LIVING WITH LEAD:

AN ENVIRONMENTAL HISTORY

OF IDAHO'S COEUR D'ALENES, 1885-2011

by

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DEDICATION

I would like to dedicate this work to my amazing, wonderful children: Nathan, Francesca, Grant, and Willa. You guys make life worthwhile.

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GLOSSARY

A Vocabulary of Coeur d'Alenes' Mine, Mill and Smelter Wastes

Location, Phase of Production	Intended Product	Byproduct, Waste
Mine	Ore	Waste Rock
Mill, Concentrator (flotation)	Concentrates	Tailings: Sands or Slimes
Smelter	Lead Bullion	SO^2, Fumes, Smoke, Slag
Electrolytic Refinery	99.99% Refined Zinc	SO^2

Terminology

Concentrates: The desired mineral that is left after impurities have been removed from mined ore as part of the milling process

Fume: An often irritating or offensive smoke, vapor, or gas produced through the smelting process

Mill: A unit operation designed to grind or break ore into smaller pieces.

Ore: A naturally occurring mineral that contains a valuable constituent, such as metal, for which it is mined and worked.

Sands: The larger waste materials (i.e., tailings) remaining after the milling of ores has been completed.

Slag: The stony waste matter separated from metals during the smelting or refining of ore.

Slimes: A product of wet crushing consisting of ore ground so fine as to pass a 200-mesh screen, waste from the milling process.

Smelter: An industrial facility whose purpose is to produce a metal from an ore.

Tailings: The waste material (i.e., sands or slimes) left over after milling or concentrating ore.

.ABSTRACT

The Coeur d'Alenes, a twenty-five by ten mile portion of the Idaho Panhandle, is home to one of the most productive mining districts in world history. Historically the globe's richest silver district and also one of the nation's biggest lead and zinc producers, the Coeur d'Alenes' legacy also includes environmental pollution on an epic scale. For decades local waters were fouled with tailings from the mining district's more than one hundred mines and mills and the air surrounding Kellogg, Idaho was laced with lead and other toxic heavy metals issuing from the Bunker Hill Company's smelter. The same industrial processes that damaged the environment and harmed human health, however, also provided economic sustenance to thousands of local residents and a string of proud, working class communities. This dissertation constitutes an effort to explore and untangle the costs and benefits of a century of mining, milling and smelting in a relatively small, isolated Western enclave.

INTRODUCTION

October 5, 1974: Idaho Governor Cecil Andrus had an announcement to make. The first-term Democrat was a conservationist who had campaigned on a pledge to block an open pit molybdenum mine in central Idaho's White Cloud Mountains. Today, he informed Idahoans, the Bunker Hill Company had agreed to drop plans to sponsor a lead-zinc trade group's study of a lead-health scare involving the Kellogg area and instead support an Idaho Department of Health and Welfare study of the situation.[1] The governor also noted that the company's agreement with the state included the provision that it would provide "appropriate medical treatment to those affected" and that Bunker Hill would take steps to reduce its lead and particulate emissions.[2] The announcement came a month after the revelation that blood lead levels in Kellogg area children had reached almost unheard of levels. Eighty percent of 370 tested children living within 2.5 miles of the smelter had blood leads that were considered to be cause for medical concern; forty-one had clinical lead poisoning.[3] Despite the magnitude of the situation, Andrus's statement must have come as something of a surprise to politically knowledgeable Idahoans. The announcement implicitly acknowledged that the governor's administration had done a pair of things that simply did not occur in Idaho politics: publicly challenging

[1] I refer to "the Bunker Hill Company" here, but the company, founded in 1887, since June 1, 1968 had been a wholly-owned subsidiary of Houston-based Gulf Resources and Chemical Company.
[2] Cassandra Tate, "Bunker Hill Agrees to Join State Study," *Lewiston Morning Tribune* October 6, 1974, 1.
[3] Ibid., The blood-lead screenings were conducted in August, 1974 by Idaho's Department of Heath and Welfare and the federal Centers for Disease Control. Although many suspected Bunker's culpability at the time, it had not yet been proven that the company's decision to run its lead smelter at full bore for months following the September, 1973 baghouse fire that wrecked the smelter's emissions filtration system was the cause of the lead-health epidemic.

Bunker Hill, the north Idaho mining and smelting giant that was the state's second largest employer, and winning the confrontation.

In the weeks since news of the Kellogg lead epidemic had broken, Bunker Hill had been unusually reticent, issuing only a press release expressing concern over the situation and asserting that retesting would show the State of Idaho-Centers for Disease Control (CDC) blood lead results to be in error. Quietly, however, the company had been active, recruiting the International Lead-Zinc Research Organization (ILZRO), an industry-financed scientific research organization, to perform a study of the lead-health situation in Kellogg. Based upon the organization's track record, Bunker Hill had every reason to believe that an ILZRO study would minimize the health implications of the lead outbreak and cast doubt upon the company's culpability in the affair.[4] Catching wind of the proposed study, however, Dr. James Bax, Andrus's head of the Idaho Health and Welfare Department, publicly blasted it, asserting that the public was unlikely to believe the results "of a study funded by lead and zinc industries."[5] A week later, Governor Andrus made his announcement.[6] The north Idaho giant had blinked.[7] The event, while it did not grab many front-page headlines, marked a significant shift. With support and

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[4] ILZRO's previous study of a similar, albeit less severe, situation involving a community nearby a smelter at El Paso, Texas contradicted the conclusions reached by public health officials. The study minimized health effects and shielded the smelter owner, ASARCO, from blame. In a study of Toronto lead smelter workers that was widely ridiculed in scientific circles, ILZRO concluded that the smelter workers' lead exposures were benign since they lived twenty years longer than non-smelter workers.

[5] *Spokane Daily Chronicle*, "Industry-Funded Research of Lead Gets Under Way," September 28, 1974, 3.

[6] Andrus is something of a legend in Idaho political history. The only governor to be elected to four terms in Idaho history, Andrus left office during his second term to serve as President Jimmy Carter's Secretary of the Interior.

[7] Memorandum Re: Gulf Resources & Chemical Corporation – ILZRO, 2 October 1974, Bunker Hill Mining Company Records, MG 413, Box 243, Folder 4455, Special Collections, University of Idaho Library (hereinafter, Bunker Hill Records). In a high-level meeting between Gulf-Bunker executives and ILZRO's top brass during the first days of October 1974, a Bunker official mentioned that the Kellogg lead epidemic had caused "great political harangue in Idaho," from which company officials evidently were feeling some heat.

sometime pressure from the federal government, Idaho, like many states in the 1970s, was becoming less deferential to large industry and more protective of the environment and human health.

The “environmental turn” of the 1960s and 1970s in the United States undoubtedly marked a watershed moment in the nation’s political and cultural history. The enactment of a raft of major federal environmental legislation and the creation of new federal agencies to protect the environment and worker health – prominent examples include the Clean Air Act, the Clean Water Act, the Environmental Protection Agency (EPA) and the Occupational Safety and Healthy Administration (OSHA) – challenged the right of industry to pollute and to expose employees to unsafe working conditions. In Idaho, as in many states, until that time pro-development attitudes and values had trumped all other concerns. In the Inland Empire, the region centered on Spokane, Washington that includes much of northern Idaho and eastern Washington, the productivity of the Coeur d’Alenes’ many mines and Bunker’s refining and smelting complex were sources of pride and the subject of numerous “Progress” features in newspapers. If the sterile Coeur d’Alene River that flowed through and below the mining district, or the dense, acrid smoke that issued from the Bunker Hill smelter, were mentioned, it was as the necessary price for progress, a classic tradeoff for the benefits of modernization that included stable employment at decent wages. Sure, Kellogg residents might have said, it doesn’t smell very good around here; our yards turn brown; the hillsides are bare; there are no fish in the river -- but smelter smoke is the smell of money and the tailings in the river mean dinner on the table for miners.

Around 1970, however, attitudes about pollution and the environment began to shift, even to some extent in the Coeur d'Alene Mining District. At 1971 air quality hearings in Kellogg, although many still spouted the traditional "price for progress" argument, others insisted that Bunker Hill needed to do a better job controlling its air emissions. Some claimed that the town's bad air was the reason it had lost population over the past decade. The Kellogg High School student president, Clint Waltham, speaking on behalf of the school's 600 students, referred to the town's air quality as a "dangerous situation" and urged "…*that economy give way to ecology* [italics added] and that pollution should be stopped…"[8] For generations in the Coeur d'Alenes, the state of the environment perforce had given way to economic considerations. The student body president was suggesting a new and radically different approach. While only a few years earlier, Waltham's views likely would have been easily dismissed in Kellogg and he regarded as something of an oddity, by the early 1970s the student body president's ecological ideas had gained enough intellectual currency and statutory backing to be taken seriously.[9] As it turned out, Waltham's statement was a harbinger. For the rest of the 1970s, the Coeur d'Alenes' mining and smelting concerns, long-accustomed to primacy in the region, found themselves increasingly on the defensive as they battled some environmental regulations and spent large amounts of capital to comply with others.

This transition conforms to sociologist Ulrich Beck's definition of two discrete stages of modernity: *classical industrial society* and *advanced modernity*. Under the

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[8]"Public Hearing," March 3, 1971, 26, Bunker Hill Records, MG 413, Box 242, Folder 4547.
[9] Nonetheless, the Kellogg City Council unanimously supported Gulf-Bunker's request for an extension of time to comply with Idaho's sulphur dioxide (SO_2) standards.

former, “the ‘logic’ of wealth production dominates the ‘logic’ of risk production, in the risk society [i.e., advanced modernity] the logic is reversed…”[10] Whereas, per Beck, a society facing scarcity presumably would be interested simply in modernizing through industrialization, and in classical industrial society “everyone is engaged in the struggle for *his* job (income, family, little house, automobile, hobbies, vacation wishes, etc. If those are lost, then you are in a tight spot in any case – pollution or no),” in *advanced modernity*, “Modernization *within* the paths of industrial society is being replaced by a modernization *of the principles* of industrial society…the gain in power from techno-economic “progress” is being overshadowed by the production of risks.[11] For Beck, the concern with, calculation of, and efforts to minimize risk are the hallmarks of the advanced modernity that has been achieved in the United States and western Europe over the past few decades. (Though the concept of modernity is admittedly somewhat amorphous, I nonetheless find it useful and employ it thematically throughout this work. With “modernity,” I refer to the social, cultural and economic tendencies and processes of the world that has been emerging globally since the advent of the industrial capitalism and the Enlightenment in the mid-18th century). In the Coeur d’Alenes, partially due to local concerns such as those voiced by Clint Waltham but more so to new federal legislation and the increased scrutiny of federal and state officials, the 1970s marked the watershed decade during which pollution and environmental risks came to outweigh traditional concerns with local prosperity and technological development.[12]

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[10] Ulrich Beck, *Risk Society: Towards a New Modernity* (London: Sage Publications, 1992), 13.
[11] Ibid., 10, 13, 49.
[12] A note on terminology: although the northern Idaho locale that is the subject of this work is today more commonly referred to as “The Silver Valley” than as “the Coeur d’Alenes,” in this work I employ the latter

The themes of the risk and tradeoffs, so central to the modern predicament, run through *Living with Lead*. At the work's core lie issues of place, power, and the environment. Sub-themes that have proven central to this exploration include economics, technology, local culture, community identity, industrial and post-industrial economies, ecology, politics, science, definitions of health, and regulatory law. This is essentially the history of a place -- principally the City of Kellogg and the Coeur d'Alenes region of northern Idaho and more peripherally the entire Coeur d'Alene River basin to Spokane.[13] A pressing interest in questions of environmental change in the Coeur d'Alenes, concerning both human and non-human nature, and in the complex causes of that change, is one of the principal drivers of this work.[14] To understand the profound changes in the land that occurred here over the past 125 years, of course, requires some study of the social and cultural forces that have been at work. As Mathew Klingle, author of an environmental history of Seattle, has written, "…place making is neither disinterested nor benign…place is never incidental."[15] The heavily industrialized landscape of the Coeur d'Alenes -- the product of over a century of mining, sixty-five years of smelting, and a quarter century of environmental remediation as a federal Superfund site – is certainly neither benign nor accidental. Here, a history of economic decisions made by capitalist

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term more commonly than the former. I make this choice primarily because the Coeur d'Alenes is what the region was called for much of its history. The Silver Valley is a relatively recent appellation, dating to the early 1970s. In keeping with contemporaneous usage, I use the "The Silver Valley" more commonly in discussing the last few decades in the area's history and "the Coeur d'Alenes" when dealing with earlier eras.

[13] The Coeur d'Alene Basin includes the North and South Forks of the Coeur d'Alene River, their tributaries, the Coeur d'Alene River, Lake Coeur d'Alene, and the Spokane River.

[14] I include both human and non-human nature in my definition of environment. Human health, therefore, is very much an environmental concern of this work.

[15] Matthew Klingle, *Emerald City: An Environmental History of Seattle* (New Haven: Yale University Press, 2007), 4.

mining companies, a history of technological decisions regarding which processes and machinery to use in smelting, milling and mining ores, and a history of, as writer Anne Whiston Spirn puts it “which groups had the power to impose certain ideas and values before weighing the consequences,”[16] are inscribed upon the landscape, and on the bodies of many who lived and worked there, who have left, and who have chosen to remain.

The issues of power and the environment are deeply intertwined in this work. In the early 1930s a group of Coeur d’Alene City residents challenged the power of upstream mining companies to pollute the lower Coeur d’Alene River and Lake Coeur d’Alene. Though influential enough to get the Idaho legislature to sponsor a study of the conditions of the Coeur d’Alene River watershed that resulted in the installation of some moderately effective pollution control technology, the group ultimately lacked the influence to achieve their goal. By the late 1960s, however, due to shifts in attitudes and a significantly enhanced federal Clean Water Act, all of the upstream mining companies were using the type of tailings impoundment system the Coeur d’Alene group had advocated thirty-five years earlier. Times had changed and power had shifted. Another example concerns Bunker Hill lead smelter workers. From the time of the smelter’s completion in 1917, working there constituted an uncomfortable, demanding, and, due to the toxic nature of lead, potentially unhealthy, job. Smelter workers, particularly from the time they gained true union representation in 1942, demanded safer and healthier working conditions. Until the 1970s, however, when new federal law and a federal agency, OSHA, tilted the balance of power in their favor, the smelter workers garnered only minimal improvements. With OSHA backing their demands, however, smelter

[16] Klingle, *Emerald City*, 11.

workers gained significant improvements in safety and health conditions at the plant. As evidenced in this work, although one group may wield power for a long time, ultimately power is not static. It is more akin to mercury than to gravity in its tendency to flow from one group to another. Though power elites almost invariably ran the show in the Coeur d'Alenes, they had different constituents, representing different interests, at different times.

This is a history of place, and also an environmental history. It seeks not only to trace significant elements of the ecology of human and non-human nature in the Coeur d'Alenes, but also to answer the deeper question, "How did it get this way?" Answering that question of course involves untangling a number of different histories: mining and milling economics and technologies; the attitudes and ideas of those running the District's major mining operations; labor-management relations; the tactics and ideas of the District's labor unions; power relations; and the ideology and policies attitudes of local, state, and federal officials over time, to name a few. Gaining an understanding of how the human and non-human environment of the Coeur d'Alenes "got that way" hopefully will provide some insight into the forces that have shaped the landscapes of other heavily polluted, and subsequently "reclaimed," places.

A substance, lead, is central to this work. The heavy, ductile, versatile, highly toxic mineral plays a key role in every chapter, and one chapter is devoted entirely to it. Although the place that this work focuses on dubbed itself The Silver Valley in the 1980s, lead's role in the area's history has been at least as significant as that of its more charismatic cousin. The importance of this substance to the work – it has been both the economic lifeblood and the toxin most responsible for devastating the Coeur d'Alenes' environment – is difficult to exaggerate. This raises the question of the agency of non-human, and even non-sensate, actors. By traditional definition, such actors cannot be said to possess agency because they lack intentionality, and thus cannot willfully affect situations. I would argue, however, along with such environmental historians as Linda Nash and Gregg Mitman, that while they may not have full agency, non-human actors such as lead can play important roles in history. Once aerosolized by a smelter and dispersed across a landscape, for instance, lead ends up in house dust and yard dirt that small children in the normal course of play readily ingest. Once inside the child's body, lead goes on a path of cellular destruction that can lead to severe health problems, and even death. As Nash writes, "As landscapes can be investigated to uncover the effects of certain human actions, human bodies – their symptoms and diseases – become sites for investigating the quality and effects of certain landscapes. Subjects blur into objects, and historical agency becomes distributed among a multitude of entities: humans, insects, microbes, trees, groundwater, and chemicals."[17]

Human bodies, and their susceptibility to environmental insult, is another focus of this work. During the modernist turn in western medicine that lasted from the late 19th century until the 1950s and 1960s, bodies were seen as largely impervious to their environments. Concerned with the pathogens acting inside bodies, the medical profession became largely uninterested in the ability of environments to affect health. Post-World War II worries about radioactive fallout, pesticides and smog, however, forced medical

[17] Linda Nash, *Inescapable Ecologies: A History of Environment, Disease, and Knowledge* (Berkeley, University of California Press, 2007), 8.

professionals again to consider the environmental sources of disease. The seminal work in this regard, of course, is Rachel Carson's *Silent Spring*.[18] Published in 1962, the book introduced many to the idea of environmental threat from pesticides such as DDT. The bodies of everyday residents of the Coeur d'Alenes, and those of Bunker Hill smelter and zinc refinery workers, are focal points of my work. Children's bodies, because of their heightened susceptibility to lead poisoning, receive particular attention. It was children's bodies, or to be more precise their blood-lead readings, that in September 1974 alerted the world to the fact that the Kellogg area had both a severe environmental lead problem and a severe lead health issue on its hands. Until that time, environmental regulators and Bunker Hill had been focused almost exclusively on the community's SO_2 problem. This instance offers a textbook example of the inextricable linkage between human bodies and local environments. In 1974, children's bodies served as the environmental marker that made first public health officials, and later large segments of the public, aware that the Kellogg area had become problematically unhealthy.

The crucial concept of risk, and the even larger notion of tradeoffs, both fundamental aspects of modernity, are critical to this work.[19] Ulrich Beck maintains that the systems of capitalism and industrialization that undergird modernity inherently

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[18] E. Jerry Jessee, "An Ecology of Nuclear Weapons Testing: Bombs, Bodies and Environment during the Atmospheric Nuclear Weapons Testing Period in the United States, 1942-1965" (PhD. dissertation, Montana State University – Bozeman, 2012).

[19] Timothy J. LeCain, *Mass Destruction: The Men and Giant Mines That Wired America and Scarred the Planet* (New Brunswick, NJ: Rutgers University Press, 2009). The notion that the base materials that form essential elements in modern consumer products (e.g., copper in car engines), and the often-environmentally destructive practices that produce them for the market, are not well-understood by the consuming public, is central to LeCain's work. Since consumers are generally unaware of the connection between, for instance, open pit copper mining and their computers or automobiles, they are unlikely to see the inherent environmental tradeoffs involved in their purchases, and, more generally, in much of modern consumer society. My own work owes a not insubstantial debt to LeCain's scholarship for inspiration, approach and theoretical grounding.

necessitate heightened levels of social and individual risk – from pesticide-laden food to nuclear radiation -- and environmental damage. These negative outcomes, however, are not the result of modernization's failures but of its successes. Beck writes that, "…modern society is ailing not from its defects but its triumphs."[20] By this he means that heightened risks and environmental harms are by-products of the very successes of industrialism and capitalism at increasing material abundance and technological sophistication that have been celebrated in catch-phrases such as "the American Way of Life." The tradeoffs of modernization are numerous, but among them must be included the loss of the security of tradition in a world where the only constant is its dizzying pace of change, the vastly increased power of the state and the private corporation in relation to the individual, environmental destruction, individual alienation and anomie, and heightened risk.

As Joseph Stalin was fond of saying, "You can't make an omelette without breaking eggs."[21] In discussing what he calls "the tragedy of development," philosopher Marshall Berman describes the inherent duality of the modern project, the impossibility of realizing the new, modern world "with clean hands."[22] While lauding "the luminous…possibilities that pervade modern life," and seconding Karl Marx's perspective that in the dynamics of capitalist development lie, "a new image of the good life…a process of continual, restless, open-ended, unbounded growth," Berman also acknowledges that modernism's, "insatiable development has left spectacular devastation

[20] Ulrich Beck, *World at Risk*, (Cambridge, UK., Polity Press, 2009), 22.
[21] Berman, *All That Is Solid Melts into Air*, 294. New York City's master developer Robert Moses, although a fervid anti-communist, also liked to employ this phrase.
[22] Berman, *All That Is Solid Melts into Air*, 68.

in its wake."[23] One need only wander the devastated landscape of the Bunker Hill Company's old works, at the Bunker Hill Superfund Site, to experience the truth of Berman's statement.

At the 1971 Idaho Air Pollution Commission hearing in Kellogg, a commission member asked Clint Waltham just how much he would be willing to give up for a clean environment, "Does this mean you would be willing to have the plants shut down? And for what period of time? And what about the loss to your parents and so on?"[24] The student body president replied that although he did not want to see the lead and zinc plants shuttered, he believed that "the pollution should be stopped."[25] Although Waltham did not specify how the air pollution would be curtailed without closing the plants, it seems reasonable to infer from his answer that he believed there to be a relatively painless technological solution to the SO_2 problem. Perhaps the installation of some good scrubbers would do the job. In the all-too-real world of American capitalism, however, a number of hard questions would need to be answered before the genie of "effective pollution control technology" could work its magic. Presuming that such technology existed and was for sale, how expensive was it to purchase and maintain? Assuming further that Gulf-Bunker was willing to buy the system, would it pass the costs along to the customer or swallow them? Passing along the costs could make the company less competitive, while swallowing them would erode profits. While a healthy, profitable company presumably could handle a certain amount of expenditure on items such as air pollution controls that provided no direct or indirect financial return, it could prove

[23] Berman, *All That Is Solid Melts into Air*, 78, 98, 102.
[24] "Public Hearing," March 3, 1971, 26, Bunker Hill Records, MG 413, Box 242, Folder 4547.
[25] Ibid.

damaging to a more marginal company to do the same. There are levels of cost, however, that would seriously wound or bring down even a successful company.

This is all to say simply that environmental decisions are not made in a vacuum. In almost any conceivable case, there is an economic context for pollution control and other significant environmental decisions. If these decisions involve significant expenditures by a for-profit corporation, as do many in this work, questions of how they will impact a company's profits and its future competitiveness almost surely will be factors in the ultimate decision. A firm might, for example, decide that it can afford a new pollution control system, but only if it lays off 200 workers or cuts wages by ten percent. At that cost, the benefits of a cleaner environment might no longer look so rosy to the workers' union or the community-at-large. While many may want a robust economy, all the benefits of a modern consumer culture, and a pristine environment, no magic wand exists to bring all three to life simultaneously in a given landscape. By the same token, it should be remembered that not all for-profit corporations, even those in "dirty industries" such as oil refining or lead smelting, have treated the environment equally. Some companies have managed to balance investments in superior pollution control technologies with bottom line issues, while others have made the decision to forego such technology purchases in order to maintain higher profit margins. Unfortunately for the environment of the Coeur d'Alenes, the most significant corporate actor in the region, the Bunker Hill Company, as a rule decided to place the bottom line ahead of investments in effective pollution control technology.

This work also deals with issues of community, focusing particularly on the small mining and smelting city of Kellogg. Because Kellogg was so beholden to its longtime chief employer and benefactor, Bunker Hill, an exploration of community in Kellogg necessarily is also an exploration of the relationship between the town and the company. With the abrupt closure of Bunker's operations in the early 1980s, however, Kellogg was forced to find a new economic rationale and identity. I examine the community's fraught transition from a quintessentially "Old West" extractive industry town to a "New West" recreation community in this work's final chapter.

Chapter One, "The Useful Metal," addresses humankind's long and problematic history with lead, tracing both the metal's deep imbrication in modern industrial civilization and the social costs the toxic substance has exacted. The often-contentious evolution of the 19th and 20th century science of lead health, and its pivotal role in shaping attitudes toward the gray metal, forms an integral segment of the chapter. "Uncle Bunker's Town," the second chapter, introduces and analyzes a place, a community, and a corporation that comprise central foci of this work. I flesh out the traditional economic structure of the Coeur d'Alenes and the role played in that economy by the Bunker Hill Company. The type, extent, and reasons behind the paternalism exercised by the company toward Kellogg is examined and contextualized as are issues surrounding Kellogg's status as a "company town." Chapter Three, "Lead Creek," describes the ecological effects on the Coeur d'Alene watershed of the intense mining and milling activity that has taken place along the upper South Fork of the Coeur d'Alene River and its tributaries since the early 1880s. The chapter traces the effects of different types of milling technology on the area's riverine environment, and highlights the periodic bursts of complaint and contention from downstream farmers and other residents over the tailings flushed their way from the Coeur d'Alene Mining District. "Lead Creek" concludes with a discussion and assessment of the efforts made since 1968 to restore the ecological health of the watershed.

The fourth chapter, "Foul Humours I," describes the construction of the Bunker Hill lead smelter and zinc refinery in the first decades of the 20th century and the company's perennial concerns with complaints over its SO_2-caused "smoke damage" to trees and other vegetation. It sketches Bunker's efforts to neutralize such threats through deals with the U.S. Forest Service (USFS) and the purchase of smoke easements from area landowners. The chapter traces the USFS's increasing protest in the 1940s and early 1950s over emissions that were destroying trees on agency-managed lands, and the company's construction of a sulphuric acid plant in response. "Foul Humours I" concludes with a discussion of the company's novel 1970s revegetation efforts and its struggles to meet the heightened burdens of federal and state SO_2 regulations – Bunker's search to make the local airshed "legible" and its ultimate decision to build the "tall stacks" as an expensive technological fix. Chapter Five, "Foul Humours II," focuses primarily upon lead-health issues in the Kellogg area. The chapter begins with a description of what likely has been the most dramatic episode in the environmental history of the Coeur d'Alenes, the 1973-'74 lead-health epidemic that was precipitated by the baghouse fire at the Bunker Hill smelter. It goes on to examine Gulf-Bunker's role in the situation. The chapter details a scientific study, the Shoshone Lead-Health Project, that was begun in response to the crisis, and a major lawsuit, the Yoss case, that involved nine children who lived near the smelter stack and claimed severe harm from the lead emissions of the period. The issue of how human, and particularly children's, health has been affected by significant emissions of aerosolized lead, how this threat has been understood, and how it has been dealt with, lie at the heart of this chapter. The chapter concludes with a discussion of the work done in the Superfund era (1983 – present) to deal with the threat to children's health posed by lead.

"On Lead's Front Lines," Chapter 6, addresses the lead-health situation that has faced workers in Bunker's lead and zinc plants. In the early days of the smelter, Bunker Hill managers understood that lead poisoning was a danger for their workers. They responded by encouraging workers to practice good hygiene, while simultaneously shifting as much of the burden for health protection as they could to the workers themselves. The chapter tracks the company's evidently well-meaning, if ineffectual, attempts to ameliorate workers' lead problems in the 1920s and 1930s through the employment of novel technologies such as the Clague Electrolytic Treatment and a Solarium.[26] It traces the trajectory of union complaint over the lead-health situation at the smelter, and details the rapid increase in worker protections at the lead and zinc plants, despite some company resistance, following the 1971 creation of OSHA. The chapter concludes with a discussion of medical studies that have shown permanent health damage to smelter works, and early death, from the heavily "leaded" environment that comprised the interior of the smelter. Chapter Seven, "A Brave New World," examines Kellogg's

[26] The electrolytic treatment was supposed to help leaded workers by passing a weak electric current through their bodies, while the Solarium provided artificial sunlight sessions in the belief that they would be beneficial in numerous ways including the treatment of lead intoxication.

post-industrial history in the wake of Bunker Hill's early 1982 closure. The chapter begins with the Kellogg community's frenzied attempts to secure a buyer for the 94-year-old Bunker Hill Company. It proceeds to track the community's challenging efforts to morph from a mining and smelting company town into a self-reliant, Bavarian-themed ski village. "A Brave New World" analyzes not only the difficulties and identity conflicts inherent in such a transition, but also the very different economic realities confronted by a mining town faces versus a tourist town. The chapter also traces the community's often contentious relationship with the EPA, which, since 1983, has emerged as a major power and economic driver in the Coeur d'Alenes.

I believe it is fair to ask the question, "Why should anyone care about the history of a small, polluted mining and smelting community and region in northern Idaho?" My answer is that there is actually much of value to learn from a well-executed study of such a place. In many ways, the story of Kellogg and the Coeur d'Alenes is a microcosm of the modern history of the nation, and a multitude of its communities. This is a place where, from the time of the discovery of gold in 1883, the relentless forces of modern industrial society have operated with a particular freneticism and destructive capacity. Home to one of the most productive mining districts in world history and to the Bunker Hill Company, once one of the nation's largest integrated mining and smelting operations, for 125 years the Coeur d'Alenes have produced lead, zinc, and silver that have played a significant role in powering national and global development. Over its history, the area has produced over twenty-six billion dollars worth of minerals.[27] As with many industrial activities, however, production has come at a significant cost. Dead

[27] From 1885-1997, in 1997 dollars.

swans, leaded children, a sterile river, toxic backyard dirt and house dust, denuded hillsides – all have been part of this hard reckoning. Lead from the Coeur d'Alenes ended up in television sets, automobiles, gasoline, paint, computers, x-ray shields, auto batteries, ships, and other products purchased by millions wolrdwide. Although the spreading of lead around the globe via consumer goods undeniably had significant negative health consequences, doing so also helped to bring affordable products to global consumers and contributed to the vaunted "American standard of living." People enjoying their cars and televisions in Albuquerque and Dubuque, however, should understand that they did not pay the full freight of these consumer items. This is because pollution costs (a type of social cost) associated with mining, milling and smelting the lead in those products was, in the jargon of economists, externalized. To name but a few examples, the social costs of leaded soils and people, dead horses, and poisoned rivers in the Coeur d'Alenes was passed on to the environment and human bodies to absorb, perhaps someday to be cleaned up, or treated, at the expense of an unlucky corporation or the American taxpayer.

In its 125 years the Kellogg area has been through the trifecta of American modernity: intensive industrial development and environmental despoliation, large-scale environmental cleanup, and redevelopment as a recreational community. Once a strong union town filled with home-owning hard hats and busy merchants, Kellogg's shrunken population now struggles to sell lattes and condos to out-of-state visitors. The smelter smoke is gone and the South Fork no longer runs the color of a lead milkshake. Gone too are most of the $70,000-a-year jobs awaiting newly minted high school diplomas.[28] In its historic trajectory and current travails, Kellogg and the Coeur d'Alenes echoes the fate of many communities, both inside and outside the United States. It is hoped that this work will shed light both on that shared history and assist in what social commentator and historian Mike Davis has referred to as "excavating the future."

[28] A relative handful of high-paying mining jobs still exist in the District. Of course, there are no longer any smelter or zinc plant positions.

THE USEFUL METAL

January, 1942. The United States is scrambling for war materiel. Though the United States ran the world's largest industrial economy in 1939, its Army, whose artillery still used horses to pull field guns, ranked only seventeenth in the world in size.[29] As the threat of the war become more evident to Americans, the nation increased its war preparedness efforts, but the country still lagged far behind Germany and Japan. A fundamental challenge lay in the task of converting its civilian production to meet the military's wartime needs. The government's efforts between 1940 and early 1942 had been notable more for their failures than their successes.

As early U.S. military efforts in the Pacific floundered on Wake Island and in the Philippines, critics blamed red tape and bottlenecks for failures to provide fighting men with adequate supplies.[30] Two programs deemed essential to military preparedness in August, 1940 – the production of large quantities of synthetic rubber and the stockpiling of 100-octane gasoline for aircraft – had achieved negligible results.[31] Seeking to turn the tide, on January 6, 1942 President Franklin D. Roosevelt set ambitious goals for the production of airplanes, tanks, guns and ships. Later that month, Roosevelt replaced the Office of Production Management (OPM) and the Supply Priorities and Allocations Board (SPAB) with the War Production Board (WPB). Stressing the urgency of the

[29] The Public Broadcasting System (PBS), *The War*, http://www.pbs.org/thewar/at_home_war_production.htm (accessed May 3, 2011), United States Army War College, Strategic Studies Institute, "General George C. Marshall: Strategic Leadership and the Challenges of Reconstituting the Army, 1939-41," http://www.strategicstudiesinstitute.army.mil/pubs/summary.cfm?q=358 (accessed October 24, 2011).
[30] "Administration: The Miserable Truth," *Time*, January 10, 1942.
[31] Ibid.

situation during a Fireside Chat in February, 1942, the President said, "Never before have we had so little time in which to do so much."[32]

Impelled by the war situation and directed by the WPB, American companies responded to the challenges of wartime production. The automobile industry shifted production from cars to war equipment: General Motors made airplane engines, trucks, tanks and guns; Chrysler made fuselages; at its Willow Run plant Ford churned out B-24 Liberator long-range bombers.[33] Factories that made silk ribbons now produced parachutes, typewriter companies converted to machine guns, undergarment manufacturers sewed mosquito netting, and a roller coaster manufacturer converted to the production of bomber repair platforms.[34] A great turnaround was effected: military aircraft production, which totaled 6,000 in 1940, jumped to 85,000 in 1943; shipyards turned out tonnage so fast that by the autumn of 1943 all Allied shipping sunk since 1939 had been replaced.[35]

A major aspect of the WPB's job consisted of curtailing the production of non-essential consumer goods such as automobiles, refrigerators and nylons and directing the raw materials that would have gone toward such products into the manufacture of defense materiel. While a number of raw materials were critical to the war effort, none were of greater importance than a set of non-ferrous metals that included molybdenum,

[32] "Address of the President Delivered by Radio from the White House," http://www.mhric.org/fdr/chat20.html, (accessed May 3, 2011). The "fireside chat" was delivered on the 210th anniversary of George Washington's birthday, February 23, 1942.
[33] *The War*, http://www.pbs.org/thewar/at_home_war_production.htm (accessed May 3, 2011).
[34] The Oklahoma Historical Society's Encyclopedia of Oklahoma History and Culture, "War Production Board," http://digital.library.okstate.edu/encyclopedia/entries/W/WA021.html (accessed May 3, 2011).
[35] *The War*, http://www.pbs.org/thewar/at_home_war_production.htm, (accessed May 3, 2011). "War Production Board," http://digital.library.okstate.edu/encyclopedia/entries/W/WA021.html (accessed May 3, 2011).

magnesium, cadmium, aluminum, copper, manganese, zinc and lead. In fact, the WPB went so far as to dub mining the "Number One War Industry," stating that "No other industry rivals mining in the essential character of its products…Planes, tanks, guns and ships and all the implements of modern, mechanized warfare call for metals in ever-increasing quantities."[36] Lead, the heavy, dull gray metal that is the subject of this chapter, contributed to the U.S. war effort in myriad ways.

This chapter deals with the dual nature of lead. In its long relationship with the versatile, highly useful mineral, humankind has both been blessed and cursed. A fundamental raw ingredient of industrial civilization, lead is also a highly toxic debilitator and killer. The dense, ductile metal also lies at the heart of the story told in this larger work, a story that deals with a place -- north Idaho's Coeur d'Alenes region -- that found the source of both its livelihood and its environmental despoliation in galena, the silvery ore that in pure form contains lead, but in the ground also usually has silver, sometimes in significant quantities. Although examples of tradeoffs abound in the history of civilization's relationship with modern technology and industrial capitalism, the particular tradeoffs involved in its relationship with lead have been especially steep. This chapter explores the long, involved and problematic relationship of civilization and "the useful metal," as lead was dubbed by industry representatives. It sketches the growth in importance of lead to American industrial development and consumer society during the 19th and 20th centuries, along with the countervailing rise of scientific evidence of the metal's harmful properties. The chapter chronicles the hard-fought, thirty-year battle in

[36] The *Engineering and Mining Journal (E&MJ)*, April, 1942, 43. The quotation is from an article by Wilbur A. Nelson, Administrator of the Mining Branch, Materials Division, of the War Production Board.

the U.S. between lead producers and a cadre of scientists and community activists over the policy framework that would govern the metal. As the ground upon which much of this "lead war" was fought, the role of science in determining its outcome is necessarily a major focus, as is the underlying contest between opposing camps of scientists that eventually leads to a major paradigm shift in the science of lead health. Finally, the chapter discusses how in outsourcing its industrial pollution problems to developing nations, the global north can make time twist back on itself.[37]

The Useful Metal and "the Good War"

Because of its importance, lead was identified as an essential war metal and placed under numerous government controls. In April, 1941, eight months before Pearl Harbor, the Office of Price Administration (OPA) froze the metal's price at 5.85 cents a pound.[38] In October, with Order M-38, the Office of Production Management officially placed lead under government control.[39] This allowed the government to claim as much

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[37] This chapter is meant to introduce the reader to the subject of the Janus-faced metal, lead, that lies at the heart of my story. Although humans have long been aware of the metal's toxic properties, and bear responsibility for knowingly harming others or the environment through its use, I am willing to grant the substance a degree of agency. Certainly without any forethought on its own behalf, the metal has greatly affected the world, both for good and for ill. This chapter, of necessity, relies almost entirely upon secondary sources. Because much of the chapter deals with battles within the field of science over lead-health questions, it owes a debt also to a pair of seminal works in the history of science that influenced my understanding of the "lead wars" that lie at the chapter's center. Those works are Thomas Kuhn's *The Structure of Scientific Revolutions* (1962) and Bruno Latour's *Science in Action: How to Follow Scientists and Engineers through Society* (1987). Kuhn's history details the difficult birth pangs that *paradigm shifts* (pp. 66-76), such as the shift from Ptolomeic to Copernican astronomy, invariably must go through as one scientific worldview gives way to another. There are obvious parallels in this chapter regarding the move from one view of lead-health to a radically different one. Latour's book shows how engineers and scientists actually work, and particularly how they use what he calls *trials of strength* to win professional arguments (see pp. 74-79). These tests of strength have more to do with the ability to persuade, often through the use of powerful tools of representation such as laboratories, than with the intrinsic rightness of scientific concepts. Latour's work is highly applicable to the "lead wars" described in this chapter.

[38] *E&MJ*, February, 1942, 45.

[39] Ibid.

lead as it needed for military purposes. Following the attack at Pearl Harbor, the WPB granted the lead mining and smelting industries preferential status that placed them on parity with the munitions industry, granting them respectively P-56 and P-73 preference ratings. These ratings allowed lead mines and smelters to move to the head of the line for the receipt of essential repair parts and new machinery and equipment.[40] In addition, the WPB established production quotas for the nation's larger lead mines.[41]

Lead's military applications during World War II are too numerous to mention, but it is worth noting that significant quantities of the useful metal found their way into storage batteries, ammunition, bearing metals, solders, gasoline, and paints.[42] Due to the scarcity of tin and other important war metals, lead found additional uses as a substitute. Instead of using tin plate as a coating material, for example, the military turned to lead-based terneplate, while lead foil filled in for aluminum foil. The metal also proved handy as protective coating for iron and steel and was used in the production of pipes and sheet metal.[43]

As might be expected, U.S. consumption of the useful metal ramped up considerably during the war, nearly doubling between 1938 and 1941.[44] During World War II, U.S. lead consumption remained steady, never dropping below a million tons in a

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[40] *E&MJ*, April, 1942, 43. Other essential war metals of course also received this sort of preferential treatment. Production of metals such as gold and silver that were not deemed important to the war effort, however, was discouraged by the WPB.
[41] *E&MJ*, May, 1942, 41. This was an aspect of WPB's establishment of production quotas for 1,000 of the nation's largest mines of important war metals.
[42] *E&MJ*, February, 1942, 45.
[43] *E&MJ*, February, 1944, 79. Red lead, a substance primarily prepared through the calcinations of lead oxide at high temperature, is virtually insoluble in water and alcohol. During the war, it was used extensively to coat Navy ships and submarines, along with many other of the military's metallic surfaces.
[44] The Lead Industries Association, *Lead in Modern Industry* (New York City: Lord Baltimore Press, 1951), 12. In 1938, the U.S. consumed 546,000 tons of lead, while in 1941 consumption rose to 1,049,000 tons.

year, and rising as high as 1,100,000 tons in 1943.[45] Because of the nature of the war emergency, certain uses of lead declined while others were heightened. White lead, a complex chemical compound containing both a carbonate and a hydroxide portion that had been manufactured for centuries via the Dutch Process, was used primarily in the manufacture of paints. The substance experienced a significant decline, as its share of the domestic lead market decreased from thirteen percent in 1938 to slightly over four percent in 1945.[46] This decline was probably attributable to wartime stoppages on the use of lead paints on residential and commercial structures. The use of lead in storage batteries dropped sharply during the first years of the conflict, but then rebounded to something resembling pre-war levels as military replaced civilian demand. [47] Dramatic increases in lead use, however, were seen in electric cable covering during the first years of the war and in tetraethyl lead from 1943 to 1945.[48]

Lead found its way into nearly every metallic product produced for the U.S. military during the war, but perhaps its most important strategic use was as a gasoline additive. Tetraethyl lead (TEL), developed as an "anti-knock" gasoline additive for General Motors in 1921, played an important role in the Allied campaign. The compound, licensed by the Ethyl Corporation (a creature of General Motors and the Standard Oil Company) and produced by DuPont, effectively combated the tendency of engine gasoline to explode prematurely and thus cause engines to "knock" or "ping." The

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[45] The Lead Industries Association, *Lead in Modern Industry*, 12.
[46] Ibid.
[47] Ibid. In 1938, the percentage of domestic lead consumption going to storage batteries stood at 30.59 but dropped to 21.56% in 1942. It rebounded to 28.17% by 1944 however.
[48] Ibid. The percentage of domestic lead consumption devoted to cable covering (e.g., electric and phone lines) went from 10.99 in 1938 to 16.50 in 1942 and for tetraethyl lead, a gasoline additive used to increase the power and gas mileage of automobiles and airplanes, the numbers were 4.50% in 1939 and 7.82% in 1944..

development of TEL permitted the development of more powerful, high compression automobile engines and generally enhanced the power and fuel efficiency of gasoline-powered vehicles.[49] Since the U.S., along with every other participant in World War II, sought to provide the maximum possible amount of engine power and fuel efficiency to its military cars, jeeps, trucks, tanks, planes and ships, TEL assumed a high degree of strategic importance during the conflict.[50] Because of the ready market provided by Uncle Sam for TEL, during the war Ethyl Corporation employees liked to tease company Sales Director, Julian Frey, about the ease of his job.[51] The use of tetraethyl lead allowed the creation of wartime aviation gasolines with octane ratings from 100 to 145.[52] While the provision of TEL to the entire U.S. fleet of mechanized vehicles undoubtedly provided significant benefit in terms of overall fuel savings and speed-of-transport, the fuel additive's benefits likely were most dramatically felt by American fighter pilots, for whom questions of engine power and performance could be matters of life and death.

In 1945 a *LIFE* magazine advertisement depicted barrels of TEL-boosted high octane gasoline parachuting down to waiting U.S. troops on a South Pacific island. The Ethyl Corporation tried to capitalize on its product's patriotic association to sell TEL to car-driving consumers in the imminent post-war era. The ad, captioned "The Best

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[49] David Rosner and Gerald Markowitz, *Dying for Work: Workers' Safety and Health in Twentieth-Century America* (Bloomington, IN: Indiana University Press, 1987), 122.
[50] The U.S. government also supplied Ethyl TEL to the Allies. Ethyl and the Standard Oil Corporation of New Jersey appeared somewhat less patriotic, however, when it was revealed that in 1936 they had given significant quantities of the compound to German industrial giant I.G. Farben Corporation and aided Farben in building a TEL factory in Germany. The war-minded Nazi leadership, evidently, desperately wanted guaranteed, secure supplies of the gasoline additive. These they achieved via I.G. Farben and its American commercial partners. The undoubted aid that Ethyl-Standard's TEL gave to the Allied war effort was undercut by the benefits in TEL-production the companies granted Nazi Germany.
[51] Joseph C. Robert, *Ethyl: History of the Corporation and the People Who Made It* (Charlottesville, VA: University of Virginia Press, 1984), 168.
[52] Octane ratings refer to the resistance of gasoline to engine knock. The higher the octane rating, the more knock-resistant the gasoline. Higher compression engines tend to require higher octane gasoline.

Gasoline Is Still Fighting," boasts that "the millions of gallons of high-octane gasoline [that are presently] going to our fighting men…is better gasoline than anything ever offered to car owners in pre-war days…it represents the best part of the American petroleum industry's production – plus most of the Ethyl fluid being manufactured." The ad also predicted that "some fine day…it will be your turn to get all the Ethyl you want and better Ethyl than ever before." The advertisement, one of a series, was meant to associate Ethyl fluid with significant, robust contributions to the U.S. war effort.[53]

Lead's significance to the U.S. war effort in the Second World War, however, was but an amplification of the blue-gray metal's role in industrial civilization in the mid-twentieth century. While a six-year-long total war undoubtedly maximized global consumption of the useful metal, that consumption had already been on a sharp, upward path ever since the mid-19th century. Between 1801 and 1826, when the building of canals commenced in earnest in the U.S., domestic lead production averaged between 1,000 and 2,000 tons a year.[54] The ramp-up of industrial development in the wake of the Civil War, however, ushered in a new era for lead. In a decade, production of the metal more than trebled, going from 42,540 tons in 1873 to 132,890 in 1882.[55] For much of the 19th century, lead was used primarily for paints and other protective coatings, water lines

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[53] Robert, *Ethyl*, 168. Perhaps overstating the case, Charles Kettering, a General Motors executive who was one of Ethyl Corporation's founders, quoted the British as saying that "if it had not have been for tetraethyl lead they would have lost the Battle of Britain." Ethyl officials and at least one military eyewitness also claim that a German submarine attack on July 25, 1943, targeted Ethyl's bromine extraction facility at Kure Beach, North Carolina (bromine was extracted from seawater at the facility – the bromine was added to TEL to provide engine-scrubbing necessary to keep the TEL from eventually destroying engines).

[54] *E&MJ*, August, 1951, 63. It can be safely assumed that all, or nearly, all of the lead produced in the 19th Century was used immediately. In the mid-20th Century, the U.S. Government began stockpiling reserves of strategic metals such as lead, so that some of the lead produced domestically may not have been used for years.

[55] *E&MJ*, January 7, 1888, 5.

and pipes, ammunition, ceramic glazes, pewter, leaded glass and crystal, burial vault liners.[56] The advent of the electrical and automobile age, however, in the late 19th and early 20th centuries created new uses for the durable metal that dramatically increased its consumption and production. Lead was needed to cover electrical and telephone cable, as a bearing metal, for caulking and solders, and as type metal.[57] Following World War I, during which lead consumption spiked, the rocketing expansion of sales of automobiles with starting-lighting-ignition (SLI), lead-acid storage batteries and terne metal gas tanks again vastly increased demand for the useful metal.[58] Bearing out these trends, U.S. primary lead production went from 455,000 tons in 1913 to 744,000 tons in 1926. While demand for TEL did not really take off until the Second World War, by 1955 America's gas guzzling, tail-finned cars were consuming nearly 200,000 tons of the metal in fuel each year. By 1970, that number had risen to roughly 300,000 tons.[59]

Due to its density and atomic weight, lead found use as a shielding agent during the atomic age. The Chicago Pile, which on December 2, 1942 produced the world's first artificial, self-sustaining, nuclear chain reaction, utilized six inches of lead insulation to protect researchers from radiation.[60] Hanford and Oak Ridge, two of the principal sites employed to develop nuclear weapons under the Manhattan Project, together used

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[56] United States Geological Service (USGS) Minerals Information: "Lead Statistics and Information," http://minerals.usgs.gov/minerals/pubs/commodity/lead/ (accessed April 20, 2011).

[57] Ibid. An additional use of lead was as an agricultural insecticide. Developed in 1893, lead arsenate coupled two toxic minerals, lead and arsenic, in a liquid compound that was effective in killing the gypsy moth and other insects. Although it was largely replaced by DDT, introduced in 1948, as late as 1947 approximately 25,000 tons of lead arsenate was sold in the U.S.

[58] USGS, "Lead Statistics and Information," http://minerals.usgs.gov/minerals/pubs/commodity/lead/ (accessed April 20, 2011).

[59] Christian Warren, *Brush with Death: A Social History of Lead Poisoning* (Baltimore: The Johns Hopkins University Press, 2000), 118. In the late 1950s and early 1960s, TEL accounted for roughly twenty percent of total U.S. lead consumption, making it the second most substantial use of lead in the U.S. after storage batteries.

[60] The Lead Industries Association, *Lead in Modern Industry*, 100.

hundreds of tons of lead in shields designed to protect workers.[61] To shield the operators of betatrons, devices developed during the Second World War used to deliver high voltage x-rays, it was necessary to use either seven inches of lead or sixty inches of concrete about twenty feet from the machines.[62] With the rising medical use of X-ray machines in the postwar world, the donning of lead shielding became a commonplace for millions of Americans.

Post-war prosperity that brought booms in home construction, auto sales, as well as in sales of a host of other consumer goods, also naturally ushered enhanced consumption of the most versatile of industrial metals. In the early 1970s, for example, a typical, new American car contained fifty pounds of lead.[63] Domestic demand for the blue-gray metal remained remarkably strong and consistent in the post-war decades, dropping below a million tons only five times between 1947 and 1979, and falling beneath 900,000 tons only once.[64]

Lead's unique combination of important qualities, along with its generally low price, virtually guaranteed its multifarious and heavy employment in industrial societies. Among the metal's more significant qualities are its resistance to corrosion, malleability, density, and unique chemical properties. Lead's corrosion and atmospheric resistance was responsible for its use in industrial containers for chemicals such as sulfuric acid and also

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[61] Sales, Cd'A – General, 1957 and 1958 and Older Material [2 of 2], Felix Wormser speech before the Northwest Mining Association, "The Competitive Position of Lead," Spokane, Washington, December 7, 1946, RG 95, Box 66, Folder S, The National Archives and Records Administration (NARA), Pacific Alaska Region, Seattle.
[62] Ibid.
[63] *Bunker Hill Reporter*, July-August, 1973, 4, Bunker Hill Mining Company Records, MG 413, Box 83, Folder 1883, Special Collections, University of Idaho Library.
[64] Ibid. This occurred in 1960 when a seven month strike at the Bunker Hill mine and smelter, in Kellogg, Idaho, one of the nation's largest lead producers and refiners, curtailed domestic production.

for the metal's presence in white lead house paints and in red lead coatings for iron and steel.[65] The blue-gray metal's softness and malleability, along with its aforementioned resistance to corrosion, contributed to its use as sheathing for power and telephone lines and its use as solder.[66] Lead's density, availability and low cost, encouraged its use as ballast in ships' hulls and as balance weights in tires. These qualities also granted the mineral ballistic properties that made it a natural for use in bullets. In addition to the metal's employment in X-ray protection, these qualities also led to its use as a counterweight in ailerons and rudders that added ease of control and prevented flutter in airplanes.[67] Finally, the metal's unique chemical properties made possible its use in storage batteries, along with its employment as an anti-knocking agent in gasoline.[68]

Although it has found many uses in modern industry, lead is hardly a newcomer to humankind. Humans evolved in the presence of minute traces of lead, a mineral that makes up less than one percent of the Earth's crust.[69] The metal's use can be traced back at least 5,000 years. A lead figure, found near the Dardanelles Straits at the site of the ancient city of Abydos, can be dated to approximately 3,000 BCE.[70] Unsmelted lead ore, known as galena, was used in eye cosmetics as early as 4,000 BCE.[71] By the 5th century BCE, the ancient Athenians mined galena at the nearby Laurion mines and produced up

[65] *Lead in Modern Industry*, 14-15.
[66] Ibid., 14.
[67] Ibid., 15.
[68] Ibid.,14, 16.
[69] Warren, *Brush with Death*, 18.
[70] Ibid., 1.
[71] Ibid., 18.

to ten tons of lead and silver each year.[72] But while Ancient Greece may have used a good deal of lead, Ancient Rome made the gray metal fundamental to their civilization.

By 50 BCE, lead had become an integral part of Roman life. Among many other things, the metal could be found in wine vessels, tombs, tooth fillings, bathtubs, and most ubiquitously, Rome's extensive hydroengineering systems.[73] These employed massive quantities of lead to bring water from the mountains to the plumbing systems of Rome and other cities. Indeed, the words "plumber" and "plumbing" derive from *plumbum* the Latin word for lead.[74] The Greeks and Romans, however, were far from the only early civilizations to use the blue-gray metal. Egyptian pharaohs and Assyrian kings inscribed messages on lead sheets, while the ancient Chinese wrote on bamboo with white lead ink.[75] The ancients also associated lead with the gods. While Ancient Egyptians associated lead with Osiris, Greeks and Romans linked the metal to Cronos/Saturn.[76]

While lead is deeply intertwined with the history of human achievement, there is another side to the human relationship with "the useful metal." For as long as people have worked with lead, they have experienced its toxic properties. The blue-gray metal is, in fact, a potent neurotoxin that accumulates in the body's bones and soft tissues. Among the metal's more significant health effects are nerve damage, anemia, kidney dysfunction, hypertension, reproductive damage, and brain damage. In its chronic form, lead

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[72] Warren, *Brush with Death*, 18.
[73] Ibid.,19-23.
[74] Ibid, 19. As does a term denoting lead poisoning, "plumbism."
[75] Ibid., 19.
[76] Ibid., Egyptian Myths, "Ancient Egypt: the Mythology: The Story of Isis and Osiris," http://www.egyptianmyths.net/mythisis.htm (accessed October 24, 2011). To this day a common term for lead poisoning is saturnism. The Greeks considered lead the father of metals, as they viewed Cronos to be the father of the gods. In Egyptian mythology the god Osiris was murdered by being buried alive in a lead-sealed coffin.

poisoning can result in slowed reaction time, lead neuropathy (i.e., wrist or foot drop), kidney failure, depression, and short-term memory loss.[77] Severe lead poisoning may lead to delirium, coma, encephalopathy (a severe condition whose symptoms include brain swelling), or death.[78] Lead harms -- and in higher doses kills -- by disrupting the intricate machinery of red blood cells. Substituting for necessary metals such as zinc and iron in cells, lead wreaks havoc, preventing blood from creating heme, blocking nerve conduction and interfering with mitochondria.[79] Although potentially harmful to adults, lead poses the greatest threat to young children and to fetuses, due to the fact that their fast-growing bodies absorb the toxin so rapidly.[80]

The realization that lead is a potent poison is far from a recent phenomenon. In the second century BC, Greek poet and physician Nicander described most of the classic symptoms of saturnism, or lead poisoning – including hallucinations and paralysis – and recommended several purgative treatments.[81] Until the 19th century, probably the most common cause of lead poisoning was the drinking of wine or cider stored in leaded containers. This malady appears to have been widespread in ancient Greece and Rome;

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[77] Wrist and foot drop refer to loss of the ability to hold one's wrist or foot up. This condition is prompted by lead-induced nerve damage. In the lead industries, wrist and foot drop have long been signs of the lead intoxication of workers.

[78] New York State Department of Health, "Lead Exposure in Adults – A Guide for Health Care Providers," http://www.health.state.ny.us/publications/2584/, (accessed May 17, 2011).

[79] Warren, *Brush with Death*, 16; Lydia Denworth, *Toxic Truth: A Scientist, a Doctor, and the Battle over Lead* (Boston: Beacon Press, 2008), 26, Anna Marie Helmenstine, About.com, Chemistry, "What Makes Lead Poisonous," http://chemistry.about.com/od/howthingsworkfaqs/f/leadpoisoning.htm, accessed October 25, 2011. Heme is the iron-rich pigment without which blood cannot do its job of carrying oxygen throughout the body. Mitochondria is the part of the cell structure responsible for producing energy.

[80] Lead is generally more bioavailable to young children than to adults. Due to their rapid growth rates and growing brains, lead poses a great threat to children's health and their IQs. Because it crosses the placental barrier, lead represents a grave hazard to fetuses.

[81] Warren, *Brush with Death*, 20.

some scholars go so far as to blame the fall of Rome on wine-induced saturnism.[82] Discovery that lead retarded fermentation and made wines taste sweeter persuaded vintners to add the mineral. In 802 AD, Charlemagne is reputed to have called for the banning of leaded wines. During the Renaissance, the German city of Ulm executed those convicted of adulterating wine with lead.[83] Severe bouts of colic that wracked Poitiers, France and Devonshire, England in the 17th and 18th centuries were later found to be products of, respectively, lead-tainted wine and cider.[84] In 1723, the Massachusetts Bay Colony banned the use of "leaden heads or worms" in the distillation of rum or other spirits.[85] Benjamin Franklin, who observed printers develop "dangles and gripe" (wrist drop and colic) from lead poisoning, in 1786 commented, "The opinion of this mischievous effect from lead is at least above sixty years old; and you will observe with concern how long a useful truth will be known and exist before it is generally received and practiced upon."[86]

In the 19th century, with the rise of industrialism, interest grew in the effects of lead on workers. Louis Tanquerel de Planches published the pioneering study on occupational lead poisoning in 1839. Based upon his examination of the case histories of over 1,200 patients at La Charite Hospital in Paris, Tanquerel's work detailed the neurotoxic effects of lead and showed that lead compounds, especially pigments, posed

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[82] Warren, *Brush with Death,* 22-23.
[83] Ibid., 23.
[84] Ibid.
[85] Ibid., 24.
[86] Denworth, *Toxic Truth*, 29. Printers have history with lead that dates to antiquity. Following the invention of the printing press in the 16th century, movable type was made from lead-tin alloys. Later, linotype machines that automatically cast molten-lead type as an operator keys in text to be printed, subjected printers to the dangers of plumbism. Linotype machines continue to be used to this day.

great occupational threats.[87] While Tanquerel's report prompted major voluntary improvements in the hygienic conditions in many French lead pigment factories, reforms in other countries did not come as quickly. In the 1870s and 1880s, Germany mandated regular government inspections of lead industries, placed lead poisoning and other occupational diseases on par with industrial accidents under the nation's workmen's compensation law, and banned especially hazardous practices such as the dry sanding of white lead paint.[88] Until the 1890s, Great Britain's lackluster efforts at promoting voluntary change by the lead industries produced minimal results. In 1895, however, the Home Secretary established the Dangerous Trades Committee, which commissioned physicians to study lead occupations and other "dangerous trades." Physician Thomas Oliver, inspecting the lead industry, made suggestions for improvement that included better ventilation and replacing dry with wet sanding. White lead manufacturers, under pressure from the Home Office to reduce cases of lead poisoning, began employing many of Oliver's suggestions. This resulted in significant decreases in Britain's industrial lead poisoning rates within a decade.[89]

More than any other figure, Alice Hamilton focused attention in the United States on the dangers of occupational lead poisoning. Hamilton, a medical doctor by training, was inspired by her long experience living and working at Chicago's Hull House to try to

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[87]Warren, *Brush with Death*, 68-69. Although Tanquerel's report boosted zinc-based paints and dealt a blow to France's lead paint industry, the same can not be said for the United States where white lead-based paints would retain their dominant position into the 1920s.
[88] Ibid., 69.
[89] Ibid., 70-71.

ameliorate the conditions of life of the urban poor.[90] Reading Thomas Oliver's work encouraged Hamilton to pioneer the field of occupational safety in the U.S.[91] America in the first decade of the 20th century, however, lagged far behind France, Germany and Great Britain in its protection of industrial workers from occupational illness and other job hazards. In 1907, the Illinois Commission on Workingmen's Compensation enlisted Alice Hamilton to spearhead a study on occupational disease in the state. While the study examined workplace exposure to a number of known toxins, Hamilton focused her own work on lead. Hamilton and her staff visited 304 lead industry plants in 1910-1911.[92] The commission's findings, published in 1911, uncovered abundant evidence of plumbism (i.e., lead poisoning) in Illinois factories. Following the Hamilton study, it was no longer possible to claim seriously that American industry had no lead problem.[93] The Illinois report prompted other occupational lead studies around the country. A survey of Missouri's sizable lead industry turned up over a thousand cases of lead poisoning.[94]

Alice Hamilton and social scientists such as Richard Ely, John Commons and John B. Andrews, pushed for workmen's compensation insurance for victims of occupational disease and industrial accident, and for state-supervised industrial hygiene programs to prevent illness.[95] In the years following Hamilton's occupational lead study, and for reasons largely unrelated to it, a number of states enacted workmen's compensation laws. By 1920, forty-two states had such laws on the books. By the late

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[90] Hull House, a settlement house, was co-founded by Jane Addams in 1889 as a community of university women whose main purpose was to provide social and educational opportunities for working class people (many of them recent European immigrants) in the surrounding neighborhood.
[91] Warren, *Brush with Death*, 72.
[92] Warren, *Brush with Death*, 76.
[93] Ibid.
[94] Ibid.
[95] Ibid, 74.

1920s, however, fewer than ten states required manufacturers to compensate industrial diseases in the same way they did accidents.[96] Workmen's compensation legislation largely supplanted the type of state-supervised occupational hygiene program advocated by Hamilton and other progressives. Illinois alone enacted such a law. In most states, leaded workers still could hope for relief only via the expensive, time-consuming court system.[97] Many lead workers "fell through the cracks" of the states' workmen's compensation systems. One to fall was Marion Winter. In the autumn of 1923, Winter left Kentucky for Dayton, Ohio. There he found a job in the paint department at the Maxwell Motor Company. Through the fall, Winter's work involved filling small imperfections in automobile paint jobs with a putty containing fifty percent lead. In November, he became seriously ill with lead poisoning. For almost a week, Winter tried unsuccessfully to complete a day's work. On November 26, he went home to recover. Through December and January, Winter was bedridden and unpaid.[98]

Other workers, too, were failed by the system. On a February afternoon in 1922, a ship painter identified in court records only as Gerald, walked toward a boat where he was employed stripping red lead from steel plates. Suddenly, Gerald's painting kit and turpentine dropped from his hand. The twelve-year veteran of the Boston shipyards picked up his load and resumed his walk, but again his hand betrayed him. That evening Gerald's doctor confirmed that the ship painter had lead neuropathy or "wrist drop." Subsequent testimony revealed that the shipyard worker also suffered from kidney

[96] Warren, *Brush with Death*, 78.
[97] Ibid, 79.
[98] Warren, *Brush with Death*, 80-81.

damage, likely a result of his plumbism.[99] In a 1919 case, plant conditions at an Illinois metal company took only five months to reduce John Labanoski, a healthy 187-pound worker, to a sallow, anemic, and delirious 144-pound inmate of the State Hospital for the Insane.[100] Through the winter and spring of 1913, Augustus Adams tended a sifting machine in the Acme White Lead & Color Works's red lead department at the company's Detroit paint factory. After five months on the job, Adams was too poisoned to continue working. A month later he was dead.[101]

While Alice Hamilton and other reformers introduced the notion of industrial hygiene to the U.S., they ultimately had to rely upon the power of moral suasion to get manufacturers to improve working conditions at their plants. Lacking both state and federal law to protect worker health against occupational disease and hard data regarding lead levels in factory environments and workers' bodies, Hamilton's only remaining gambit was to appeal to moral suasion to convince factory owners to clean up their premises.[102] It was surprisingly successful. Hamilton and others visited lead factories and made detailed suggestions that quite frequently were followed.[103] Often such advice

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[99] Warren, *Brush with Death*, 81.
[100] Ibid., 80.
[101] Ibid., 79-80. The Michigan Supreme Court denied Adams's widow compensation under Michigan's recently enacted workmen's compensation act on the grounds that lead poisoning in a lead paint factory was "something that is contracted by a fairly certain percentage of those working," and therefore a reasonably predictable occurrence, not the sort of "accident" covered under the Compensation Act.
[102] Warren, *Brush with Death*, 82-83. Apparatus to detect levels of air lead, dust lead and blood lead would not be developed until the 1920s, when it would be put to use by lead industry-sponsored industrial toxicologists. Significant federal legislation to protect workers against lead poisoning and other occupational diseases did not come into being until passage of the Occupational Safety and Health Act in 1969.
[103] Ibid. Hamilton and company had considerably less success preventing lead poisoning in commercial painters, where the malady was quite common. Many painters were proud "white leaders" (users of white lead-based paints). Unlike workers in lead factories, painters were highly independent, more like a medieval guild than workers in modern industry. Their independence and self-reliance, unfortunately,

centered on ways of suppressing or removing highly leaded dusts and improving worker hygiene. That Hamilton met with such considerable success in her efforts testifies both to her potent skill as an advocate and to the lingering capacity of campaigns of moral suasion to influence industrial leaders during the early decades of the 20th century.

In the mid-1920s, the useful metal put on an unforgettable display of its versatility and potency as a workplace toxin. In December, 1921, Thomas Midgley, Jr., chief chemist with the Dayton, Ohio-based General Motors Research Corporation, discovered tetraethyl lead (TEL)'s benefit to gasoline-powered engines. However, unlike lead oxides, such as those found in white lead paints, tetraethyl lead is fat soluble and highly toxic to the nervous system when absorbed through human skin.[104] Indeed, the U.S. War Department tested TEL as a possible nerve agent during World War I, but found it less effective than mustard gas for combat purposes.[105]

In 1922, while General Motors heralded Midgley's discovery, some scientists began to worry about the occupational and general health consequences of manufacturing and then releasing large quantities of TEL into the atmosphere. Chemistry professor William Mansfield Clark, in October, 1922, wrote to A.M. Stimson, Assistant Surgeon General at the Public Health Service, noting that serious cases of lead poisoning already had occurred in the manufacture of TEL. He warned that "the possibilities of a real health menace do exist in the use of such a fuel…"[106] Clark advised Stimson to launch an

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seems only to have increased the prevalence of plumbism among painters during the heyday of leaded paints (ca. 1880-1940). See *Brush with Death*, 52-60.

[104] Warren, *Brush with Death*, 120. Lead oxides, of course, can be highly toxic as well, but generally only when breathed in or swallowed.

[105] Ibid. Still, the Chemical Warfare Service estimated that roughly five teaspoonfuls of TEL applied to healthy skin would prove fatal to an adult.

[106] Rosner and Markowitz, *Dying for Work*, 122.

investigation of the likely health consequences of unleashing TEL upon the public. A month later H.S. Cumming, the Surgeon General, wrote to P.S. DuPont, chairman of the DuPont Company, which had been contracted by General Motors to manufacture the bulk of its TEL, to respectfully ask whether the public health effects of TEL manufacture and use had been contemplated. Thomas Midgley answered Cumming, who replied that the question "had been given very serious consideration…although no actual experimental data has been taken."[107]

General Motors asked the U.S. Bureau of Mines to conduct an investigation into the subject. The terms of agreement between the corporation and the agency, however, severely shackled the Bureau's capacity to make a valid, independent report of its findings. In return for funding the investigation of the health effects of TEL, General Motors received guarantees that the Bureau would refrain from giving out any press or progress reports while the investigation was underway and that the federal agency would submit pre-publication editions of any papers or articles to the company for comment, criticism and approval.[108] This proviso ensured the company of a veto over any offending facts or conclusions the Bureau might wish to publish.

In October, 1924, however, events at Standard Oil's Bayway tetraethyl lead production facility in Elizabeth, New Jersey, undermined the TEL-producers' recent efforts to manipulate and package government science, at least for the time being. Although DuPont was licensed to manufacture the bulk of the new Ethyl Gasoline Corporation's patented TEL, Standard Oil of New Jersey also was permitted to

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[107] Rosner and Markowitz, *Dying for Work*, 123.
[108] Ibid., 124.

manufacture the substance at its small Bayway plant. [109] On October 23, 1924, things began to go terribly wrong at Bayway. On that day Ernest Oelgert, a worker at the facility (dubbed "the loony gas building" by workers), began to experience hallucinations, complaining to co-workers that people were following him. The following day, running through the factory, he shouted that there were "three coming at me at once." Caught and taken to a nearby hospital, Oelgert died in convulsions the next day.[110] At the same time, co-workers of Oelgert's experienced similar symptoms. On Sunday, October, 25th, Walter Dymock rose from his sickbed and walked through a second story window. Rushed to the hospital, he died the following day in violent convulsions.[111] William McSweeny went home sick on October 26th, only to be hauled off in a straitjacket later that day. He died the following day. Two more workers died later in the week, one on the 28th, another on the 29th, bringing the death total to five.[112] In addition, thirty-five of the "loony gas building" workers experienced tremors, hallucinations, severe palsies, and other serious neurological symptoms of organic lead poisoning.[113] In all, forty of Bayway's forty-nine

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[109] General Motors and Standard Oil of New Jersey together created the Ethyl Gasoline Corporation in August, 1924. Ethyl held patent rights to the TEL gasoline additive, but did not manufacture the substance itself. It licensed the lion's share of the manufacture out to the DuPont Corporation and a small portion to Standard Oil of New Jersey. GM had experimented with the manufacture of TEL at its Dayton laboratories and originally tasked DuPont with the commercial manufacture of the substance, but soon became dissatisfied with DuPont's slow production rate. Standard Oil of New Jersey, with DuPont a major owner of GM, began experimenting with other methods of producing TEL and came up with a much faster, cheaper system. In order both to reward Standard and to benefit from its production methods, GM agreed to share TEL patent rights with Standard. This was accomplished via the creation of the Ethyl Gasoline Corporation as a joint venture of GM and Standard Oil of New Jersey. As part of the deal that created Ethyl, Standard of New Jersey was permitted to engage in commercial manufacture a relatively small amount of TEL employing its new production methods. This Standard did, with fateful results, at its Bayway facility.

[110] Warren, *Brush with Death*, 118.

[111] Ibid.

[112] Warren, *Brush with Death*, 118.

[113] Jamie Lincoln Kitman, "The Secret History of Lead," *The Nation*, March 20, 2000, 26.

workers, or more than eighty per cent, suffered either severe neurological illness or death.[114]

Faced with screaming headlines and serious public concern about the safety of their product, Standard of New Jersey and the new Ethyl Corporation scrambled to perform damage control. Standard claimed that workers should have understood, based upon the precautions they were encouraged to take at the plant, that they were engaged "in a man's undertaking."[115] Thomas Midgley, now serving as Ethyl Corporation's Vice President, appeared at a press conference and placed the blame for the Bayway illnesses and deaths on worker carelessness. For proof, the TEL mastermind cited the case of another tetraethyl lead plant where, "the men, regardless of warnings and provision for their protection, had failed to appreciate the dangers of constant absorption of the fluid by their hands and arms."[116] Contradictorily, at the same time Midgely attempted to reassure the public of the safety of small quantities of TEL through presentations in which he washed his hands thoroughly in the fluid before drying them on his handkerchief. The celebrated chemist, who only recently had been forced to leave work to recover from a bout of lead poisoning, then told audiences, "I'm not taking any chance whatever…Nor would I take any chance doing that every day."[117]

After some digging, print journalists discovered that the Bayway deaths were not the first to be caused by the manufacture of tetraethyl lead. The previous April, two workers at GM's experimental facility in Dayton had succumbed, while more than fifty

[114] Rosner and Markowitz, *Dying for Work*, 125.
[115] Ibid, 126.
[116] *Dying for Work*, 125.
[117] Kitman, "The Secret History of Lead," 26.

others had contracted serious lead poisoning.[118] At DuPont's Deepwater plant in southern New Jersey, at least six died and over three hundred were poisoned before the Bayway tragedy.[119] Of the three TEL manufacturing facilities, Deepwater was by far the largest. Designed to produce 1,300 pounds per day, the plant was rushed into service before proper ventilation was installed and before a safe manufacture process had been established.[120] Like Bayway, Deepwater received a moniker from workers. It was dubbed "the House of Butterflies" for the creatures poisoned workers saw flying around them in the facility.[121] Until the events of late October, GM and DuPont were able to keep a lid on the story of poisoned and killed TEL workers, but the Bayway deaths made the safety of the new gasoline additive a national concern.

Within days of the last of the Bayway worker deaths, New York City, Philadelphia, Pittsburgh and the State of New Jersey banned the use of gasoline containing the lead additive.[122] Also in early November, 1924, the Bureau of Mines released the results of its GM-commissioned report on the health consequences of TEL. To no one's surprise, the Bureau, on the basis of its limited animal testing, gave the gasoline additive a clean bill of health.[123] The report, however, coming on the heels of Bayway, convinced few, and caused a furor in the scientific community. A number of

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[118] Warren, *Brush with Death*, 120.
[119] Rosner and Markowitz, *Dying for Work*, 128. It is difficult to know exactly how many workers died and were sickened at Deepwater. DuPont only admitted that "some" workers had died before the Bayway incident. The company's tight control over worker information and over information flowing from the local hospital where employees were treated made uncovering information about worker health at Deepwater difficult. Reporters received much of their information from workers themselves.
[120] Warren, *Brush with Death*, 120. Six more Deepwater workers died in early 1925 after DuPont began using Standard Oil's method of manufacturing TEL.
[121] Ibid., 122.
[122] Kitman, "The Secret History of Lead," 26.
[123] Ibid., 27.

prominent scientists, including Cecil K. Drinker, a professor of public health at Harvard, and Yandell Henderson, a public health physiologist at Yale, blasted the Bureau of Mines' report and called for an independent scientific investigation of TEL. In late April, 1925, H.S. Cumming, the Surgeon General of the Public Health Service, announced he was calling together experts from business, labor and public health to assess the tetraethyl lead situation.[124]

On May 20th, eighty-seven participants convened in Washington, D.C. for the Surgeon General's conference.[125] At the conference TEL defenders offered three principal arguments: first, that the product was essential to the nation's industrial progress; second, that any innovation entailed certain risks; third, that the failure of TEL workers to exercise proper caution had caused their illnesses and deaths.[126] Speaking to the first point, Standard Oil's Frank Howard extolled the importance of automobiles and oil to the nation's industrial progress, cited TEL's capacity to increase fuel economy by fifty percent, and stated that, "Our continued development of motor fuels is essential in our civilization." Howard also garnered attention through his description of tetraethyl lead as "a gift of God."[127] In support of the argument that the innovation that brought progress often entailed costly risk, Dr. H.C. Parmlee, editor of *Chemical and Metallurgical Engineering* described the TEL workers' deaths and injuries as "negligible compared to human sacrifice in the development of many other industrial enterprises."[128]

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[124] Rosner and Markowitz, *Dying for Work*, 129.
[125] "The Secret History of Lead," 28. On May 4, in an act of brilliant public relations, Ethyl publicly withdrew its product from the market. TEL would remain off the market over a year.
[126] Rosner and Markowitz, *Dying for Work*, 129.
[127] Ibid., 129-130.
[128] Ibid., 130.

Those opposing leaded gasoline presented a fundamentally different viewpoint. They argued against the risk of introducing a powerful cumulative toxin into the environment on such a large scale. Although they certainly disagreed with the characterization of TEL as “a gift of God” and with the assertion that workers had been responsible for their own poisonings, tetraethyl lead opponents were most concerned about the risk leaded gasoline posed to the entire U.S. population. Expressing horror at the idea that hundreds of thousands of pounds of lead would be deposited on the streets of American cities, Yandell Henderson presciently said that, “the conditions would grow worse so gradually and the development of lead poisoning will come on so insidiously…that leaded gasoline will be in nearly universal use…before the public and the government awaken to the situation.”[129] Alice Hamilton, still regarded as the country’s foremost authority on lead, weighed in on the side of the TEL opponents. Expressing her concerns about the inevitable widespread diffusion of lead into the environment, Hamilton queried, “You may control conditions within a factory…but how are you going to control the whole country?”[130]

Before closing, the conference called upon the Surgeon General to organize a blue ribbon committee of the nation’s top public health scientists to conduct a study of leaded gasoline. The Surgeon General assembled an all-star committee and requested that it make its report in a timely fashion. Insuring that its results would be complete in a matter of months, the committee designed a short-term and rather limited study of 252 Dayton chauffeurs, garage workers, and filling station attendants. Some of these workers came

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[129] Rosner and Markowitz, *Dying for Work*, 131.
[130] Ibid., 132-133.

into contact with TEL, while others did not. In January, 1926 the committee released its report. As a result of its study, the group concluded that, "there are at present no good grounds for prohibiting the use of ethyl gasoline…provided that its distribution and use are controlled by proper regulations."[131] Although the committee noted, "a greater storage of lead in the bodies of those exposed to ethyl gasoline," and advised continued investigation of the health effects of leaded gasoline under the auspices of the Public Health Service, the TEL industry reacted simply as if its product had been given a clean bill of health. On June 1, 1926, Ethyl Gasoline Corporation reintroduced its only product to the nation. "Ethyl Is Back" read signs in filling stations.[132] No public studies of leaded gasoline would occur during the next forty years. All scientific studies of tetraethyl lead conducted up to the mid-1960s would be performed by the Ethyl Corporation and scientists employed by it.[133]

If the leaded gasoline industry learned anything from its near death experience in the mid-1920s, it was the need to control the science of lead health. Realizing they required a medical specialist to help them better understand the health implications of their toxic fuel additive, in early 1923 GM's Kettering and Midgley hired Robert Kehoe, a 34-year-old, recent University of Cincinnati medical school graduate, as their medical director. Midgley set up the young physiologist with his own laboratory in Dayton, where he began conducting TEL experiments on animals.[134] Following the Dayton, Bayway and Deepwater tragedies, Kehoe was named medical director of the Ethyl Gasoline

[131] Rosner and Markowitz, *Dying for Work*, 134-135.
[132] Warren, *Brush with Death*, 128.
[133] Rosner and Markowitz, *Dying for Work*, 135.
[134] Warren, *Brush with Death*, 129.

Corporation and special consultant to DuPont. The companies granted tremendous administrative powers to the young doctor, who, drawing upon the precepts of Alice Hamilton, designed strict controls and procedures concerning every process from distillation to the cleaning of storage tanks.[135] Kehoe not only designed occupational safety procedures for the TEL industry, however, he soon replaced Hamilton as the nation's best known authority on lead, a role he would wield into the 1960s.

The Ohio physiologist gained his stature largely through research he and his colleagues performed at the Kettering Laboratory of Applied Physiology at the University of Cincinnati. Founded in 1930 by Kehoe and spearheaded by him for decades, the Kettering Laboratory was funded by Ethyl, DuPont and the Frigidaire Corporation.[136] Kehoe and the Kettering Laboratory forged and defended a body of research that, as lead poisoning historian Christian Warren has written, "acknowledged some of lead's dangers while maintaining its essential harmlessness."[137] At the heart of Kehoe's work were his "balance studies," a series of experiments performed in the Kettering Lab in the 1930s to determine how the body metabolizes lead. Kehoe concluded from these experiments that the human body naturally excretes all but the highest concentrations of lead, thus keeping lead levels "in balance."[138] As long as lead levels did not exceed "threshold levels," beyond which the body's systems of excretion were overwhelmed, there was no need for medical concern. Kehoe based his threshold value on the lowest level of blood lead at which he had seen lead workers sicken, 80

[135] Warren, *Brush with Death*, 129-130.
[136] Ibid., 130.
[137] Ibid.
[138] Ibid., 130-131.

ug/dl. (ug/dl, or micrograms per decileter, long has been the standard measure of lead in the bloodstream).[139] The Cincinnati doctor also emphasized that lead was a natural element that the human body had “learned” to effectively deal with. Bodily burdens of lead produced by the environmental exposure to leaded gasoline were so negligible, asserted Kehoe, as to be essentially inconsequential from a health standpoint.[140]

Kehoe’s authority within the lead industry guaranteed that his procedures would be followed in the manufacture of tetraethyl lead. The implementation of Kehoe’s protocols for the handling of TEL during manufacture essentially solved the problem of headline-generating occupational death in the substance’s production. For those who equated the danger of TEL with the issue of worker death, the issue had been resolved. But Kehoe also had quieting answers for those concerned with the implications of the nation’s tailpipes spewing millions of tons of leaded exhaust. His answers were widely accepted by the scientific community until the mid-1960s.[141]

Even in the 1920s, however, there existed a lead health problem that Kehoe’s paradigm did not begin to address. At the time, the U.S. medical community was only beginning to recognize the nature and the scope of the problem, and it would be decades before the public-at-large became conscious of “The Silent Epidemic.” Childhood lead poisoning, caused by the eating of leaded paint chips, killed hundreds of children every year in America’s cities. Fatal cases of childhood lead poisoning, however, were commonly misdiagnosed as tubercular (TB) meningitis and other diseases until at least

[139] Warren, *Brush with Death*, 131.
[140] Ibid, 132.
[141] Rosner and Markowitz, *Dying for Work*, 140-141.

the late 1920s.[142] For a variety of reasons, the foremost of which appears to have been their preoccupation with germ-based causes of disease, American doctors of the late 19th and early 20th centuries were blinded to the presence of environmentally-caused diseases such as childhood lead poisoning.[143] Once their eyes were opened, however, doctors realized that lead paint in homes was a leading killer of young children.

For as long as infants have grown teeth, they have looked for things to gnaw on. Often surrounded by lead-painted interior walls, cribs, and toys, for much of the 20th century American infants had many sweet-tasting leaded items to choose from to satisfy their teething needs. As physician John C. Ruddock observed in 1924, "A child lives in a lead world."[144] Although childhood lead poisoning had been identified as a disease elsewhere as early as 1900, conditions in the U.S. were not ripe for the "discovery" of the illness until the 1920s.[145] As Christian Warren elucidates, before the American medical community could properly recognize childhood lead poisoning certain preconditions had to be met: a mature subdiscipline of pediatrics needed to develop, heightened sensitivity to environmental disease causation had to evolve, and a reason needed to arise to single out lead as the particular toxin.[146]

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142 Warren, *Brush with Death*, 35-37.
143 Ibid., 33-34.
144 Ibid., 30.
145 Ibid., 29. Australian pediatricians A.J. Turner and J. Lockhart Gibson established that the seasonally recurring colics, vomiting and paralysis of dozens of Queensland children was due to the ingestion of flaking lead pain from sun-weathered verandahs.
146 Warren, *Brush with Death*, 42.

White lead-based paints retained the leading position in the paint industry until the 1940s when they were supplanted by titanium dioxide pigments.[147] Many house painters were fervent "white leaders," believing that "pure" white lead provided superior durability and overall quality. While many European countries banned the interior use of lead paint following World War I, until the 1970s lead-based paints were used commonly on interior, as well as exterior, walls in the United States.[148]

From the late 1920s through the late 1940s, childhood lead poisoning was defined in the U.S. largely as a disease of poverty that could be safely ignored by the bulk of the population. Sensational cases such as the Depression era "battery burnings," in which unfortunate individuals died after burning inexpensive wooden battery casings to heat their homes, served to solidify this definition.[149] In the 1950s and 1960s, as the health departments of major cities became more aggressive in their pursuit of childhood lead poisoning, the disease was rebranded as a problem of race, a "ghetto disease," due to the fact that African-Americans were far more likely than any other group to suffer from it. Although a number of prominent childhood lead poisoning researchers objected, many in the medical community defined "pica," or the tendency of children to eat non-food items such as lead paint chips, as the race-based behavior that lay at the root of childhood lead poisoning. Going further, some equated pica with the "exotic" cultural practices of dirt eating acquired during the days of sharecropping and slavery in the American South, and blamed contemporary African-American mothers for not keeping their children from

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[147] Warren, *Brush with Death*, 46. In addition, white lead-based paints were associated with the virtues of cleanliness, racial whiteness, and, ironically given the product's toxic nature, purity. Until supplanted by car batteries in the 1920s, lead paint constituted the largest destination of lead in the U.S.

[148] Ibid., 62, 202. Lead-based paints were not banned from interstate commerce in the U.S. until 1977.

[149] Ibid., 142-143.

eating paint chips.[150] This reasoning conveniently segregated the disease while also laying blame squarely on its victims.

Although beginning in the late 1920s the American medical community was aware of childhood lead poisoning, it was commonly diagnosed as TB Meningitis, or other maladies that it superficially resembled.[151] By the 1960s, however, enhanced awareness of the environmental causes of disease generally and of the presence of lead poisoning specifically, along with the use of powerful chelating agents – chemicals that bind with and neutralize certain metal ions -- such as British anti-Lewsite (BAL), eventually brought down the disease's death rate.[152] In New York City, for example, the common pattern of increased detection of the disease coupled with reduced mortality rates was evidenced: in 1954, 80 cases of lead poisoning were reported with twelve deaths; 1964 saw 509 cases and only seven fatalities.[153]

In 1943, Randolph Byers, a pediatric neurologist, and Elizabeth Lord, a psychologist, published a paper that challenged the prevailing notion that only childhood lead poisoning cases that caused profound neurological effects such as encephalopathy or coma could result in long-term mental impairment. By the late 1930s, Byers and Lord, both of whom worked in the Neurological Service at Boston's Children's Hospital, had come to suspect that lead poisoning had affected a number of the children who had been

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[150] Warren, *Brush with Death*, 184-185.
[151] Ibid., 36-38.
[152] Ibid., 169. BAL was developed secretly by the Allies during World War II as an anti-nerve gas agent. It was tested successfully as a chelating agent for lead in late 1946. BAL works by binding with lead in the body to form a less harmful compound that the body can safely excrete. It is in no sense "a cure" for lead poisoning, but can substantially reduce blood lead levels in victims of lead poisoning. Blood lead levels usually drop substantially after a course of treatment with BAL, only to rise again later due to the fact that the chelating agent leaves a good deal of lead stored in the bone. That "bone lead" is prone to enter the bloodstream at a later time.
[153] Ibid.

referred to the Hospital because of learning disabilities or "behavioral difficulties."[154] Scanning admissions records for the past decade, the duo identified 128 lead poisoning cases. Lord then performed psychological evaluations and tracked the school progress of the twenty children she located who still lived in the Boston area. Her findings undercut the premise that non-cerebral lead poisoning left no after-effects.[155] Byers and Lord's pioneering report, published in the November, 1943 issue of the *American Journal of Diseases of Children*, showed that though none of the patients showed, "gross evidence of cerebral damage at the time of discharge," only one of the children was doing well in school. Though most of the children had intelligence quotients (IQ)s in the normal range, they showed attention deficits, learning disabilities and erratic behaviors. More than a few also showed clear symptoms of neurologic damage years after having been discharged with a clean bill of health.[156] Although Byers and Lord's study lacked statistical rigor – due to its small sample size and failure to test for confounding variables, among other factors – it nonetheless significantly affected understandings and the research that came in its wake.[157] No longer could anyone ignore the possibility that relatively low levels of childhood lead poisoning could cause neurological damage.

In the mid- to late 1960s, the activism of a younger generation of urban health professionals combined with the protests of minority communities to bring about significant change on the childhood lead poisoning front. In New York City only slow progress had been made in childhood lead poisoning identification and treatment since

[154] Warren, *Brush with Death*, 148.
[155] Ibid.
[156] Ibid.
[157] Ibid., 150.

the 1950s. In 1967, young scientists and community activists joined forces to demand action from city hall. The pressure had an effect. Among other things, director of the city's poison control center, Joseph Cimino, agreed with the activists' characterization of the problem as "a silent epidemic" and estimated that over 25,000 of the city's children were lead poisoned.[158] In April 1969, the death of two-year-old Janet Scurry garnered a good deal of attention when local politician Robert Abrams used the issue as a cudgel with which to beat the city's Public Health Department. In September of that year, investigative reporter Jack Newfield launched a high profile series of exposes in the *The Village Voice*. Newfield berated New York City's liberal establishment for ignoring the problem, charging that, "if lead poisoning affected white, middle class children, it would be covered on the front page of the *New York Times*…But 30,000 undiagnosed cases of lead poisoning, living in Bed Stuy, El Barrio, and the South Bronx, is not news."[159] It may have been merely a coincidence, but within weeks of Newfield's first expose City Health Commissioner Mary McLaughlin announced that she was transferring $150,000 from other programs to the lead control program. McLaughlin also announced changes to the city's health code that would allow landlords to cover over lead-painted walls with wallboard or other sheathing and empower the department to summon emergency repair crews if offending apartments were not fixed in five days.[160] The Public Health Department ramped up its blood testing program. The Big Apple was turning the corner on its lead-health problem.

[158] Warren, *Brush with Death*, 192.
[159] Ibid., 194.
[160] Ibid.

In the new decade, the federal government got into the act. In January, 1971, President Richard M. Nixon signed into law the Lead-Based Paint Poisoning Prevention Act (LBPPPA). In 1977, the .06 requirement was extended to interstate commerce, effectively banning lead paint from the U.S. market.[161] While a public health hazard to children undoubtedly exists in the form of the estimated twenty-four million U.S. homes still containing lead paint, major strides undeniably have been made in the battle against childhood lead poisoning over the past forty years.[162] Childhood deaths from lead poisoning have gone from commonplace to almost-unheard-of, while at the same time, and principally due to the phaseout of leaded gasoline, median blood lead levels in the U.S. have decreased by nearly an order of magnitude.[163]

However, researchers following in the path of Byers and Lord have continued to unearth evidence of bodily harm at increasingly low levels of lead exposure. In the early 1970s J. Julian Chisolm, Jr., a pediatrician at Johns Hopkins University, was the nation's foremost researcher investigating childhood lead poisoning.[164] In the late 1960s and early 1970s, Chisolm and others researching the effects of lead on blood metabolism found consistent relationships between blood damage and blood-lead levels well below those associated with clinical symptoms of lead poisoning.[165] This work cast doubt on the

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[161] Warren, *Brush with Death*, 202. The rule, promulgated by the Consumer Product Safety Commission, went into effect in 1978.
[162] Denworth, *Toxic Truth*, ix.
[163] Warren, *Brush with Death*, 211, 239, 261-262. While the average blood lead level for all Americans in 1965 was approximately 20 ug/dl, as of 1994 it was 2.8 ug/dl. Whereas between 1923 and 1966 an average of about twenty children per year died from lead poisoning, the most recent case of a child dying from lead poisoning in the U.S. appears to have occurred in 2006 when a four-year-old Minnesota boy swallowed a charm containing 99 percent lead. For more information on the Minnesota fatality, see Minnesota Department of Health, Lead Poisoning Prevention, "Child Dies of Lead Poisoning from Metal Charm," http://www.health.state.mn.us/divs/eh/lead/topics/braceletrecall.html (accessed June 1, 2011).
[164] Warren, *Brush with Death*, 226.
[165] Ibid., 227. Until 1971, that threshold was still generally Kehoe's standard of 80 ug/dl.

notion of a clear blood-lead threshold for damage and raised questions about the effects of asymptomatic lead absorption in other body systems.[166] Chisolm's blood metabolism studies prompted the first two downward revisions of the federal Public Health Service's definitions of "undue lead absorption," from 60 to 40 ug/dl in 1971, and to 30 ug/dl in 1975.[167]

In 1971, Herbert Needleman a physician and psychiatrist, studied the lead content in the baby teeth of 761 Philadelphia schoolchildren and showed a clear association between lead absorption, environmental lead pollution and poor housing. In 1979, Needleman and his associates published a pathbreaking paper attributing diminished IQs and school performance to subclinical lead exposure. The study, conducted in Boston, again relied upon lead levels in the baby teeth of schoolchildren. The 273 children studied were mostly healthy; only ten showed symptoms of lead poisoning and had blood-lead levels above 40 ug/dl.[168] Needleman's paper, published in the presitigious *New England Journal of Medicine*, concluded that a strong correlation existed between lower IQ scores and poorer school performance and higher levels of tooth lead. More specifically, Needleman and his group found that schoolchildren with tooth lead levels of higher than twenty parts per million were significantly less competent in the areas of verbal performance and auditory processing than were their colleagues who had tooth lead levels of ten parts per million or less. The same relationship applied to the children's ability to sustain attention and behave in the classroom, as evaluated by their teachers.[169]

[166] Warren, *Brush with Death*, 227.
[167] Ibid.
[168] Ibid., 229.
[169] Denworth, *Toxic Truth*, 105.

With research increasingly showing problematic health effects from what once had been considered low-level lead exposure, threshold levels were repeatedly lowered. Following significant lowerings of the standard in the 1970s, in 1985 the federal Center for Disease Control (CDC) dropped the threshold for pediatric concern for blood lead from 30 to 25 ug/dl. In 1991, CDC again lowered the level, this time to 10 ug/dl, and called for a plan to eliminate childhood lead poisoning by 2010.[170] Unlike selenium and other minerals that are necessary to proper body functioning in small doses but toxic in large ones, no amount of lead is good for the body.

Clair Patterson stumbled onto lead as a graduate student. Patterson, a geophysics student at the University of Chicago in the late 1940s, was attempting to accurately date the age of the earth. To accomplish this task, Patterson relied upon the rate of decay of uranium into lead isotopes to act as a sort of elemental timer. But the young geophysicist repeatedly ran into the same problem. Too much lead was showing up in his experiments. Patterson quickly realized that the excess lead was coming from within his lab, which was emanating the substance from innumerable sources. As Patterson said of the problem, "…there was lead in everything I used that came from industry."[171] The graduate student set out to clean his lab assiduously and establish processes that guaranteed uncontaminated experiments. In 1953, by now a professor with his own specially-designed clean lab at Caltech, Patterson finally succeeded in dating the Earth.[172]

[170] Denworth, *Toxic Truth*, 213-214.
[171] Ibid., 13.
[172] Ibid., 21. Patterson initially determined the Earth's age to be 4.5 billion years. He later revised that figure to 4.55 billion.

His difficulties with the lead-infested lab in Chicago, however, put the geophysicist onto what became his life's work.

A decade later, Patterson, while analyzing sea floor sediments as a piece of his geochronological work aimed at shedding light on the formation of the continents, again encountered lead levels far in excess of expectation. Patterson also determined that, relative to the ancient past, a hundred times more lead was entering the ocean than was leaving it, and that the upper levels of ocean water contained far higher lead concentrations than did lower levels of the slow-mixing waters.[173] The Caltech scientist examined data on the production of tetraethyl lead (TEL) and began to wonder if the gasoline additive could be the culprit.

Patterson eventually came to conclude that whereas prehistoric humans had carried a body burden of lead of .0025 parts per million (ppm), typical contemporary people carried .25 ppm, or one hundred times as much.[174] In a paper published in a 1965 issue of *Archives of Environmental Health*, an occupational health journal read by industrial toxicologists such as Robert Kehoe, Patterson referred to Americans' environmental exposure to lead from a variety of sources including TEL, lead pipes, lead solder in cans, paint, and lead arsenate insecticides, as "a severe chronic lead insult."[175]

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[173] Denworth, *Toxic Truth*, 49.
[174] Ibid., 119, 110-111. Following his early 1970s study of 4,000-year-old bones of Ancient Peruvians, Patterson revised these estimates upwards, concluding that contemporary Americans carried lead burdens 3,000 times the level of prehistoric Peruvians. Patterson's early 1970s research into environmental lead concentrations in the remote Thompson Canyon area of Yosemite National Park extended this picture to the animal and plant worlds. Patterson employed isotopic measurements to determine that 95 percent of the lead in Thompson Canyon came from automobile exhausts, much of that from San Francisco and Los Angeles, which lay respectively 150 and 300 miles away. Patterson's studies of concentrations of lead in the area's plants and animals lead him to conclude that contemporary Americans had lead levels 400 times higher than their natural levels, four times higher than his 1965 estimate.
[175] Ibid., 64.

Not content with attacking Kehoe's paradigm of "natural levels" of lead in the human body, the geophysicist also contended with industrial toxicology's longheld standard of 80 ug/dl as the threshold value below which no bodily harm could occur. Holding that the standard was too high by an order of magnitude, Patterson also questioned the underlying logic that "a worker must be either perfectly healthy or classically intoxicated but cannot be neither."[176]

Predictably, the scientific establishment, in this case represented by the field of industrial toxicology, responded scornfully to the young geochemist's assertions. One peer reviewer labeled the article, "…very unfortunate in its aggressive tone, somewhat sophomoric in organization…assumptions and presumptions are substituted for rigor and objectivity."[177] Another called the piece a polemic and complained that it "impugned the life work of Bob Kehoe."[178] Kehoe himself, in his four-page response to Patterson's article, contended that the geochemist, "…has ventured, without caution, humility, or appropriate critique, into what is clearly for him, an alien area of biology." The dean of industrial toxicologists, following a lengthy discussion of his own work, referred to Patterson's dismissal of the threshold concept as "astonishingly dogmatic (and absurd)" and reiterated that there was "no evidence of any current threat to the health of representative populations in the United States."[179]

To ascertain more about historic and current levels of lead in the atmosphere, Patterson traveled to Greenland in 1965 and collected snow and ice samples dating back

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[176] Denworth, *Toxic Truth*, 65. Patterson maintained that what Kehoe defined as "natural levels" of body lead were in fact merely the "typical levels" that contemporary humans had achieved following the gross contamination of the atmosphere with lead by industry.
[177] Ibid., 65-66.
[178] Ibid.
[179] Ibid., 67.

to 800 B.C.[180] The paper he published based upon this research showed that in the Northern Hemisphere, between 1750 (the beginning of the Industrial Revolution) and 1930, the level of lead in the atmosphere had increased by 400 percent. Between 1930 and 1965, with leaded gasoline in use, lead concentrations rose an additional 350 percent.[181]

In December, 1965, spurred in part by Patterson's findings, the Public Health Service held a major symposium on lead pollution. Although Patterson could not attend, the symposium and its attendant press coverage managed to put Kehoe and the old toxicological paradigm on the defensive for the first time.[182] Cracks began to appear in the ranks of the scientific community, with Harriet Hardy, an MIT toxicologist, and Harry Heimann, of Harvard's School of Public Health leading the charge. Heimann questioned the 80 ug/dl threshold standard, and called for the repetition of Kehoe's "balance studies" in other locations.[183] In June of the following year, Senator Edmund Muskie (D-Maine), Chair of the Senate's Subcommittee on Air and Water Pollution, held hearings on the 1963 Clean Air Act that grappled specifically with the issue of lead pollution. While Kehoe again argued at length that leaded gasoline posed no threat to human health, Patterson made the opposing case. Speaking before a receptive Muskie, the geochemist posited that with the dramatic, recent increase in levels of environmental

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[180] Snow and ice in places like Greenland and Antarctica provide a good measure of concentrations of atmospheric lead over long periods of time. Since snow precipitates from the air, it provides an accurate representation of air- lead levels. In extremely cold environments snow is laid down year after year and does not melt. By digging down into the snow and ice in such places, one can ascertain levels of atmospheric elements (e.g., lead) for up to thousands of years. Patterson studied ice and snow that had not been contaminated by lead-bearing modern humans (i.e., "virgin snow"), to ensure the accuracy of his results.

[181] Denworth, *Toxic Truth*, 72-73.

[182] Ibid., 74.

[183] Markowitz and Rosner, *Deceit and Denial*, 114.

lead and the real threat posed to health by this ancient toxin, further research on the health effects of airborne lead must be carried out by independent investigators.[184]

The initial death blow for leaded gasoline, however, came from an unlikely source, General Motors. The catalytic converter, an antipollution device that converts carbon monoxide to carbon dioxide and water, was developed in the late 1960s. From the perspective of the leaded gasoline industry, however, there was a big problem with the device. It was rendered inoperable by even trace amounts of lead. In January, 1970, GM president Ed Cole announced the company's intention to meet the conditions of pending clean-air legislation with catalytic converters beginning in 1974.[185] A stunned Ethyl Corporation was left to deal with what it viewed as a supreme betrayal by its initial, and longtime, sponsor.

Also in the early 1970s, the new federal Environmental Protection Agency (EPA) grappled with its mandate under the Clean Air Act of 1970 to regulate serious air pollutants such as lead. In 1972, following the release of a National Research Council study it had sponsored, *Airborne Lead in Perspective*, the EPA proposed two separate regulations covering leaded gasoline. The first required that, in order to protect catalytic converters, all gasoline producers offer at least one grade of unleaded gasoline by 1975. The second regulation, designed to protect human health, required gasoline refiners to halve the amount of lead in the nation's gasoline pool within four years time.[186] The former regulation was implemented in 1973. The latter, besieged by the lead and gasoline refining industries, was delayed until a court decree forced the EPA's hand. In 1978,

[184] Markowitz and Rosner, *Deceit and Denial*, 114.
[185] Kitman, "The Secret History of Lead," 36.
[186] Warren, *Brush with Death*, 220-221.

following a lengthy, intense battle between anti-lead and lead industry-funded scientists, the EPA promulgated a national ambient air lead standard of 1.5 ug/dl.[187] The new air lead standard affected a number of American communities whose air was lead-saturated, lead smelter towns such as El Paso, Texas and Kellogg, Idaho, and smog-filled cities such as Los Angeles. The lead industry challenged the new standard in court but ultimately lost its battle before the D.C. Court of Appeals in 1980. In 1985, Ronald Reagan's EPA announced plans to speed the phase-out of leaded gasoline and ten years later Congress completely banned its sale, more than seventy years after TEL's introduction.

By the mid-1980s the old Kehoe-Kettering toxicological paradigm for lead-health had been thoroughly overturned. In its place reigned a scientific consensus that viewed almost any lead exposure to children as potentially harmful. This new consensus, the product of a nearly classic case of what the historian of science Thomas Kuhn has labeled a "paradigm shift," relied upon studies that showed damage to mental functioning, nerve conduction, and other bodily processes at ever-lower levels of lead exposure.[188] Despite sometimes dramatic shifts in government policy over the past forty years, the momentum to increasingly regulate and eliminate potentially harmful lead-based products has remained remarkably consistent. Following its success in virtually eliminating leaded

[187] Denworth, *Toxic Truth*, 104. Before the mobilization of a contingent of anti-lead scientists including Herbert Needleman and Sergio Piomelli, the EPA had proposed a standard of 5.0 ug/dl, more than three times higher than the eventual standard.

[188] Ibid., 202-203. By 2000, there had been eight major prospective studies on lead conducted around the world. Six of these demonstrated evidence of a harmful effect from lead at very low levels. Combining the data from seven of the eight studies – encompassing 1,333 children with a mean blood lead level of 12.4 ug/dl (slightly over the current standard of concern in the U.S.) – showed a decline of 6.2 IQ points for an increase of ten ug. (micrograms) of blood lead. Further, the steepest losses of IQ came at the lowest levels of lead exposure (e.g., at 1-7 ug/dl). The EPA's 2006 lead criteria document noted studies showing effects on kidney functioning at blood lead levels at low as 2-3 ug/dl.

gasoline from the marketplace, the EPA in 1986 reduced the permissible lead contamination of drinking water by a factor of ten, prompting passage of federal laws that sharply curtailed lead in solder, plumbing fixtures and drinking fountains.[189]

The elimination of the lion's share of readily bioavailable lead from the U.S. environment has had a profound impact upon the overall health of Americans. Of all the steps that have been taken, by far the most significant in terms of lowering bodily lead burdens has been the elimination of leaded gasoline. The Second National Health and Nutrition Survey (NHANES II), conducted by the Centers for Disease Control (CDC) between 1976 and 1980, showed that blood-lead levels had dropped by nearly forty percent over the period, from 14.6 to 9.2 ug/dl, closely paralleling the decline in sales of leaded gasoline.[190] CDC's follow-up study, NHANES III, covering the 1988-1991 period, evidenced a continuation of the same positive trends. By 1991, when leaded gasoline had been nearly eliminated from the U.S. marketplace, average blood lead levels had fallen to 2.8 ug/dl, just over one-fifth of where they had stood fifteen years earlier.[191]

The public health triumph surrounding the elimination of leaded gasoline, however, hardly constituted the first public health victory involving lead in the U.S. During the first decades of the twentieth century, Alice Hamilton and other Progressive Era reformers succeeded in virtually eliminating occupational death from plumbism. In the 1960s and 1970s, urban health officials and low-income advocates, eventually aided by the federal government, fought the "silent epidemic" of lead paint poisoning and succeeded in largely eradicating this longtime health scourge.

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189 Warren, *Brush with Death*, 236.
190 Ibid., 221-222.
191 Ibid., 239.

Well-publicized public health victories over lead-based disease, though, have led some to believe that a dangerous complacency has set in. Among those who believe that there is still much important work to be done is the now-senior researcher, Herbert Needleman. Needleman and his followers believe there is no safe level of bodily lead, that any amount of the toxin is a potential health hazard. To this end, they advocate eliminating as much of the existing lead paint as possible in residential housing. Many in this camp also support universal childhood blood lead screenings as a means to keep track of national health trends vis-a-vis lead. Although both the complete elimination of childhood lead poison and universal childhood blood lead screenings at one time enjoyed strong governmental support, these goals have to a large extent become victims of the success of the public health campaigns against leaded gasoline and lead-based paint.[192] With average blood-lead levels dropping to small fractions of former levels and deaths from lead-based paint now almost-unheard-of, the political will to undertake such massive public efforts has waned. Some medical experts argue that, with lead-health problems now largely corralled, there are better ways to spend health dollars.[193] In a reprise of earlier arguments, albeit at far lower levels of exposure, others contend that blood-lead levels of under the 10-20 ug/dl threshold are of little, if any, medical concern.[194]

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[192] At the behest of the George H.W. Bush Administration, the CDC in 1991 developed a plan to eliminate childhood lead poisoning. Until the election of Ronald Reagan in 1980, universal childhood lead screening was the official implementation goal of various Administrations vis a vis the Lead-Based Paint Prevention Act. For the former, see Denworth, *Toxic Truth*, 160. For the latter reference, see Warren, *Brush with Death*, 224-227, 234.
[193] Warren, *Brush with Death*, 237-238.
[194] Ibid, 238, Denworth, *Toxic Truth*, 201.

In the early decades of the 21st century, lead, the once-ubiquitous, seemingly indispensible metal of modern industrial civilization, has been largely swept into the corners of consumer life. This development, of course, has been due almost completely to the gray metal's highly toxic nature. While U.S. and international lead consumption have continued to expand slowly, its uses have been dramatically curtailed. In the U.S., the metal is no longer put into solder, pipes, wire sheathing, gasoline, or paint. It is still used in bird shot, although this use too has come under attack for its environmental impact and may be on the wane.[195] In the U.S., since the mid-1980s the percentage of total lead consumption devoted to lead-storage batteries has increased dramatically. By the early 2000s, batteries accounted for nearly 90 percent of all the lead consumed in the nation.[196] As between sixty and eighty percent of the lead used in storage batteries comes from recycled former batteries, the need for newly mined and smelted lead has decreased with the increasing devotion of the mineral to batteries.[197] With the rapid growth of car purchases in huge, developing economies like China's and India's, the near-term future of the effective, inexpensive-to-produce lead-acid battery seems relatively secure. The popularity of the lead-acid battery, in turn, secures the future of the global lead mining, smelting, and recycling industries. China, the economic blunderbuss of the past three decades, with its relatively low wages and lax environmental regulations, has emerged as the world's leading smelter of lead. With its increasing prominence in the inherently dirty industry of lead smelting, it is not surprising that China has experienced environmental

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[195] The lead shot can be ingested by animals that consume killed birds left in the wild; this can induce lead poisoning in those animals.

[196] USGS, "Lead Statistics and Information," http://minerals.usgs.gov/minerals/pubs/commodity/lead/ (accessed April 20, 2011).

[197] Earth 911.com, "Facts about Car Batteries, http://earth911.com/recycling/automotive/car-batteries/facts-about-car-batteries/ (accessed July 8, 2011).

problems. In 2009, in the city of Jiyuan, home to China's largest lead smelter, about 15,000 workers were forced to relocate after over 1,000 children exhibited excessive levels of lead in their blood.[198] In 2007, in an eerie reprise of a public health problem long considered dead, over ten million toys sold by Mattel Corporation had be recalled because they contained lead paint. The Chinese manufactures who assembled the toys for Mattel used lead paint because of it cheapness.[199]

Such recent incidents involving Chinese lead production and use in manufacturing serve to illustrate that while in developed countries such as the United States lead-health issues may appear to be largely a thing of the past, the imbrication of the still-useful metal in the global economy insures that people will continue to suffer from exposure to the substance's potent toxic properties. That suffering, however, has largely been shifted from economically advanced nations that have taken steps to protect lead workers and consumers, to less developed countries that are often loathe to put such standards in place for fear of losing their valuable lead industries or alienating poor consumers of inexpensive goods.

In northern Idaho's Coeur d'Alenes, home to intensive and extremely profitable lead and silver mining for over a hundred years and smelting for over sixty, the cleanup continues, thirty years after the Kellogg smelter's last shift call. Although the federal EPA Superfund cleanup already has exhausted thirty years and hundreds of millions of dollars, there is no end in sight. In the developed world, as eventually will be the case in

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198 Sara M. Bradford, "Lead Smelting Issues in China Could Impact Lead Acid Battery Market, *Frost & Sullivan Market Insight*, http://www.frost.com/prod/servlet/market-insight-top.pag?docid=183154997 (accessed April 21, 2011).
199 Denworth, *Toxic Truth*, *xv*.

portions of the undeveloped world, the bill for past environmental damages from lead mining and smelting will be coming due for a long time.

UNCLE BUNKER'S TOWN

Kellogg, Idaho lies at the heart of the Coeur d'Alene Mining District, one of the most productive lead, silver, and zinc districts in world history. But unlike other mining towns in the Coeur d'Alenes region of northern Idaho, Kellogg and its immediate environs were heavily industrialized. It boasted the Bunker Hill Company's impressive works: by the 1950s these included a large custom lead smelter, a zinc refinery, a huge lead-silver mine, and a sulphuric acid plant. In its long history, this fully-integrated plant, run by roughly 2,000 workers, produced tremendous quantities of both finished metals products and pollution.

Kellogg, however, was an afterthought. Until 1903, when the Bunker Hill and Sullivan Mining and Concentrating Company, better known to locals as "The Bunker" or "Uncle Bunker," completed a tunnel moving the mine entrance two miles northwest and connecting the town to its underground mine workings, Kellogg had been dwarfed by Wardner, its up-canyon neighbor. Bunker spent six years and considerable resources excavating the Kellogg Tunnel. The tunnel allowed the company to discontinue use of the unreliable and relatively inefficient aerial tramway system it had been using to transport ores from the mine to rail loading facilities.[200] The shift in physical proximity to the Bunker Hill mine entrance, however, heralded a reversal in the fortunes of the two communities. As miners and their families moved "down the hill" to Kellogg, which lay predominantly on the south side of the narrow valley carved by the South Fork of the Coeur d'Alene River, businesses, bars, schools and churches followed. Though named

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[200] Katherine Aiken, *Idaho's Bunker Hill: The Rise and Fall of a Great Mining Company, 1885-1981* (Norman, OK: University of Oklahoma Press, 2005), 17.

for the prospector Noah Kellogg, who in September, 1885 discovered the lead-silver lode that would become the Bunker Hill Mine, the city owed its growth, as it would much else in its history, to decisions of the Bunker Hill Company.

Although for some years Kellogg and Wardner were known locally as “The Twins,” within a decade of completion of the Kellogg Tunnel it was clear which sibling was going to be dominant. Whereas previously Bunker Hill letterhead had identified the company with both Wardner and Kellogg, by 1907 the reference to Wardner had been dropped.[201] In 1914, the Union Pacific railway changed the name of its local depot from Wardner to Kellogg and Bunker Hill Manager Stanly Easton informed the company’s main office in San Francisco that it now was “safe in addressing all your communications either telegraphic, postoffice, or express matter, to Kellogg.”[202]

Wardner, perched in a tight, snowslide-prone canyon, lost the only significant geographic advantage it had enjoyed over Kellogg – its proximity to the Bunker Hill Mine. From 1903 forward, the company had little reason to concern itself with the up-canyon town. Kellogg, on the other hand, became home to Bunker’s management office, much of its means of production and many of its workers. In addition, the city provided easy access to the railroad service that moved the company’s ores to distant smelters and markets. Located in a valley, albeit a narrow one, the city had room to expand to provide housing and services for additional workers. By 1928, either within or closely adjacent to Kellogg’s city limits, Bunker would build crushing mills, settling ponds, a major lead-

[201] Frederick Burbidge to John A. Finch, 17 December 1900, MG 367, Box 9, Folder 89 and letter from Stanly Easton to F.W. Bradley, 1 January 1907, Box 10, Folder 109, Bunker Hill Company Records. The 1900 letterhead listed “Mines and Works at Wardner, Idaho” and “Postoffice address Kellogg, Idaho” while the 1907 letterhead’s only geographic reference was to “Kellogg, Idaho.”
[202] Ibid., Stanly Easton to G.D. Abbott, 21 August 1914.

silver smelter, and a large zinc refinery. With so much at stake in the small, north Idaho mining and smelting community, it is no wonder that Bunker Hill took a strong interest in Kellogg's development.

Figure 1: Kellogg-Wardner Portion of a 1957 USGS Map of the Kellogg, Idaho Area

This chapter addresses the remarkable role played by the Bunker Hill Company in the development and maintenance of Kellogg, Idaho. It delves into the not-always-altruistic reasons underlying Bunker's extensive and varied efforts in the arena of corporate welfare and details and offers context for some of these endeavors; for instance, the company's longtime sponsorship of an "industrial YMCA," its support for the local activities of the Boy Scouts of America, its backing of decades' worth of annual Miners Picnics, and its patronage of the Wardner Industrial Union (WIU), the company union that provided Bunker workers with their only "union representation" from 1899-1942. The chapter also fleshes out the economic importance of Bunker for Kellogg and the Inland Empire, and what the mining and smelting economy meant for the town's, and region's, standard of living. Central to the questions raised by this chapter is the "company town" issue. While many Kellogg residents came to identify with their community's principal employer and benefactor to the extent that they nicknamed the company "Uncle Bunker," there nonetheless remained grievances that resulted in lengthy strikes in 1949, 1960 and 1977. Although Kelloggites undoubtedly appreciated Bunker's contributions toward the YMCA, local schools and hospitals, such gifts did not purchase universal silence over the issue of the company's acrid, landscape-scarring SO_2 emissions. Still, for decades there existed a reservoir of goodwill in Kellogg for Bunker Hill. This chapter explores the nature and scope of the benefits bestowed by the company that secured a not insignificant measure of the town's goodwill and loyalty.

While not a company town in the strictest sense, Kellogg in many respects resembled one from 1903 until the demise of Bunker Hill in 1982. Although definitions vary, the integral components of a company town include: ownership of all, or most, of the real estate by a single corporation; devotion of the community to a single industry; planning of the town's layout and architecture by a corporate entity; and concern for the welfare of employees that translates into forms of corporate welfare. In some of the more pure examples of company towns, such as Pullman, Illinois or Potlatch, Idaho, the corporation disallowed local politics and directly ran the communities, along with a large company store.[203] With the rise of industrial capitalism, large numbers of company towns sprang up around the world from 1830 to 1930.[204] While utopian wishes and concerns with social engineering colored a number of company towns, corporate desires to secure an ample, quiescent, non-union workforce was in almost all cases a hallmark of these social experiments.[205]

Kellogg resembled a company town in several respects: the Bunker Hill Company dominated the local economy and much of the town's population owed its livelihood directly to the company; until the 1950s, the company owned a considerable amount of local housing and rented and sold houses to many of its employees; Bunker Hill's property tax payments comprised a major share of local tax revenues; and the company's various forms of corporate welfare provided significant amenities to Kellogg residents. In other ways, however, Kellogg differed from a company town, or at least from that form's purer examples. There always remained a considerable amount of Kellogg real estate that was not owned by Bunker Hill. The company never was much-involved in city planning and did not attempt to impose a uniform architectural style in the town. Bunker did not oppose Kellogg's successful early 20th century efforts to incorporate and does not appear to have meddled much in city politics. And, as the mining community's protean drinking

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[203] Pullman Palace Car Company employees were required to live in Pullman, south of Chicago, and purchase their supplies from the company store. The town of Potlatch, located about ninety miles southwest of Kellogg as the crow flies, was founded by the Potlatch Lumber Company, a subsidiary of The Weyerhauser Corporation, in 1907. The town was created to house workers at the company's newly-constructed white pine sawmill, at the time the world's largest. In both Pullman and Potlatch, all of the real estate was owned by the respective companies. In addition, by company decree both towns were "dry."

[204] John S. Garner, ed., *The Company Town: Architecture and Society in the Early Industrial Age* (New York City: Oxford University Press, 1992), 3.

[205] Ibid., 8.

culture attests, the company did not waste its time trying to turn Kellogg into a dry community. Still, while Kellogg had more autonomy than a pure company town, the dominant role played by Bunker Hill in the town's economic life insured that it remained a species of company town, perhaps a cousin to the most traditional variety.[206] As Wendell Brainerd, editor of the *Kellogg Evening News* from 1945 through 1985 revealingly put it, "We're not going to come out against Bunker Hill. Bunker Hill is Kellogg. Kellogg is Bunker Hill."[207]

In turning Kellogg into a species of company town during the first decades of the 20th century, Bunker Hill executives F.W. Bradley and Stanly Easton were following an anti-union corporate strategy that already had proven its worth in the turbulent coalfields of southern Colorado. As Thomas Andrews shows in *Killing for Coal*, his groundbreaking history of the Colorado coalfield wars, coal company operators took note of the fact that the major "marching strike" of 1894 broke primarily upon the shoals of the company coal towns – places such as Rouse and Berwind -- where strikers proved unable to enlist sufficient numbers of colliers in their cause. Whereas in the "free-standing open camps" where most miners had built or owned their own homes, marching strikers garnered strong support, in the closed camps that had been built by the coal

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[206] Kellogg undoubtedly was more of a company town during the 1903-1942 period, when Bunker Hill workers were represented only by the Wardner Industrial Union, a company union, than it would be in the 1942-1982 period, when company workers were represented by, respectively, the International Union of Mine, Mill and Smelter Workers, the Northwest Metal Workers Association, and the United Steelworkers of America. During this latter period, the union served as a counterweight to company authority and identity. The union hall became a community center to rival the Bunker Hill-sponsored YMCA and Staff House. As signs of these shifts, in the 1950s the annual, Bunker-sponsored Miners Picnic died out and the company stepped back from its longtime role as a housing provider in Kellogg.

[207] Dwight Jensen, "The Loneliness of the Environmental Reporter," *Columbia Journalism Review*, January-February 1977, 40-42. Brainerd succeeded his father as editor of the newspaper, which served as Kellogg's only daily for many decades. In the article, Bunker President James Halley also revealed that the *Evening News* published basically anything the company sent it to print.

companies, and where workers generally rented housing or ground from the companies, the marchers were far less successful. Borrowing language from landscape geographer J.B. Jackson, Andrews labels the former communities "vernacular landscapes," and the latter "political landscapes."[208] The lessons of 1894 were not lost on Colorado's coal company chieftains. Andrews notes that,

> John C. Osgood [president of the Colorado Fuel and Iron Company, one of the largest operators in the southern fields] and his counterparts realized that they might easily have lost the strike. No less important, they noted the decisive role that closed camps had played in the companies' victory, when the marchers could move freely and talk openly, after all, they succeeded. But when they tried to take Rouse, Sopris, and other closed camps, the miners' mobilization stalled, and the strike was denied the critical mass it needed to prevail. Thus it was that Colorado mine operators came to embrace industrial paternalism…[209]

In the aftermath of the 1894 strike, Colorado coal companies went on a building spree. Determined to erase the vernacular landscape of the open camps with their wide-open streets and saloons – hotbeds of unionism they believed – and replace it with the political landscape of company towns, they set about doing just that. Doubtless mining company executives in the Coeur d'Alenes, beset by strikes and outbreaks of union violence throughout the 1890s, were well-aware of the successes their Colorado compatriots had recently enjoyed with the deployment of the company town. The response of Bunker Hill's Bradley and Easton was to attempt to forge in Kellogg a pro-company, "family town" that would form a bulwark against what they perceived as the radical unionism that flourished in the saloon-ridden, vernacular landscapes of such open camps as Wardner and Burke. Various, and often highly generous, forms of corporate

[208] Thomas G. Andrews, *Killing for Coal: America's Deadliest Labor War* (Cambridge, MA: Harvard University Press, 2008), 188.
[209] Ibid., 196.

welfare, would be essential to the company's strategy of turning the town into a stable, loyal working class community.

The Makeup of Kellogg

In 1890, five years after Noah Kellogg's big discovery, the prospector's namesake's population was only 324. A decade later, the town counted 823 residents, a paltry number compared to the 2,278 souls living in Wardner or the 2,265 residing eleven miles east in Wallace, the Shoshone County seat.[210] By 1910, however, following completion of the Kellogg Tunnel, Kellogg's population had nearly doubled to 1,552, while Wardner's had decreased to 1,369.[211] In 1920, Kellogg's surpassed its intra-county rival, Wallace, and never looked back. In 1930, the Census Bureau listed 4,636 persons living in Kellogg's two "precincts," versus a mere 939 in the "Wardner precinct."[212] Kellogg reached its population zenith in 1957, when it climbed to a size of approximately 5,900.[213] During the long strike of 1960, the population dropped to 5,061.[214] It continued to decline, reaching 3,417 in 1980, before the bottom fell out of the local economy in

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[210] U.S. Census Office, *Census Reports Vol. I, Twelfth Census of the United States Taken in the Years 1900: Minor Civil Divisions, Table 5 – Population of States and Territories by Minor Civil Divisions: 1890 and 1900*, 113 (Washington, DC).
[211] Ibid., *Thirteenth Census of the United States Taken in the Year 1910, Vol. II, Population Reports by States with Statistics for Counties, Cities and Other Civil Divisions, Alabama-Montana, Population – Idaho, Table 1*, 418-419 (Washington, DC).
[212] U.S. Bureau of the Census, *15th Census of the United States: 1930, Population, Vol. III, Part I, Reports by States, Showing the Composition and Characteristics for Counties, Cities, and Townships or Other Minor Subdivisions, Alabama-Missouri*, Table 21, 587 (Washington, DC, 1932).
[213] "Kellogg Population Estimated at 5,900," *Lewiston Morning Tribune*, November 9, 1957, 10.
[214] U.S. *Bureau of the Census, 1980 Census of Population, Volume I, Characteristics of the Population, Chapter A, Number of Inhabitants, Part 14, Idaho: Population of County Subdivisions: 1960-1980*, 12 (Washington, DC).

1982 with the closure of all Bunker Hill operations. Populations of 2,591 and 2,227 were recorded for, respectively, 1990 and 2000, in the onetime mining and smelting town.[215]

Shoshone County, home to scores of mines, including some of the world's most productive silver and lead mines, historically has been heavily dependent upon the mining industry. Like many mining regions, the Coeur d'Alenes initially attracted miners and laborers from all over the nation and the world. The 1900 Census showed that of a county population of 11,950, there were 3,149 foreign-born persons, slightly over a quarter of the total.[216] Of these, substantial numbers hailed from English Canada, Sweden, Germany, England, Ireland, and Italy.[217] By 1930, although the area no longer constituted a young mining district, there remained a fairly high male-to-female ratio along with a relatively elevated number of foreign-born persons. Of the county's total population of 19,060, 11,052 (roughly 58%) were male, and 3,608 (approximately 19%) were foreign born.[218] The 1930 Census also tabulated the number of offspring of "foreign born" parents, classifying them as foreign born even if only one of their parents had been born in a country other than the United States. By this standard, Shoshone County reported 5,197 foreign born persons, or over a quarter of the total population. Of these,

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[215] David Bender, "Tiny Idaho Cities Make Big Splash in Census," *Spokesman-Review*, February 3, 1991. The most recent estimate of Kellogg's population, ca. 2009, is 2,177. See http://idaho.hometownlocator.com/id/shoshone/kellogg.cfn (accessed August 16, 2011).

[216] U.S. Census Office, Census Reports Vol. I, Twelfth Census of the United States Taken in the Years 1900, Statistics of Population, Table 34, Foreign Born Population Distributed According to Country of Birth, by Counties, 744 (Washington, DC).

[217] U.S. Census Office, *Census Reports Vol. I, Twelfth Census of the United States Taken in the Years 1900, Statistics of Population, Table 34, Foreign Born Population Distributed According to Country of Birth, by Counties,* 744 (Washington, DC).The 1900 Census showed the numbers of foreign-born in Shoshone County to be, respectively: Canada (English), 521; Sweden, 427; Germany, 389; England, 341; Ireland, 296; Italy, 239.

[218] U.S. Bureau of the Census, *15th Census of the United States: 1930, Population, Vol. III, Part I, Reports by States, Showing the Composition and Characteristics for Counties, Cities, and Townships or Other Minor Subdivisions, Alabama-Missouri,* Table 11, 565 (Washington, DC 1932).

significant populations were descended from all of the ethnicities represented in the 1900 census, with the addition of a pair of new groups, Finns and Norwegians.[219]

Kellogg mirrored the broad patterns of the county. Of the 4,636 people residing in Kellogg's two "precincts," 2,620 (roughly 57%) were male and 894 (approximately 19%) were foreign born.[220] An additional 1,224 (26%) were born of one or more foreign parents.[221] Thus, in 1930, nearly every other person in Kellogg and Shoshone County was either foreign born or had at least one parent who was. There have been few black or Asian permanent residents of Shoshone County during its existence.[222] The 1890 Census reported the presence of 44 "colored" people in a total county population of 5,179, but by 1930 that number had plummeted to 6.[223] Although it is difficult to know with certainty its exact ethnic composition, it seems that Kellogg's population, like that of Shoshone County as a whole, was comprised primarily of a reasonably wide spectrum of white ethnicities. Julie Whitesel Weston, who grew up in Kellogg in the 1950s and early 1960s, recalled émigrés from Finland, Wales, Poland, Croatia, England, Mexico, and following the failed 1956 uprising, Hungary. Most vividly she experienced her hometown as "full of big Italian families."[224]

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[219] Ibid., Table 19, 575. I define "significant populations" as those of 300 or more. Roughly the same ethnic patterns held as were present in the 1900 Census. They were are as follows: Canada – Other [all but French Canada], 752; Germany, 730; England, 531; Sweden, 492; Finland, 373; Italy, 355; Norway, 353; Irish Free State, 313.

[220] Ibid., Table 21, 587.

[221] Ibid.

[222] The highest, albeit temporary, populations of African-Americans were likely achieved when an all-black Army unit was stationed in Shoshone County following the labor violence of 1899.

[223] U.S. Census Office, *Compendium of the Eleventh Census: 1890, Part I – Population, Table 13,* 481; U.S. Bureau of the Census, *15th Census of the United States: 1930, Population, Vol. III, Part I, Reports by States, Showing the Composition and Characteristics for Counties, Cities, and Townships or Other Minor Subdivisions*, *Alabama-Missouri*, Table 11, 565 (Washington, D.C, 1932).

[224] Julie Whitesel Weston, *The Good Times Are All Gone Now: Life, Death, and Rebirth in an Idaho Mining Town*, (Norman, OK: University of Oklahoma Press, 2009), 31, 33.

Labor Strife Molds Bunker Hill – Kellogg Relationship

Bunker Hill Company President F.W. Bradley was scarred, both literally and figuratively, by the labor wars of the 1890s. Bunker Hill originally brought Bradley, who graduated from the University of California at Berkeley in 1885 with a degree in mining engineering, to Kellogg in 1890 to serve as Assistant Mine Manager. In 1893, he became Mine Manager and in 1897 Bradley ascended to the company presidency, a position he would hold until his death in 1933. On November 17, 1904 a bomb ripped through the front door of Bradley's home in San Francisco. The blast destroyed the entire front of the house and threw the mining company head out onto the street. Deaf and blind for two months following the explosion, Bradley carried scars on his face and body for the rest of his life.[225] Western Federation of Miners (WFM) member Harry Orchard later confessed to planting the bomb that nearly killed Bradley. Orchard claimed the WFM carried out both the attempt on Bradley's life and the successful assassination of former Governor Frank Steunenberg a year later in revenge for the union's defeat during the 1899 labor war in the Coeur d'Alenes Mining District.[226]

The first labor violence in the Coeur d'Alenes occurred in 1892 in Burke Canyon, an intensively-mined area lying roughly fifteen miles northeast of Kellogg. The announcement of district-wide wage cuts, effective April 1, 1892, prompted miners to go on strike. Mine owners responded by hiring scabs and shortly thereafter Judge James Beatty issued an injunction that severely curtailed the ability of local unions to act in

[225] Aiken, *Idaho's Bunker Hill*, 48.
[226] Ibid., In his confession, Orchard also admitted to having planted the bomb that killed Steunenberg in 1905. That bomb was attached to the yard gate of the former governor's Nampa, Idaho home.

opposition to the operation of the mines. On July 11, 1892, company guards and union men at the Gem Mine and the Frisco Mill exchanged shots, and a dynamite explosion destroyed part of the Frisco Mill. When the smoke had cleared, five men were dead: three union men, a detective, and a non-union worker.[227] The following day Idaho Governor Norman B. Willey declared martial law in Shoshone County. The military then constructed "bullpens" to incarcerate those – namely miners -- deemed a threat to public order.[228] Discovering himself surrounded by a large union force during the disorder, Bunker Hill Manager Victor Clement promptly offered to close down the mine. On July 19, 1892, a week after the violence, Bunker Hill became the first operator in the District to reopen.[229]

Tensions continued in the District throughout the 1890s. On July, 10, 1895, fire destroyed the houses of three local businessmen known to support Bunker Hill, considered by unionists to be "the last bastion of managerial hegemony in the region."[230] An explosion at the company's flume, coupled with a fire at the mill, took place on May 10, 1896. Though the apparent effort to destroy the Bunker Hill mill proved unsuccessful, destruction of the flume might well have prevented the company from effectively fighting the mill fire.[231] In 1899, labor violence in the Coeur d'Alenes reached a crescendo. As the only mine operator in the District paying below the standard rate of three dollars per hour to shovelers and three-fifty per hour to miners, Bunker Hill was a natural target for union

[227] Aiken, *Idaho's Bunker Hill*, 12.
[228] Ibid.
[229] Ibid., 13.
[230] Ibid., 21, 25.
[231] Ibid., 25-26.

vehemence.[232] On April 29, 1899, organizers lost control of a labor protest. Union men hijacked a Union Pacific train at Burke and drove it to Wardner, where they exchanged gunfire with a Bunker Hill watchman. Bunker's ore concentrator, valued at a quarter of a million dollars, was dynamited and completely destroyed; the company's Kellogg offices were burned to the ground. The violence left one union and one non-union worker dead.[233] Democratic Governor Frank Steunenberg, an ally of the mine operators, immediately declared martial law in the District. On May 4, federal soldiers took control in the Coeur d'Alenes. They began building bull-pens and liberally incarcerating not only unionists but local People's Party officials and members, believed to be union supporters.[234]

Although Bunker Hill quickly rebuilt its mill and fully resumed its operations, F.W. Bradley and other top company officials remained deeply affected by the labor strife of the 1890s. For decades, a principal lens through which Bradley and Stanly Easton,[235] Bradley's longtime right-hand man, judged workers and local citizens was by where they stood in 1899 – with or against the company. Perennially anti-union, Bradley believed the WFM to be the worst of a bad lot, repeatedly referring to them simply as "dynamiters." The Bunker Hill chief viewed the pro-union Populists and Populist-Democrats, who had gained control of numerous Shoshone County offices during the 1890s, as nearly as harmful and dangerous as their union allies. Bradley, a lifelong

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[232] Aiken, *Idaho's Bunker Hill*, 27.
[233] Ibid.
[234] Ibid., 32.
[235] Stanly Easton, like Bradley a UC-Berkeley-trained mining engineer (Class of 1895), came to work for Bunker in 1902 as Assistant Mine Manager. In 1903, Easton was promoted to Mine Manager, a position he would hold until Bradley's death in 1933. In that year, Easton assumed the Company presidency. Easton served as Bunker Hill President until 1954 and as the company's Chairman of the Board of Directors from 1954-1958, when he retired.

Republican, closely followed Shoshone County politics and almost invariably directed company campaign contributions to what he perceived as safe, law-and-order GOP candidates.

Following the troubles of 1899, Bunker Hill adopted a two-pronged approach to labor and community relations. On the labor front, the company adopted a hard, anti-union stance. Joining with other District mining companies and working through the Mine Operators Association (MOA), Bunker helped to establish and finance an employment office responsible for screening all potential employees to ensure that no WFM members were hired. In order to receive a permit for employment in the Coeur d'Alenes, a worker had to take an "ironclad oath" foreswearing union membership. Company physician and County Coroner Dr. Hugh France served as the ultimate gatekeeper in this process. It was impossible for a worker to gain employment from a mining company in the District without a permit signed by France.[236] A common source of complaint in letters between Bradley and Easton concerned the failure of other mining companies in the District, and particularly the Guggenheim-controlled Federal Mine, to faithfully use the employment office for all their hiring. The Bunker Hill chieftains looked askance on examples of such negligence, worried at the likelihood that it would reawaken the scourge of labor radicalism in the mining district.[237] Another aspect of Bunker's hard approach to labor relations was its hiring of Pinkerton detectives, from the 1890s through at least the first decade of the 20th Century in order to infiltrate local labor

[236]Aiken, *Idaho's Bunker Hill*, 32.
[237] Easton to Bradley, 13 September 1912, 28 September 1912, and 12 December 1912, MG 367, Box 10, Folder 119, Bunker Hill Company Records, Special Collections, University of Idaho Library.

organizations and report back to the company on their plans and activities.[238] Company officials undoubtedly viewed the ability to spy on labor organizations as an important weapon in their ongoing struggle against what they perceived as radical labor elements in the District.

The other major aspect of Bunker Hill's approach, however, was in the vein of developing corporate welfare. It issued from essentially the same motivation as did Bunker's tougher approach – to keep radical labor groups such as the WFM and the Industrial Workers of the World (IWW) from gaining a foothold in the Coeur d'Alenes generally, and in Bunker Hill operations, more specifically. However, this tactic represented a fundamental effort to develop a loyal and quiescent workforce by associating the company with efforts both on direct behalf of employees and also on behalf of making Kellogg a more desirable place to live. Andrea Tone, a scholar of American corporate welfare, or "welfare capitalism" as she refers to it, identifies the strategy as a fundamentally conservative business response to the public welfare proposals of the Progressive Era (1900-1920), referring to the practice as "…a system of labor control that also was an anti-statist scheme."[239] Supporters of welfare capitalism contended that the opportunities it provided to (male) employees to "earn" pensions, stockholding plans, and other forms of property were inherently preferable to the intrinsically emasculating handouts provided by state welfare programs.[240] It was a system that caught on quickly. By 1914 over 1,500 U.S. firms were engaged in some

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[238] Aiken, *Idaho's Bunker Hill*, 12, 51 and Easton to Bradley, 13 May 1906, Bradley to Easton, 18 May 1906, MG 367, Box 9, Folder 107, Bunker Hill Company Records, Special Collections, University of Idaho Library.

[239] Andrea Tone, *The Business of Benevolence: Industrial Paternalism in Progressive America* (Ithaca, NY: Cornell University Press, 1997), 52.

[240] Ibid., 42.

form of welfare. The lion's share of these corporations were large – 79% of them had over a thousand employees and the average firm practicing corporate welfare employed more than 7,500 workers.[241]

Corporate welfare took a wide variety of forms, including the ten hour day for women; thrice- daily "rejuvenating" calisthenics breaks; "free" hot lunches; lavishly decorated rest areas; health insurance, sick benefits and pensions; roof gardens; health and occupational safety plans, and stock-sharing plans.[242] Though undoubtedly there was genuine goodwill involved in some corporate welfare efforts, most practitioners seem to have viewed welfare primarily as a sound business decision. As Tone writes, "Employers adopted welfare work because they believed that for a variety of reasons, sympathy within the workplace paid."[243] Among corporate welfare's general goals were the recruitment and retention of a labor force, securing heightened levels of labor productivity, and diminishing the likelihood of labor unrest.[244] Employers believed that corporate welfare efforts would create a more satisfied, quiescent workforce, in part by addressing the problem of "corporate estrangement" from workers that had developed with the rise of large, impersonal corporations. Through their welfare work, corporations hoped to "renew the personalism of small firms within the colossal aggregations of Progressive America…Its philosophy of congeniality, propagated in company newspapers, speeches, posters, and songs, suggested mutuality and even familial love.

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[241] Tone, *The Business of Benevolence* , 52, 54. Interestingly, the move toward "corporate welfare" occurred nearly a century earlier in the British coal country, where by the 1830s "coal owners increasingly viewed education, religion, and benefit societies as important means of securing a stable, as well as a deferential workforce." See James Alan Jaffe, *The Struggle for Market Power: Industrial Relations in the British Coal Industry: 1800-1840* (Cambridge, UK: Cambridge University Press, 1991), 89.
[242] Tone, *The Business of Benevolence*, 33, 35-37.
[243] Ibid., 63.
[244] Ibid., 65.

The logic of welfare capitalism dictated that increasing distance between worker and owner could be relieved partially by weekend picnics in which both parties intermingled freely…"[245]

Bunker Hill's longstanding practice of a wide range of corporate welfare strategies largely accords with Tone's description of national trends in the area. The time frame within which the company initiated many of its welfare efforts fits with the period (i.e., 1900-1920) within which the bulk of such efforts took place nationally. With its politically conservative management team of Bradley and Easton at the helm, Bunker also undoubtedly would have supported the anti-Progressive, anti-statist bent of the initiative. Coming directly on the heels of a period of extreme labor violence in the Coeur d'Alenes, however, the motives behind Bunker's welfare efforts would have been geared more directly toward promoting non-unionism and labor peace than toward other goals. Another difference from the norm lies in the duration of Bunker's welfare programs in Kellogg. While corporate welfare programs nationally largely dropped all but their pecuniary benefits by the late 1920s – particularly insurance, stockholding plans, and pensions – Bunker Hill continued many of its forms of welfare through the late 1970s and early 1980s.[246] Although Bunker did conform to the larger trend by adding an employee stockholding program in the mid-1920s, among the ways that it broke with the trend was through the continuance of its support for Kellogg's "industrial YMCA" through 1979. The company's "bucking of the trend" in this instance likely has something to do with the

[245] Tone, *The Business of Benevolence*, 57.
[246] Ibid., 241.

relatively isolated, rural character of Kellogg and also the tradition of the "special relationship" that developed between that one-industry town and its benefactor.

Part of Bunker Hill's corporate welfare policy involved lavishing support on the Wardner Industrial Union (WIU), the "company union" that Bunker established in the wake of the 1899 debacle. For F.W. Bradley, the company-sponsored Industrial Union acted both as a kind of insurance policy and as a litmus test for Bunker Hill, simultaneously protecting the company against labor violence and identifying those workers who could and could not be trusted. The Bunker president wanted to enroll all company workers as members of the Industrial Union, since "…we can take it for granted, that all employees who are not members of it, are not heartily in sympathy with us; that is, that if there are a hundred Western Federation men in our mine, they are surely not members of the Wardner Industrial Union."[247] Not surprisingly, Bunker Hill gave financial support to the Union. At the inception of the union, in September, 1899, Bunker Hill Manager Frederick Burbidge proposed that the company would match employee donations to the union on a monthly basis.[248] When in 1905 Bunker sent the WIA a check for $1,257.25, company Manager Stanly Easton offered his hopes that the union would "…continue to prosper and I would be very glad to hear of an increase in its membership."[249] Although during its decades of existence, Bunker Hill would claim that

[247] Bradley to Frederick Burbidge, 18 May 1900, MG 367, Box 9, Folder 104, p. 1, Bunker Hill Records.
[248] Burbidge to F.W. Bradley, 26 September 1899, MG 367, Box 8, Folder 86, Bunker Hill Company Records, Special Collections, University of Idaho Library.
[249] Easton to C. W. Evans [Financial Secretary, Wardner Industrial Union], 6 October 1905, MG 367, Box 9, Folder 106, Bunker Hill Records.

the WIU was a legitimate bargaining agent, there is little evidence that the ersatz union ever did more than submit mostly toothless requests to the company.[250]

Although Bunker appears to have been among the first to occupy the field, numerous corporations sponsored company unions between 1898 and 1937. The first major company to establish a company union was the Boston-based Filenes department store chain. In 1898, Filenes set up the Filene Cooperative Association, "to enable all of the employees of the corporation to have a sufficient voice in the store government and administration to make it just, considerate and effective."[251] Probably the most famous company union, however, was the Colorado Fuel and Iron Company's Employee Representation Plan, introduced at the behest of the company's leading shareholder, John D. Rockefeller, Jr., in the wake of the 1913 Ludlow Massacre. The younger Rockefeller turned to company unionism along with an extensive corporate welfare program, in the Colorado coalfields, in an effort to prevent future union-management conflict. In their heyday, company unions spanned several hundred firms and represented perhaps half a million workers.[252] Although it has been argued that these ersatz unions represented, "…the principal institutional link between the ambitious innovations in production and personnel management of the pre-World War I years and the less sweeping but inclusive changes in industrial management and worker organization associated with New Deal

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[250] Aiken, *Idaho's Bunker Hill*, 80-81, 106-107. Under the pressure of New Deal support for unionization and the popularity of the International Union of Mine, Mill and Smelter Workers in the mid-1930s, Bunker allowed the WIU to form an Employee Representation Committee to meet with company officials and make formal requests. Bunker denied the Committee's more costly requests for more pay and paid vacations, while honoring some that were less expensive to meet – for example, to discontinue during the noon hour lunch break and for more showers at the Wardner dry.

[251] Daniel Nelson, "The Company Union Movement, 1900-1937: A Reexamination," *The Business History Review* 56, no. 3: 339.

[252] Nelson, "The Company Union Movement, 1900-1937," 336.

initiatives and labor militancy in the late 1930s and 1940s,"[253] there is scant evidence that the Wardner Industrial Union ever significantly affected Bunker Hill's important management decisions. Company unions were outlawed under Section 8(a)(2) of the 1935 Wagner Act. The Act made it illegal for an employer to interfere with the formation or administration of any labor organization or contribute financial or other support to it. In 1937, the U.S. Supreme Court ruled in favor of the law, evidently putting the *coup d'grace* on company unions. A few such unions, including the WIU, sputtered on for a while longer, however, but their time was clearly at hand.

In another instance of Bunker Hill's paternalism, in an era long before Social Security and Medicare, F.W. Bradley wanted to insure that "employes who have grown old in our service and who have made good" did not go destitute. He therefore proposed that such workers be given continued employment by the company as fire watchmen or as janitors, or that they could continue mining in "some easy lease" to ground in the Bunker Hill Mine "whereby they may safely make a living."[254] Bradley's concern with the welfare of loyal, older workers evidenced both a humanitarian streak in the company president and also was part of his ongoing determination to reward "good employees" and to cultivate a loyal workforce.

In addition to its efforts to foster a company-friendly workforce, Bunker engaged in a host of efforts, most centered on Kellogg, aimed at improving the quality of life in the blue collar community. The company provided electric power and water to the communities of Wardner and Kellogg from the early 1900s until well after World War II;

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[253] Nelson, "The Company Union Movement, 1900-1937," 336.
[254] Bradley to Easton, 17 March 1911, MG 367, Box 10, Folder 117, Bunker Hill Records.

built the first school house in the area and deeded it to the community, and leased, and later donated, land on its property for Kellogg's second school, the Lincoln School. Bunker also constructed the first and second hospitals in the area, the first in Wardner and the second, built in 1908 at a cost of $12,000, in Kellogg, and donated the land and water system for the third hospital, the Shoshone Medical Center, built in 1957-'58, and for decades ran boardinghouses for single employees, both in Wardner and Kellogg.[255] Bunker Hill made donations to churches, thinking these institutions a good influence on local culture; hired scores of local youths for summer work; and from 1952-'81, in tandem with fellow mining giant Hecla, gave out hundreds of college scholarships that helped local students to attend Idaho colleges and universities.[256] For a number of years, the company also owned the local newspaper, *The Wardner News*.[257] When, in April, 1917, Bunker was faced with a U.S. Postal Service requirement that as the newspaper's owner it publish a list of all stockholders with over one percent of its stock, the company sold the paper to its publisher, W.L. Penny. Easton, however, told Bradley that there was no cause for concern, as, "Our relations with the paper will be just the same, having a mortgage on it and being its chief patron in the way of job printing, as though the outfit was owned by us as at present."[258]

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[255] Ray Chapman, *Uncle Bunker: Memories in Words and Pictures* (Kellogg, ID: Chapman Publishing, 1994), 24-25.
[256] "Minutes of Meeting – Trustees – Hecla-Bunker Hill Scholarship Fund," 27 April 1977, MG 367, Box 14, Folder 224, Bunker Hill Company Records, Special Collections, University of Idaho Library. From 1952-1977, the scholarship fund donated $165,399.41 to local students. Until a 1970s Internal Revenue Service ruling sidelined the practice, preference was given to local students who either were themselves current of former Bunker employees or whose parents enjoyed that status.
[257] Easton to Bradley, 25 April 1917 and Bradley to Easton, 28 April 1917, MG 367, Box 10, Folder 128, Bunker Hill Company Records, Special Collections, University of Idaho Library.
[258] Ibid.

The company's biggest contribution almost certainly was its construction and maintenance of a YMCA-administered "industrial recreation facility" in uptown Kellogg for company workers and community members. The "Y" would be a community fixture for nearly seventy years.[259] On February 1, 1910, Bradley authorized Easton to proceed with construction of the two-story YMCA building "on the basis of cost of $26,000, although I presume this means, with furnishings, an ultimate cost of what I hope will not exceed $30,000."[260] The red brick facility opened to the public in December, 1910. A formal dedication ceremony in February, 1911 included members of the company's Board of Directors and prominent stockholders. Bunker leased the top floor of the building to the Wardner Industrial Union.[261] Offering club rooms, reading and library facilities, a gymnasium, swimming pool, showers, bowling alleys and other recreational equipment, the elaborate new facility bore more than a passing resemblance to an urban gentleman's club or a small college.[262] Over the years, Bradley and Easton corresponded extensively about the YMCA and appear to have taken great pride in it.

Bunker Hill seems to have treated running and maintaining of the YMCA facility as a normal cost of doing business, despite the fact that the venture always remained, as expected, a big money loser.[263] In addition to constructing the YMCA building, Bunker contributed substantial sums to the annual maintenance of the facility and paid the

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[259] Ray Chapman, *History of Kellogg, Idaho, 1885-2002*, Chapman Publishing, Kellogg, Idaho (2002), 12. The Y.M.C.A. building was shuttered in 1979 when, due to fire and handicapped regulations, it became cost-prohibitive to maintain.
[260] Bradley to Easton, 1 February 1910, MG 367, Box 10, Folder 115, Bunker Hill Records.
[261] Ibid., 15 February 1911.
[262] R.D. Wilder, "Kellogg's Industrial Y.M.C.A.," *The Engineering & Mining Journal* (*E&MJ*), August, 1939, 81.
[263] The company collected rent from the Wardner Industrial Union, but this amount did not come close to covering its expenses for the facility.

YMCA director's salary.[264] In October 1917, Easton suggested to Bradley the advisability of adding a third story to the YMCA building, "for lodge and other social meetings," at an estimated cost of up to ten thousand dollars.[265] The new floor's rooms were to be leased and furnished by the WIU. In approving Easton's idea, Bradley mentioned his belief that construction of the third story would, "…add another favorable 'tie' in our relations with our own crew and the community."[266] In a similar vein, in 1918 Bunker Hill began construction of a Staff House, located directly across McKinley Avenue from its Kellogg corporate offices. The Staff House contained temporary lodgings for miners and managers recently hired by the company and also provided space for social events such as wedding receptions, tea gatherings, and Christmas parties for town businesses.[267]

In October, 1924, the Kellogg YMCA, with Bunker Hill's moral and financial support, branched out into another area of community improvement by opening a night school. Boasting a faculty of at least six, and offering courses in Citizenship, English, Geology and Mineralogy, Mathematics, and Mechanical Drawing, the school charged only nominal fees and was open to all adult community members. Stanly Easton was optimistic that enrollments would reach one hundred for the school's first term.[268] Two years later, however, in a letter to Bradley listing the course offerings for the coming

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[264] Easton to J.S. Wallace [F.W. Bradley's personal assistant], October 20, 1917, MG 367, Box 10, Folder 130, Bunker Hill Records. In the letter, Easton pointed out that the YMCA's "overdue bill" of $434.75 "represents a donation made by this Company, to the association." "Bunker Hill & Sullivan M & C Co Kellogg Salaries," MG 367, Box 10, Folder 126, Bunker Hill Company Records lists the salary of J.E. Sturtevant, the YMCA Director, as $125 for January, 1916 and $155 for November, 1916.
[265] Easton to Bradley, October 1, 1917, MG 367, Box 10, Folder 130, Bunker Hill Records.
[266] Ibid., Bradley to Easton, October 5, 1917, Bunker Hill Records.
[267] Ibid., Easton to Bradley, December 21, 1917, Weston, *The Good Times Are All Gone Now*, 147.
[268] Easton to Bradley, received October 21, 1924, MG 367, Box 12, Folder 149, Bunker Hill Company Records, Special Collections, University of Idaho Library.

winter term of the Night School, Easton expressed his disappointment at the school's past low enrollment, stating that, "…the interest of our employes [was] not what it should be, too many counter attractions and not enough ambition for improvement, the attendance has run about forty, we should have two hundred forty easily."[269] Despite Easton's frustrations with the level of interest in the Night School, however, he and Bradley continued to support it. This support evidently was justified; by the late 1930s the school's enrollment was averaging between two hundred and three hundred per year, with roughly equal numbers of men and women taking classes.[270] Perhaps some of the credit for the school's heightened popularity lay with its increased emphasis on vocational education – by the late 1930s courses in determinative mineralogy, carpentry, machine work, drafting, automobile mechanics, and shop mechanics were included among its vocational offerings.[271] The school, however, continued to offer some "purely academic and cultural" courses, and also, owing to the desire to "Americanize" the relatively large number of foreign-born workers hired by Bunker Hill, citizenship and remedial English classes.[272]

Bunker Hill's "industrial YMCA" appears to have filled many niches in Kellogg and outlying communities in the Coeur d'Alenes. In 1938, a registered YMCA membership of 1,200 and a user community of 2,000, enrolled in nearly 200 organized activity and program clubs. Many of these were youth groups, led by an estimated fifty volunteer group leaders. Among the youth groups was Hi-Y, the national organization's

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[269] Easton to Bradley, 8 October 1926, MG 367, Box 12, Folder 154, Bunker Hill Records.
[270] R.D. Wilder, "Kellogg's Industrial Y.M.C.A.," *E&MJ*, August, 1939, 82.
[271] Ibid.
[272] Ibid.

high school fraternity, which in Kellogg catered to both girls and boys.[273] In the brief, but often glorious, north Idaho summer, residents of the Coeur d'Alenes naturally turned their attentions to outdoor recreational opportunities, and the YMCA moved to accommodate their interests, sponsoring baseball, softball and other sports leagues, an aquatic program at the city's outdoor pool, and a summer camping program for boys and girls at a mountain campsite twenty miles from Kellogg.[274] In 1916 Bunker Hill donated the land and money to lay out the YMCA's baseball fields, bleachers, and playground equipment. F.W. Bradley had mentioned to Stanly Easton that he wanted "the Y.M.C.A. to make a big play yard of the tract of bottom land between the old school house and the O.R. & N. Railroad [UP] track…substantial bleachers could be put up, and baseball grounds laid out in attractive shape."[275] As often was the case with Bunker Hill largesse, the gift was more than a little tinged with the desire to pacify a potentially restless laboring population. Prefacing his suggestion to donate the land and money for the YMCA "play yard," Bradley's letter to Easton noted, "…that there might be a feeling of unrest around Kellogg, because of the boosting the Spokane and other papers are indulging in regarding the profits being earned by the lead and zinc mines, etc."[276] Indeed, during World War I, the lead mining company experienced record profits. Given Bunker's history with serious labor unrest, it is perhaps not surprising that the company would opt to plow a portion of those profits back into recreational opportunities for the

[273] Wilder, "Kellogg's Industrial Y.M.C.A.," 82.
[274] Ibid.
[275] Bradley to Easton, 13 January 1916, MG 367, Box 10, Folder 125, Bunker Hill Records.
[276] Ibid.

community that housed its plant and equipment and whose workingmen supplied the bulk of its ore.

Kellogg was hardly the only American community to boast an industrial YMCA, although it's undoubtedly persisted longer than most. In the 1870s the organization and railroad executives came together in an effort to combat the problem of an increasingly restive, class conscious workforce. The result was the creation of "railroad YMCAs." These facilities, located along the railroad lines, were meant to offer, like the company town and other forms of corporate welfare, a moral, uplifting alternative to saloons and brothels. In the words of Thomas Winter, historian of the YMCA's work in this field, "Railroad YMCAs…provided a place for leisure and for time spent between 'runs,' offering overnight accommodations and meals – all in combination with non-denominational religious work."[277] In 1903, at the behest of manufacturing concerns, the YMCA decided to expand its programs to urban, industrial workmen. By 1906, the organization's recently-established Industrial Department had established industrial associations in twenty-four locations spanning eight states.[278] By 1921, at perhaps the movement's high watermark, 218 YMCA officials served workers in urban industries and 226 catered to the needs of the nation's railway workers.[279] Companies often paid for an association building. Bunker Hill's costs in this regard were in the middle range; in 1905, a typical YMCA building usually cost between $10,000 and $50,000.[280] In addition, corporations and local membership dues needed to pay for the facility's upkeep and the

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[277] Thomas Winter, *Making Men, Making Class: The YMCA and Workingmen, 1877-1920* (Chicago: The University of Chicago Press, 2002), 30.
[278] Ibid., 33.
[279] Ibid., 90.
[280] Ibid., 39.

salary of a local YMCA secretary, a trained YMCA employee who ran the facility. For their money, corporations could expect the YMCA to provide, "…an ideal of Christian manhood to the workers…Once the workers adopted a higher ideal of manhood, rooted in values of Christian brotherhood and service…workingmen would abstain from political radicalism and labor unrest."[281] Despite their appeal to corporate managers, the industrial YMCAs also held an attraction for many workers, who as a rule were expected to contribute to their maintenance. Winter notes that, "In the name of social harmony and respectable manhood, craftworkers felt that a union would have to exercise certain edifying and uplifting influences over its members,,.YMCA programs…[involved] them in a web of uplifting activities, all of which were designed to make them better men and more loyal employees."[282] As was the case in Kellogg, workers commonly participated in governing the local YMCA. Local support for the industrial YMCAs was often strong -- it was in Kellogg -- even if workers often interpreted the meaning of the institution differently than did company bosses.

Industrial YMCAs were underwritten by essentially the same broad goals and purposes that, at roughly the same time, inspired other forms of corporate welfare and company towns. All were part of a project aimed at undermining a masculine working culture, centered on the workplace and the saloon, that enshrined mutualism and solidarity, and placed a premium upon a masculine assertiveness toward the boss. The industrial YMCA sought to supercede that workingman's culture with a culture in which responsible, sober, Christian manhood would bond together workingmen and their

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[281] Winter, *Making Men, Making Class*, 7.
[282] Ibid., 65.

corporate managers as Christian brethren and men of character. In this relationship, the familial, sentimental values of the YMCA would dominate workers' relations with their corporate superiors, while company officials would be free to follow the logic of the marketplace in their workplace relationship with workers.[283] Although YMCA officials may, as Winter contends, have wished to "harness the forces of industrialization to their own project, creating a society in which Christian manhood would serve as a matrix for social order – a society in which moral, pious men, regardless of social standing, would self-sacrificingly cooperate in the production of industrial wealth, while bringing about the kingdom of God on earth," it is doubtful that many workingmen were taken in by the obvious double-standard they were being pitched.[284]

The industrial YMCA movement undoubtedly received a public relations boost when, in the aftermath of the 1913 Ludlow Massacre, John D. Rockefeller, Jr., embraced it as one of the Colorado Fuel and Iron Company's (CF & I's) primary stratagems for warding off further labor troubles. CF & I authorized funding for YMCA industrial secretary Clarence Hicks to go on its staff full-time as head of the company's employer-employee relations. At CF & I, the YMCA developed one of its largest operations at a single company. The company appropriated $80,000 for buildings and equipment and $20,000 annually for maintenance. CF & I quickly established industrial YMCAs at nine of its mining camps.[285]

By the 1920s the railroad and industrial YMCA movements were running out of steam. After 1920, many companies curtailed their support for YMCA's industrial

[283] Winter, *Making Men, Making Class*, 12, 61.
[284] Ibid., 14.
[285] Ibid., 40-41.

welfare services, "as they increasingly shifted their support to trained industrial relations experts, sometimes setting up in-house Departments to handle this."[286] Remarkably, however, despite the national trend, Kellogg's industrial YMCA persisted as an integral community organization into the late 1970s. This probably was due principally to the community's small size, isolation and relative lack of other recreational and adult educational opportunities.

For much of the 20th century, a remarkable feature of life in Kellogg was the fact that Bunker Hill employees could rely upon the company to take care of their housing needs. The most fortunate were supplied, *gratis*, with houses owned by Bunker, others rented at low rates, and sizable numbers utilized low interest company-financing to purchase homes from Bunker Hill. Discussing a 1916 census of Bunker Hill employees, Stanly Easton noted that in addition to the thirty-two percent of company employees who were homeowners, "it is well to remember that quite a number of our employees have homes furnished gratis by the company."[287] In a 1921 feature on Bunker, the eminent mining writer T.A. Rickard described the company's policy to encourage homeownership among its employees, explaining that Bunker leased up to an acre of land to employees for a dollar a year; lent them the money to build or purchase a home at six percent interest when the banks charged eight to twelve percent; or lent them the materials to build their

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[286] Winter, *Making Men, Making Class*, 147.
[287] Easton to Bradley, 18 March 1916, MG 367, Box 10, Folder 125, Bunker Hill Records. For a basis of comparison, the national homeownership rate in 1910 was 45.9%, see U.S. Census Bureau, Census of Housing, "Historical Census of Housing Tables: Homeownership," http://www.census.gov/hhes/www/housing/census/historic/owner.html (accessed September 8, 2011).

own homes at the same six percent rate of interest.[288] Recalling his experiences as a young miner in the 1920s, Julian Marshall gave personal credit to Stanly Easton for enabling him to secure a home in Kellogg at little expense, noting that, "In 1922, he [Easton] gave me a lease on a fifty-foot lot at W. 624 McKinley Avenue in Kellogg on which I built a five-room frame house for $3,100. I didn't have to put a dime down. The Bunker Hill financed the entire deal and my monthly payments were nominal."[289]

Bunker Hill remained heavily involved in the Kellogg housing market until the mid-1950s, when, under the direction of new company president John D. "Jack" Bradley, the company put much of its housing stock up for sale.[290] In June, 1956, the company announced that it was going to sell 80 single family residential units and begin renting its remaining 160-odd properties for close to market rates.[291] The houses put up for sale were offered first to their residents, who, if they did not wish to purchase, were permitted to rent from the company at increased rates. President Bradley portrayed Bunker's move out of the housing business as a means both to promote "free enterprise real estate development in Kellogg," which Bradley believed long had been stifled by the company,

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[288] T.A. Rickard, "The Bunker Hill Enterprise: An Account of the History, Development, and Technical Operations of the Bunker Hill & Sullivan Mining & Concentrating Company at Kellogg, Idaho," *Mining and Scientific Press,* 1921, 143.

[289] "Bunker Hill and District Recalled in Feature," *Kellogg Evening News,* July 1, 1974.

[290] Jack Bradley was the youngest son of former company president F.W. Bradley. Married to Jane Easton, Stanly Easton's daughter, the younger Bradley was, like his father and father-in-law, a mining engineer trained at The University of California at Berkeley. The accession of the 45-year-old Bradley to Bunker's helm represented a generational shift in the company's management. Although under Bradley's leadership, Bunker pulled back from involvement in the Kellogg housing market, the company never completely withdrew from that field. Housing shortages in the area drew Bunker back into housing development in 1968, when the company became involved in a housing project on the 160-acre parcel where the old Kellogg Airport had been, and again in the mid-1970s when it joined with other area mining projects in developing a worker housing project in Osburn.

[291] "Bunker Announces Important Changes," *Kellogg Evening News*, June 12, 1956, 1 and "Management Committee Meeting," 9 March 1956, MG 367, Box 6, Folder 40, Bunker Hill Records, Special Collections.

and to enable Bunker to focus greater attention on its primary business concerns.[292] A little over a year later, the company proudly reported in its newsletter that, due to its change in housing policy, "There are 60 more homeowners in Kellogg today than there were just one year ago…60 homes formerly owned by the Company have been sold since July 1, 1956."[293] Recognizing that it was reducing a considerable employee benefit, Bunker at the same time offered a profit-sharing plan to its 350 salaried personnel. Under the plan Bunker would contribute five per cent of its annual net profits for the purchase of company stock for salaried employees.[294]

At the same time that Bunker Hill was retreating from its longtime housing policy, the company also placed its electric utility, The Lighthouse, and a related appliance store business on the auction block. The company-owned utility had served the communities of Kellogg and Wardner since the early years of the century, but to a new generation of Bunker leadership represented by Jack Bradley it was a relic of a bygone era and an unwanted corporate appendage. In June, 1956 Bunker sold the The Lighthouse to the Washington Water Power Company for about $805,000.[295] Announcing the company's decisions to divest itself from the housing and utility businesses in Kellogg, General Manager Wallace Woolf suggested a fundamental shift in Bunker's relationship to the town. While insisting that the company, "is in business to stay, and in Kellogg to

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[292] "Bunker Announces Important Changes," *Kellogg Evening News*, June 12, 1956, 1.

[293] *Bunker Hill Reporter*, July, 1957, 2, MG 367, Box 83, Folder 1869, Bunker Hill Records.

[294] "Bunker Announces Important Changes," *Kellogg Evening News*, and "Management Committee Meeting," 27 March 1956, 4, MG 367, Box 3, Folder 9, Bunker Hill Records, Special Collections. The profit sharing plan evidently was not offered to Bunker's much larger unionized workforce.

[295] Bunker Announces Important Changes," *Kellogg Evening News*, "WWP Purchase of System OK'd," *Spokesman-Review*, 24 August 1956, 1. In addition, Bunker operated a water business for its own operations that also provided domestic service to some residents of Kellogg, Wardner and Smelterville. The company provided this service from the early years of the century until October, 1974, when it sold its domestic water business to the Central Shoshone County Water District for $85,000.

stay, as well," Woolf added that, "We [Bunker Hill] should be in the position of just another 'citizen' -- a very interested one, to be sure – *and not a paternalistic organization which allows no room for the city to cultivate its own self-respect and initiative* [italics added]."[296] The prosperous mid-1950s represented a period of rapid change and development for Kellogg. The small city was in the midst of a preparing a Master Plan for long-range development, along with projects to build a new hospital, high school, and airport. Bunker Hill, albeit in its new, less paternalistic role, strongly supported the city in all these endeavors.

Taxes had long proved a central aspect of the relationship between the city and the company. Shortly after Kellogg incorporated in 1907, Easton reported to Bradley that, "I inclose you [a] small map showing the portion of our property included in the Kellogg incorporation. I have excluded therefrom all portions of our property on which a heavy assessment can be levied, but we have enough people and enough holdings within the town limits to give us a good voice in the conduction of its affairs and government."[297] Notwithstanding efforts to keep Bunker's local tax burdens "very light," Easton expressed the need to maintain "friendly relations" with the town and insure, "that its officials be not antagonistic to the company."[298] The company's efforts to lessen its tax burdens did not extend only to the City of Kellogg, however; the following year Easton appeared before the Shoshone County Board of Equalization and secured a $10,000 reduction of the assessment covering Bunker's concentrator.[299]

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[296] "Bunker Announces Important Changes," *Kellogg Evening News*, June 12, 1956, 1.
[297] Easton to Bradley, 1 November 1907, MG 367, Box 10, Folder 110, Bunker Hill Records.
[298] Ibid.
[299] Ibid., 10 August 1908.

In 1913, the Kellogg City Council passed a resolution requesting that Bunker Hill permit the extension of city boundaries so as to allow the incorporation of the company's concentrator and other facilities into the city. The obvious purpose of this move was simply to increase the city's tax base. The very fact of the request, of course, evidenced the relatively weak position of the town *vis-a-vis* the company. In discussing the proposed incorporation with Bradley, Easton noted that indeed it would entail a significant hike in taxes, from the $181.44 the company paid the previous year, to a sum of $4,559.17.[300] Bradley wrote to Easton that, "This is a matter that we should treat courteously and seriously. On the face of the resolution, the arguments seem clearly in favor of our granting it, but there may be disadvantages in addition to the extra cost of the taxes that I should know about."[301] Despite Bradley's concerns, the company eventually acquiesced and permitted the incorporation of the concentrator and other equipment.[302] In addition to its other local tax burdens, by the early 1920s Bunker was paying sixty percent of Kellogg's school taxes.[303] The city received another tax windfall in the mid-1950s. At the same time Bunker was eschewing its longstanding role in Kellogg's housing and electric utility markets, the company softened the blow by allowing its mine and smelter to be incorporated within the city limits.[304]

By 1913, Kellogg had grown large enough to warrant a sewer system. Or at least that was what Bunker officials, and according to Stanly Easton, "the business section of the town," believed. Smaller property holders, Easton felt, were less interested in paying

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[300] Easton to Bradley, 13 May 1913, MG 367, Box 10, Folder 121, Bunker Hill Records.
[301] Ibid., Bradley to Easton, 16 May 1913.
[302] Aiken, *Idaho's Bunker Hill*, 54.
[303] Rickard, *The Bunker Hill Enterprise*, 141.
[304] Ibid., 140. Bunker let the mine become part of Kellogg in 1955 and the lead smelter in 1956.

the cost of installing a modern sewer system.[305] Bunker had a sewer system for its operation but lacked a city system with which it could be connected. Moreover, according to Easton, the company's considerable housing stock in the community could rely only upon, "a system of cess pools, short sewers and other unsanitary and troublesome arrangements, which cause us considerable annual expense to keep up."[306] When the City of Kellogg encountered difficulty selling its sewer bonds, Easton and Bradley took the matter up with their company banker, William Crocker, a San Francisco financier who was also a major Bunker Hill stockholder. Bunker purchased the city's sewer bonds, at a cost of $23,000, and thus enabled the construction of Kellogg's sewer system.[307]

With the entry of the United States into World War I in April, 1917, Bunker led Kellogg efforts to support the war effort, with General Manager Easton and his wife, Estelle, personally spearheading much of this work. During the war, Estelle Easton acted as county chairman of the Red Cross, head of the War Insurance Board, and chief of War Relief Work.[308] To encourage worker purchases of Liberty Bonds, the company offered a plan that permitted employees to buy a hundred dollars worth of bonds for only a ten dollar down payment. The company fronted the remaining ninety dollars and then re-collected it, with no interest, over the subsequent four months via payroll deductions.[309] Easton soon proudly reported to Bradley that for the first round of Liberty Loans, 213

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[305] Easton to Bradley, 28 January, 1913, MG 367, Box 10, Folder 120, , Bunker Hill Records.
[306]Easton to G.D. Abbott (Bradley's assistant secretary), 11 August 1913, 2, MG 367, Box 10, Folder 121, , Bunker Hill Records.
[307] Easton to Abbott, 30 September 1913, MG 367, Box 10, Folder 119, Bunker Hill Records.
[308] Rickard, *The Bunker Hill Enterprise*, 141.
[309] "Liberty Loan Bonds," Attachment to letter from Easton to Bradley, 5 June 1917, MG 367, Box 10, Folder 128, Bunker Hill Records..

employees subscribed through the company for a total of $21,450, while another 76 made subscriptions totaling $6,080 through local banks. When combined with the subscriptions of Bunker management and their families, the total climbed to $41,530.[310] As a gesture of support for the war effort and goodwill toward local families who had members serving in the conflict, in July, 1917 the company announced its cancellation of all rental, electricity, water, and building loan interest charges to the families or dependents of its employees who were serving in the armed forces.[311]

Worried about Wobblies

At this time, Bradley and Easton, along with other Coeur d'Alenes' mining honchos, were much alarmed by reports of local activity by the Industrial Workers of the World (IWW).[312] The radical labor organization, a successor to Bunker's old nemesis, the WFM, was seen as "brazenly pro German" by Bradley and others.[313] In the highly charged atmosphere following American entry into World War I, the IWW, with its inflammatory anarchistic rhetoric and anti-war stance, became a ripe target for corporations, the media, and the U.S. government. In one of the more notorious incidents of the period, in response to an IWW-led strike at three Bisbee, Arizona copper mines, on July 12, 1917 a *posse comitatus* arrested more than 2,000 men, most of whom were strikers. Later that day the deputies forced 1,186 of them onto a train and unloaded them

[310] Easton to Bradley, 22 June 1917, MG 367, Box 10, Folder 128, Bunker Hill Records.
[311] "Notice to Employees," 23 July 1917, MG 367, Box 10, Folder 129, Bunker Hill Records.
[312] A common nickname for IWW members was "Wobblies."
[313] Bradley to Easton, 16 July 1917, MG 367, Box 10, Folder 129, Bunker Hill Records.

at Columbus, New Mexico, 173 miles to the east.[314] In another infamous episode, during the early morning hours of August 1, 1917, shortly after giving a fiery anti-war speech, IWW organizer Frank Little was abducted from his Butte, Montana boarding house room, dragged behind a car, and hung from a railroad trestle. His killers were never discovered.[315]

The IWW was indeed active in the Inland Empire and the Coeur d'Alenes in 1917, playing upon wartime labor shortages to organize timber workers and miners in demands for higher pay and better working conditions. A huge, IWW-led, timber strike proved threatening enough to prompt Idaho governor Moses Alexander to move his official residence to Coeur d'Alene for the summer of 1917 in an effort to break the strike.[316] In the Coeur d'Alenes, Stanly Easton believed that IWW-influenced "roughs and renegades from Butte" had filled "all the mines east of Kellogg, except the Hecla."[317] In April, in response to "some report of seditious talk," two additional watchmen were put on duty and "a lot of new electric lights installed at strategic points" at the smelter, which was still under construction.[318] Discussing the IWW situation in July, Easton told Bradley that, "An organized financed campaign is being systematically carried on to tie up all industries hereabouts…These agitators and pickets are reported to be getting $3 per day and are surely being supported by outside (German) money.[319]" Noting that the IWW

[314] James W. Byrkit, "The IWW in Wartime Arizona," *Journal of Arizona History* (Summer, 1977): 149-170.
[315] Only in Butte, "Frank Little's Grave," http://www.butteamerica.com/flit.htm, (accessed November 8, 2011).
[316] Keith C. Peterson, *Company Town: Potlatch, Idaho, and the Potlatch Lumber Company* (Pullman, WA: Washington State University Press, 1987), 164.
[317] Easton to Bradley, Received 22 March 1917, MG 367, Box 10, Folder 127, Bunker Hill Records.
[318] Ibid., Easton to Bradley, 18 April 1917.
[319] Easton to Bradley, Received 2 July 1917, MG 367, Box 10, Folder 128, Bunker Hill Records.

had made inroads in the upper part of the District, Easton reported that in Kellogg, "We are extremely careful…and yet have no cause for alarm."[320]

The situation in Kellogg was due in no small part to the aggressive, anti-IWW stance taken by the city government with Bunker's full support. In early July, the city swore in 100 extra police officers. Announcing that Kellogg was willing to swear 500 extra officers if necessary, Mayor T. R. Mason stated baldly that, "The I.W.W. organizers will not be permitted to hold meetings here. Nor shall the I.W.W.s get a footing here."[321] Easton informed Bradley at this time that there were in Kellogg "I.W.W. agitators who are planning to start trouble here," and moreover that "…their speakers on the streets of Spokane say the [newly opened] Bunker Hill Smelter is to be their special point of attack…"[322] When the dust from this Wobbly scare cleared, however, it was evident that both the City of Kellogg and Bunker Hill's operations remained unscathed. Bradley credited the bonds Easton had forged between the company and the Kellogg community with dimming the IWW's local appeal. He wrote Easton, "If we were not treating our own crew and the people of Kellogg fairly and decently, these [IWW] circulars might bear some fruit. But the Liberty bond and Red Cross subscriptions on the part of our crew indicate to me that you have tied the Bunker Hill & Sullivan organization mighty well with both crew and the community."[323]

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[320] Easton to Bradley, Received 2 July 1917.

[321] Ibid., 8 July 1917, MG 367, Box 10, Folder 129, Bunker Hill Records. The quotation from Mayor Mason is from an editorial entitled "Kellogg Shows the Way." Easton included the editorial, drawn from an undetermined Wallace newspaper, with his letter to Bradley. As of the end of August, 1917, roughly 180 men had been sworn in as special policemen by the City of Kellogg and forty-six Bunker Hill employees had been deputized by the Shoshone County Sheriff.

[322] Easton to Bradley, 8 July 1917, MG 367, Box 10, Folder 129, Bunker Hill Records.

[323] Ibid., Bradley to Easton, 16 July 1917.

The loyalty of its workforce and the militant support of Kellogg's elected officials during the IWW agitation of 1917 was a marked contrast with the situation Bunker Hill faced during its struggles with the WFM in the 1890s. The episode gave credence to the company's two- pronged approach that coupled militant anti-unionism with paternalistic care for its workers and the City of Kellogg. Although Bunker Hill's sway over its workforce and the community of Kellogg waned somewhat with the 1942 replacement of the Wardner Industrial Union with the International Union of Mine, Mill and Smelter Workers (IUMMSW or Mine-Metal), the company's policy of local largesse nonetheless paid large dividends over its long career. Despite the strenuous efforts of union organizers throughout much of the 1930s, Bunker workers stuck with their company union for nearly a decade.[324] As Mine-Metal's Local Number 18 during the districtwide 1949 strike, Bunker Hill workers garnered the odium of fellow Coeur d'Alenes' unionists with their vote to settle, the so-called "'49 sellout" that broke the strike's back.[325] The watershed 1960 strike, lasting over seven months, deeply divided the community of Kellogg. Charges of communism leveled at Mine-Mill were central to the struggle that ended with the replacement of Mine-Mill with the Northwest Metal Workers Union (NWMW), which Mine-Mill contended was a company union. While it does not appear that the NWMW was in fact a company union, Bunker Hill certainly preferred dealing with it over the more militant Mine-Mill, and must have been pleased at the strike's outcome. Chalk up another victory for "Uncle Bunker."

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[324] Section 7(a) of the National Industrial Recovery Act, signed into law by President Franklin Roosevelt in July 1933, permitted workers to bargain collectively. The federal law spurred a rash of union organizing around the country, including the Coeur d'Alenes. The May 26, 1942 vote to unionize was quite close, 353 for Mine-Mill representation and 327 against.

[325] Aiken, *Idaho's Bunker Hill*, 132.

Post-World War I Policies

Following the war, Bunker rehired all of their returning veterans at the same positions or higher ones. Unfortunately, however, seventeen of the 289 Bunker Hill workers who served the U.S. government during the war did not return. The company memorialized these fallen warriors by placing their names on a bronze tablet that it installed on the front wall of its Kellogg offices.[326]

In the mid-1920s, as part of the ongoing effort to, in the language of Bradley and Easton, reward "worthy employees," and to strengthen bonds between Bunker and workers and the community, the company began offering six percent preferred stock to its employees. The stock paid generous returns – six percent guaranteed annual interest, plus dividends. Employees could pay for stock either directly or via monthly payroll deductions.[327] Within slightly over a month the entire stock issue, 3,000 shares, had sold out. Believing that a number of "very worthy employees" had been unable to take advantage of the stock offer in the short time it had been available, Easton suggested to Bradley that another, rationed, stock offering be issued.[328] Bradley agreed with this idea,

[326] Rickard, *The Bunker Hill Enterprise*, 141.
[327] Easton to Bradley, 9 January 1925, MG 367, Box 12, Folder 150, Bunker Hill Records.
[328] Ibid., Easton to Bradley, 20 February 1925. Easton also puzzled over how to handle situations regarding two widows of "former good employees" (only current, full time employees were supposed to be eligible to take advantage of the offering). Before deferring the matter to another day, Easton informed Bradley that "these cases are wholly worthy, the women are permanent residents of Kellogg, are properly bringing up and educating good sized families and are husbanding their meager resources and making a brave effort to add to them." In another case, that of a college student, "the son of an employe who works here during vacation and…will without doubt in due course follow his father's experience and be a regular employe of the Company…," Easton made an exception, allowing him to purchase the stock.

and the company began to offer up 200 shares of the preferred stock per month, giving priority to employees who had not previously made purchases.[329]

As has been illustrated, Bunker took pains to foster and support the Wardner Industrial Union. These efforts included the direct infusion of cash into union coffers, and artificially low utility and rental charges to the WIU's offices. Another subsidy the company provided the union was its longstanding support for the Miners Picnic. The WIU sponsored the Kellogg-based extravaganza, held from 1904 through the early 1950s.[330] It constituted a big, multi-day, outdoor celebration that attracted visitors from across the Inland Northwest. In 1937 an estimated 10,000 people crowded Kellogg streets.[331] The Miners Picnic featured parades and dances, sporting events such as baseball games and boxing matches, theatrical and musical performances, children's races, airplane shows and parachuting demonstrations, mining events such as mucking and drilling contests, and a profusion of jackasses.[332] Political speeches were not uncommon at the Picnics. Idaho governors routinely appeared at the event, and the state's most renowned politician, Senator William Borah, spoke there in 1927. For a number of

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[329] Easton to Bradley, 20 February 1925and Easton to Bradley, 1 December 1925, MG 367, Box 12, Folder 153, Bunker Hill Company Records, Special Collections, University of Idaho Library. The second offering of the preferred stock was made between February and December, 1925. The par value of the stock was approximately $200,000. It is not clear whether the stock plan was continued the following year. The plan was revived later, however. 1,010 additional shares of preferred stock issued for employee purchase in 1951. See Board of Directors Meeting Minutes, 17 November 1951 meeting, MG 367, Box 2, Folder 8, Bunker Hill Records.

[330] The "company union" was replaced by the decidedly more independent, aggressive International Union of Mine Mill and Smelter Workers (IUMMSW) in late 1943.

[331] "Ten Thousand Persons Gather at Kellogg Today for Annual Miners' Picnic," *Spokane Daily Chronicle*, 3.

[332] The latter in honor of the legendary burro reputed to have lead Noah Kellogg to the silver-lead outcroppings that in turn led to the development of the mining district.

years, Bunker Hill donated the equivalent of a day's worth of company payroll to support the Miners Picnic.[333]

Figure 2: Undated photo, likely from a Miners Picnic[334]

The 1935 Miners Picnic was an especially grand celebration. Dedicated to Bunker Hill, the event celebrated the fiftieth anniversary of the discovery of the silver-lead outcroppings that were the community's *raison d'etre*. The 1935 Picnic, a three day affair that lasted from Friday, August 23rd through Sunday, August 25th, featured, among other things, a boxing card and a reception for area pioneers at the YMCA; baseball games, pageants, an athletic program, fireworks, and a carnival at the ball park; a street parade; a literary and musical program; airplane rides; a ball and other dances; and a water carnival

[333] "Kellogg Fete Dates Are Fixed," *The Spokesman-Review*, 27 July 1916, 10.
[334] Bunker Hill Company Photographic Collection, Bunker Hill Records.

at the city pool.[335] The long weekend's entertainment seemingly offered something for everyone. The boxing card showcased five Kellogg fighters from different weight classes squaring off against opponents from nearby Burke and distant Spokane.[336] The Pioneer Association presented the Silver Queen and Silver Princesses, one chosen to represent each of the fourteen major mines in the district, while Chief Saltese of the neighboring Coeur d'Alene tribe offered "Indian Lore." Undoubtedly the cultural keynote of the celebration, though, was "The Pageant of Silver." Billed as "An Historical Pageant Celebrating the Fiftieth Anniversary of the Bunker Hill and Sullivan Mines," the pageant attempted to trace the 19th Century history of the Coeur d'Alenes.[337]

Divided into three "episodes," consisting of thirteen total "parts," the pageant offered a fairly standard Turnerian narrative of western progress, albeit one tailored to fit the specifics of the area's geography and political economy. Episode One, "The Trails That Led to Silver," depicted a Coeur d'Alene encampment on the shores of Lake Coeur d'Alene, circa 1800. Prominent contemporary Coeur d'Alene Indians, including Lawrence Nicodemus, Henry Si John, Bazle Peone, Pete Seltice and Joe Seltice represented their ancestors.[338] Episode One continued with scenes from the Lewis and Clark Expedition, Northwest Fur Company trader and explorer David Thompson's trek, and trail-builder Captain John Mullan in a scene set in "A steep-sided canyon below the present site of Kellogg, Idaho, on July 4, 1861." While Episode Two focused on the 1883-'84 gold rush that centered on the town of Murray, Episode Three, entitled

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335 "Official Souvenir Program, 31st Annual Miners' and Smeltermen's Picnic," MG 367, Box 75, Folder 1632, Bunker Hill Records.
336 Ibid.
337 Ibid.
338 Ibid.

“Silver!,” highlighted the discovery of silver and lead at Milo Gulch, a subsequent legal battle over ownership of that valuable claim, and Wardner’s early days in the 1880s and 1890s.[339]

In the 1950s Bunker embarked on new community programs while continuing to support longstanding ones. In 1951, in conjunction with the Hecla Mining Company, Bunker’s ownership partner in the Star Mine and the zinc refinery, the company launched the Hecla-Bunker Hill scholarship, with an endowment-establishing gift of $100,000.[340] The scholarship fund originally was intended to support only the children of Hecla and Bunker Hill employees who wanted to attend Idaho colleges and universities, but soon was broadened to include other local students.[341] Annual scholarships generally totaled between $5,500 and $10,000 and benefited thirty to forty-five students. The *Bunker Hill Reporter,* a company publication for employees, annually spotlighted the scholarship fund’s recipients, granting special attention to those who were the children of Bunker employees. On more than one occasion, company President C.E. Schwab personally handed out the awards to area high school seniors. Through 1977, the scholarship fund disbursed $165,399.41 to college students, with nearly all that amount going to young people from the Coeur d’Alenes.[342]

In addition to the scholarship fund, Bunker continued to offer what it referred to as “working scholarships” for local young people. For decades the company had made it

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[339] “Official Souvenir Program,” 31st Annual Miners’ and Smeltermen’s Picnic.”
[340] “Scholarships Granted to Thirty-Seven,” *Bunker Hill Reporter*, June, 1968, 1, MG 367, Box 83, Folder 1868, Bunker Hill Records. A handful of scholarships was awarded to non-locals studying mechanical or mining engineering, or related fields, at Idaho institutions of higher learning.
[341] “Students Notified Applications for Scholarships Due,” *Bunker Hill Reporter*, March, 1958, 1, MG 367, Box 83, Folder 1869.5, Bunker Hill Records.
[342] “Minutes of Meeting – Trustees: Hecla-Bunker Hill Scholarship Fund,” 27 April 1977, MG 367, Box 14, Folder 224, Bunker Hill Records.

a practice to employ local youths during the summer. This policy both benefitted area youth and provided the company with needed manpower during the summer months when many regular employees took time off to engage in fishing, camping, travel and other recreational pursuits. The summer of 1959, an evidently typical one in this respect, found that "...86 college students and 18 high school students are being employed in Kellogg operations. Of these 104 students all but 13 are from the Kellogg area…In past years the employment of college and high school students has been as high as 150…Besides earning a thousand dollars or better…the students fill vacation-depleted crews."[343]

In January, 1958, the company, with support from the United Crusade of Shoshone County, launched the Idaho Free Ski School.[344] Utilizing the alpine ski facilities at Lookout Pass, located twenty-three miles east of Kellogg on the Idaho-Montana border, the company arranged free transportation and ski lessons for six hundred area youths.[345] During its years of operation, the Free Ski School enabled thousands of children from the Coeur d'Alenes to ski through its weekend programs. Many of these young skiers went on to race competitively, and at least three Lookout Pass ski racers made it to the Olympics.[346]

In 1957 Bunker began supporting, and strongly encouraging its employees to support, the United Crusade. The Crusade, through its local chapters, supported charitable and non-profit organizations throughout the United States. Bunker gave funds

[343] "Jobs at Bunker Aid Local Youth," Bunker Hill Reporter, August, 1959, 2, MG 367, Box 83, Folder 1870, Bunker Hill Records.
[344] The United Crusade later became The United Way.
[345] *Bunker Hill Reporter*, April, 1958, 3, MG 367, Box 83, Folder 1869.5, Bunker Hill Records.
[346] Weston, *The Good Times Are All Gone Now*, 145.

both to the San Francisco and the Shoshone County chapters of the organization, but encouraged employee support principally for the Shoshone County branch. The company urged and goaded its workers, both salaried and non-salaried, to contribute, allowing them to make payroll deductions to the Crusade, urging them to meet yearly giving goals, shaming them in the *Reporter* for "falling short" of the previous year's giving, offering raffles of televisions and radios to gin up contributions. In 1958, for instance, the *Reporter* labeled employee contributions "disappointing," noting that "only $6,650 [was] contributed as compared to $12,663 in 1957."[347] Between 1957 and 1977, employee contributions ranged between roughly $6,500 and $12,700.

Bunker Hill support for the United Crusade, however, did not signify an end to direct corporate contributions to what it deemed worthy activities in the Kellogg area. At a Bunker Board of Directors meeting in 1956, John W. Bradley noted that the company had been averaging $20,000 in "contributions" to Kellogg, and suggested keeping the figure the same, or reducing it, for the coming year due to serious declines in the market price of zinc. He recommended that at most $15,000 to go toward "the interest of local community and employee relations," and "$5,000 for philanthropy."[348] In the end, however, the Board of Directors approved an expenditure of $31,502, more than fifty percent over what Bradley had suggested, for "Kellogg philanthropy."[349] In addition, the company opted to donate $25,000 to the West Shoshone Hospital District in order to assist its faltering efforts to construct a new, sixty-bed, 1.3 million dollar hospital to

[347] "United Crusade In Plant Drive Is Disappointing," MG 367, Box 83, Folder 1869.5, *Bunker Hill Reporter*, December, 1958, 1, Bunker Hill Records.
[348] 1956 Directors Meeting Minutes, 31 July 1956, MG 367, Box 3, Folder 9, Bunker Hill Records.
[349] Ibid., As a contrast the Board approved an expenditure of only $6,000 for philanthropy in San Francisco, where its corporate offices were located, all of that designated for the United Crusade effort there, and $1,000 to be split between Portland, Oregon and Seattle, where Bunker also had operations.

replace the Wardner Hospital, Bunker's fifty-year-old facility.[350] A year later, the company returned to the subject, purchasing $50,000 in general obligation bonds for the hospital's construction.[351]

Over the years, Bunker Hill also gave strong support to the Boy Scouts of America. Numerous Bunker employees worked with the Scouts, including longtime company chief Stanly Easton, who served as a volunteer Scout leader for forty-three years, and was one of the founders of the Boy Scout Council in northern Idaho.[352] Camp Easton, a 383-acre Scout Camp on the eastern shores of Lake Coeur d'Alene that annually hosts over 1,300 Scouts, honors the former Bunker President.[353] In 1961, the company began permitting employees serving as Scout Masters to take annual one-week paid leaves of absence so that they could accompany their troops to Summer Camp.[354] Six years later, the Boy Scouts Twelfth World Jamboree was held sixty-five miles from Kellogg, at Farragut State Park on Lake Pend 'Oreille. The event drew 12,000 Scouts and Scout leaders and over 85,000 visitors from all around the world to northern Idaho. Bunker Hill, not surprisingly, played a significant role in orchestrating the event. Among other things, the company and its employees set up many of the exhibits, donated ore to salt the ground for a "dig" by Scouts, and took about 300 Scouts on a tour of the

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[350] 1956 Directors Meeting Minutes, 31 July 1956. Evidently, a $70,000 deficit existed in the building fund.
[351] Directors Meeting Minutes, 27 June 1957, MG 367, Box 83, Folder 1872, Bunker Hill Records.
[352] Ibid., *Bunker Hill Reporter*, September, 1962, 1,
[353] "Boy Scouts consider selling Camp Easton to developer," *Spokesman-Review*, http://www.spokesman.com/stories/2011/aug/13/boy-scouts-consider-selling-c-easton-to/ (accessed September 29, 2011).
[354] "Scout Masters to Get Leave," *Bunker Hill Reporter*, 4, MG 367, Box 83, Folder 1871, Bunker Hill Records.

company's plants. In addition, former Bunker Hill boilermaker Norm McLeod reprised his role as Noah Kellogg, replete with jackass.[355]

In addition to its backing of Scouting, Bunker continued its longtime support for the Kellogg YMCA. At the time of the club's fiftieth anniversary in 1961, it had added heat to its indoor pool, and was offering recreational opportunities that included weight lifting, basketball, volleyball, badminton, and trampoline, in addition to its many youth clubs, summer sports leagues and Night School for adults. The "Y" claimed nearly 2,000 members.[356] The Night School remained a thriving concern in the 1960s. In 1966, for instance, 219 students were enrolled. Course offerings continued to stress vocational types of learning, and included typing, drafting, shorthand, and welding.[357] Some credited Kellogg High School's success in boys basketball – four state championships between 1955 and 1964 – to the fact that the club allowed the team's "gym rats" extensive access to its basketball court.[358] As of 1966, the company had given over $800,000 to the organization. The 1950s service of company leaders such as Stanly Easton, John W. Bradley, and Wallace Woolf on the YMCA's Board of Directors and the extensive coverage granted the organization in the *Bunker Hill Reporter* also testified to the company's ongoing support.[359]

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355 "Bunker Plays Active Role in XII World Jamboree," *Bunker Hill Reporter*, August, 1967, 3, MG 367, Box 83, Folder 1877, Bunker Hill Records.

356 "Kellogg YMCA Is Now 50 Years Old," *Bunker Hill Reporter,* September, 1961, 2, MG 367, Box 83, Folder 1871, Bunker Hill Records.

357 Ibid., Folder 1876, "Kellogg YMCA Night School Is 'in business'," *Bunker Hill Reporter*, December, 1966, 3.

358 Chapman, *History of Kellogg*, 12.

359 "Bunker Hill 'Kids,' Adults Participate [in] YMCA Programs," *Bunker Hill Reporter*, February, 1966 Issue, 4, MG 367, Box 83, Folder 1876, Bunker Hill Records. "Simmons Is Re-elected Head of YMCA Board," *Bunker Hill Reporter*, March 1959 Issue, 1, MG 367, Box 83, Folder 1870, Bunker Hill Records. The *Bunker Hill Reporter* was the company's staff publication. In addition to its support for "The Y," Bunker also sponsored a winter bowling league, and granted it ample coverage in the *Reporter*.

Bunker Hill's philanthropic contributions in Kellogg and Shoshone County, though significant, constituted but a tiny fraction of the company's total economic impact on the area. Though the Coeur d'Alenes long-boasted a number of large mines, for much of the 20th century Bunker Hill possessed not only the District's largest lead mine but also its only lead smelter and zinc refinery. One of the nation's vertically integrated mining, concentrating and smelting operations, with the capacity to locate and extract raw ores and transmute them into valuable refined metals, Bunker claimed by far the area's largest workforce, payroll, and assemblage of assets. The company also boasted the highest revenues and paid the greatest share of taxes in the District. In 1951, for example, of an estimated 4,000 workers employed in the mining industry in the District, roughly half worked for Bunker Hill.[360] To put these figures in a larger demographic context, the population of Shoshone County at the time was approximately 22,806, while the City of Kellogg's was 4,913, or 22% of the county's population.[361] In 1953, following the negotiation of a new labor agreement with Mine-Mill's Local Number 18, Bunker Hill's payroll reached nearly a million dollars per month.[362] The milestone prompted *The Kellogg Evening News* to boast that Kellogg had become "…one of the biggest payroll

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[360] Unidentified, undated document, MG 367, Box 72, Folder 1511, Bunker Hill Records. This appears to be an internal company document prepared by Bunker's negotiations team circa early 1952.
[361] U.S. Census Bureau, *1980 Census of Population, Volume I: Characteristics of the Population, Chapter A, Number of Inhabitants, Part 14, Idaho*, "Table 2, Land Area and Population: 1930 to 1980," (Washington, DC, September, 1981), 8, "Kellogg Population Estimated at 5,900," *Lewiston (ID)Morning Tribune*, November 9, 1957, 10.
[362] "Kellogg Enjoys Biggest Payday in Local History: Monthly Payroll Now Tops One Million Mark," *Kellogg Evening News*, September 28, 1953, 1. This figure included what the company defined as "fringe benefits," items such as paid vacation, sick leave and medical insurance.

cities of its size in the United States," meaning, evidently, that few towns of its size garnered such wages.[363]

During the prosperous mid-1950s, Bunker Hill's success, along with that of its fellow mining companies in the Coeur d'Alenes, provided the foundation for a bustling local economy.[364] The 1954 U.S. Census of Business showed that Shoshone County's 303 retail stores, with 828 paid employees, garnered $24,085,000 in sales. Of that, Kellogg's share was 94 stores, 337 employees, and $10,741,000, or nearly forty-five percent of the county aggregate, in sales.[365] Kellogg, the most populous of the Coeur d'Alenes' small urban centers, led Shoshone County in most retail categories: boasting 21 of the 54 food stores, 27 of 85 restaurants and bars, 10 of 16 car dealerships, 7 of 22 gas stations, 5 of 13 lumber, building equipment, hardware and farm equipment stores, and 3 of 9 drugstores.[366] Retail sales and after-tax (i.e., disposable) income continued to make gains in Shoshone County throughout the mid-1950s. Retail sales climbed nearly nine percent, to $26,848,000, from 1954 to 1956, while the mining county's estimated 7,330 families averaged $4,850 in disposable income for the 1955-'56 business year, or

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[363] "Kellogg Enjoys Biggest Payday in Local History," *Kellogg Evening News*, September 28, 1953, 1.

[364] Among the successful mining companies in the District in the 1950s were the Sunshine Mining Company, owner of the Sunshine Mine, the world's greatest silver mine, located between Kellogg and Osburn, and the Hecla Mining Company, owner of the Lucky Friday Mine, located near Mullan.

[365] "Kellogg Easily Tops Business: 1954 Business Census Figures Revealed," *Kellogg Evening News*, February 6, 1955, 1.

[366] "Kellogg Easily Tops Business: 1954 Business Census Figures Revealed," *Kellogg Evening News*, February 6, 1955, 1. Kellogg trailed its rival, Wallace, the county seat, in the categories of general merchandise stores, apparel and accessory stores, and furniture, home furnishings and appliance stores. Although Kellogg and Wallace each had three drugstores, sales from Kellogg's were by far the greater of the two. Wallace, located eleven miles east of Kellogg, until 1920 had boasted a more sizable population than the smelter city. By 1950, however, the county seat had fallen behind and could claim only 3,140 residents to Kellogg's 4,913.

$241 more than the average Idaho family.[367] The trend toward relatively high wages in the Coeur d'Alenes continued until the shutdowns of Bunker Hill and the Sunshine Mine in 1982.[368] In 1972, for example, the average miner in the District earned $8,500 per year, more than twice Idaho's average annual wage and nearly double the national average.[369] This pay scale, however, was fairly typical of the mining industry, which has tended to issue relatively high wages for the dangerous and difficult work required to secure precious, and base, metals from the ground. In 1971, for example, mining was the third-highest paying industry in the State of Idaho, with an average annual wage of $8,912.[370] This wage pattern lasted through the 1970s and continued to benefit residents of the Coeur d'Alenes. In 1975, for instance, a year when fifty percent of Idaho's $260 million in mining sales came from Shoshone County, mining remained the state's third highest-paying industry, and the County ranked fourth of Idaho's forty-four counties with $9,639 in average annual wages.[371]

In the forty-year period from 1942 to 1981, Bunker Hill annually employed between 1,233 and 3,151 workers and issued between $3,269,149 and approximately $50

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367 "Shoshone County Families Earn More Than Average in Idaho," *Kellogg Evening News,* January 11, 1957, 3. The business year runs from July 1-June 30.

368 While the closure of Bunker's operations, and the layoff of 2,100 workers, in February, 1982 undoubtedly constituted the greatest blow to the area's economy, the June shutdown of the 600-employee Sunshine Mine, the world's most productive silver mine, was another major hit. Unlike Bunker, however, Sunshine eventually returned to full operations.

369 "Disaster Could Jolt Area Economy," *Spokesman-Review*, May 8, 1972, 7, "Per Capita Personal Income: 1969-2007," http://lmi.idaho.gov/LinkClick.aspx?fileticket=V0iQVOgmwVk%3D&tabid=762, (accessed September 29, 2011). The average wage in the U.S. in 1972 was $4,717 and in Idaho it was $4,119. For Shoshone County as a whole, average per capita income in 1972 was $4,279, slightly higher than the state average but far lower than the average mining wage in the county, showing that miners earned a good bit more than most other residents of the Coeur d'Alenes.

370 "Idaho Mining Wages Rank High," September-October, 1972 Issue, 2, MG 367, Box 83, Folder 1882, Bunker Hill Company Records, Special Collections, University of Idaho. Mining ranked just ahead of timber products and right behind the construction industry.

371 *GAP News*, March 3, 1976, MG 367, Box 83, Folder 1867, Bunker Hill Records.

million in payroll.[372] In 1961, when Bunker's annual payroll was roughly $13 million, company President C.E. Schwab estimated that Bunker's total cash payments in Shoshone County would be around $19 million for the year.[373] In a 1961 talk before the Spokane North Side Rotary Club, Bunker Manager of Metallurgy, A.Y. Bethune, assessed the importance of his company to the economy of Spokane and the Inland Empire. Noting Bunker Hill's status as a basic industry – a fundamental economic activity that supports communications, transportation, entertainment and other service industries -- Bethune proceeded to detail his company's contributions to the regional economy. In addition to its substantial payroll and tax payments, the company manager pointed to Bunker's annual purchase of roughly $6 million in operating supplies, "many of which are administered or distributed through Spokane," the more than $2.3 million worth of utilities that the company paid for annually, including electricity from Spokane-based Washington Water Power Company, coal and coke, natural gas, petroleum products, water supply and telephone and telegraph service; the $7 million worth of railroad freight the company generated annually, much of it traveling on the Union Pacific Railroad, and the over $18 million Bunker paid mines the previous year for their concentrates.[374] Bethune estimated Bunker's value to the Inland Empire at "a tidy

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[372] Unidentified, undated document, probably from early 1952, MG 367, Box 72, Folder 1511, Bunker Hill Records. This appears to be an internal company document prepared by Bunker's negotiations team, "Two Buyers Negotiating for Bunker," *Spokesman-Review*, September 16, 1981, 8. The employment low occurred in 1944, during the World War Two (WWII) manpower shortage, and the employment high in 1956. The highest payroll was made during the silver price spike year of 1980 and the lowest payroll came in 1945, the final full year of WWII rationing. The payroll numbers are not adjusted for inflation; however, If put into 1942 dollars, the $50 million 1980 payroll becomes $8,976,660. The approximate averages for the period are 2,000 workers and a $16 million payroll.

[373] "C.E. Schwab Talk Before Kellogg Chamber of Commerce," 26 January 1961, MG 367, Box 83, Folder 1858, Bunker Hill Records.

[374] A.Y. Bethune talk before the Spokane North Side Rotary Club, "What the Bunker Hill Means to Spokane and the Inland Empire," 22 May 1961, 4, MG 367, Box 83, Folder 1858, Bunker Hill Records.

$47,000,000 per year." Hammering home the theme of the pivotal position of Bunker Hill in the economically interconnected region, Bethune suggested to the Spokaneites that, "No matter what business or profession you're in, chances are whatever affects the Bunker Hill Company, sooner or later affects you for better or for worse…It's to your advantage that we stay strong, vigorous, successful and solvent, that we may contribute our full share to the economy of the region."[375] Though he did not mention it in his Spokane address, Bethune also might have noted the fact that a high percentage of Bunker's shareholders – 26 percent in 1959, controlling about 50 percent of company stock -- resided in the Inland Empire, adding yet another important bond between the company and the region's unofficial capitol.[376]

While the Bunker Hill payroll -- averaging roughly 1.5 million dollars a month, distributed amongst roughly 2,000 Kellogg employees over the 1945 -'81 period – undoubtedly went a long way toward propelling the local economy, the company's tax payments also substantially boosted that economy while providing a major share of support for local government services. By the late 1950s, Bunker's local property tax payments were averaging about $900,000 annually, and, due principally to the presence of much of the company's plant and equipment within its city limits, Kellogg claimed the

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Bunker long held the status of both the Washington Water Power Company's (WWP's) and the UP's largest customer in north Idaho.

[375] Bethune, "What the Bunker Hill Means to Spokane and the Inland Empire," The value of that $47 million in 2011 dollars would be $345,450,000 .

[376] "Bunker Hill Stock Transfer Procedure Is Interesting Part of Corporate Affairs," *Bunker Hill Reporter*, September, 1962, 2, MG 367, Box 83, Folder 1872, Bunker Hill Records. In addition, under Gulf Resources, the Houston-based company that absorbed Bunker Hill in 1968, Bunker's operations were headquartered in Spokane from 1968-'71, before being returned to Kellogg. Bunker, over the years, also held some of its shareholder meetings in Spokane.

highest per capita property tax rate of any Idaho city.[377] By 1970, the company was paying out nearly $1.3 million in local property taxes. Nearly half of that amount, $610,839, went to School District 391, serving students from the Kellogg-Pinehurst area, and more than a third, or $397,715, went directly to Shoshone County. Of the remainder, $143,297 was sent to the City of Kellogg, $68,394 to the West Shoshone Hospital, and $46,046 to the Kellogg fire district, Fire District Number 2.[378] By 1975, when Bunker's property tax payments stood at approximately $1.36 million, the company's payments represented 22 percent of Shoshone County's total tax revenues, 51 percent of the City of Kellogg's, 41 percent of those for School District 391, 49 percent of those for County Fire District Number 2, 39 percent of West Shoshone County Hospital's, and 22 percent of those for the City of Smelterville. In addition, Bunker provided over $1.3 million in matching Social Security payments for its employees, over $1.6 million in state taxes, and roughly $10 million in federal income taxes.[379] The profitable company clearly was a cash cow for more than just its shareholders.

On July 26, 1965, for the first time in Bunker Hill's seventy-eight year history, the company's stock was made available on the New York Stock Exchange.[380] Less than three years later, the successful company fell victim to a hostile takeover by the far

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[377] "Remarks Prepared by John D. Bradley for Presentation Before Northwest Mining Association," 2, MG 367, Box 83, Folder 1858, Bunker Hill Company Records, Special Collections, University of Idaho. The talk was delivered by Wallace G. Woolf on 4 December 1959, following Bradley's untimely death in an auto accident the previous Thanksgiving Day. The value of the $19 million referenced by Bradley in 2011 dollars would be $139,650,000, "North Idaho Towns Have Top Tax Rates," *Spokane Daily Chronicle*, December 24, 1957, 3. The average per capita property tax rate in Kellogg for 1957 was $117.19, although few, if any, individual Kellogg homeowners paid that much.

[378] "Operating Payroll Reaches New Record," *Bunker Hill Reporter*, January-February 1971, 1, MG 367, Box 83, Folder 1881, Bunker Hill Records.

[379] "Property Taxes Up," *Bunker Hill Reporter*, November-December 1975, 1, MG 367, Box 83, Folder 1885, Bunker Hill Records.

[380] Before this time, the company's stock was traded on regional exchanges such as the Spokane Stock Exchange.

smaller Gulf Resources and Chemical Corporation. The Houston-based Gulf, a company mostly known for its lithium assets in Mexico, utilized a large, Wall Street loan to purchase a controlling portion of Bunker stock. On June 1, 1968, Bunker became a wholly-owned subsidiary of the Texas firm. Instead of being run from offices in Kellogg, the company now had to answer to officials on the 21st and 26th floors of Houston's Tenneco Building. Rather than taking a subservient position in the Gulf-owned company, popular Bunker President C.E. Schwab, having failed in his efforts to fend off the takeover, resigned.[381]

It is fair to say that Gulf was never accepted in Kellogg or the wider Coeur d'Alenes in the way that Bunker Hill had been. The Houston company continued the Bunker tradition of charitable sponsorship in the Kellogg area, for instance, carrying on the Hecla-Bunker scholarships, sponsoring local television coverage of the annual Kellogg-Wallace high school football game, supporting the Kellogg YMCA, purchasing the local ski hill, Jackass Bowl, when it ran into financial difficulties, and contributing to projects of the Kellogg Chamber of Commerce.[382] Yet no one ever referred to the company as "Uncle Gulf" or felt for Gulf President Robert Allen the respect and affection they had for Schwab or Stanly Easton. Notwithstanding their largesse, Gulf and its

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381 Schwab was soon thereafter hired to a senior management position by the Butte, Montana copper giant, the Anaconda Company.

382 "Minutes of Meeting – Trustees: Hecla-Bunker Hill Scholarship Fund," 27 April 1977, MG 367, Box 14, Folder 224, "Telecast Order" from Spokane's KHQ-6TV, MG 367, Box 14, Folder 240, letter from Bunker President E. Viet Howard to Bob Douglas, Kellogg Chamber of Commerce President and Terry Smith, Manager, Idaho First National Bank, 21 March 1978, MG 367, Box 14, Folder 240, 21 March 1978, Bunker Hill Records.

officials were commonly referred to as "Texas bandits" in Kellogg, where civic leaders evidently viewed the Gulf takeover as "a bad day for the homefolk."[383]

Although Kellogg was not a company town in the strictest sense – Bunker Hill, for instance, never owned a company store or required workers to live in Kellogg – the small city nonetheless was dominated by the company for nearly eighty years. The disappearance of "Uncle Bunker" from the local scene following its shutdown in February, 1982, left the community with an identity crisis and a gaping hole to fill. Even for its local critics, the company had, like the sun, simply always been there. Bunker Hill's predominant role in its economy coupled with its active engagement in Kellogg's industrial YMCA, along with numerous additional forms of corporate welfare, which persisted decades past their expiration in most other communities, undoubtedly goes a long way toward explaining the special relationship between the small city and the company.

Kellogg's legacy, however, does not lie solely in its record as a tight-knit, quasi-company town that long was, as the *Kellogg Evening News's* masthead proudly proclaimed, "The Smelter City of the Coeur d'Alenes," home to the "World's Largest Lead-Silver Mine." Kellogg and its corporate sponsor had another legacy that constituted the Jeckyll face of their productive activities. Kellogg-Bunker was a polluter on an epic scale, fouling water and air, and endangering human health, to such an extent that it would take decades to remedy much of the damage. Some of the harm, however, could never be undone.

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[383] "Confidential" report to senior Gulf officials by public relations firm Dale Henderson, Inc., 1975, 1, MG 413, Box 242, Folder 4545, Bunker Hill Records.

LEAD CREEK

It begins as a trickle high in the Bitterroot Mountains just west of Mullan Pass.[384] Here, a stone's throw from the Montana-Idaho border, the South Fork of the Coeur d'Alene River runs cold and clear. Healthy populations of native cutthroat trout swim about. West of the town of Mullan, Idaho, about ten miles downstream from the headwaters of the South Fork, however, the picture begins to change. The stream's water becomes more turbid; fewer fish are to be found. By the time the South Fork reaches the town of Wallace, another eight miles downstream, although its water is still refreshingly cold, there are no fish to be found. What has happened, one wonders? Where did the fish go?

Simply put, mining happened. From the hills just northeast of Mullan, where the Lucky Friday mine has been in operation for nearly seven decades, to the flats just west of Kellogg, where the giant Bunker Hill Company smelter once belched out its toxic smoke, lies one of the historically richest mining and smelting districts in the world. Since the time that gold was discovered near Murray in 1883, and, far more importantly, silver-bearing galena near Kellogg in 1885, to 1997, the world-famous Coeur d'Alene mining district has produced staggering amounts of metals: 34,300 metric tons of silver, 2,870,000 metric tons of zinc, and 7,288,000 metric tons of lead, or respectively 18%, 17% and 6% of the nation's production of those metals.[385] The total monetary value of

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[384] The chapter title derives from the principal nickname that was historically used for the South Fork of the Coeur d'Alene River by locals. The term "Lead Creek" presumably owes its origins both to the opaque gray quality of the water body and the lead tailings that gave the river its distinctive color and texture.

[385] Keith R. Long, *Production and Disposal of Mill Tailings in the Coeur d'Alene Mining District, Shoshone County, Idaho: Preliminary Estimates*, Open-File Report 98-595, special report prepared at the request of the United States Geological Survey, 1998, 2.

these metals stands in excess of twenty-six billion dollars in 1997 dollars. In terms of historic minerals production in the United States, the Coeur d'Alene district ranks first in silver, third in lead, and third in zinc. Indeed, the district has produced more silver than any other mining area in world history, even more than the legendary Cerro Rico de Potosi district in Bolivia.[386] But the land undoubtedly has paid a steep price for these revenues.

Some of the largest, most profitable and most famous mines in the country have been located in the Coeur d'Alenes: the Lucky Friday, Golconda, Sunshine, Gold Hunter, Hercules, Hecla, Page, Morning Star, and the Bunker Hill, to name a few. These mines have employed tens of thousands and paid out many millions of dollars in wages. They have sustained local communities that at their peak, in 1950, boosted the Silver Valley's population to 22,500. Though the largest and best-known of these concerns, the Bunker Hill Company, possessed the largest lead and zinc mine in the U.S., the Bunker Hill Mine, it was but one of eighteen mines in the Coeur d'Alene Mining district that has yielded over a millions tons of metal.[387] But they and their brethren, the area's ore concentrators and the Bunker Hill smelter, also possess another legacy, one of environmental degradation and destruction.

This chapter examines the history of the Coeur d'Alene watershed from the advent of mining along tributaries of the South Fork of the Coeur d'Alene River in the

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[386] Long, *Production and Disposal of Mill Tailings in the Coeur d'Alene Mining District*, 2, Keith R. Long, John H. DeYoung, Jr., Stephen D. Ludington, *Database of Significant Deposits of Gold, Silver, Copper, Lead and Zinc in the United States*, Open File Report 98-206A, special report prepared at the request of the United States Geological Survey, 1998.

[387] The Committee on Superfund Assessment and Remediation in the Coeur d'Alene Basin, The National Research Council, *Superfund and Mining Megasites: Lessons from the Coeur d'Alene Basin* (Washington, DC: The National Academies Press, 2005), 43.

early 1880s through the present. The narrative is primarily framed through the lens of the ecological health, or lack thereof, of the watershed. Mines used the South Fork primarily as an industrial sewer until the late 1960s, in keeping with the industry's common practice during the era, thus the story is largely one of decline and wreckage. But it is more than that, too. It is also a story of social contest between different users of the water system -- downstream farmers and ranchers who employed the Coeur d'Alene River for irrigation, Coeur d'Alene merchants reliant upon tourism to their lovely lake, and powerful upstream mining interests who used the South Fork to cheaply transport tailings that otherwise might overwhelm the mining district. The mining and milling companies' power to pollute the watershed – a power that remained supreme, and nearly absolute, from the 1880s through the late 1960s – deprived downstream farmers, ranchers, sportsmen, and merchants of the ability to use the watershed and its adjacent lands as they wished. This chapter also highlights the inherent risks, tradeoffs and environmental destructiveness of modernity. In 1885, the sparkling Coeur d'Alene River teemed with fish; by the 1930s it ran gray and supported no fish. In the interval, of course, a teeming mining, milling and smelting district, producing great wealth and supporting thousands of workers, had arisen in and around Kellogg. While people in the District, most particularly those who ran the larger companies and those companies' shareholders, experienced the benefits of industrial development, downstream users felt its risks and costs, and the environment of the Coeur d'Alene Basin experienced devastation. An early 1930s controversy over the potential fouling of Lake Coeur d'Alene by mine wastes that briefly focused state attention on the ecological health of the drainage basin, offers an intriguing snapshot of the values and interests that long have shaped the basin's ecology.[388] In addition to other issues with which it engages, this chapter seeks to address the simple question, "What happened to this river?"

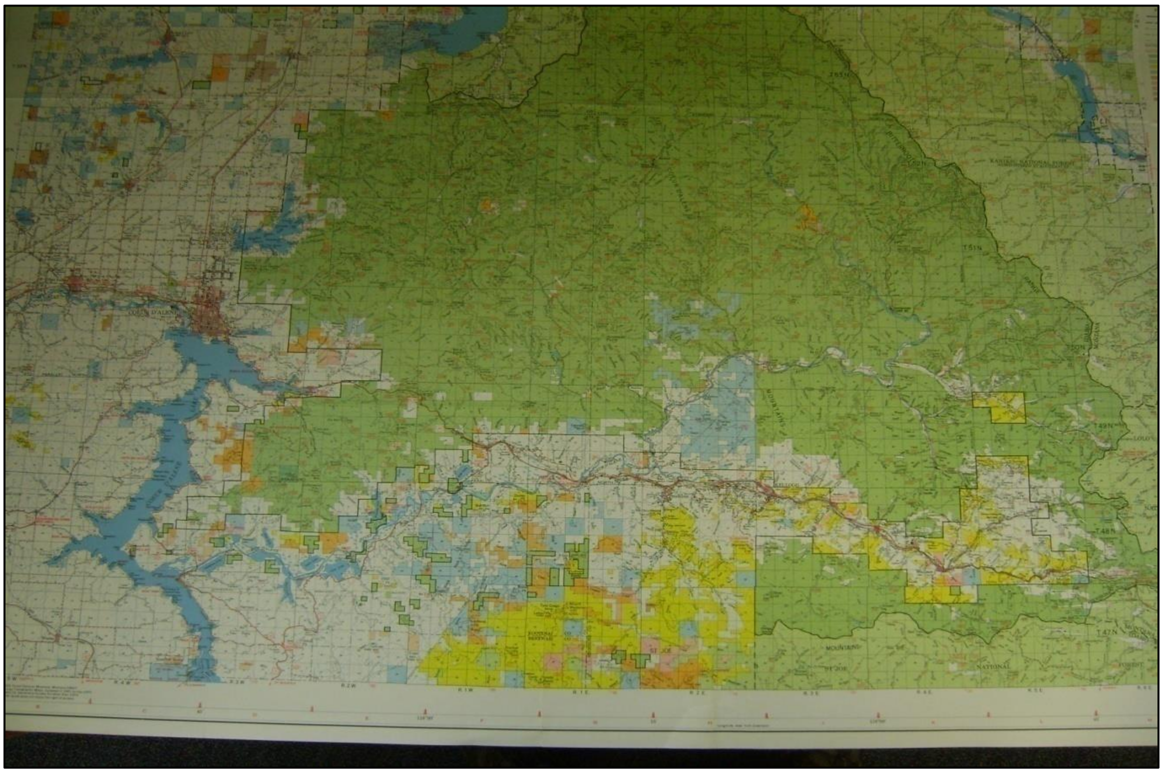

Figure 3: 1972 U.S. Forest Service Map of the Coeur d'Alene River Basin, with the Upper Basin at the map's lower right hand side and the Lower Basin (including Lake Coeur d'Alene) at its lower left.

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[388] There are a number of books that use rivers as a lens on the history of an area – Biloine Young's *River of Conflict, River of Dreams* performs this work with the Upper Mississippi and Bob Deans's *The River Where America Began* does it for Virginia's James River – but this chapter does not do that, except perhaps in a narrow sense. There are also important works of environmental history that place rivers at their center: these include such seminal works as Donald Worster's *Rivers of Empire* (1985) and Richard White's *The Organic Machine* (1995) and more recent books including Marc Cioc's, *The Rhine: An Eco-Biography, 1815-2000* (2002) and Sara B. Pritchard's *Confluence: The Nature of Technology and the Remaking of the Rhone* (2011). All of these environmental histories center around a dialectical understanding of the changing interaction between human beings and the natural world. So does this chapter, but in its specific attention to the use of Coeur d'Alene River and its tributaries as an industrial sewer by the mining and milling industry, and the ecological effects of that use, it probably most-resembles Cioc's analysis of a far larger river, or Wallace Scot McFarlane's recent article, "Defining a Nuisance: Pollution, Science and Environmental Politics on Maine's Androscoggin River" (*Environmental History,* April, 2012).

Among the numerous landmark federal statutes enacted during the late 1960s and early 1970s were the 1970 Clean Air Act, the 1972 Amendments to the Federal Water Pollution Control Act (The Clean Water Act), the 1969 National Environmental Policy Act (NEPA) and the 1973 Endangered Species Act (ESA). Of the new federal agencies created to enforce this body of legislation, none would have a greater impact on the environment of the Coeur d'Alenes or on the conduct of business in the mining district than the Environmental Protection Agency (EPA), which came into being in December, 1970 under the administration of President Richard M. Nixon. The 1972 Amendments to the Federal Water Pollution Control Act represented an extension of the 1948 legislation that, importantly, gave enforcement authority to the brand new EPA. Under section 402 of the legislation, the EPA had the authority to set and enforce water quality standards for "point source" industrial polluters such as the mining companies of the Coeur d'Alenes. The principal tool granted the agency was a permitting process under which the EPA could grant industries the right to discharge only certain quantities of pollutants into waterways. Lacking the requisite federal permit, industry would be breaking the law if it released pollutants.

Early Days on the Coeur d'Alene

Although today, after years of cleanup efforts, one is still hard-pressed to find evidence of living fish in the heart of the old mining district, the situation was not always thus. Until the arrival of significant numbers of Euro-Americans in the area following the completion of the Mullan Road in the early 1860s, the Silver Valley had been primarily the preserve of the Coeur d'Alene Indian tribe, who utilized its extensive wild game and fish resources. Jesuit missionaries such as Father Nicholas Point who arrived in the area to minister to the Coeur d'Alenes in the early 1840s, noted the richness and fecundity of its natural landscape. Describing the place where Coeur d'Alene Lake empties into the Spokane River, Point remarked, "The waters are teeming with fish which are caught, until January, by means of a trellised barrier extending from shore to shore."[389] Point further described a local hunt in which six hundred deer were taken. Discussing the plentitude of game animals roaming over the Coeur d'Alene Indians' landscape, which encompassed the Silver Valley and a considerable amount of territory to its west, north and south, Point wrote:

> Is there an abundance of game? Perhaps nowhere does so small an area contain such a variety. Next to the roe deer, these are the most common: the deer, the elk, the mountain lion, the cacajou, the white sheep, the bighorn, the goat, the wolf, the fox, the wildcat, the polecat, the hare, the otter, the weasel, the badger, the mink, the marten, the fisher, the beaver, the muskrat, a large variety of mouse-colored rats, squirrels, field mice, not to mention four or five varieties of bear…Fish are abundant in the lakes, rivers and small streams."[390]

Commenting on the same area twenty years later as he oversaw the building of the federal road that would bear his name, Captain John Mullan noted that the Mission Flats section of the Coeur d'Alene River, about fifteen miles west of Kellogg, hosted a sufficient supply of fish to provide vital sustenance to a population of three hundred

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[389] Nicolas Point, S.J., *Wilderness Kingdom: Indian Life in the Rocky Mountains,1840-1847 (The Journals and Paintings of Nicholas Point, S.J.),* trans. Joseph P. Donnelly (New York: Holt, Rhinehart and Winston, 1967), 62.

[390] Ibid., 180-81.

Coeur d'Alene Indians who resided at the Jesuit mission located there.[391] In 1883, on the eve of the mineral discoveries that would forever change the region, a resident named Stoll commented that the rivers of the Coeur d'Alene country "teemed with fish."[392] In 1930, Armand Perrenoud, an "old-timer" who had traveled the Coeur d'Alene River by boat in the 1880s, reported that in those earlier days the river possessed remarkable beauty and charm and supported adjacent farms that raised ninety to one hundred bushels of oats and five tons of hay per acre.[393] Writing about the Coeur d'Alene River in her book on the area's once-prolific steamboat traffic, Ruby El Hult noted that in the 1890s, during the heyday of the passenger steamboat era, "The Coeur d'Alene River was…clear as crystal, deep, with cottonwoods and silver beeches on both banks almost forming an arch overhead."[394] Describing the Coeur d'Alene's fecundity El Hult wrote,

> The stream was alive with trout and other fish, and all the early boats featured trout dinners. Just below the Old Mission, at the Big Eddy where the boats turned around, scraps were thrown into the water nearly every day. Most of the fish in the Coeur d'Alene River came to haunt this feast table. They could be seen by the thousands in the clear water and were a source of amazement to the boat passengers.[395]

In the fall of 1883 the discovery of gold along Prichard Creek led to one of the more memorable American gold rushes of the late 19th century. Spurred on by an aggressive publicity campaign by the Northern Pacific Railroad, which hoped to people its trains with westward passengers, thousands of would-be prospectors descended upon the remote, wilderness outpost during the winter of 1883-1884. Once arrived, the gold-

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[391] U.S. Bureau of Fisheries, *Special Scientific Report, No. 1, Pollution of the Coeur d'Alene River and Adjacent Waters by Mine Wastes* (Washington, DC, 1940).

[392] Ibid.

[393] *The Coeur d'Alene Press* "Old-TimersTell How River Valley Looked in Old Days," January 10, 1930, 1.

[394] Ruby El Hult. *Steamboats in the Timber* (Caldwell, ID: Caxton Press, 1953), 61.

[395] Ibid.

hunters quickly cobbled together the towns of Murray and Prichard. Although undoubtedly frenzied, the placer-mining era was also undeniably short-lived. By 1886 it was clear that all, or nearly all, of the easy-to-pan gold in the Coeur d'Alenes had been scooped clean. Though some success was still to be had acquiring the glittery metal through quartz mining techniques, including the use of a dredge in the early twentieth century, the romanticized placer mining era in the Coeur d'Alenes was largely finished by the late 1880s. In any event, the district's future lay in other, less hallowed, metals.

In the late summer 1885 an itinerant, middle-aged carpenter and sometime prospector named Noah Kellogg persuaded some Murray merchants to grubstake him in a prospecting effort along the South Fork of the Coeur d'Alene River and up its tributary creeks. Possibly as much to be rid of the noisome carpenter as in hopes of enriching themselves from his finds, the merchants agreed. Provisioned with coffee, beans, other staples and a troublesome jackass, Kellogg set out through the dense North Idaho forests. According to legend, after several fruitless days of searching for ore-bearing veins along the South Fork and Milo Creek, Kellogg decided he had had enough and determined to return to Prichard Creek. Tired, though, he decided first to take a nap. When he awakened, the prospector discovered to his deep chagrin that his burro was missing. Perhaps following the issuance of a few choice imprecations, Kellogg set off after his missing ass. After trudging up one steep hill and down another, the weary carpenter finally came across his burro munching upon some flowers and grass on a hillside. He sat down to enjoy his pipe after all his exertion, looked down, and saw a large outcropping of galena (silver-lead ore). Kellogg's ass had led him to one of the richest areas of lead-silver mineralization in the world.

In contrast to placer mining, silver and lead mining generally requires far more complexity and expense. Silver and lead are usually found mixed in with lots of other ores, and often hundreds of feet below the earth's surface. Quartz mining techniques, requiring significantly greater inputs of technology, labor, and capital than are needed in placer mining, must be applied in order to secure the minerals in question. Corporations, with their unique abilities to marshal large quantities of technology, labor and capital, have tended to dominate the field of quartz mining. This pattern was followed in the Coeur d'Alenes where, within a few years of Kellogg's discovery, some of the biggest names in American finance and mining engineering could be found working to expand their fortunes. Not surprisingly, the largest of the mining ventures in the district, that of the Bunker Hill and Sullivan Corporation, by the late 1880s had attracted some of the biggest of these names, including: Simeon Reed, a railroad and iron magnate; John Hays Hammond, a famed mining engineer; California bankers William H. Crocker and D.O Mills; and a Chicago syndicate headed by banker James Houghteling and including iron and steel magnate Edward Ryerson and farm equipment manufacturer Cyrus McCormick. Of course, even if all the silver and lead lying in the Coeur d'Alenes could be efficiently mined and refined, it still would remain worthless if it could not be transported at a reasonable cost to far-flung markets. As a sign of the promise that the Coeur d'Alenes' mineral deposits evinced, by 1891 two railroad lines had been built into the narrow Silver Valley and were competing for the mines' business.

As was common practice in the late nineteenth century and for decades thereafter, Silver Valley mining ventures big and small employed the nearest serviceable moving body of water to transport their two types of tailings -- *jig tailings*, sand-sized particles that accumulated in large piles along creeks, and *slimes*, very fine-grained, sub-silt-sized tailings that would travel much farther downstream – away from their mining and concentrating operations.[396] In this case that meant the South Fork of the Coeur d'Alene River and its numerous immediate tributaries. The quantity of such tailings, even in the early years of Silver Valley mining, was massive. Mineral economist Keith R. Long estimates that from 1886 - 1997, 56,000,000 metric tons of tailings "were disposed of or otherwise lost into the Coeur d'Alene River or its tributaries."[397]

For the first few decades of mining in the Coeur d'Alenes companies used the stamp and jig table method of separating valuable ores from waste rock. Mechanical stamps crushed the ore and this ore was then sent over the jig tables, which, as with panning for gold, utilized the propensity of heavier ores such as silver and lead to sink to the bottom of water separating more valuable ores from waste rock. A drawback of the jig table method, however, was its relative inefficiency, which resulted in the loss to the tailings pile of between twenty and forty percent of the lead and silver. Most tailings from the early era -- 1885 to roughly 1925 -- tended to be rather coarse and large. Of the more than one hundred milling operations in the Coeur d'Alenes during this period, the bulk of them located along the upper South Fork and its nearby tributaries, most used flumes to transport their tailings directly from the mill to a large tailings pile. Due to the steepness

[396] "Tailings" refers to waste rock that is left over after the sought-after valuable ore – silver, for instance -- has been extracted.
[397] Long, "Production and Disposal of Mill Tailings in the Coeur d'Alene Mining District," 2.

of valley walls and the narrowness of canyons in the Coeur d'Alenes, flooding and high rates of soil erosion are commonplace. This led to the frequent washing of coarse tailings into the South Fork of the Coeur d'Alene and its tributaries. During the jig table era, however, most tailings, due to their size, generally did not wash more than about ten miles downstream. Nonetheless, Keith Long has concluded that by 1900 mill tailings had reached Lake Coeur d'Alene (thirty-five miles downstream from Kellogg) and had impacted as much as 25,000 acres of floodplain along the river.[398]

Beginning around 1910 a new method of concentrating ores came into use in non-ferrous mining, including in the Coeur d'Alenes. Gradually gaining in acceptance throughout the district, it was almost-universally employed by 1930. This method, the flotation process, employed chemical reagents and oils that would bind to the valuable ores in a slurry of water to separate them from the waste rock.[399] Flotation allowed ore-recovery rates to increase to as high as 90 per cent, meaning that far fewer tailings would be dumped into the river. But the tailings produced via the flotation process were far finer than those produced via the jig table method. This meant that tailings created under the new process would be carried much farther in suspension than they had been previously, often all the way to Lake Coeur d'Alene, if not even further. While the flotation process helped solve a problem for concentrator operators – namely, that of the often-massive tailings piles and bars that developed near their operations and threatened to impede those operations – it also was instrumental in creating a new problem, the widespread diffusion

[398] Long, "Production and Disposal of Mill Tailings in the Coeur d'Alene Mining District," 2.
[399] The reagants permit the ores to bind to oily bubbles on the surface of the water. The ores then can be relatively easily scraped off of the water.

of lead and other toxic minerals throughout the watershed of the South Fork of the Coeur d'Alene River.

In 1899, downstream farmers and ranchers began to complain that debris from mining and milling was interfering with their operations, fouling their land, especially in places where the Coeur d'Alene River usually flooded in the spring, and wreaking havoc upon their crops and livestock. In 1903, Josiah Hill, a Shoshone County farmer, filed suit against the Standard Mining Company, which operated a mining and milling operation on Canyon Creek above Wallace. This was to be but the first of a number of environmentally-based legal actions against the mining concerns of the Coeur d'Alenes. The following year, as the Hill case worked its way through the Idaho courts, sixty-five Kootenai County agriculturalists filed a pair of court actions against the upstream mining companies. The first case, *McCarthy, et. al. v. Bunker Hill and Sullivan Mining and Concentrating Co., et. al.,* sought an injunction to stop further polluting of the Coeur d'Alene River and its tributaries. The second, *Doty, et. al. v. Bunker Hill and Sullivan Mining and Concentrating Company Co., et. al.,* sought over $1,224,000 in pollution damages. Plaintiffs' testimony in the two class action cases tended to focus upon the same sorts of alleged wrongs: "leaded" soils and plants in farmers' fields; diseased and otherwise damaged livestock; greatly diminished hay yields; dead fish in a now-polluted river; gray-colored, and "leaded" water issuing from the mining district.

Elmer Doty, lead plaintiff in the second lawsuit, testifying in the *McCarthy* suit in 1905, echoed many of the common themes. He spoke of dead and sickened cows and horses, describing horses that lost hair and developed severe breathing difficulties and lethargy and cows plagued with severe diarrhea; hay fields whose yields diminished from two tons to a quarter ton per acre; the grayish color of the river water that flooded his fields and a grayish dust that afterwards was left upon his vegetation; and numerous “bald spots” where no hay would grow in previously flooded fields.[400] The *Doty* plaintiffs contended that widespread deposits upon the lands adjacent to the South Fork and the main stem of the Coeur d’Alene River, “contains both lead and zinc in large and poisonous quantities…[and] that a large number of horses and cattle died from eating this hay and grass that was grown on these meadows.”[401] They also argued that the market for hay they were able to grow along these rivers “was destroyed more than four years ago.”[402] The farmers alleged that whereas the federal Department of Agriculture held that as little as a tenth of a grain of lead in solution per gallon of water (or 17.14 ppm.) was poisonous to livestock, there was twenty-five times that quantity in the waters of the Coeur d’Alene River. The alleged amount of lead in suspension and/or solution in the river perhaps should not be surprising, given the twelve million tons of material that plaintiffs claimed the mining interests had so far dumped into the watershed. Also unsurprising was the allegation that the affected river channels were filling up with sediment, which of course, in turn would have made seasonal flooding more prevalent. In addition, plaintiffs noted that while the North Fork of the Coeur d’Alene River, where mining activity was not significant, flowed “pure,” the South Fork was completely different, and far dirtier. Addressing the health of the tributary itself, the plaintiffs stated that in 1898 farmers “noticed that the fish were destroyed on the river, no more fish

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[400] MG 130, Box 5, Folder 1, Bunker Hill Records.
[401] Ibid.
[402] Ibid.

appeared in that pure stream. Many of them floated down the stream belly up, and no fish have ever inhabited those waters since."[403]

The Kootenai County agriculturalists -- perhaps not surprisingly given the era and the preferential economic status then-generally accorded to mining activities – lost their pair of class action lawsuits. Better luck was had, however, with the original case to be filed, *Hill v. Standard Mining Company*. Josiah Hill, a Shoshone County farmer, had initiated a twelve thousand dollar damage suit against the Standard Mining Company. He alleged that the company had dumped 550,000 tons of mining debris containing "poisonous substances" in Canyon Creek. This material, Hill contended, then had washed down into the South Fork of the Coeur d'Alene.[404] There it had filled the river's channel to such an extent that it caused a flood that deposited sediment on his land. Hill's complaint alleged that this sediment destroyed his crops and the value of his agricultural land, while also contaminating his well water. The company's lawyers responded that the Idaho Constitution granted "preference" to mining operations in the use of water, and for good measure added that the accusers had failed to illustrate clearly Standard's responsibility and negligence in the alleged damages incurred. Although the Idaho District Court in Wallace granted the defendants a discharge, the Idaho Supreme Court consented to hear the case on appeal.

The Court, in an historic opinion written by Chief Justice Charles O. Stockslager, reversed the lower court and held that despite their preferential status vis-a-vis water appropriation, mining companies did not enjoy an unlimited right to fill or pollute

[403] MG 130, Box 5, Folder 1, Bunker Hill Records.
[404] Nicholas A. Casner, "Leaded Waters: A History of Mining Pollution on the Coeur d'Alene River in Idaho: 1900-1950," (master's thesis, Boise State University, 1989), 28.

streams with their wastes, or in the words of the High Court, to load stream channels with, "debris and poisonous substances to the injury of other users of water."[405] Dowstream water users such as Hill, ruled the Court, had "the right to assume the upper appropriator will continue the use of water as he found it, and if any change would damage him in the use of his appropriation, the courts will protect him in his right."[406] In making this ruling, the Court flatly rejected the bald-faced, utilitarian argument made by the corporation to the effect that should the Court rule for the plaintiff, the result in Shoshone County well could be "the abandonment of all mining and milling…and bankrupting of [its] inhabitants." Stockslager, writing for the Court, responded that, "Deplorable as this might be – if true – it furnishes no excuse for the Court to shirk its responsibilities." "The law," wrote the Chief Justice, "protects the lone settler in his rights, let them be ever so meager, as well as the capitalist, the corporation or the individual with its or his millions."[407]

While Hill personally garnered little from the High Court for his efforts – he was granted only the cost of his appeal – the Court's decision nonetheless represented a significant check, at least in theory, on the legal right of mining companies operating in Idaho to use stream beds as dumping grounds for their tailings. The far more numerous plaintiffs in the *McCarthy* and *Doty* suits did not even garner the sort of moral satisfaction that Josiah Hill might have claimed following the resolution of his case. Due to the fact that many of the mining companies operating in the Coeur d'Alenes were registered as "foreign," out-of-state corporations, these latter cases were tried in federal

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405 Casner, "Leaded Waters," 29.
406 Ibid.
407 Ibid.

court. In the McCarthy case, concluded in November, 1908, plaintiffs' request for an injunction to stop all mining activity in the district was denied. Judge James H. Beatty of Boise, while admitting that the "complainants have suffered injury and may suffer more from [the] alleged causes," nonetheless concluded that the "preponderance of the evidence" in the case seemed to be largely in the mines' favor.[408] Unlike the Idaho Supreme Court in the Hill case, the federal court proved willing to consider the economic value of mining to Shoshone County in rendering its decision, stating that the closing of every mine and mill in the district would paralyze the sole means of occupation of nearly all of its twelve thousand inhabitants. "Any court," wrote Beatty, must hesitate to act as to bring such a result."[409]

The *Doty* case also denied relief to the farmers and ranchers. In a 1910 judgment, Federal Judge Frank S. Dietrich, although finding, like Judge Beatty, that evidence existed showing injury to the agriculturalists, nonetheless held that there was no support for the claim that Bunker Hill was "responsible for the condition of the water…it can only be held responsible for its own wrongful acts."[410] Accepting Bunker Hill testimony to the effect that water leaving its impound area was cleaner than the water the company received from upstream users, Dietrich found that there was "evidence insufficient to justify a verdict in favor of the plaintiffs for more than nominal damages."[411]

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[408] Casner, "Leaded Waters," 33.
[409] Ibid., 34.
[410] Ibid., 40.
[411] Ibid.

Commencing in 1901, the Mine Owners Association (MOA), [412] perhaps in response to the complaints of downstream agriculturalists, began building relatively crude dams of wood pilings and planks for the purpose of impounding tailings along Canyon Creek and the South Fork of the Coeur d'Alene.[413] The Canyon Creek Dam was constructed in the vicinity of Woodland Park; the Osburn Dam was built on the South Fork near Osburn; and the Pine Creek Dam was erected on the South Fork near the mouth of Pine Creek not far from the Cataldo Mission. While these structures did succeed in holding back significant quantities of tailings for a number of years, subsequent floods, especially those occurring in December 1917, ruined the dams, causing great quantities of tailings to wash downstream. The MOA never rebuilt the dams. Meanwhile, millions of tons of tailings remained in place on floodplains above the now-defunct dams. Some of these tailings sit there to this day.

The 1917 flooding and consequent destruction of the MOA's dams was at least partly responsible for the next series of environmental lawsuits to confront the mining interests. Following the 1917 flooding, sixteen actions were filed against the mining interests in U.S. District Court. Downstream rancher Jacob Polack filed the most legally significant of these. In 1919, Polack, owner of 320 acres near Cataldo, brought suit against the Hecla, Gold Hunter and Bunker Hill mining companies. As had earlier downstream agriculturalists, Polack charged that the longstanding movement of mining

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[412] The MOA was an organization involving a number of the mining district's larger mining companies that was founded in 1889. The organization marshaled corporate resources to battle labor unions, to struggle collectively against smelters and railroads for lower rates, to lobby the Idaho Legislature, to mount collective legal defenses against environmental lawsuits, and to provide for common environmental remediation measures.

[413] Frederic L. Quivik, "Of Tailings, Superfund Litigation, and Historians and Experts: *U.S. v. Asarco,* et. al. (the Bunker Hill Case in Idaho)," *The Public Historian* (Winter, 2004): 90.

companies' tailings down the South Fork of the Coeur d'Alene had substantially filled the natural channel of that watercourse; this, in turn had made flooding of the South Fork a much more common event. This flooding, Polack alleged, brought poisonous, leaded waters to his land, crops and livestock, damaging them all. Raising a new charge, though, Polack and other downstream ranchers alleged that the poisoned floodwaters had contaminated their groundwater and also their domestic-use wells.[414]

In a rare legal defeat for the big mining companies of the Coeur d'Alenes, Judge Dietrich this time found Bunker Hill and its fellows responsible for property damages and awarded Polack $3,500 in compensation. The judge stated that despite its impoundment efforts testimony indicated that Bunker Hill's effluent into the South Fork contained fine materials and cited the defendants as negligent in their maintenance of Pine Creek Dam. In response to the mining companies' protestations that constructing a series of settling ponds to contain their tailings was unfeasible, Dietrich responded that not only should this be done but that it could be accomplished, stating, "it follows that the problem is one of financial economy and not physical impossibility."[415] While gainsaying the economic importance of the Coeur d'Alenes' mining interests to the state of Idaho's economy, Dietrich did not allow that this stature granted the mining companies the unlimited right to disparage the property rights of others. Harking back to the tenor of the *Hill* decision, the judge wrote that the "mining industry is important to Idaho but the industry must bear

[414] Casner, "Leaded Waters," 46.
[415] Ibid., 47.

its own burden, nor is it exempt from the fundamental maxim, '*sic utere tuo ut alienum non laedus*.'"[416]

The companies appealed the decision to the Ninth Circuit Court of Appeals in San Francisco. Bunker Hill and its fellow defendants argued here, as they had successfully done before, that the Idaho Constitution granted the mining industry the use of water without liability. They further argued that they were not jointly liable for damages and that the decision should have been dismissed due to conflicting evidence. In a significant interpretation, the Ninth Circuit Court ruled that the Idaho Constitution's preference for mining did not grant mining interests "the right to inflict unlimited injury upon property of those who have acquired vested rights as manufacturers or agriculturalist."[417] Echoing the *Hill* decision of 1910, the Court ruled that the Coeur d'Alenes' mining interests' significant water and pollution rights had their limits, and that the industry must henceforth take into account the rights of downstream economic interests not to be harmed by mining activities. Responding to the defendants' other arguments, the Court acknowledged that there was evidence of conflicting scientific testimony but found the disagreements to be relatively unimportant. The Court also found that the evidence presented "shows beyond question" that the mining companies had acted in concert in discharging waste material into the river: purchasing pollution easements, building tailings dams, and maintaining an organization (the MOA) in which they acted as a unit for the deposition of mining and milling waste.[418] The Ninth Circuit Court upheld the

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[416] Casner, "Leaded Waters," 47. This means, "use your own property in such a manner as to not injure that of another."
[417] Ibid., 48.
[418] Ibid.

District Court decision. The companies, still unwilling to accept a negative judgment in such an important case, then petitioned the Supreme Court for a writ of *certiorari*. The writ, however, was denied, preserving the judgment. But while *Polack* met with a reasonably happy verdict for its plaintiffs, the other lawsuits filed in the wake of the 1917 flooding did not.

The landmark *Polack* case apparently demonstrated that the mining interests' days of doing whatever they wanted with the South Fork were at an end. Or did it? While the law now stood in the way of Bunker Hill and other mining giants' indiscriminate harming of the economic interests of those downstream, what if the mining companies simply bought out those interests? Would there then be any legal barrier to the continued pollution of the South Fork of the Coeur d'Alene?

This was precisely the question that courts would face in the coming years. The *Hill* case evidently convinced Bunker Hill and a number of its fellows that the time had come to buy out those who might be in a position to challenge their pollution of the stream. The decision in *Polack* seems to have only deepened the mining companies' belief in the efficacy of this *modus operandi*. Beginning in 1910, shortly following the *Hill* decision, the Mine Owners Association started a program to indemnify property owners along the South Fork and the main stem of the Coeur d'Alene River against possible damage resulting from the overflow of sediments from the mining district.[419] The MOA's member companies shared the costs of these purchases according to their share of the group's total tonnage milled, meaning that the most productive members,

[419] The MOAs indemnification efforts principally involved Kootenai County residents whose land adjoined the Coeur d'Alene River.

such as the Guggenheim-controlled Federal Mining and Smelting Company, the Day Mining Company, and Bunker Hill, paid out the most. Any land along the watercourse considered to be definitely threatened by the likelihood of overflow either was covered with an easement that “released the mines from all past and future pollution claims” or was purchased outright. The easements also applied to any and all “damage to crops, sickness, disease, or death to domestic animals” that upstream mining and milling operations might cause.[420] Using this stratagem the mining interests gained either outright control of or usufruct rights to pollute practically all the land abutting the South Fork and the main stem of the Coeur d’Alene River all the way from the mining district down to Lake Coeur d’Alene. By 1903, the MOA had acquired the right to pollute 11,000 acres of land adjoining the river.[421] Approximately 26,000 acres were enrolled by the late 1930s.

From a business standpoint alone, at least in the near term, the mining interests’ decision to buy their way out of the problems posed by the threat of pollution lawsuits from downstream interests had proven remarkably successful. Following the *Polack* decision in 1925, no such lawsuits were victorious against the mining companies. A number were attempted in the late 1920 and early 1930s but by 1940 such efforts had been abandoned due to their unlikelihood of success. The larger mining and milling companies of the Coeur d’Alenes, firms including the Federal Mining & Smelting Company, Hecla, Day Mines, and Bunker Hill – it has been estimated that sixteen of the area’s more than one hundred mills contributed 93% of the total tailings to the streams --

[420] Robert Higgs, The Independent Institute, “Coasian Contracts in the Coeur d’Alene Mining District,” June 2, 2004, http://www.independent.org/publications/working_papers/article.asp?id=1337 (accessed September 23, 2009). Higgs here is citing a 1913 indenture.
[421] Long, “Production and Disposal of Mill Tailings in the Coeur d’Alene Mining District,” 8.

had apparently solved their problem without having been forced to significantly change their milling practices or address the issue of the pollution of the South Fork of the Coeur d'Alene River.[422] In a notable exception, however, the Bunker Hill Company, owner of the district's largest concentrating operation, built the area's first tailings impoundment in 1928. Located between its Kellogg mills and the South Fork of the Coeur d'Alene , the impoundment was filled to capacity by 1956, when it was replaced with a another one.[423] Although Bunker Hill's tailings facility undoubtedly represented a step forward with regard to the pollution of the South Fork, it could hold only a fraction of the district's tailings, and still leached toxic heavy metals into the river system.

The next significant challenge to mining interests' treatment of the Coeur d'Alene watershed came not in the courtroom but in the political arena. In late 1929 and early 1930, *Coeur d' Alene Press* editor John Knox Coe fanned anti-pollution flames with a series of articles. The immediate trigger for the series likely was the discovery of sixteen dead muskrats in Thompson Lake, one of the numerous lateral lakes near the river's mouth at Harrison. Concern arose over the possibility that the lake's water had become contaminated by mining wastes. Water from the lake was sent to Boise for testing to determine its arsenic levels.[424] In a vivid, muckraking style Coe attacked what he depicted as the upstream mining interests' wanton despoliation of the once-idyllic Coeur d'Alene River valley and their increasing threat to the health and beauty of scenic Lake

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422 Long, "Production and Disposal of Mill Tailings in the Coeur d'Alene Mining District," 2 and Fredric L. Quivik, e-mail message to the author, April 11, 2012 (in the message Quivik referenced files in his possession that contain tables supporting Long's published work). Of that 93% of total tailings, the District's largest concentrator of ores, Bunker Hill, produced 28%, or close to a third.

423 Long, "Production and Disposal of Mill Tailings in the Coeur d'Alene Mining District," 8. In 1962-'63, the Idaho Department of Transportation dredged tailings from the first impoundment area to use as the roadbed for the section of Interstate 90 that ran through Kellogg.

424 "Test Water of Lake at Boise!," *Coeur d'Alene News*, December 16, 1929, 2.

Coeur d'Alene. More than a generation prior to the first Earth Day, Coe placed the ecological health of the Coeur d'Alene River watershed at the heart of his classically declensionist environmental narrative. The first article in the series appeared on the front page of the *Press* on December 23, 1929. Titled "Once It Was a Vale of Plenty But Now – Coeur d'Alene River Valley Is Desolate; Party of Officials and Press Make Exploration Trip," the article depicted a recent boat trip taken by the Kootenai County Commissioners, a state legislator from Kootenai County, and Coe himself, up the lake from Coeur d'Alene City to the inlet of the Coeur d'Alene River at Harrison and then up the Coeur d'Alene River.

The voyage's explicit purpose was to ascertain the extent of the mining-inflicted pollution of the lake and river. Coe evidently ran across far more evidence than he had ever hoped to find, quite literally, when his boat ran aground on a tailings bar sitting several hundreds of yards out into the lake. He wrote, "A lake cruiser with a party of officials and a newspaper representative spent an hour on a silt and slimes bar across the mouth of the Coeur d'Alene River at Harrison yesterday." Continuing, Coe offered that, "The hour spent in extricating the boat from the mess of mud, slime and mill refuse in the midst of a stench that was almost stifling…was the best evidence of what is actually taking place in the Coeur d'Alene River that could ever be found."[425]

Even before running aground, however, Coe and his party saw evidence of pollution. By the time they reached East Point, three miles down lake from Harrison, Coe detected, "an appreciable coloring to the water. It assumed the appearance of yellow-

[425] John Knox Coe, "Once It Was a Vale of Plenty But Now…," Dec. 23, 1929, *Coeur d'Alene Press*, 1.

grayish glass."[426] At Harrison passengers could see both the Coeur d' Alene River and the St. Joe River, which hosted little mining activity, entering the lake. Coe contrasted the appearance of the two streams, writing, "There was a clear line of demarcation between the water coming down from the St. Joe River; clear, sparkling, and clean, and that emanating from the Coeur d'Alene; muddy, yellowish and revolting with a noticeable stench arising therefrom."[427] Heading up the Coeur d'Alene River the editor and his party came upon the numerous lateral lakes that lie adjacent to the river. Coe expressed concern that these lakes, "with one or two exceptions," were being polluted by mine wastes due to the fact that "the lakes are lower than the river and the slime infested waters pouring into the lakes."[428] Continuing upriver, Coe noted the decrepit state of many once-proud farms and ranches, writing, "Buildings that were once imposing homes, large hay barns and cattle barns telling of prosperous years, large incomes and happy community life, all are sad reminders of what once was. The buildings have collapsed, windows, doors and fences are all wrecks of their former selves."[429]

In his next article in the series, entitled "Valley of Desolation Tells Its Own Story," Coe picked up where he had left off, detailing heart-rending stories of individual farmers and ranchers in the "Valley of Death" whose lands had been poisoned and who had been ruined by "the octopus of heartless wealth." Of this trend, the editor wrote, "The list of former prosperous land owners who lost everything is almost endless. In varying degrees all suffered. A few with hill lands in conjunction managed to hang on. The great

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[426] John Knox Coe, "Once It Was a Vale of Plenty But Now…," Dec. 23, 1929, *Coeur d'Alene Press*, 1.
[427] Ibid.
[428] Ibid.
[429] Ibid.

majority had to give up."[430] Coe's account here is not quite full and accurate, however, as it fails to mention the significant role played by MOA land and easement purchases in the abandonment of agricultural lands bordering the river. Neglecting the companies' financial arrangements with landowners permitted Coe to paint a picture indicating that the sole reason for the abandonment of these lands was pollution via mine wastes.

For his final article in the series, "Once a Fruitful Paradise – Now the Valley of Death," Coe contrasted the recollections of old-timers such Armand Perrenoud of a relatively pristine Coeur d'Alene River Valley with the contemporary reality. The following month, Coe wrote a coda to the series. In another front-page article, the editor suggested that all was not lost, that the mining companies still could take effective measures to deal with the pollution of the Coeur d'Alene River and Lake Coeur d'Alene – either voluntarily or at the behest of the state legislature – the choice was theirs. Coe suggested a technological remedy for the problem of the emission of mine tailings into the watershed: the construction of settling ponds below the various milling operations of the mining district. The editor indicated the possibility that the mining companies would take such steps voluntarily, "if properly approached," but also suggested a willingness to take the issue to the political arena should the mining giants prove unwilling to deal with their pollution problem on a voluntary basis, writing, "…and if they will not stop of their own free will it is possible to force them to stop their action in the state legislature."[431] For those state legislators reluctant to enact novel pollution control legislation, Coe cited as models the examples of the stream pollution acts recently made law in Illinois and

[430] John Knox Coe, "Valley of Desolation Tells Its Own Story," *Coeur d'Alene Press*, December 26, 1929, 1.
[431] Coe, "Pollution of the CDA Can Be Stopped," *Coeur d'Alene Press*, February 14, 1930, 1.

Wisconsin. Of course, 1930 was an election year. John Knox Coe, along with other Kootenai County residents, was poised to make a political issue of the mining pollution.

Perhaps to avoid stirring up more trouble, the mining companies of the Coeur d'Alenes remained notably silent. Undoubtedly, though, the companies remained committed to their 19th century *laissez faire* philosophy when it came to the suggestion that government agencies should begin to police their emissions. If there were pollution problems - and the companies by no means appeared willing to make such an admission - then they were to be dealt with by private industry in its own way and on its own terms.

Kootenai County Republicans, however, had other ideas. Dependent primarily upon logging, farming and tourism - not mining - for their constituents' incomes and for local tax revenues, politicians from the mining district's neighboring county could hardly be expected to truckle to the demands of the upstream mining interests. At their August, 1930 convention, the Kootenai County Republican Party passed a resolution concerning "the constant dumping of mine tailings and slimes into the Coeur d'Alene River."[432] Largely echoing the tenor of Coe's series on the environmental degradation of the Coeur d'Alene watershed, the Kootenai Republicans stated that the disposal of mine tailings had rendered the river valley barren and economically unproductive. This destruction, in turn, had cost the county a great deal in lost tax revenue. The resolution went on to state that the continuance of the mining district's methods of dealing with its wastes represented a "menace" to Lake Coeur d'Alene. The Kootenai GOP leaders further directed county commissioner nominees, if elected, to appropriate funds for the purpose of taking the county's case to the appropriate judicial jurisdictions. In addition, the local Republican

[432] *Coeur d'Alene Press*, October 31, 1930, 8.

leaders directed candidates for state senator and representative to initiate legislation to protect Kootenai County citizens from mining pollution and to guard against "any further destruction of their property and rights."[433]

On January 5, 1931, the twenty-first session of the Idaho Legislature convened. The Counties Committee took up the issue of water pollution in the Coeur d'Alene watershed with Kootenai County senator Ralph S. Nelson leading the discussion. In the first week of the session, State chemist and sanitary engineer for the Department of Public Health W.V. Leonard presented to the committee his findings from a November expedition to the Coeur d'Alene Lake and the Coeur d'Alene River. Leonard's report suggested that while no lead or lead salts in solution were found in the lake, suspended tailings were carried in the river. The report also showed a significant of bacterial pollution from the disposal of raw sewage into the river.[434] Admitting that his study was not conclusive due to time constraints and the seasonally low flow of the river when he observed it, the state chemist recommended that a commission be established to further study the situation.

On March 16, the legislature approved an emergency act creating the Coeur d'Alene River and Lake Commission. The commission consisted of the state attorney general, Fred J. Babcock, who acted as chair, along with the chairmen of the boards of county commissioners from Kootenai and Shoshone Counties, E.O. Cathcart and James H. Taylor, respectively. The act's emergency status permitted the commission to begin using state funds immediately. The legislature granted $3,000 for the publishing of a

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[433] *Coeur d'Alene Press*, October 31, 1930, 8.
[434] Until the early 1970s this was common practice for all the communities sitting astride the South Fork and the main stem of the Coeur d'Alene River.

report and expenses. The report was to be delivered to the next session of the legislature, at the beginning of 1933. The act required the commission to investigate the "ways and means of eliminating, so far as practicable, all industrial waste which pollute the Coeur d'Alene River and Lake." The act required the commission to recommend means of preventing further pollution that would be harmful to vegetation, domestic crops, public health, or animal life, including fish and aquatic life. It offered the services of W.V. Leonard and provided for the opportunity to employ the services of other technical advisors as needed.

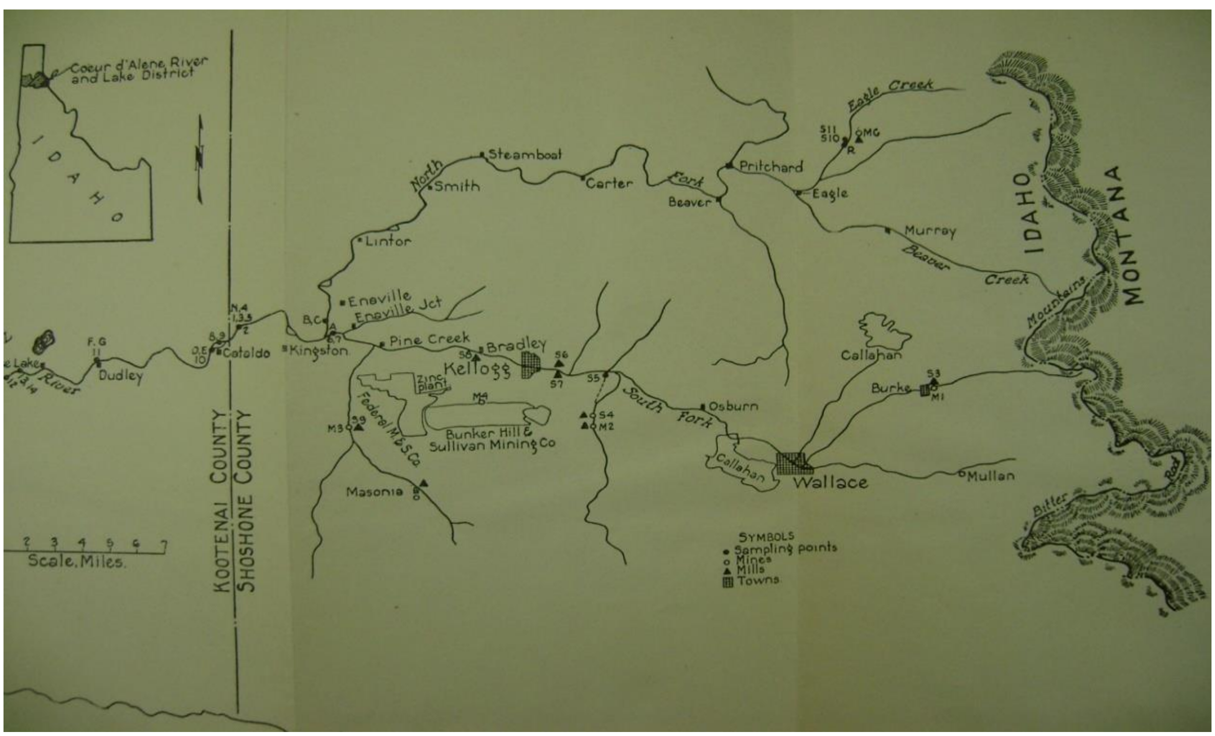

Figure 4: Upper Coeur d'Alene Basin, Map from the Coeur d'Alene River and Lake Commission's Report, 1932.[435]

[435] Idaho State Legislature, Coeur d'Alene River and Lake Commission, *Report and Recommendations of the Coeur d'Alene River and Lake Commission to the Twenty-Second Session of the State Legislature of Idaho* (Boise, 1933), Figure 1.

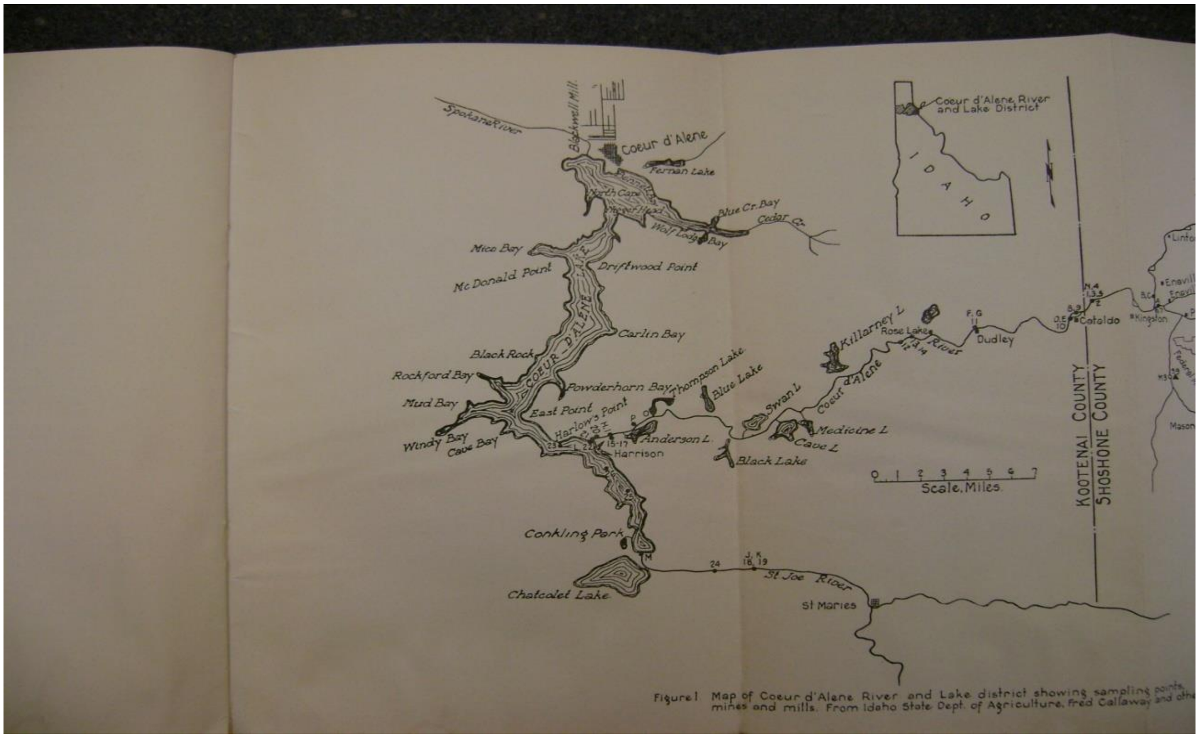

Figure 5: Lower Coeur d'Alene Basin, Map from The Coeur d'Alene River and Lake Commission's Report, 1932[436]

On May 2, 1931, the Commission held its first public meeting. At the meeting, at the Shoshone County Court House in Wallace, the Commission elected Attorney General Babcock its Chairman. Also at this meeting, the Commission opted to contact the U.S. Biological Survey and the Federal Fish and Game Commission to request the assistance of a federal sanitary engineer to work with W. V. Leonard in studying the condition of the Coeur d'Alene River and Lake. The Commission additionally stipulated its intention that this federal-state investigation be done in the spring of the current and subsequent years when the river would be in "freshet condition."[437] The Commission held its next public meeting at Rose Lake, near Harrison, on August 29th. About 60 people showed up,

[436] Coeur d'Alene River and Lake Commission, *Report and Recommendations*, Figure 1.
[437] Ibid.,10.

among them a number of Kootenai County farmers who testified about the death of horses and cattle that had grazed upon meadow lands which had been flooded by river waters. John Knox Coe, whose muckraking journalism had been at least partially responsible for the creation of the Commission, also testified "regarding his observations and theories as to the condition of Coeur d'Alene Lake."[438]

The River and Lake Commission eventually succeeded in enlisting the aid of the U.S. Public Health Service, the U.S. Bureau of Fisheries, and the federal Bureau of Mines, along with that of the Idaho Department of Public Welfare. All of the involved agencies except the Bureau of Fisheries correlated their efforts so as to avoid duplication. The Department of Public Welfare and the Public Health Service, under the direction of J. K. Hoskins, Sanitary Engineer in charge of the Stream Pollution Station at Cincinnati, Ohio, investigated the pollution of Coeur d'Alene Lake and the Bureau of Mines studied the pollution to be found at the source -- the mining district – along with the South Fork and the main stem of the Coeur d'Alene River. In a separate investigation, the Bureau of Fisheries' Head of Fisheries Investigations, Dr. M. M. Ellis, examined the waters of the Coeur d'Alene River system from above Wallace down to the Spokane River at the Idaho-Washington state line.

The Commission's report, signed and submitted on December 24, 1932, constituted a potent, science-based statement about the state of the Coeur d'Alene River and Lake after nearly a half century of mining.[439] The report offered a brief history of the area's mining industry, including a discussion of the relatively recent shift from the jig-

[438] Coeur d'Alene River and Lake Commission, *Report and Recommendations*, 16.
[439] On a two-to-one vote, *sans* the signature of Shoshone County Commissioner Taylor, who disagreed with the report's proposed recommendations for the mining industry.

table to the flotation system of ore separation.[440] The Commission offered that in the period since the flotation system had been widely adopted the problem of suspended lead being carried greater distances from the mining district had grown immensely, stating that, "enormous quantities of finely powdered rock and ores have been deposited in the channel of Coeur d'Alene River and on lands adjacent to this river in the Coeur d'Alene River valley, from the town of Cataldo to the mouth of the river near Harrison, where it empties into Coeur d'Alene Lake."[441] The report found that lead was present, both in suspension and in solution, in the waters of the Coeur d'Alene Lake and River.[442] The presence of lead in solution presented the more intractable and potentially dangerous problem. It was more toxic in that form, and while it was readily feasible to filter out lead in suspension, it was not so in the case of lead in solution. Both the sizable community of Coeur d'Alene City and the far smaller one of Harrison relied upon, respectively, the Lake and the River for their domestic water supplies.

The Commission noted with some apparent surprise its discovery of the tendency for the lead content of deposits in the river and lake to be higher than that of tailings at the mills. It concluded that this situation likely resulted from the repeated rewashing, during periodic flooding, of old downstream tailings that contained a higher percentage of lead than did current tailings.[443] Turning to the problem of lead in solution, the Commission accepted M. M. Ellis's diagnosis. The Bureau of Fisheries' expert explained that lead came to be found in solution in the Coeur d'Alene River and Lake due to the

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[440] So finely ground that all could pass through a 200 mesh screen.
[441] Coeur d'Alene River and Lake Commission, *Report and Recommendations*, 7.
[442] Ibid., 21.
[443] Ibid.

exposure of old streamside tailings' deposits to weathering processes. When flooding occurred and these deposits were rewashed, lead in solution wound up in the river, and eventually, the lake.[444] Describing this recurrent problem, the report noted that, "The Coeur d'Alene River periodically overflows its banks and creates a settling basin of some 25,000 acres upon which this lead or other mineral may be settled and is probably the chief contributing factor to the problem of lead in solution through the process of weathering…"[445] In other words, approximately 25,000 acres of land lying adjacent to the South Fork and the main stem of the Coeur d'Alene River, had, by 1932, in the parlance of local farmers and ranchers, "become leaded." With each new flooding this "leaded land" contributed to the increasingly toxic re-leading of the downstream environment. By the early 1930s the Coeur d'Alene Valley and Lake region found itself caught in an increasingly vicious, man-made cycle of environmental pollution.

In his "summary of investigations," federal sanitary engineer J. K. Hoskins addressed the results of the numerous water samples he and his team took from various locations in Lake Coeur d'Alene, and at one location in the lower Coeur d'Alene River. Hoskins found that, "…under normal conditions the lake water is practically saturated continuously with lead in solution."[446] The sanitary engineer found that while most of the water samples' lead contents ranged from .08 to .20 parts per million, a few of the samples indicated the presence of lead in much higher quantities. For instance, a sample taken at the Harrison intake contained lead at a ratio of 2.25 parts per million and one at the Coeur d'Alene City intake showed a lead level of 1.75 parts per million. By the early

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[444] Coeur d'Alene River and Lake Commission, *Report and Recommendations*, 23.
[445] Ibid.
[446] Ibid., 48.

1930s, lead's toxic properties had been long-known, particularly in regard to drinking water. The U.S. Treasury Department's drinking water standards specified that lead should not exceed .1 parts per million, a rate exceeded by most Lake Coeur d'Alene water.[447] Hoskins also reported that the lead levels found in the lake's water definitely tended to decrease with the distance from the mouth of the River, with significantly lower levels found at Coeur d'Alene City than at Harrison. This the engineer attributed to the settling out of lead to the lake's bed as water traveled from the mouth of the river to the point near Coeur d'Alene City where the lake emptied into the Spokane River.

While noting the lack of general agreement among the authorities on the level of lead in drinking water that could be considered safe for humans, Hoskins cited the Treasury Department's drinking water standards. Hoskins' review of the relevant literature noted that the limits varied from .025 to 1.0 parts per million, placing the Treasury Department's specifications toward the stricter end of the safety spectrum.[448] Based upon the average lead reading at the Coeur d'Alene City drinking water intake of .22 ppm and the estimate that it would take the absorption of 1/32nd of a grain of lead daily to "set up chronic lead poisoning,"[449] Hoskins calculated that a person would have to drink 2.4 gallons of water a day – far more than the average person consumed -- to be in danger acquiring chronic lead poisoning. The sanitary engineer did not perform such

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[447] In the days long before the EPA and Homeland Security, the Treasury Department was something of a catch-all for a wide variety of federal roles, housing functions from drinking water standards to the Secret Service.

[448] Idaho Legislature, *Report and Recommendations*, 49. For some basis of comparison the federal Environmental Protection Agency (hereinafter EPA) in 1991 lowered its standard of danger for lead in drinking water from 50 parts per billion (ppb.) to 15 ppb., or .015 parts per million (ppm.). This is the agency's current "action level" for drinking water. It regards no amount of lead in drinking water as safe, see http://www.epa.gov/safewater/contaminants/index.html (accessed October 28, 2009).

[449] Ibid.

calculations for the city of Harrison, where the average lead content of the water at the intake was found to be .36 ppm, more than fifty per cent higher than at Coeur d'Alene City, but had he done so he would have come to the conclusion that the Harrison resident could only safely drink about 1.6 gallons of water per day, a far less comforting number, especially when one also factors in the amount of water used daily in cooking food.[450]

Given the levels of lead found in the waters of Lake Coeur d'Alene, the Bureau of Mines' findings concerning lead quantities in the waters of the South Fork and the main stem of the Coeur d'Alene River were not particularly surprising. The Bureau, whose fundamental mission was to act as a governmental handmaiden to the mining industry by providing it with useful advice and scientific data, was, of the federal agencies involved in the investigation, certainly the one most correctly perceived as a friend of the mining industry. Although in a number of important aspects, the Bureau found itself in agreement with its fellow agencies in its principal conclusions, the agency nonetheless managed in other ways to live up to its pro-industry reputation in both the rhetoric and substance of its report. Rhetorically, unlike the other agencies, the Bureau of Mines made repeated, prominent use of the word "alleged" in its initial paragraphs outlining the scope of the issues it had been brought in to address – referring to the "*alleged* [italics added] material damage to farm land in the Coeur d'Alene River valley," the site of the *alleged* [italics added] trouble" [the River valley] and "the *alleged* [italics added] poisonous constituents contributed by the tailings."[451]

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[450] They of course would have felt even less safe had they been using early 21st century standards, under which they would have been considered to be at risk of contracting lead poisoning by drinking as little as 1/5th of a gallon of water per day at Coeur d'Alene and 1/8th of a gallon at Harrison.
[451] Coeur d'Alene River and Lake Commission, *Report and Recommendations*, 41.

The Bureau also waxed enthusiastic about the mine owners' proposed technological fix to the problem of tailings pollution – the massive suction dredge that the MOA installed at a spot near Cataldo where the valley widens and the river's pace slackens. The mine owners set up the dredge in 1932 while the investigation into the pollution of the Coeur d'Alene River and Lake was ongoing. Rejecting the option of establishing settling basins at Cataldo and piping their tailings there directly from the concentrating mills as overly expensive and technologically unfeasible, the mine owners had instead decided to allow their tailings to continue to trail down the South Fork and the main stem of the Coeur d'Alene River to Cataldo before many of them would be removed and stacked on adjacent land by an electric suction dredge. The Bureau wrote that, "…there are no apparent reasons for believing the dredge will not be an amelioration, and ultimate improvement can be expected. Plants that operate on the same principles for removing tailings from water have proven to be satisfactory in other situations." Of the fact that the dredge would do nothing to ameliorate the condition of the South Fork or of the brief stretch of the Coeur d'Alene River above Cataldo, the Bureau made no mention.

The Bureau first determined that the lead found in these rivers was not indigenous to the area by performing comparisons with the amount of lead found in the St. Joe, a neighboring tributary where little to no mining and concentrating had taken place. In this waterway the Bureau found a truly negligible amount of lead in the water -- less than .0001 per cent. Examining samples of tailings at the source itself – the mills of the mining district – the Bureau found them to contain a range of from .02 to 1.77 per cent lead, with an average of about .4 per cent lead. Turning to the Coeur d'Alene River, the Bureau's samplings determined that the lead content of total water-borne solids found there lay between .14 and .30 per cent, with an average of .24 per cent.[452] Samples from the bottoms of the Coeur d'Alene River and Lake contained higher quantities of lead, ranging from .68 to .93 per cent,[453] not surprising given the tendency of the mineral to sink and to accumulate on the bottoms of waterways over time.

Turning to the nettlesome question of the presence of lead in solution in the Coeur d'Alene River, the Bureau concluded that the majority of the lead found there came in the less hazardous form of lead in suspension, and that, "Only a small part of the lead is in solution." While observing that, "enough tailings can be carried in suspension by rapidly moving and turbulent water to cause chronic lead poisoning to man or stock that drink normal amounts of water for several days or longer," the Bureau went on to conclude that such water was distinctly turbid and that the lead in solution in such water would "settle rapidly" once the water was stilled.[454] No sane person, the Bureau's report strongly implied, would drink the turbid river water before it had been allowed to settle out, but that the non-turbid river water was safe to drink. That livestock would avoid drinking the turbid, tailings-laden water, however, was less clear, although the Bureau took pains to maintain that no conclusive evidence existed to show that cattle had been poisoned by drinking water from the Coeur d'Alene River. The Bureau, based upon its investigations, also dismissed the suggestion that the presence of arsenic in the river water constituted a

[452] Unfortunately, the Bureau of Mines employed a different instrument of measure than did the Bureau of Health – percent rather than ppm. – so the two are not directly comparable.
[453] Coeur d'Alene River and Lake Commission, *Report and Recommendations,* 43.
[454] Ibid., 43-44.

threat to life, saying that not nearly enough arsenic was present in the waters "to be…of practical consideration from the viewpoint of poisoning or harmful pollution of the water."[455]

The most hard-hitting and attention-getting of the federal agency reports, however, was penned by Dr. M. M. Ellis, Chief of Interior Fisheries Investigations for the U.S. Bureau of Fisheries in the Department of the Interior. In a highly detailed and wide-ranging sixty-one-page report, Ellis assessed the quality of the South Fork, the Coeur d'Alene River proper and Lake Coeur d'Alene as habitat for flora and fauna and made recommendations for improving their respective conditions. Following his studies of the waters of the area in July, 1932, Ellis found the South Fork from a few miles above Wallace and the entirety of the main stem of the Coeur d'Alene River to be essentially a dead river, "practically devoid of fish fauna, bottom fauna or plankton organisms."[456] Without plankton, fish life was essentially an impossible, as "The importance of planktonic plants and animals as the basic links in the food chains of all fishes and other aquatic animals is so well established that the abundance of and even the survival of fishes in any given stream or lake is known to be dependent upon the abundance of the proper species of plankton organisms."[457] So it was hardly encouraging to learn that not only did the roughly fifty miles of river from above Wallace to Harrison lack plankton life, but that the plankton fauna of Lake Coeur d'Alene was "as a whole rather sparse,

[455] Coeur d'Alene River and Lake Commission, *Report and Recommendations*, 45.
[456] Ibid., 50.
[457] U.S. Bureau of Fisheries, *Special Scientific Report, No. 1, Pollution of the Coeur d'Alene River and Adjacent Waters by Mine Wastes* (Washington, DC, 1940), 13.

and particularly poor at the south end," or that "No plankton were taken off Harrison…and very few as far up the lake as East Point."[458]

Indeed, Ellis found that while the Lake's plankton conformed to essentially the same distribution patterns they did when fisheries biologist George Kemmerer had performed his 1911 studies, they had declined in the intervening twenty-one years of mining discharges.[459] Kemmerer, in 1911, as part of the U.S. Bureau of Fisheries' study of the fish-production potential of the Northwest's lakes, examined the biological and chemical properties of Lake Coeur d'Alene. He noted that the Coeur d'Alene River's waters as they entered the Lake at Harrison, "are so laden with silt that they may be traced far out into the clear water of the lake, the bottom of which shows the effect of the sediment from both rivers [the Coeur d'Alene and the St. Joe]."[460] Kemmerer also saw evidence that the Coeur d'Alene River was dropping much of its mineral-heavy load near the river's outlet into the Lake, thus considerably decreasing the Lake's depth there.[461] Kemmerer and his colleagues noted the thinness of plankton at the river's opaque outlet.[462] His catches in the deepest part of the lake also indicated a relative lack of plankton.[463]

By 1932, the lake's health certainly had not improved. Ellis found negative trendlines in the lake's bottom fauna, describing it as "very meager" and noting that it

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[458] Idaho Legislature, *Report and Recommendations,* 50.
[459] Ibid.
[460] George Kemmerer, J.F. Bovard, W.R. Boorman, "Northwestern Lakes of the United States: Biological and Chemical Studies with Reference to Possibilities of Production of Fish," Bureau of Fisheries, *Bulletin of the Bureau of Fisheries*, Vol. 34, 1923-1924, "Northwestern Lakes of the United States: Biological and Chemical Studies with Reference to Possibilities of Production of Fish," (Washington, DC: Government Printing Office, 1923), 80-81.
[461] Kemmerer, Bovard, and Boorman, "Northwestern Lakes of the United States," 80-81.
[462] Ibid., 83.
[463] Ibid.

"seemed to be declining."[464] While not finding any living fish at the mouth of the Coeur d'Alene River at Harrison, Ellis detected the presence of minnows, dace, bass, perch and trout in other parts of the lake. He noted, though, that trout now were rarely caught off Harrison and that their numbers seemed to have decreased significantly since the time when Captain Mullan visited the lake in 1858 and found it to be, "a noble sheet of water…filled with an abundance of delicious salmon trout."[465] Ellis did not lay the entire blame for this evident condition at the feet of the upstream mining industry, however, noting that similar fates had befallen numerous western lakes as a result of the advent of cultivation of surrounding lands, deforestation and other aspects of modern civilization, all of which also had come to the Lake Coeur d'Alene area.

Turning to the more specific scientific reasons behind the evident lack of acquatic life, Ellis first focused his attentions to the state of the bed of the Coeur d'Alene River. There he found a riverbed that "was deeply covered with shifting deposits of very fine rock powder which not only overwhelmed the bottom fauna but prevented the development of any bottom consocies of animals either adult or immature."[466] The immense quantities of mine tailings that had washed downstream had not only choked out existing life in the river, they also prevented the development of any new life there. Examining the deposits of mine slimes on land adjacent to the Coeur d'Alene River about which litigating farmers had so often complained, Ellis wrote, "Along the polluted portion of the Coeur d'Alene River the banks, flats, and low lands were covered often to a depth of several feet with deposits of mine slimes which had been left there during high

[464] Kemmerer, Bovard, and Boorman, "Northwestern Lakes of the United States, 51.
[465] U.S. Bureau of Fisheries, *Pollution of the Coeur d'Alene*, 8.
[466] Coeur d'Alene River and Lake Commission, *Report and Recommendations*, 51.

water and which were being continually returned to the river by wind, rain, and current action, *thus producing a constant repollution of the river* [italics added]…"[467] Ellis found highly toxic "incrustations" which often formed on these mine slimes and on soils that were "more or less impregnated with mine slimes"[468] – hard coatings over the soil that often covered several acres. Determining these incrustations to be "composed of a soluble fraction [3 to 40 percent] which was largely zinc sulphate and an insoluble fraction carrying zinc, and lead compounds," Ellis and his team then performed experiments on animals which determined that the soluble fraction of the incrustations "was highly toxic to fish, frogs, turtles, fresh-water mussels and plankton crustacea."[469] After exposing fish to high dilutions of these incrustations for twelve to thirty-one days, the fish died, "showing among other symptoms black deposits of lead in the fins and elsewhere about the body, indicative of cumulative lead poisoning."[470] Simply put, rewashed mine tailings were highly lethal to fish; this constituted bad news for the future prospects of "the finny tribe" in the Coeur d'Alene River, a water body that remained highly prone to semi-annual flooding.

Ellis also conducted further experiments. He placed long-nosed dace and dace minnow caught in Lake Coeur d'Alene in live-buckets at two separate locations, one live-bucket in the water at Lake Coeur d'Alene offshore of the Harrison Beach, the other about one quarter of a mile up the Coeur d'Alene River from its mouth at Harrison. After twenty-four hours both buckets were raised and all of the fish seemed to be in fine

[467] Coeur d'Alene River and Lake Commission, *Report and Recommendations*, 52.
[468] Ibid., 53.
[469] Ibid.
[470] Ibid.

condition. The buckets then were placed back in the water. After seventy-two hours the buckets again were raised. This time around, while all of the fish in the Harrison Beach bucket "were active and in good condition," all of the fish in the Coeur d'Alene River bucket were dead. In addition, each of the dead fish "was covered with a heavy coating of mucous slime and the gills were choked with mucous."[471]

Ellis concluded that the death of the Coeur d'Alene River fish could not be ascribed to "low oxygen, high carbon dioxide, high osmotic tension or a temperature differential…because there were no deaths in the first 24 hours."[472] For Ellis, the "heavy secretion of mucous" by the fish clearly points to an irritation, "either chemical or mechanical, or possibly both, since the secretion of mucous is one of the protective reactions of living fish."[473] Meanwhile, the same type of native fish, placed in identical experimental conditions to those of the Coeur d'Alene River fish, but in the lake instead of the river and at a distance of approximately a third of a mile away from the other group, thrived in conditions that in many respects were identical to those of their now-deceased fellows. The chief difference in the two situations seems to have been the relative concentration of mine wastes in the two water bodies. In the lake the wastes were given more of an opportunity to diffuse, whereas in the river, even forty miles downstream from the mining district, the wastes remained relatively more concentrated. That such wastes were toxic to fish was borne out by Ellis's experiment. Or, as he writes, "It is evident, therefore, that the mine wastes carried by the Coeur d'Alene River in July, 1932, were sufficiently harmful because of mechanical action, chemical toxicity, or both,

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[471] U.S. Bureau of Fisheries, *Pollution of the Coeur d'Alene*, 32.
[472] Ibid.
[473] Ibid.

to kill native minnows in 72 hours, while controls from the same lot of fish lived without a casualty under identical conditions of confinement in Coeur d'Alene Lake."[474]

Ellis and his team performed similar experiments on local plankton using water from the Coeur d'Alene River near Dudley and from Lake Coeur d'Alene near the mouth of the river at Harrison. As a control group Ellis placed some plankton in water from the headwaters of the South Fork where healthy populations of plankton were found to exist. All of the plankton exposed to river water died in eighteen hours or less, while the plankton exposed to Coeur d'Alene Lake water fared slightly better: most of this plankton survived for from 48 to 72 hours before succumbing, and about twenty per cent survived outright for three days.[475] These results largely conformed to the pattern found at the time in the river and the lake – no plankton presence in the Coeur d'Alene River and a rather sparse presence at the mouth of the river at Harrison. Not surprisingly, the plankton placed in the waters from above Mullan did just fine. When the water from Dudley and Harrison was diluted so that it was mixed at a 50/50 ratio with local tap water, it still killed all of the plankton exposed to the mixture containing Coeur d'Alene River water within forty-eight hours or less, while the mortality rate for the mixture containing lake water dropped to 25 percent.[476] Even significantly diluted, the Coeur d'Alene River water remained potently toxic to plankton.

In order to insure that their experiments tested only the degree of harm caused by substances present in solution in the waters of the Coeur d'Alene River and of the Coeur d'Alene Lake at Harrison, Ellis and his team removed material present in suspension in

[474] U.S. Bureau of Fisheries, *Pollution of the Coeur d'Alene*, 32-33.
[475] Ibid., 34-35.
[476] Ibid.

both cases before using it experimentally. The team's experiments thus tested only the effects of the chemical properties of the waters on plankton; the "mechanical action" -- for example abrasion or crushing -- of the respective waters could be ruled out as a cause of harm to the plankton.[477] Ellis thus concluded, "…that the Coeur d'Alene River water contained salts or other substances in solution during July 1932, which were quite toxic to plankton animals…".[478] The federal biologist determined that the river water possessed a "rather high toxicity," concluding that its toxicity was roughly comparable to that of water containing 2-2.5 per cent salt solution.[479] Ellis further deduced from the overwhelming evidence that exposure to Coeur d'Alene River waters explained the rapid diminution in plankton life as streams flowing from relatively healthy lateral lakes such as Rose Lake and Black Lake mixed with waters from the River.[480]

Ellis devoted considerable attention in his report to the "lead incrustations" that formed such a prominent landscape feature on the lands directly adjacent to the Coeur d'Alene River from Cataldo down to Harrison. This interest was in part due to their massive physical presence and in part to the fact that as substantial portions of them consisted of water-soluble lead and zinc sulphates, as opposed to insoluble sulphides, the incrustations had the potential to be highly toxic to plant and animal life. As such, the incrustations might well be a key to the toxicity of the Coeur d'Alene River in general, and more specifically to the apparently perplexing fact that the river water contained higher levels of lead below Cataldo than it did directly below the mining district. Ellis

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[477] U.S. Bureau of Fisheries, *Pollution of the Coeur d'Alene*, 34.
[478] Ibid.
[479] Ibid., 35.
[480] Ibid.

determined to his full satisfaction that the incrustations had been produced by the weathering of exposed mine wastes "which are subjected to a variety of conditions conducive to chemical changes [such] as moisture, light, heat, and oxidation."[481] In appearance, Ellis described the incrustations as "of a crystalline material varying from pure white to dull gray or dirty brown in color." Their size was rather staggering. Ellis spoke of their gross bulk as amounting to "the enormous weight of 27 to 28 tons per acre of surface incrusted."[482] The fisheries biologist noted that particularly far-ranging examples of incrustations were observed at "flats" near Dudley and at Thompson Flat, and also that "practically every exposed mass of mine slime deposits along the river from Cataldo to the mouth, was more or less covered with these incrustations..."[483]

Viewing the incrustations at Thompson Flat as relatively representative of the incrustations found along the Coeur d'Alene River, Ellis performed chemical tests upon them. He found that 3.3 per cent of the incrustations, by total weight, were water soluble and that this soluble fraction was composed of 62 per cent zinc sulphate, 30 per cent other soluble solutions -- principally sodium and magnesium -- and .05 per cent lead. Next, the fisheries biologist turned to the experimental method to determine what sorts of effects this water-soluble fraction would have on the relatively hardy common goldfish. Ellis found that if the water-soluble solution was present in the water with goldfish at a level of .01 per cent or stronger, "a profuse secretion of mucous by the fish was induced in the course of the first 6 hours or less." This, of course, was a sign of bodily irritation in the fish. But at such a low level of exposure, the goldfish stopped secreting mucous after

[481] U.S. Bureau of Fisheries, *Pollution of the Coeur d'Alene*, 44.
[482] Ibid.
[483] Ibid.

four days and appeared perfectly healthy again. At higher levels of exposure to the water-soluble portion of the incrustation matter, the goldfish evinced greater physical difficulties including the more voluminous production of mucous, sluggishness of movement, and difficulty swallowing food. Even at a concentration of 1.6 percent, however, the fish were able to recover if the solution were only introduced on one occasion. If, though, the solution were introduced on a daily basis, as might for instance happen on the Coeur d'Alene River during a flood, all of the fish perished within four to six days.[484] Even hardy fish apparently could not survive continuous exposure to the incrustation materials in solution.[485]

Despite the relatively low level of lead present in the water-soluble fraction of the incrustations, Ellis found it to be the culprit in the deaths of the goldfish used in his experiments. While zinc, present in much higher levels in the incrustations, is not a cumulative toxin, lead most definitely is. Ellis determined that the zinc present in the incrustations irritated the fish, causing mucous production, as did the lead, but did not kill them.[486] Discussing the cumulative effect of lead on the fish he experimented upon, Ellis wrote, "The cumulative effects of the incrustation material from the Thompson Flat are more significant perhaps than the immediate effects. The appearance of black deposits,

[484] Bureau of Fisheries, *Pollution of the Coeur d'Alene*, 47.
[485] One is puzzled, however, by the fact that Ellis used goldfish for these experiments and not the types of locally-found fish (e.g., dace) employed in earlier experiments on the Coeur d'Alene River and Coeur d'Alene Lake water. It would seem that, notwithstanding the greater relative hardiness of goldfish, using the same types of fish would have maintained more experimental consistency and also would have better-tested the effects of the incrustation material upon local fish populations.
[486] U.S. Bureau of Fisheries, *Pollution of the Coeur d'Alene*, 47.

which were chemically identified as lead, in the fins of the fish exposed to this crust powder points specially to lead poisoning in these fish…"[487]

Ellis also tested the reactions of goldfish to exposure to lead sulphide.[488] Although minute amounts of lead precipitated out over time when the sulphide was placed in water, this substance was many orders of magnitude less water soluble than was lead sulphate. This seemingly technical distinction actually carried great potential import both legally and ecologically. In the *Doty* case, for example, the presiding judge accepted the companies' claims that the lead ore they produced was harmless. The companies had claimed, among other things, that cows that drank the water directly from their mill flumes had grown fat and happy. Based upon such evidence the judge had released them from any liability for the crop and livestock losses of downstream farmers. Ecologically, it made a big difference whether the harmful mining product was found to be pure lead ore or chemically weathered lead sulphates. The findings likely would indicate highly different solution paths to the problem of ongoing ecological damage to the Coeur d'Alene River and Lake. In any event, Ellis's experiments revealed that goldfish had little to worry about from lead sulphides in the form of washed lead ore. Whereas nearly all of the goldfish continually exposed to lead incrustation material -- lead sulphate -- had perished within thirty-one days, the goldfish exposed to washed lead ore -- lead sulphide -- all survived, apparently quite healthy, for the same period of time.[489] The ecological problem evidently was with lead sulphate, with lead compounds after they had been

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[487] U.S. Bureau of Fisheries, *Pollution of the Coeur d'Alene*, 48. Ellis also tested the incrustation material located at Bradley Flats, just west of the city of Kellogg. He found them to be even more toxic to plant and animal life than those located downstream at Thompson Flat (see 51-52).

[488] That is to say lead ore, or what was released directly from the mills before exposure to weathering action.

[489] U.S. Bureau of Fisheries, *Pollution of the Coeur d'Alene*, 49.

exposed to weathering action and were returned to the river, and not with lead ore *per se*. The problem, however, was that lead ore tailings, once washed downriver from the mining district, invariably washed up onto riverbanks and flats and began the process of weathering that converted them into highly toxic lead sulphates. Unless all of these downriver lead tailings were somehow collected and stored in some type of impervious container or were captured directly below the mills and stored in impoundment ponds, it was difficult to see how the massive ecological problem they were causing could be remediated. Legally, if the mining companies were continuing to release a product that, while not toxic at the point of release was known to be converted on a wide scale to a highly toxic substance, would they not be liable for resultant damages from exposure to that product?

Presumably in order to determine their toxicity to other types of animals that might normally frequent a riverine area such as the Coeur d'Alene, Ellis also tested the effects of the incrustation material on frogs, turtles and fresh water mollusks. Again using highly diluted portions of the water soluble fraction of the incrustation material, Ellis found that such material had a dramatic, negative effect on the health of the creatures. It "produced immediate paralysis of the stomach and intestines of fishes, frogs and turtles, in dilutions as high as 1:100,000" – this paralysis was unfortunately "very largely irreversible." [490] The material also "caused immediate disturbances in the heart beat of fishes, frogs, turtles and fresh-water mussels which shortly resulted in complete cessation of heart beat, when dilutions as high as 1:100,000 were used."[491] Ellis found the effects of

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[490] U.S. Bureau of Fisheries, *Pollution of the Coeur d'Alene,* 50.
[491] Ibid.

the incrustation material on these animals to be quite similar to those "produced by lead poisoning with lead acetate in dilutions on 1:100,000…"[492] From these experiments Ellis concluded that not only were the incrustations highly toxic to fish but also that they were "highly toxic to…frogs, turtles and fresh-water mussels if the exposure were long enough to allow even very small quantities of this soluble fraction to be absorbed, taken into the alimentary canal, or otherwise brought to vital organs."[493] There presumably existed little hope for water-based animals to return to the South Fork or the main stem of the Coeur d'Alene River as long as large amounts of the incrustation material remained on the riverbanks.

Moving downstream to Lake Coeur d'Alene, the large settling basin for the waters of the Coeur d'Alene and St. Joe Rivers, Ellis found considerable evidence of the effects of the mining district's wastes. Dredging material from the bottom of Lake Coeur d'Alene at numerous points revealed that mine slimes had nearly blanketed the lake floor. The biologist noted that, "The dredging work in Coeur d'Alene Lake demonstrated conclusively that the mine slimes have deposited over the entire floor of the lake from Harrison to the outlet west of Coeur d'Alene City…and that from time to time when certain conditions arise these slimes are being deposited inconsiderable quantities on certain parts of the lake floor…"[494] The presence of these slimes, Ellis concluded, was a significant factor in the relative sparsity of bottom creatures living on the lake floor. This lack of bottom life was significant since, as previously noted, such life constitutes a cornerstone in aquamarine food chains -- mine slimes may have played a major role in

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[492] U.S. Bureau of Fisheries, *Pollution of the Coeur d'Alene*, 50.
[493] Ibid., 51.
[494] Ibid., 29.

turning Coeur d'Alene lake into a water body that could only sustain relatively meager fish populations. Ellis also noted the presence of other substances found on the lake floor, including mica sands, black sands, and saw mill waste that came principally from the St. Joe River, and commented that, "All of these deposits including the mine slimes are covering over the small amount of organic debris which could be used as food by animals of the bottom fauna of the lake."[495] The fisheries biologist saw the negative import of the mine slimes for the lake's bottom fauna as lying not so much in their mass, however, as in their toxicity.[496] Ellis also noted the presence of mine slimes along the shores of Lake Coeur d'Alene and even up relatively high on a prominent shore feature known as Black Rock. This proved that the very fine tailings produced by the flotation process were making their way all around Lake Coeur d'Alene.[497] Indeed, they even apparently travelled farther; Ellis found evidence of mine slimes along the Spokane River at Green Acres, Washington.[498]

At the end of his report Ellis summed up his findings and made recommendations for the restoration of the fish populations of the Coeur d'Alene River and Lake. Observing that, "Collectively the mine wastes in the Coeur d'Alene River have destroyed the fish fauna and the plants and animals on which fishes feed…," and also that, "These conditions in the Coeur d'Alene River not only have made that river barren, but they are threatening all of the lakes adjacent to the Coeur d'Alene River, and constitute a constant

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[495] U.S. Bureau of Fisheries, *Pollution of the Coeur d'Alene*, 30.
[496] Ibid.
[497] Ibid.
[498] Coeur d'Alene River and Lake Commission, *Report and Recommendations*, 50.

menace to Coeur d'Alene Lake,"[499] the Interior Department's chief of Fisheries Investigations proceeded on to his recommendations. Here, Ellis concluded that, "There is only one complete solution to this problem and that is the exclusion of all mine wastes from the Coeur d'Alene River."[500] Still, he cautioned that even if such a thoroughgoing remedial step were taken, "…it will take the river some time to rid itself of the masses of powdered rock in the stream bed and of the weathering deposits of mine slimes along its banks, so that several years will elapse before a natural fauna will reestablish itself in the now polluted portion of the Coeur d'Alene River."[501]

Evidently not content to offer such a drastic recommendation without supplying a means to fulfill it, Ellis also proffered a technological solution. Based upon his recent exploratory visit to the comparably-sized lead and silver Sullivan Mines and Mills at Kimberly, British Columbia, the fisheries biologist stepped somewhat out of his realm of professional expertise and recommended that the Idaho mining companies adopt something like the filtration system in place in Kimberly. That system employed wooden flumes to transport mine wastes to a number of settling basins that allowed mill tailings to progressively settle out. The settling basins also progressively filtered the mill water so that, according to Ellis, by the time it reentered the local stream, the St. Mary's River, "…the mine chemicals and other substances in solution are very largely destroyed" and "plankton, algae, aquatic insects and fish were found…"[502] Ellis further noted, perhaps recalling earlier complaints of Coeur d'Alenes' mining companies, that the Kimberly

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[499] U.S. Bureau of Fisheries, *Pollution of the Coeur d'Alene*, 54.
[500] Ibid.
[501] Ibid.
[502] Ibid., 55.

filtration system, which essentially had been mandated by Canadian water laws prohibiting the dumping of mill wastes into that nation's natural waters, had not been cost-prohibitive to construct and involved only nominal costs to maintain. Turning to the possibly rival technological system the MOA had recently put into operation to deal with the problem of mine wastes in the natural waters of North Idaho, Ellis granted that it promised an improvement in the water quality of the Coeur d'Alene River and of the Lake. But the fisheries biologist concluded that operations of the suction dredge at Cataldo would fall far short of restoring the health of those waters, stating, "This procedure will undoubtedly reduce the amount of mine slimes carried to the lower river but as the finer particles will not settle out even in Coeur d'Alene Lake the pollution of the lower river will not be corrected but merely modified." [503] Ellis clearly felt that when it came to truly restoring the health of the Coeur d'Alene riverine system the settling ponds method of dealing with mill wastes as employed in Kimberly offered the far superior "tech fix" over the MOA's suction dredge option.

Ellis's technological recommendation in fact became the principal sticking point for the Coeur d'Alene Lake and River Commission. In their final report two of the three commissioners – Attorney General Babcock and Kootenai County Commissioner Cathcart – voted to approve the full report, including both of the suggestions in the "Recommendations" section. The third commissioner, Shoshone County Commissioner James H. Taylor, however, voted against approving the full report, noting his specific objection to the report's endorsement of the proposal to transport mine wastes to settling beds by some means other than the South Fork of the Coeur d'Alene River. That

[503] U.S. Bureau of Fisheries, *Pollution of the Coeur d'Alene,* 55.

recommendation, the Commission's second, stated that, "…the *most efficient* [italics added] method of handling the slimes which come from the mills is to transport them to the settling beds by some means other than by using the river channel."[504] Taylor added that it was, "his position that the dredge as set up and operated at the present time will satisfactorily handle the question of slimes in the Coeur d'Alene River."[505] That Taylor's position mirrored that of the mining interests who played such a powerful economic and social role in the county where he practiced politics should hardly come as a surprise. It is interesting that Taylor did not publicly object to any other aspects of the report. Perhaps he felt unequipped to challenge the scientific observations and conclusions of scientists working on their own turf, but was more secure in tackling the technical engineering-based solutions of non-engineers. In any event, the Shoshone County Commissioner's refusal to sign on to the final report meant that it lacked unanimity and also that the upstream-downstream conflicts that spawned the River and Lake Commission were still in evidence at the conclusion of its labors.

The River and Lake Commission, in fulfilling its stated duty to recommend means of preventing pollution that would be harmful to animals, plants, and human health in and along the Coeur d'Alene River and Lake, made only two recommendations to the Idaho Legislature. The first recommendation, to which dissenter Taylor made no specific objection, made favorable mention of the recently-constructed dredge at Cataldo and clearly implied that the MOA's efforts in this regard should be applauded and use of the suction dredge continued. The Commission stated that, "…the use of the dredge *may be*

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[504] Coeur d'Alene River and Lake Commission, *Report and Recommendations,* 24.
[505] Ibid., 25.

very effective [italics added] in cleaning the deposits of slimes out of the Coeur d'Alene River and reclaiming that portion of the river below Cataldo." Perhaps the Commission was attempting to "split the difference," or assuage different constituencies, by praising the dredge, but in fact its recommendation for the continued use of the dredge would have been rendered essentially pointless had its recommendation for installation of some sort of flume and settling ponds system been adopted. Ellis reported that the settling ponds system he observed in Kimberly had so well-filtered the mine wastes that the water leaving the final pond was clean enough to sustain substantial aquatic life. From an ecological point, then, why would a second filtration system, located miles downstream, be needed? Ellis, after all, hardly circumspect when discussing the requirements of healthy fish and plankton populations, had not recommended the installation of such a secondary system. In addition, it seems unlikely that the mining interests, once having constructed an undoubtedly costly settling ponds system, would then want to turn around and build, or in this case continue to maintain and operate, a costly dredging system.

What seems more likely in this case is that the Commission essentially decided to hedge its bets in making its recommendations to the Legislature. Understanding it unlikely that the MOA would build a settling ponds system like that found in Kimberly, B.C. after having already gone to the expense of purchasing and installing a massive dredge at Cataldo, the Commission probably opted to give them an out. The Commission's "Recommendations" section basically asserted that the settling ponds option was optimal but that the use of a dredge was still quite a good choice.[506] In the depths of the Great Depression, little opposition could be expected to mass against the recommendation. Even if only a half measure, this probably represented the best that could be achieved given that north Idaho's powerful mining industry opposed further action. The Coeur d'Alenes mining industry must have breathed a collective sigh of relief at having gotten off so cheaply

The 22nd Idaho Legislature accepted the Commission's report in January, 1933 and then proceeded to let it begin to collect dust. The state of Idaho took no action with regard to the pollution of the Coeur d'Alene basin for a number of years.

In March 1933, in the midst of the Great Depression, a new administration took the reins of power in Washington, D.C. promising a "New Deal" for Americans. Franklin D. Roosevelt (FDR) and his "New Dealers" swept into office and began an aggressive, often highly improvisatory effort to relieve the country's deep social and economic burdens. As with more recent incoming national administrations, "change" was the watchword of the New Dealers, who promised to formulate new approaches to old problems and not to be so constrained, as had the preceding Hoover Administration, by 19th century laissez faire nostrums regarding what constituted the proper role and scope of governmental activity. FDR's more activist approach to governing of course involved the creation of the numerous "alphabet soup" agencies designed to give work to the unemployed and tackle a wide range of social and economic ills. One program of the Works Progress Administration (WPA), was the Federal Writers Project (FWP) which

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[506] Keith R. Long reports that between 1932 and 1946, the suction dredge at Cataldo removed more than 15,000,000 metric tons of tailings-contaminated sediments from the river. See Long, *Production and Disposal of Mill Tailings in the Coeur d'Alene Mining District*, 2.

put numerous underemployed writers to work on various projects, including a series of state guides. These books were generally rather comprehensive tomes and were largely sociological and historical in nature.

Vardis Fisher, a native Idahoan and prolific novelist and essayist, wrote the FWP book on Idaho, entitled *Idaho: A Guide in Word and Pictures*, published in 1937. Fisher was unsparing in his portrait of the environmental despoilage he witnessed on his mid-1930s travels through the mining area. The author, however, did not neglect to note the relative size and potency of the Coeur d'Alenes' mining capacity. He observed, for instance, that the area was the richest silver producer in the nation's foremost silver-producing state and that the Coeur d'Alenes' possessed the largest silver mine -- the Sunshine -- and the three largest lead mines in the country.[507] Part history, part travelogue, *Idaho: A Guide in Word and Pictures*, depicts Fisher's journey through the mining district on U.S. Highway 10 (now Interstate 90). He crosses from Montana into Idaho at Lookout Pass and begins the downhill trek to Mullan, six miles distant, mentioning that the vistas found there "offer little foretaste of what is to be found in the Coeur d'Alene mining district."[508] At Mullan, Fisher notes the inescapable presence of the Morning Mine, "the third largest lead producer in the United States," along with the fact that it "sustains most of the population of the town" of 1,891.[509] Then Fisher turns his eye to the South Fork of the Coeur d'Alene, observing that, "On the right, too, as the highway leaves the W end of town, is the river, but it is not the lucid stream of a mile ago. It has been diverted to the mines here, impregnated with poison, and turned free. It

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[507] Vardis Fisher, *Idaho: A Guide in Word and Picture* (Caldwell, Idaho: Caxton Publishers, 1937), 172-73.
[508] Ibid., 332.
[509] Ibid.

now looks like a river of lye. Or, better, it looks as if all the dirty clothes in the world had been washed in it."[510]

By Fisher's account, the South Fork already looked badly tarnished at Mullan, before it had even traveled through the vast majority of the mining district. Eighteen miles further downstream at Kellogg, by this time the largest town in the mining district (pop. 4,124) and home to the giant Bunker Hill mine and smelter, Fisher's description of the river has not become any gentler. He writes, "Below it [the Bunker Hill mine] the river bottoms look like a caricature of a graveyard…"[511] Travelling a bit further down the South Fork from the smelting and mining center, the author observed, "West of Kellogg with its miracles of machinery, there is still to be seen a poisoned or dead and dying landscape. Trees slain by the invisible giant still stand with lifeless limbs and with roots still sucking the poisoned earth."[512] To Fisher the South Fork from Mullan to below Kellogg was ugly and unhealthy.

The New Dealers, however, wanted to do something about the nation's water pollution, much of it caused by mining operations and a lack of adequate sewage treatment facilities. In 1934, using an executive order, President Franklin Roosevelt created a National Resources Committee designed to study pollution, amongst other subjects. Its Advisory Committee on Water Pollution collected information from various federal agencies as well as from the states. The Committee published a report entitled *Pollution in the United States,* which made recommendations concerning pollution legislation. In 1939, Congress passed a major water pollution act that would have created

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[510] Fisher, *Idaho: A Guide in Word and Picture*, 332.
[511] Ibid., 333.
[512] Ibid., 334.

a permanent National Water Resources Committee to study pollution and make recommendations to the federal government for its abatement. Roosevelt, however, reluctantly vetoed the legislation because it lacked a permanent system for disbursing federal grants to states. A similar water pollution bill narrowly missed passage in 1940 and then World War II intervened, putting pollution concerns on the back burner. In 1948, however, national politicos returned to the issue. In that year Congress passed, and President Harry S. Truman signed into law, the landmark 1948 Water Pollution Control Act, the nation's first water pollution control legislation.

The Act provided for coordinated comprehensive planning, technical services and research to address the states' water pollution problems along with their water resource potentials, under the auspices of the Public Health Service (PHS) and the Surgeon General.[513] Although weakly-funded, at least in its initial years of operation, federal and state officials nonetheless went to work to fulfill the Act's mandate to study the nation's water resources. For purposes of effectiveness and efficiency, the PSA divided the nation's waters into fourteen basins, often corresponding to major watersheds such as the Columbia River. The PHS, assisted by the Army Corps of Engineers and state and local officials, created fourteen Basin Commissions and tasked them with reporting to Congress on a variety of issues relating to the nation's water quality and quantity. This they all did by 1951.

The waters affected by mining activities in the Coeur d'Alenes – the South Fork, the main stem of the Couer d'Alene River, Coeur d'Alene Lake and the Spokane River –

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[513] Leonard Dworsky, *Conservation in the United States, a Documentary History: Pollution* (New York: Chelsea House Publishing, 1971), 222.

all part of the massive Columbia River drainage system, were included in Basin Fourteen, province of the Pacific Northwest Basin Commission, headquartered in Portland, Oregon. Not surprisingly, the Basin Commission identified the mining and concentrating operations in the Coeur d'Alenes as one of the most significant threats to water quality in the Upper Columbia River Basin and the Coeur d'Alene watershed as one of the most heavily polluted in the region. Speaking more generally, the Commission pointed to a handful of mining and concentrating operations in the Basin, the Basin's rapidly growing population, and its scarcity of adequate sewage treatment facilities, as the region's chief water quality threats.[514] Noting the environmental destructiveness of major mining operations such as those found in the Coeur d'Alenes, the Commission commented that,

> Fortunately, the big mining operations – copper, lead, zinc, silver, gold, etc., -- have been concentrated in three relatively confined areas. In some localities these mining companies have worked out their own methods of control which have reduced the amount of wastes entering the watercourses. In other localities, however, such as…the south fork of the Coeur d'Alene River below Mullan, Idaho…large mining operations for years have degraded streams by the discharge of wastes directly to the watercourses.[515]

Despite mining companies' "excellent efforts" to mitigate their pollution of watercourses through such technological solutions as the establishment of dredging operations and the construction of tailings and settling ponds, along with their attempts to essentially purchase the problem via various policies of buying land and pollution easements from downstream landowners, the Commission concluded that, "…some 100

[514] The Commission pointed out that only 8.5 per cent of the sewered population of the Spokane Sub-Basin had adequate sewage treatment facilities. In the Coeur d'Alenes, where the Coeur d'Alene River and its tributaries had always been used as "sewage sinks," that figure dropped to zero per cent.

[515] U.S. Public Health Service, Division of Water Pollution Control, *Pacific Northwest Drainage Basins* (Washington, DC, 1951), 8.

miles of watercourses have been *destroyed for most normal uses* [italics added]."[516]

Specifically addressing the effects of this pollution on municipal drinking water and aquatic life in the Coeur d'Alene watershed, the Commission stated that,

> Wastes from ore concentration mills entering some of these watercourses have affected the drinking water supply of Harrison, Idaho; destroyed all fish and aquatic life in the South Fork of the Coeur d'Alene River below Mullan, Idaho and the Coeur d'Alene River below the mouth of the South Fork…In addition, *the possibility of mine tailing wastes affecting the water supply of Coeur d'Alene, Idaho must be recognized* [italics added].[517]

Honing in on the particular nature of the environmental problems caused by mining and concentrating operations, and largely echoing Ellis's conclusions, the Commission specified that,

> The inorganic wastes discharged to the streams are principally mine tailings, acids, and toxic chemicals. Probably the greatest stream degredations found in the area are caused by the discharge of tailings from ore concentration mills and acid ore mine wastes. These wastes contain many chemicals which are detrimental to normal water uses and cause depositions which destroy the aquatic life in streams.[518]

Notwithstanding the Coeur d'Alenes' status as a grade-A water polluter, the Basin Commission referenced the district's importance to the nation's industrial and military strength, mentioning with pride that it was one of two mining districts in the Basin -- the other being the Butte-Anaconda, Montana copper center – that had produced over a billion dollars worth of mineral wealth, "a record achieved by only six other mining districts in the world."[519]

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[516] U.S. Public Health Service, *Pacific Northwest Drainage Basins*, 9.
[517] Ibid., 26.
[518] Ibid., 6.
[519] Ibid., "Summary," p. x. 1951, of course. represented a time of particularly heightened Cold War tensions.

Nonetheless, there was apparently no getting around the messy fact that mining, and even more so, concentrating, operations, were deeply fouling the Basin's waters and the lands adjacent to them. As the Commission noted, "Ore concentration mills, are dumping annually more than a million tons of mine tailings into watercourses [the lion's share of these from operations in the Coeur d'Alenes and Butte-Anaconda]. Acid mine wastes are disposed of in the same manner."[520] While admitting that for the time being, "pending development of practical disposal methods," it might be necessary to permit mine companies "to continue to use stretches of certain streams for receiving these wastes,"[521] the Commission nonetheless maintained that, presumably in the not very distant future, "Mine owners should be required to develop and provide the necessary treatment of their wastes."[522]

Shit Creek

The 1951 Columbia River Basin Commission Report cited the lack of sewage treatment facilities to serve the roughly 20,000 people who lived along the South Fork of the Coeur d'Alene River as one of the chief threats to the watershed. By 1960, nothing had been done about the situation and a group of concerned Coeur d'Alene Lake residents decided it was time to address what they saw as a serious threat to the health of their lake and themselves.[523] Forming the Coeur d'Alene Lake Anti-Pollution Committee, the group pressured the Idaho governmental agencies and the Idaho Wildlife Federation

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[520] Ibid., 11.
[521] U.S. Public Health Service, *Pacific Northwest Drainage Basins*, 11.
[522] Keith R. Long, "Tailings Under the Bridge: Causes and Consequences of River Disposal of Tailings, Coeur d'Alene Mining Region, 1886 to 1968," *Mining History Journal*, Vol. 8, 1991, 94.

to present recommendations to the 1961 Idaho Legislature. The Committee sought measures to prevent the continued dumping of raw sewage and mine wastes into water that eventually made its way down to their lake. It also advocated better enforcement of water quality regulations already on the books.[524] In the early- and mid-1960s the mining companies and local communities began making efforts to comply with federal and state clean water statutes. The valley's narrow, rugged terrain posed significant challenges, but by 1968, with Bunker Hill leading the way, the companies had constructed modern tailings impoundments and settling ponds at several locations in the valley to serve all the district's remaining mines.[525] The MOA decommissioned its dredge at Cataldo Flats. Responding to pressure from federal and state governments that were shedding their complaisance about fouled watercourses, mining companies of the Coeur d'Alenes, after thirty-six years, finally were complying with M.M. Ellis's 1932 recommendations.

At the same time, however, local advocates of the installation of sewer systems and sewage treatment facilities in the Coeur d'Alenes were having less success. In 1967 and again in 1968 local bond elections to finance the construction of sewage disposal infrastructure went down to defeat.[526] In 1968 the Idaho Department of Public Health began posting signs along the South Fork warning of sewage contamination.[527] When these signs began disappearing, the department responded by posting billboard warning and threatening legal action. In 1969, the department persuaded area mining companies to

[524] Casner, "Leaded Waters," 136-37.
[525] Long, "Tailings Under the Bridge," 94.
[526] Ibid., and letter to the editor, *Spokesman-Review,* August 20, 1974, 4. Somewhat ironically, at this time the Pollution Committee of the Coeur d'Alene Lake Property Owners Association, actually petitioned the Idaho Department of Public Health to ask the mining companies *to continue to discharge tailings into the river* where they would destroy bacteria in the sewage and thus, it was hoped, impede the prevalence of algae in the lake – the department denied the request.
[527] Long, "Tailings Under the Bridge," 94.

join the regional sewer district and bear sixty percent of its costs. With their financial burden thus eased, local voters finally passed the sewage bond.[528] It took a few years for the sewer lines and other infrastructure to be built, but by 1972 almost no raw sewage was funneled into the South Fork.[529]

Another technological improvement that benefited the waters of the Coeur d'Alene, was the adoption of the sand-fill system. In 1949, the Dayrock Mine began extracting the sand fraction of its mill tailings and putting it back into the mine as fill material. Between 1954 and 1961 most other district mines adopted the technique. Mines generally used about half of their former tailings as fill. Given a steady rate of production, this meant the deposition of only about half as many tailings.[530] The adoption of the sand-fill system, by necessitating the employment of less land in the narrow valley for the deposit of tailings, also freed up future space for the construction of settling ponds.[531]

University of Idaho biologist Fred W. Rabe began studying the Coeur d'Alene watershed in 1967. Over the next seven years, with the help of his graduate students, Rabe extensively examined Coeur d'Alene Lake, along with the South Fork, the North Fork and the main stem of the Coeur d'Alene River. Among Rabe's significant findings was that while the installation of tailings impoundments and settling ponds in the mining district undoubtedly made the South Fork and the main stem of the Coeur d'Alene River

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[528] Long, "Tailings Under the Bridge," 94.
[529] It was deemed cost-prohibitive to link sewer lines to the relative handful of homes in the extremely narrow Burke Canyon. Until late 2007, when septic systems were installed, residents piped their sewage directly into Canyon Creek, a tributary of the South Fork of the Coeur d'Alene.
[530] Keith Long estimates that between 1949 and 1997, 16.3 million metric tons of tailings were used as sand-fill. See Long, *Production and Disposal of Mill Tailings in the Coeur d'Alene Mining District*, 11.
[531] Long, "Tailings Under the Bridge," 94.

flow clearer, these measures unfortunately did not necessarily make it cleaner, at least not in the short run. Fine clay particles that had once combined with heavy metal ions from the mining district to make them relatively inert, now largely remained in the tailings ponds. Lacking these particles to bond with, after 1968, the heavy metal ions that still found their way downstream were significantly more toxic to the flora and fauna they encountered.[532] In addition, it appeared that some of the tailings ponds were "doing more harm than good."[533] Ponds, such as those built on Canyon Creek over old jig tailings rich in unrecovered lead and zinc, had raised the water table, causing lead, zinc and other heavy metals to leach into the ground water. As the ground water seeped into the South Fork, that much-burdened stream was once again re-polluted with heavy metals.[534]

Settling ponds apparently offered some help with the problem of reducing settable solids from mining waste water but offered no real mechanism for reducing heavy metal concentrations.[535] Thus, even after the implementation of modern settling ponds and tailings impoundments, heavy metals continued to contaminate the groundwater and the rivers and streams that flowed from the mining district. For example, of the approximately 5,000 gallons of waste water that entered Bunker Hill's tailings ponds each minute, 2,000 gallons left per minute. Some of the 2,000 gallons evaporated but a larger amount found its way into the groundwater system, "carrying with it heavy metals in solution."[536] Heavy metals, once in the ground water, prove difficult to remove.[537]

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532 Fred W. Rabe and David C. Flaherty, *The River of Green and Gold: a Pristine Wilderness Dramatically Affected by Man's Discovery of Gold* (Moscow, ID: Idaho Research Foundation, Inc., 1974), 50.
533 Ibid.
534 Ibid.
535 Ibid., 55.
536 Ibid.
537 Ibid.

Another problem was that settling ponds were rapidly filling up and mining companies were continuously being forced to buy up additional land for the siting of new ponds. For instance, by 1973 the five ponds dug in 1968 by the Star Mines on Canyon Creek were already nearly full.[538] In the narrow confines of the Valley of the South Fork, it was only a matter of time before sites for such ponds ran out. In addition, a problem that M. M. Ellis noted in his 1932 study – the filling of the valley floor with a toxic mixture of jig tailings and gravel – had only worsened over the intervening decades. By the 1970s this mixture comprised the upper eight to ten feet of the valley floor.[539] Every spring during runoff the lower valley was repolluted via the “much maligned”[540] South Fork’s fresh reworking of the old tailings. As a solution to this problem, a hydrologist with the Idaho Bureau of Mines and Geology, Dale Ralston, proposed channelizing the meandering, heavily braided South Fork through the construction of six to seven foot high levees. This, Ralston suggested, not only would prevent the river from overflowing its banks every spring and rewashing toxic old tailings downstream, but also would eventually succeed in sending tailings from the new riverbed downstream where they would do less harm.[541]

Although the South Fork undoubtedly had made strides toward recovery in the five years since the 1968 construction of settling ponds and tailings impoundments, it still remained far from a healthy river. In the summer of 1973, live box tests were performed at eleven sites in the South Fork and one in the relatively pristine North Fork on the

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[538] Rabe and Flaherty, *The River of Green and Gold*, 55.
[539] Ibid.
[540] Ibid., 56.
[541] Ibid.

Coeur d'Alene. In results remarkably similar to those reported from Ellis's 1930s work, all of the fish placed in boxes in the South Fork below the mining district died within seventy-two hours. The trout placed in boxes adjacent to Smelterville, in the heart of the district, died within five hours. By contrast the fish put in boxes in the North Fork and in the South Fork above Mullan, all did fine.[542] The researchers concluded with understatement that "the South Fork still is a highly unhealthy place for fish."[543]

With regard to the diversity of aquatic insects in the South Fork, a similar story was told. In 1968, when researchers sampled the insect diversity and quantity in the South Fork at Smelterville, they found absolutely no aquatic insects – a faunal dead zone. Several miles downstream, well below the confluence of the North and South Forks of the Coeur d'Alene, 125 specimens of one individual species was found.[544] By contrast, at a sampling station on the North Fork, 368 specimens of twenty-seven different species were located. In 1968, the water and streambed of the North Fork clearly were capable of supporting far larger and more diverse populations of aquatic insects than were those of the South Fork or of the main stem of the Coeur d'Alene. In the years immediately following the construction of the settling ponds there was "some detectable improvement in total numbers and species present at a few sampling stations on the South Fork," but researchers still found that "the contrast with the North Fork is still striking."[545]

Although Rabe did not perform an extensive study of the question, anecdotal evidence indicated that the lower Coeur d'Alene and its lateral lakes were harmful

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[542] Rabe and Flaherty, *The River of Green and Gold*, 52.
[543] Ibid.
[544] This research, of course, took place before any beneficial aspects of the new settling systems could have been manifested on the river.
[545] Rabe and Flaherty, *The River of Green and Gold*, 53.

environments for wildfowl. Idaho Fish and Game Department wildlife manager Al Bruner reported to Raby that wildfowl mortality almost always occurred in the spring, with the highest mortality rates generally corresponding with years in which the Post Falls Dam conducted an early fall drawdown of water.[546] Bruner theorized that the early drawdowns left the lakes' mud flats exposed for longer periods of time, permitting higher quantities of their burdens of heavy metals to return to the lakes and their surrounding marshes with the return of water in the spring.[547] Also echoing earlier findings, lower Coeur d'Alene area ranch foreman Marion McPeak reported finding scores of dead and disabled birds on his pastures adjoining the strangely turquoise-colored river.[548] According to the ranch foreman, "In early spring, they fly out of Blue Lake or the river, and land on the lower end of our fields. But they can't fly away again."[549] McPeak reported hopefully, however, that often if he or his workers could reach the whistling swans and Canada geese in time, pen them up and feed them uncontaminated grain and water, the birds could be nursed back to health.[550]

The lower Coeur d'Alene's heavy load also took a toll on unwary horses and cattle, particularly nursing foals. In the early 1970s, McPeak told a story that

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[546] The Post Falls Dam was constructed on the Spokane River about ten miles west of the outlet of Lake Coeur d'Alene, in 1906, by the Washington Water Power Company. It raised the level of the Lower Coeur d'Alene River by approximately twelve feet and created many of the lateral lakes along the lower portion of the river. Many farmers and ranchers in the area blamed the dam for causing heavy metal-laden waters from Lake Coeur d'Alene and the lower river to back up and overflow their lands. Every year in the fall the dam released water, leading to a drawdown of the lateral lakes, which emptied back into the Coeur d'Alene River. In high flood years, such as December, 1933 and January, 1974, the waters of the river and the lateral lakes merged and became one massive body, spreading heavy metals in the soils and waters over a wide area.

[547] Rabe and Flaherty, *The River of Green and Gold*, 64.

[548] The river was colored this way by the large amounts of "rock flour" from the mining district suspended in the water.

[549] Rabe and Flaherty, *The River of Green and Gold*, 59.

[550] Ibid.

encapsulated the danger, “We had twelve mares with nursing foals and put them in this pasture [by the river]. We came down a few days later and found that all the foals had swollen joints. When they moved their knee joints popped like rifle shots. We lost all twelve of them.”[551] The ranch foreman also reported having to build new feed lots and pipe in an alternate source of water in order to shield the ranch’s cattle from the river’s toxic waters.[552] No longer could he afford the risk of pasturing cattle by the river or letting them drink its water.

University of Idaho researchers in 1971 discovered a potent factor in the poisoning of horses and cattle along the lower Coeur d’Alene when they ascertained that red top, a type of grass common to the area, concentrates heavy metals such as zinc, lead and copper when they are present in the soil. This type of grass proved able to concentrate heavy metals up to four times the quantity they were found in the soil. With soils as contaminated as those found at Cataldo Flats and other areas along the river, Red Top’s uncanny properties of concentration could prove highly lethal. Local veterinarian Roy Larsen commented, “You cannot pasture a mare with a nursing colt anywhere near the river or the foal will die without drinking the water or eating the [normal] forage.” Of the dangers of Red Top grass to immature horses, Larsen said that if a foal was old enough to be weaned, it “will die from eating the red top grass.”[553] On the brighter side, Rabe found some evidence of the recovery of stocks of aquatic life along the lower Coeur d’Alene. Probably due to improvements in water quality that had taken place since the upstream installment of settling ponds and tailings impoundments, by the early 1970s

[551] Rabe and Flaherty, *The River of Green and Gold*, 59-60.
[552] Ibid., 60.
[553] Ibid.

fishermen at Springston, just upstream from the mouth of the Coeur d'Alene, were catching bullheads, tench, perch and squawfish. In addition, stomachs of catfish taken from the lower river in 1973 contained fly and caddis larvae, indicating the likelihood that the river was producing aquatic insects.[554] In another encouraging sign, Idaho Fish and Game biologists also believed that adult cutthroat trout found in Evans Creek, a tributary to a lateral lake, ascended up the Coeur d'Alene River from the lake. They suspected that the fish came up the river during spring when the high runoff had sufficiently diluted the river water as to make it habitable for the fish.[555] While certainly a step forward from the river's early 1930s status, when M.M. Ellis found the lower Coeur d'Alene to be "devoid of life," its early 1970s status still represented a massive diminution of the river's productivity since the advent of mining, when fish were observed by the thousands in the big eddy below the Old Mission at Cataldo.[556]

Turning their attention to Lake Coeur d'Alene, Rabe and his graduate students conducted core samples of the lake's bottom sediments to determine the extent of the effects of the mining district on the lake's underwater environment. In results consistent with Ellis's findings, the researchers' dredging of sediments from the underwater delta at Harrison showed zinc, lead, cadmium, and copper to be evenly present to a depth of up to eighteen inches. Although less concentrated than at sampling stations up the river, "sediments of high metal content were found most everywhere at the south end of the lake."[557] In addition, aquatic fauna were sought out by researchers employing a small

[554] Rabe and Flaherty, *The River of Green and Gold*, 66.
[555] Ibid.
[556] Ibid.
[557] Ibid., 83.

dredge. Fish-food organisms found included fly larvae, aquatic earthworms and caddis worms, with fly larvae making up the majority of organisms located at the lake bottom. Even the fly larvae, however, became sparse when they came into contact with the heavily polluted delta at Harrison.[558] Further studies of lake bottom sediments at Harrison were conducted using a six foot drill core sampler. Findings from these studies showed the existence of significant amounts of heavy metals down to a depth of thirty-one and thirty-two inches. Below this depth, beneath which sediments were believed to have been deposited before the commencement of upstream mining activities, heavy metal concentrations decreased dramatically. The researchers also found that the diversity of tiny plants called diatoms dwindled as the concentrations of heavy metals in the sediments increased and also that diatom shells located in highly metallic sediments often were deformed.[559] These discoveries indicated the tendency of mining metals to be hard on the lake's aquatic plant life. All of these findings, very much in keeping with those of the 1930s, indicated that Lake Coeur d'Alene, while certainly far more capable of sustaining life that its tributaries flowing from the mining district, nonetheless was ecologically a somewhat impoverished body of water.

In 1937, in response to the falloff of the Lake Coeur d'Alene's cutthroat trout population, the Idaho Department of Fish and Game, devoted to providing a new game fish to Idaho anglers, began stocking kokanee in the lake. Fish and Game biologist Jerry C. Mallet laid the blame for the cutthroat's decline and subsequent failure to thrive in the Lake on several main factors. One of these was the long-standing pollution of the Coeur

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[558] Rabe and Flaherty, *The River of Green and Gold,* 83.
[559] Ibid., 84.

d'Alene River, which denied the species important spawning habitat.[560] In the early 1970s, one million kokanee were being stocked in the Lake Coeur d'Alene each year. Kokanee runs were established on the St. Joe River in 1973 and Idaho Fish and Game officials wanted to establish runs up the Coeur d'Alene as part of an effort to replace artificial maintenance of kokanee populations with natural reproduction. The Coeur d'Alene was still not nearly clean enough to support salmon runs at that time though.[561]

Enter the Feds

On June 26, 1973, the EPA held a sparsely attended public hearing in the city of Coeur d'Alene. The subject was the issuance of permits to mining companies governing the discharge of wastes into the South Fork of the Coeur d'Alene. At the hearing EPA officials asserted that restrictions upon the companies' discharges were needed because the dumping of mine wastes and raw sewage into the river had made the South Fork "one of the most seriously polluted rivers in the Northwest."[562] Mining industry representatives in the audience responded that the proposed regulations were, "difficult, unreasonable, and in some cases, impossible."[563] Under the new regime of the proposed discharge permits, the amounts of heavy metals discharged each day into the South Fork would be cut dramatically: zinc, from 9,500 to 1,100 pounds; lead, from 540 to twenty pounds; arsenic, from 125 to thirty pounds, and suspended solids, from 23,000 to 8,000 pounds. In September 1973, waste discharge permits were issued to the Bunker Hill and Sunshine

[560] Rabe and Flaherty, *The River of Green and Gold*, 86.
[561] Ibid.
[562] Ibid.,50.
[563] Ibid.

Mining companies.[564] Bunker officials announced that their new wastewater treatment plant would be completed by the end of the year, at a cost of over one million dollars and an annual operating budget of $702,000, and that it would cut the release of heavy metals to less than half of the amounts allowed by the EPA permit issued in September, 1973.[565] Undoubtedly the significant decrease in the release of heavy metal pollutants into the South Fork represented a positive step for one of the most polluted streams in North America, but "Shit Creek," as some locals referred to the river, still had a long way to go.

The early 1980s represented a hard time for the human populations of the Coeur d'Alenes, as Bunker Hill shuttered its operations, laying off 2,100 workers. Many other mines in the district either curtailed or eliminated production at the time in response to low metals' prices and the loss of the nearby smelter. But the mining bastion's downturn meant something very different for the waters of the Coeur d'Alene Basin and the plants and animals they served. In early 1982, the Bunker Hill smelter ceased spewing its heavy load of lead, zinc and other toxins into the air for the first time in nearly sixty-five years and the company's zinc plant ceased fouling the South Fork for the first time in over a half century. In 1983, EPA declared a twenty-one square mile area centered on the old smelter complex a federal Superfund site, subject to the new CERCLA legislation (1980) that required corporations, under EPA supervision, to shoulder the burden for cleaning up their environmental messes. From this time to the present, the EPA would play a large and often controversial role in the affairs of the mining district.

[564] These were the first waste discharge permits issued under the 1972 Clean Air Act.
[565] Rabe and Flaherty, *The River of Green and Gold*, 51.

In the early 1990s, the Idaho Department of Fish and Game received reports of fish in the lower South Fork of the Coeur d'Alene.[566] These likely were the first fish to have inhabited the river's waters in seven or eight decades. The South Fork is still a heavily polluted river, though, officially designated as an "impaired river" that requires a remediation plan under Section 303 of the Clean Water Act. Its lower reaches now support reasonably substantial populations of native westslope cutthroat trout, native shorthead sculpin and torrent sculpin and introduced species of rainbow trout, brook trout, mountain whitefish, but other sections of the South Fork are far less productive. The middle reaches of the river, particularly the area between Kellogg and Smelterville in the heart of the old smelter district, remain nearly devoid of fish and the benthic macroinvertibrates that area fish rely upon for food. This is almost certainly due to the high levels of zinc that leach into the river from old mine adits and toxic groundwater in this area.[567] Bull trout have not reestablished themselves in the South Fork and westslope cutthroat are rarely found above Smelterville, except in the extreme upper reaches above Mullan. Despite its progress, the South Fork likely will remain a diminished fishery until its concentrations of heavy metals such as zinc, lead and cadmium have been significantly further reduced.

The main stem of the Coeur d'Alene and its lateral lakes, in whose lower reaches Raby witnessed the reintroduction of warm water fish species in the early 1970s, has continued to make progress as a fishery and as a healthy body of water. Anglers now can

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[566] U.S. Bureau of Land Management, "Environmental Assessment: Sunshine Sale," 2009, http://www.blm.gov/pgdata/etc/medialib/blm/id/nepa/cda_fo/sunshine_precious.Par.71644.File.dat/Sunshine_Precious_Metals_Sale-Decision_FONSI_508.pdf (accessed April 16, 2010), 3.
[567] The National Research Council, *Lessons from the Coeur d'Alene Basin*, 79, 81.

hire fishing guides from businesses such as the Castaway Fly Shop in Coeur d'Alene to take them in search of prize catches of westslope cutthroat trout, bull trout, rainbow trout, chinook salmon, bass, northern tench, and tiger muskellunge. All of these species excepting the westslope cutthroat and the bull trout have been artificially introduced, and the natives are relatively few and far between.[568] Should you manage to catch a good number of the non-natives on your guided trip, however, you might not want to eat many, as all contain relatively high levels of zinc, lead and cadmium.

If anything, the prognosis for Lake Coeur d'Alene is less favorable than that of its upstream and downstream tributaries. While due primarily to its sheer size, the Lake's biological communities never have experienced the level of devastation that its namesake rivers have witnessed, the Lake undoubtedly has served as a massive sink for heavy metal loads that have come to it from the great mining district to its east. While its postcard vistas and sparkling waters attract thousands of visitors to the lake's shores every year, it is fair to say that a monster of epic proportions lurks beneath the waters of Lake Couer d'Alene. It is estimated that between 350 and 440 thousand tons of lead presently coat the lake bottom.[569] Massive amounts of cadmium and zinc also are present in the lake's bottom sediments. The coarser sediments have settled out near the mouth of the Coeur d'Alene River at Harrison, where a 20-foot thick delta of metal-enriched sand begins a downward slope of nearly three-fifths of a mile to the lake bottom.[570] A metal-rich sediment layer up to 3.9 feet thick is found near the delta. Finer sediments drift toward the lake's outlet near the city of Coeur d'Alene, where the Spokane River heads toward

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[568] And available for catch-and-release fishing only.
[569] The National Research Council, *Lessons from the Coeur d'Alene Basin*, 89.
[570] Ibid.

the city of Spokane. At the city of Coeur d'Alene the metal-enriched sediments decrease to a thickness of only four to five-and-a-half-inches.[571] Other than at the delta, the lake's lead concentrations are heaviest at its greater depths, where bottom sediments show a mean concentration of 1,900 mg./kg. but range up to 7,700 mg./kg.[572]

While for a number of years the prevailing wisdom held that lead and other heavy metals sitting quietly in Lake Coeur d'Alene's bottom posed no real threat to the health of the lake, that thinking is now being questioned. One thing many people do not realize is that the Lake is continuing to be polluted with heavy metals from upstream. The fact that the delta at Harrison continues to grow is evidence of this. Of the sediments that find their way into the Lake, an estimated eighty per cent come from the lower Coeur d'Alene basin. Of this quantity, the lion's share comes from the bed of the Coeur d'Alene River, where many of the old tailings have settled out.[573] Although the continued pollution of the lake with heavy metal sediments undoubtedly remains a problem, this does not appear to be the chief threat to its health. After more than a century of intense heavy metal deposition, lead, zinc and other metals, for better or worse, have become important actors in Lake Coeur d'Alene's complex ecological system.

Short of the removal of the bulk of the metals from the lake's bottom sediments – economically if not technologically unfeasible – it is not clear that the removal of a fraction of the pollution would improve the ecological condition of the lake. In fact, one of the proposed hazards to the lake comes from the diminished deposits of zinc that may come from the cleanup of the lateral lakes area of the lower Coeur d'Alene. Zinc, as it

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[571] The National Research Council, *Lessons from the Coeur d'Alene Basin*, 89.
[572] Ibid., 90.
[573] Ibid., 85.

turns out, plays an important role in shaping the lake's chemistry. Binding with plant matter and, through its toxic properties, keeping aquatic plant growth in check, the heavy metal plays an important role in keeping plant populations in check.[574] But there are indications that zinc's heroic efforts are not keeping pace. A 2004-2006 U.S. Geological Survey (USGS) limnological study of the lake found increased concentrations of nutrients, such as phosphorus and nitrogen, and resultant increased lake productivity.[575] Aquatic plants such as algae grow better in such nutrient-rich environments. When these plants die and decompose, oxygen dissolved in the water is consumed. The danger exists that with a decrease in the quantity of dissolved oxygen in the water, chemical processes could be set in motion that lead to the heightened rate of release of the heavy metals that are present in lake-bottom sediments. Such a process not only would lead to a more toxic lake for fish and humans, it also would increase the rate of eutrophication of the lake, as additional algae growth would be encouraged.[576]

While zinc is currently keeping the lake's main aquatic plant community, diatoms, in check, it is feared that, with the increased nutrient-loading of the lake, communities of zinc-resistant green algae and bloom-forming species of blue greens will take root. The self-perpetuating process outlined above has the potential to, in the tempered words of the USGS, "increase risks to human health and adversely affect the environment and the economic and social welfare of the community."[577] In lay terms, if allowed to spiral out of control, the combination of eutrophication and the release of

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[574] U.S. Geological Survey, *Scientific Investigations Report 2008-5168*, http://pubs.usgs.gov/sir/2008/5168/section5.html (accessed April 16, 2010).

[575] Ibid.

[576] Ibid.

[577] U.S. Geological Survey, *Scientific Investigations Report 2008-5168*, http://pubs.usgs.gov/sir/2008/5168/section5.html (accessed April 16, 2010).

heavy metals from bottom sediments into the water stream eventually could result in a severely degraded or possibly even a dead lake. The USGS is not the only voice in the scientific community that is expressing deep concern about the future of Lake Coeur d'Alene. According to the National Research Council's 2005 report,

> It is also unclear what will happen in Lake Coeur d'Alene…The major question is whether the lake will become more eutrophic, and, if so, what effects this will have on the lake's chemistry and biota. There is substantial concern that changes in the lake's chemistry could result…in the release of contaminants currently bound in the sediments coating the lake bottom. These released contaminants could be toxic to fish and other aquatic biota and, therefore, in conjunction with the other effects of eutrophication, could cause significant changes in the lake's biological systems.[578]

As it evidently turns out, the hundreds of thousands of tons of heavy metals once thought to be safely encased in Lake Coeur d'Alene's bottom sediments are far more volatile and less predictable than had been believed. Instead of being locked up tight, they apparently are chemically available under certain circumstances. Indeed, in a chemically ever-changing lake environment, heavy metals that once may have been relatively immobile and inert may become anything but, possibly with far-ranging negative consequences for the lake. Heavy metals such as zinc that ironically once were able to protect the lake's health, may become unable to do so any longer. In a further irony, well-intentioned efforts to clean up a century of heavy-metal pollution in the lower Coeur d'Alene River, through their effect of decreasing zinc releases, may prove to be profoundly harmful to Lake Coeur d'Alene. One is led to wonder about the prospect of additional heavy metals being employed to solve the future ecological problems of a

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[578] The National Research Council, *Lessons from the Coeur d'Alene Basin*, 96.

heavy-metal contaminated lake.[579] The consequences for this evident lack of stability to the lake and its human, animal and plant communities has yet to be determined. One thing is certain, though, sizable natural systems such as the Coeur d'Alene basin are tremendously complex and difficult, if not impossible, for humans to effectively manage, perhaps particularly after they have been deeply implicated in large-scale industrial processes.

In the spring of years of high runoff, it is not uncommon to see a discolored plume of water riding atop Lake Coeur d'Alene as it snakes its way from the mouth of the Coeur d'Alene River toward the Lake's outlet at the beginnings of the Spokane River. Such spring runoff transfers are thought to constitute a principal means of transporting the heavy metal-laden sediments of the Coeur d'Alene River system into the Spokane River.[580] Although concentrations of members of the usual congery of Coeur d'Alenes' metals (i.e., zinc, lead, arsenic) are somewhat dissipated by the time they reach the waters, riverbanks and beaches of the Spokane River, they are still often found at levels considered unsafe for humans and animals.[581]

It is hard to believe that the early mining chieftains of the Coeur d'Alenes -- men such as Bunker Hill's F.W. Bradley and Stanly Easton and Hecla's Harry Day -- ever imagined that one day in the early 21st century a federal pollution control agency would be hauling steam shovel loads of heavy metals-laden dirt and sand away from popular Spokane area beaches. Although men such as Bradley and Day certainly understood that tailings from their operations invariably made their way down the South Fork to the

[579] In order, for example, to keep the new threats like green algae in check.
[580] The National Research Council, *Lessons from the Coeur d'Alene Basin*, 96.
[581] Ibid.

Coeur d'Alene River, with some of them no doubt traveling as far as the Lake's bottom, they firmly resisted the idea that any appreciable amount of heavy metals found their way into the Spokane River, let alone crossed state lines to reach the sizable hub city of Spokane, nearly eighty miles west of the mining district. The notion that the metallic deposits found in the sands of the Spokane beaches would constitute such a threat to human and animal health as to warrant the precipitate action of a federal agency to remove them, likely would have been inconceivable to them. And yet, this exact scenario has been played out repeatedly over the past few years, as popular beaches along the Spokane River have been remediated by the EPA and state agencies.

Although, to be sure, times and corresponding environmental attitudes and awarenesses have changed since the late 19th and early 20th centuries, it is also clear that mining industry captains like F.W. Bradley simply were in error regarding their assessments of the environmental costs of their operations. The byproducts of their industrial processes traveled further, and were far more durable and damaging to plant and animal life than they ever dared admit. As proud as these business and mining ground-breakers were of their industrial accomplishments – achieved in good measure through the labor of thousands of workers -- they were nearly as blind to the environmental consequences of their work.

In their ecological blindness, however, men such as Bradley and Easton evinced the attitudes and values of their generation. Like other products of the "heroic age of mining engineering," the captains of the Coeur d'Alenes almost certainly viewed themselves as heroic figures, mining engineers and businessmen who provided vast quantities of relatively inexpensive lead and silver to a hungry, fast-growing nation of producers and consumers.[582] Turn-of-the-20th century westerners, they doubtless viewed the region as vast and sublime, its resources nearly inexhaustible. Easton was an avid hunter and fisherman, who with no apparent sense of irony, served a term as a member of the Idaho Board of Fish and Game. The fact that their business endeavors polluted a neighboring stream or two or denuded adjacent hillsides of foliage, while certainly regrettable, would have meant little in the context of what they perceived as the inexhaustible nature of the West. By the year 2001 their district's tailings, if set inside a football field, would reach four miles into the air, but that presumably would have filled Bradley and company more with pride than a sense of ecological concern.[583]

The generation of empire builders who played such a critical role in the creation of a massively productive lead, silver and zinc mining and processing complex in the far reaches of northern Idaho is long gone. Much-honored in their time, names such as F.W. Bradley, Stanly Easton and Harry Day are now largely forgotten, even in the Coeur d'Alenes. Their legacy is very much alive, however, in the communities, the wealth, and the products that their efforts helped to create. It is also embedded in the millions of tons of heavy metal sediments that will continue to confront the Coeur d'Alene watershed with serious health and environmental costs and problems for decades to come.

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[582] Although a number of the corporate heads in the mining district were not trained as mining engineers, both Bunker Hill's Bradley and Easton were, both proud alumni of the University of California at Berkeley. Bradley was a member of the Class of 1885 and Easton of the Class of 1895.

[583] U.S. Department of the Interior, "Coeur d'Alene Basin Final Interim Basin Restoration Plan," April, 2007, http://www.fws.gov/pacific/ecoservices/envicon/nrda/pdf/CdA_INT%20RES%20FINAL.pdf (accessed April 18, 2010), 33.

FOUL HUMOURS I

Just in time for the 1917 Independence Day celebration a major lead smelter was born a mile west of Kellogg. Eleven years later, a younger sibling, a zinc refinery, joined the metals processing complex. At the time of their completion and for some years to come, these custom facilities were praised as technological marvels that contributed to the economic development and general progress of the region. The facilities were bathed in the light of what Marshall Berman has called "the modern romance of construction."[584] Nearby residents, however, complained the acrid, vegetation-killing sulphur dioxide (SO_2) smoke the Bunker Hill plants produced. By the 1950s and 1960s, these complaints had become louder and more insistent, particularly from federal agencies such as the U.S. Forest Service. In response, the company began to implement technological changes, such as the construction of a sulphuric acid plant, designed to bring its SO_2 problem under control. With the passage of the 1970 Clean Air Act, more stringent controls were placed upon the company's SO_2 emissions, standards Bunker Hill struggled to meet until its construction of the "tall stacks" in 1977. For the company, the decade of the 1970s bore out the truth of Ulrich Beck's observation that, "Socially recognized risks [in this case, the risk to human and vegetation health from SO_2] contain a peculiar political explosive; what *was* until now *considered unpolitical becomes political – the elimination of the causes in the industrialization process itself*. Suddenly the public and politics extend their rule into the private sphere of plant management – into product planning and

[584] Marshall Berman, *All That Is Solid Melts into Air: The Experience of Modernity* (New York: Simon & Schuster, 1982), 300.

technical equipment."[585] Also in the 1970s, Bunker Hill, from motives that mixed genuine ecological concern with a desire to curry favorable public opinion following the self-inflicted publicity damage of the 1973-'74 lead-health epidemic, embarked upon a major revegetation effort in the Silver Valley. This effort provided a prelude to more successful EPA efforts in the late 1990s. This chapter examines the costs of an unfettered economic activity to local landscapes, and traces several decades of wrangling over the area's air quality.[586]

Genesis: A Smelter Is Born

The health and environmental concerns that later would surround Bunker Hill's smelter were scarcely in evidence at the smelter's unveiling. Ground had been broken for the company's lead and silver smelting and refining works in June, 1916. On July 5, 1917, furnace number one was blown in and the smelter opened to considerable local and national fanfare. Writing in the leading mining trade publication, *The Engineering and Mining Journal*, on the eve of the smelter's inauguration, Idaho's State Inspector of Mines, Robert M. Bell, referred to the event as "an epoch-making occurrence in the history of this remarkable smelting-ore district."[587] Bell praised the company's siting and the efficiency of the plant, labeling it, "elaborately planned for transportation and

[585] Ulrich Beck, *Risk Society: Towards a New Modernity*, (London: Sage Publications, 1992), 24.
[586] Other works that deal with the interrelations of smelting, economics, pollution control technology, and ecological damage -- and that influenced my approach and understanding despite dealing with copper rather than lead and zinc-- are Donald MacMillan's *Smoke Wars: Anaconda Copper, Montana Air Pollution, and the Courts, 1890-1920* (2000), John D. Wirth's S*melter Smoke in North America: The Politics of Transborder Pollution* (2000), and Timothy J. LeCain's *Mass Destruction: The Men and Giant Mines That Wired America and Scarred the Planet* (2009).
[587] Robert N. Bell, "Coeur d'Alene Items," *The Engineering and Mining Journal* (*E&MJ*), June, 1917.

convenience, gravity handling, and supplied with every modern mechanical device obtainable…"[588]

The million dollar, state-of-the-art facilty, sited one mile to the west of the tunnel into the Bunker Hill Mine, boasted four Dwight & Lloyd roasters, a twenty-six foot wedge furnace, and three steel-jacketed blast furnaces. [589] Its superstructure consisted of structural steel, cast iron and red brick. Liquid lead bullion was to be transferred first to a drossing plant and then to the new refinery, which contained two softening furnaces, four desilverizing kettles, two refining furnaces and four merchant kettles. The refinery's silver division contained six retorts, two cuppelling furnaces, one fine-silver furnace and a crucible furnace for good bullion.[590] Waste gases were to be dealt with via a baghouse and a concrete stack measuring 200 feet in height by twelve feet in diameter.[591]

The construction of its own smelting complex accomplished at least two major goals for Bunker Hill. It enabled the company to free itself from dependence upon the Guggenheims' virtual stranglehold on the lead smelting industry while also making Bunker one of the few lead-silver mining firms in the country capable of smelting its own product.[592] For years Bunker Hill had shipped its ore to the Guggenheims' AS & R smelter at Tacoma, Washington. Company managers F.W. Bradley and Stanly Easton had long nursed resentments and fears over what they viewed as ASARCO's capacity to

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[588] Bell, "Coeur d'Alene Items."
[589] H.O. Hofman, "Metallurgy of Lead in 1916," *E&MJ*, January 6, 1917, 50.
[590] Hofman, "Metallurgy of Lead in 1916."
[591] "Bunker Hill & Sullivan Smelting Works at Kellogg, Idaho," *E&MJ*, May 13, 1916, 869.
[592] Bunker did not just smelt its own ores, however. With its custom smelter, the company refined much of the lead and silver ores from the Coeur d'Alenes, and additional ores from inside and outside the United States.

capriciously raise smelting rates. With the construction of their own works, Bunker could leave those fears behind.

After looking at several sites in the Northwest, including ones in Tacoma and Portland, Bunker Hill decided to build its new plant right in its own backyard. Principal factors behind the siting decision were: the perception that the relatively sparse, economically dependent population of the Kellogg area was less likely to oppose a lead smelter's noxious effluent than were such populous locales as Tacoma and Portland; the easy, efficient access to its own and other district ores; the fact that Bunker Hill already owned the land upon which it wanted to develop the smelter; the relatively friendly treatment the company, referred to in the area as "Uncle Bunker," could expect to receive from the local populace generally and local government officials more specifically. For obvious reasons the company did not stress pollution issues or the relatively benign nature of the taxation and regulatory approach of local government officials when explaining its decision to locate its smelter in Kellogg, instead highlighting factors of economy in construction and operation."[593]

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[593] "Bunker Hill & Sullivan Smelting Works at Kellogg, Idaho," *E&MJ*, May 13, 1916, 868.

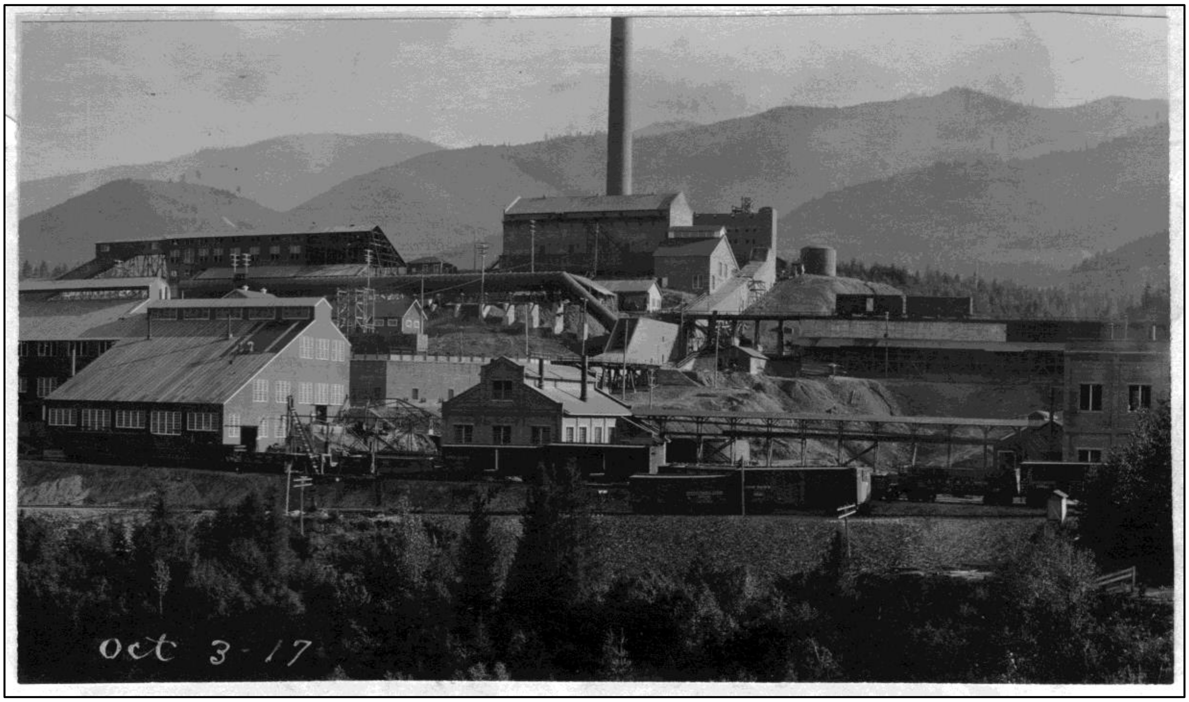

Figure 6: Bunker Hill & Sullivan Mining & Concentrating Company lead smelter, 1917[594]

Smoke pollution concerns, however, definitely were on the minds of Bunker Hill executives when they made the decision to construct the smelter one mile west of Kellogg, where the town of Smelterville soon took shape. Bradley, Easton and other top Bunker managers were well aware of the various "smoke lawsuits," both on behalf of private citizens and the U.S. Forest Service, that had beset the Anaconda Company and other members of the U.S. smelting industry since the first years of the new century. In order to buffer his company against this sort of threat, Easton began purchasing "smoke damage" easements from local landowners before the decision to site the smelter was

[594] Bunker Hill Company Photographic Collection, Bunker Hill Company Records, Special Collections, University of Idaho.

announced.[595] These easements, like the "water damage" easements purchased from farmers bordering the Coeur d'Alene River, essentially purchased a right to engage in a certain form of pollution on a landholder's property for an indefinite period of time. The company also spent considerable sums of money on pollution control equipment, namely, the aforementioned baghouse and a new, relatively revolutionary piece of technology, the Cottrell electrostatic precipitator.[596] Developed by University of California-Berkeley chemist Frederick Cottrell, the precipitator employed a powerful electrostatic charge to separate out toxins such as lead and sulphur oxide from the waste fumes of a smelter. If installed and used correctly, Cottrell's invention represented a significant advance in smelter pollution control, but it was far from a panacea. In an effort to forestall any potential complaints from its large land-managing neighbors, the U.S. Forest Service, Bunker sought and received assurances from the U.S. government that it would not be sued for damages for nearby forest land in return for a pledge to pay for any damages the company might inflict.[597]

In its earlier efforts at purchasing pollution easements from disgruntled downstream landowners, Bunker Hill had enjoyed the support of its fellow Coeur d'Alenes mine owners, in the form of the MOA. Now it would absorb all the cost and liability. Whereas there were literally dozens of mining and milling operations in the district, there was only one smelter. Seemingly undaunted by this heightened level of burden, Bunker adopted essentially the same strategy to deal with smoke complaints that it had with earlier pollutions complaints revolving around water-borne tailings. While on

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[595] Aiken, *Idaho's Bunker Hill*, 69.
[596] Ibid., 93.
[597] Ibid.

the one hand it resolutely fought any and all smoke damage lawsuits, determined not to give ground on the economically vital terrain of legal liability, on the other hand Bunker Hill proved quite willing to purchase pollution easements, and to buy land outright from those it deemed in the pathway of smelter smoke.[598] Bunker was even willing to pay out what it considered to be reasonable sums in cases where it believed that there actually had been "smoke damage" to someone's land. The company additionally was prepared to spend significant amounts of money on pollution abatement devices – examples include the Cottrell precipitator, a considerable 1923 expansion of the baghouse, the suction dredge at Cataldo – but there definitely were limits to this "magnanimity." For example, the company vetoed the U.S. Bureau of Fisheries' 1933 proposal to slurry all its tailings to an impoundment pond. Bunker Hill proved willing to swallow the relatively predictable, if not small, costs of keeping up with industry standards for pollution control technology and "paying to pollute," in the form of buying land and pollution easements from neighboring property owners. The company, however, viewed the possibility of legal precedents holding it liable for damages for harm done by the release of its pollutants as anathema. Such legal rulings could lead to a flood of lawsuits and to damage judgments of unpredictable, and possibly stratospheric, amounts. The company followed a policy of aggressively defending itself in court and never admitting or accepting legal liability for any damage that might have accrued from the effluents of its works.

As befit a large, professionally-run 20th century corporation, Bunker Hill developed regular procedures for handling what the company referred to as its "smoke

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[598] Beginning in 1925, the Company repeatedly, and always successfully, rebuffed smoke damage lawsuits by area farmer Matt Kaiser.

damage" program. This program included the purchase of smoke easements, direct purchases of land, and the payment of damage awards to those the company viewed as affected by smelter smoke. Legal forms were developed that afforded the company certain types of rights to pollute, for example, with smoke from its smelter, on specified tracts of land while also specifying that landowners would forgo their right to sue to company for pollution-related damages. Professionals were put on retainer to investigate claims and otherwise administer the program – a veterinarian, a pathologist, a mechanic, attorneys; someone, presumably a forester, to "cruise timber."[599] Perhaps given the relatively sparse population of the area involved and the company's political sway in the mining region, Bunker's pollution compensation program had surprising heft, suggesting that continued good community relations were important to the mining giant. In the eighteen years spanning December 1, 1936 through November 30, 1954, the company spent approximately $394,000 on its smoke damage program, or an average of $21,888 per year. The year of lowest expense, 1940, saw a payout of $10,165.35 while the most expensive year, 1950, witnessed a payout of $36,390.61. Not all of this money went directly to landowners of course. Much of it went toward paying to administer the program. But considerable sums did go to landowners. In 1938, for instance,[600] of the $15,184.81 paid into the program, well over half, or $8,584.02, went to paying for thirteen easements.[601] As a percentage of total yearly program costs during the period

[599] MG 367, Box 51, Folder 960, Bunker Hill Records.
[600] For the sake of convenience I will refer to the December 1-November 30 "year," the company's fiscal year for this program, as the following full year; for instance I will refer to the December 1, 1936-November 30, 1937 period as 1937.
[601] MG 367, Box 51, Folder 960, Bunker Hill Records. To give some sense of the financial context for these expenditures, Bunker Hill reported a net income of $854,351 for 1940. The company's income, of

examined here, easements ranged from a low of a little under twenty-five percent to a high of slightly over half the total expenditure. Payments for "crop damage" or "crop and livestock damage," on the other hand, made up but miniscule portions of total expenditures, ranging from a high of $365 in 1937 to a low of zero dollars in 1942 and 1943. The company presumably much-preferred the relatively tidy nature of easements and land purchases over the far messier business of making post facto payments for damage claims.

An internal company document dealing largely with an earlier period, 1928-'39, states that Bunker spent the considerable sum of $70,501.28 for its smoke damage program during those dozen years. The company official, who went by the initials "C.P.," made no pretenses about the fundamentally defensive nature of these expenditures or about the essentially ravaged condition of the lands purchased. He wrote, "The Smelter has also spent, up to and including the year 1939, $25,822.07 for the purchase of smoke damaged land…This land is farm land and timber land that has been rendered valueless because of smoke damage and is of no use to the Company except as protection against smoke damage claims."[602] Describing the condition of this land following over twenty years of nearby lead smelter and a dozen years of zinc smelter operations, C.P. writes, "There is some timber on the land purchased, most of which is second [growth] and a large part of which has been smoke killed." By 1940, the company evidently had thirty-

course, was far higher after U.S. entry into World War, but significantly lower during the Great Depression. The 1940 figure is probably close to the company's median net income for the 1936-'54 period.

602 "Cost of Smoke Damages," October 2, 1940, MG 367, Box 51, Folder 960, Bunker Hill Records.

nine "smoke damaged" properties, totaling 7,831.98 acres, on its hands.[603] Despite the fact that this property had been rendered largely worthless commercially, and that the company would have to "sit on it" indefinitely, Bunker still had to pay local property taxes on the lands.

The pathology contract with Bunker Hill evidently was a lucrative one, as was the veterinary contract, albeit less so. During the 1937-1943 period, the only years for which the company's expenditures for the smoke damage program are intensively itemized, Bunker paid the pathologist between $3,828.31 and $4,818.10 annually for his services, not including the company's annual payment for his supplies.[604] The veterinarian's annual payment ranged from $1,183.70 to $1,994.29. In 1949, a new itemized expenditure line appeared for the first time, entitled "soil erosion," for which a $1,372.26 payment was made. This is conjecture, but it seems probable that a heightened environmental awareness about the relationship between healthy tree roots and the prevention of soil erosion, particularly on steep slopes, had by this time implicated the company in the area's soil erosion problems. Bunker Hill's electrolytic zinc smelter, which began production in 1928, put out lots of SO_2. This SO_2 caused severe damage and often death in the pine trees of the area. Damaged and dead trees obviously could not hold soil in place as they once had, especially on the steep-sloped mountainsides that surround the Kellogg area.

[603] "Cost of Smoke Damages," October 2, 1940, MG 367, Box 51, Folder 960, Bunker Hill Company Records, Special Collections, University of Idaho.
[604] MG 367, Box 51, Folder 960, Bunker Hill Records.

A Zinc Plant for Kellogg

Once viewed as nearly worthless, by the 1920s considerable quantities of Coeur d'Alenes' zinc was being sent outside the district for processing. Enjoying success in their new role as a custom smelter of Coeur d'Alenes' lead and silver ores, Bradley and Easton decided to build a plant to process the area's valuable zinc resources as well. This decision likely was spurred by the company's 1922 purchase, along with its partner the Hecla Mining Company, of the valuable Star Mine in Burke. Star Mine ores, like others in the Pine Creek drainage, contained large amounts of zinc along with lead and silver.[605] The Bunker Hill lead-silver smelter was unequipped to treat the zinc portion of these ores. Encountering difficulties in experimental efforts to smelt the Star Mine zinc ores, Bradley heard about a method that had enjoyed some success in the Anaconda and Trail, British Columbia smelters. This so-called Tainton Process, developed by U.C. Tainton, employed sulfuric acid to leach zinc ore and then an electrolytic process to extract zinc from the zinc sulphate solution.[606] Experiencing success with the Tainton Process, Bradley became determined to secure exclusive rights to use it for his company and thus garner Bunker Hill an important competitive advantage. By agreeing to pay Tainton a ten percent royalty, in May, 1922 he did exactly that.[607] When it went on line in October, 1928 near Government Gulch, four miles west of Kellogg, Bunker Hill's electrolytic zinc smelter set a new industry standard by producing at a level of purity theretofore unseen:

[605] Aiken, *Idaho's Bunker Hill*, 89.
[606] Ibid., 90.
[607] Ibid., 91.

99.99% pure zinc.[608] The smelter represented a two million dollar investment on the part of Bunker Hill and Hecla. Once up to full production speed, the new plant was expected to produce sixty tons of zinc per day.[609]

While its zinc might have been pure, the zinc plant's effluent was anything but. Whereas the chief environmental burdens produced by Bunker's lead-silver smelter were heavy metal oxides such as lead, cadmium and arsenic, the zinc plant's principal culprit was sulfur dioxide, more commonly known as SO_2.[610] As scientific studies of pine and fir trees and other vegetation near lead, zinc, and copper smelters had shown, airborne SO_2 in sufficient concentrations could have devastating effects. In a 1903-'04 study, J.K. Haywood, chief chemist of the Miscellaneous Division of the U.S. Bureau of Chemistry, determined that sulfur dioxide and trioxide from the Keswick smelter near Redding, California was damaging and destroying vegetation. Haywood's report, published in 1905, concluded that sulfur dioxide, "when present in very minute amount kills vegetation," and that vegetation as distant as nine miles from the smelter had been "greatly injured" by sulfurous effluent.[611] Haywood's subsequent investigations of the conditions surrounding smelters in Ducktown, Tennessee and Anaconda, Montana only served to confirm his earlier conclusions. Examining the effects of the arsenic- and sulfur-rich effluent of the Anaconda Company's giant copper smelter in 1906-'07,

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[608] While for the sake of convenience I refer above to the plant as "Bunker Hill's," it was in fact legally housed under Bunker's Sullivan Mining Company wing, which was half-owned by the Hecla Mining Company.

[609] "Zinc Production Started From Sullivan Electrolytic Plant," *E&MJ*, October 20, 1928, 630.

[610] The lead smelter produced SO_2 as well, to be sure. The relatively weak strain of SO_2 that came from the smelter, however, was difficult to turn into sulfuric acid. Not until the late 1960s did the company invest in the expensive technology needed to accomplish this task.

[611] Donald MacMillan, *Smoke Wars: Anaconda Copper, Montana Air Pollution, and the Courts, 1890-1920* (Helena, MT: Montana Historical Society Press, 2000), 150.

Haywood, following his most comprehensive investigation to date, determined that tree regeneration had been impaired and vegetation injured in a large radius extending from the Washoe Reduction Works: for at least ten miles to the north, six miles to the south, thirteen miles to the west and fourteen miles to the east. Haywood found differing resistances to the smoke among different species of trees. While junipers proved almost impervious, red firs were highly susceptible. Lodgepole pines were found to be less susceptible than red firs, but still had been injured at distances as great as ten miles from the smelter.[612] While large quantities of arsenic were present in the copper smelter's smoke, Haywood left no doubt that SO_2 constituted the principal cause of harm to area vegetation.[613]

Later scientific research built upon and reinforced the findings Haywood and others. In a major international dispute that lasted from the late 1920s through the early 1940s, a group of northeastern Washington state farmers alleged that fumes from The Consolidated Mining and Smelting Company of Canada's lead-zinc smelter located along the upper Columbia River at Trail, British Columbia had damaged their crops, trees and livestock. In work that was readily accepted by the scientific community, George G. Hedgcock, the senior U.S. Forest Service pathologist, after first distinguishing smoke damage from drought and winter damage to Douglas fir trees, ponderosa pine and forest shrubs, proceeded to map the geographical distribution of SO_2 injury in three distinct zones. The zones were based upon the percentage of smoke-damaged trees that areas' contained; Hedgcock showed that while the worst and most widespread damage generally

[612] MacMillan, *Smoke Wars*, 151.

[613] Ibid. The arsenic, however, was hardly blameless. It injured and killed many Anaconda area horses and cows.

occurred closest to the smelter, the damage extended as far as forty-nine miles down the Columbia River Valley.[614]

It is likely no coincidence that Bunker Hill began making significantly greater outlays of capital toward its "smoke damage program" in 1928, the year its zinc plant began operations. The company, however, was not content merely to purchase quiescence from its private sector neighbors. Following the precedents set by the Anaconda Company, which had successfully swapped thousands of acres of its private holdings of forest lands for Deer Lodge National Forest lands that either already had been, or were likely to be, damaged by its smelter smoke, Bunker began swapping some of its large forest holdings for Coeur d'Alene National Forest lands lying in the pathway of smoke from its zinc and lead refineries.[615] Obtaining ownership of national forest lands in the pathway of their smelter smoke, conferred the continued right to pollute such lands without having to fear legal recrimination from the Department of Justice.[616]

Despite Bunker Hill's previous agreement with the Forest Service and its considerable efforts to purchase peaceable relations from the local population, from 1946 through 1950 heightened complaints about the zinc and lead plants' effect on area vegetation pushed the company to take pollution control measures. In 1946, Bunker Hill and the Coeur d'Alenes' other major area mining companies,[617]approached the Forest

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[614] John D. Wirth, *Smelter Smoke in North America: The Politics of Transborder Pollution* (Lawrence, KS: The University of Kansas Press, 2000), 28-29.

[615] "Memorandum: Exchange," March 16, 17, 1928, RG 95, Box 4, Folder, 1928-'29, 1/3, The National Archives and Records Administration (NARA) Pacific Alaska Region (Seattle).

[616] This fear was legitimized by the 1910 lawsuit launched by President William Howard Taft's Justice Department against the Anaconda Company over alleged damage caused the Deer Lodge National Forest by the company's smelter smoke.

[617] At this point, that meant The Federal Mining and Smelting Company, Hecla, The Sunshine Mining Company, and The Day Mining Company.

Service about the prospect of securing an annual sustained yield cut of timber from the neighboring Coeur d'Alene National Forest. The companies annually consumed tremendous quantities of timber, principally Douglas fir and western larch – twenty-two million board feet in normal years of good production – primarily to replace old mine timbers that served to support thousands of miles of underground tunnels.[618] Facing a dramatic shortage of available timber in the immediate postwar years, the mining companies turned to local Forest Service representatives for help. The companies wanted the Forest Service to set aside sections of the neighboring Coeur d'Alene National Forest for their exclusive use and guarantee approximately twenty million of the Forest's annual thirty-three million board foot cut for their use.[619] Perhaps sensing a rare opportunity, Forest Service officials raised the subject of the local lead and zinc refineries' SO_2 output and its effect on tree growth and forest health on neighboring forest lands. Regional Forester P.D. Hanson, noting his Department's efforts to improve its management of the forest resource so that sustained timber yields of the type the mining companies were requesting could be maintained, suggested that the mining companies needed to begin doing their part to make this happen.

Internal Region One documents from 1946 reveal that, in fact, by at least this date Forest Service officials harbored serious concerns about the effect of Bunker Hill's smelting and refining operations on the forests and the overall ecological health of the

[618] August 16, 1946 letter from the General Managers of Bunker Hill, The Federal Mining and Smelting Company and The Sunshine Mining Company to P.D. Hanson, District Forester, District One, Missoula, Montana, RG 95, Box 66, Folder "S-Sales, Cd'A – General, 1957 and 1958 and Older Material [2 of 2]," National Archives and Records Administration (NARA) -- Seattle.
[619] Ibid.

surrounding area.[620] Discussing how best to frame the upcoming discussion with the mining interests over guaranteed timber harvests, Coeur d'Alene National Forest Supervisor K.A. Klehm suggested to his superior, P.D. Hanson, that they should base their presentation upon, "…a factual account of the merchantable timber on national forest land within the mining zone," and they should "…show the necessity for increasing the productivity of other forest lands in the area *and should suggest correction of the smelter fume damage* [italics added]."[621] In a rough draft of a letter to Bunker Hill Assistant Secretary Ira A. Robson, Regional Forester Hanson expressed three main points: alarm over the increasing levels of SO_2 damage on forest lands affected by refinery smoke, concern over heightened soil erosion and fire danger on impaired forest lands, and the irony of the fact that the very mining companies that presently were asking the Forest Service to guarantee them massive annual timber harvests from the Coeur d'Alene National Forest were also the entities most culpable for the destruction of timber resources in that forest.[622] In the draft, Hanson mentioned that on a recent tour of the forest's "smoke damaged areas," he beheld "…some rather startling erosion problems."[623] Continuing, the forester added, "We recognize that erosion is becoming an

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[620] The Forest Service divided, and still divides, its management responsibilities into different regions. The Coeur d'Alene National Forest was part of the USFS's Region One, headquartered in Missoula, Montana. Regional Forester P.D. Hanson managed all of the forests in Region One, which covered all of Montana, Idaho, Washington and Oregon, and reported to his superiors at USFS in Washington, D.C. The Coeur d'Alene National Forest was managed on a day-to-day basis by Forest Supervisor K.A. Klehm, headquartered in Coeur d'Alene, Idaho.

[621] K.A. Klehm to P.D. Hanson, November 1, 1946, RG 95, Box 66, Folder "S-Sales, Cd'A – General, 1957 and 1958 and Older Material [2 of 2]," National Archives and Records Administration (NARA) -- Seattle.

[622] It is unclear whether or not Hanson ever sent a final draft of this letter to Robson.

[623] Rough draft, letter, P.D. Hanson to Ira A. Robson, December, 1946 (?), RG 95, Box 66, Folder "S-Sales, Cd'A – General, 1957 and 1958 and Older Material [2 of 2]," NARA (Seattle).

ever important and increasing problem in the fume-damaged area."[624] SO_2-killed trees, of course, could no longer serve to prevent the erosion of soil on the steep hillsides of the mountains that framed the narrow valley. Turning to another hazard posed by the area's many killed (but still standing) trees and bushes, Hanson wrote, "…we also realize that the killed material is also greatly increasing the fire hazard in the area."[625] Residents of the Coeur d'Alenes were acutely aware of the dangers posed by forest fire; not only was the area surrounded by forested mountains, but also the massive 1910 complex of wildfires known as "The Big Burn" had run through Wallace, destroying almost half the town. In 1945, the Coeur d'Alenes again was hit with a major wildfire. Turning to the ironic nature of the situation – the arsonist, if you will, petitioning a contractor whose buildings he has previously set ablaze to erect a certain number of new wood buildings each year for him to burn – Hanson wrote, "This damage to timber [from refinery fumes] is a little difficult to reconcile with the urgent demand on the part of the mining industry for additional forest products."[626] Another ironic fact was that had it not destroyed the timber on much of its own forest lands, along with that lying on neighboring Forest Service territory, Bunker Hill doubtless would have been in a better position to meet its current demand for wood. Hanson wrote, "The area tributary to Kellogg, if in production, would no doubt in itself contribute materially to supplying the wood products that are needed to operate your mine."[627] Taking Bunker Hill to task and anticipating federally-

[624] Rough draft, letter, P.D. Hanson to Ira A. Robson, December, 1946 (?).
[625] Ibid.
[626] Ibid.
[627] Ibid.

prompted environmental changes to come,[628] Hanson mentioned that since the company's fume damage was "expanding rather rapidly," it might want to take "some control measures, in addition to those now exercised" in order to stop destroying so much of the timber on its own lands.[629]

In 1950, responding to demand generated by the thriving postwar economy, the company's lead smelter produced at record levels and the zinc plant closely followed suit. Increased smelting activity coupled with no improved or increased level of pollution control, of course, led to a greater release of harmful effluents such as SO_2 into the airstream. Not surprisingly, in 1950 local Forest Service officials increased complaints to the company over the loss of trees on national forest lands adjacent to the smelters.[630] At the behest of the USFS, Bunker began construction of a sulfuric acid plant as an addition to the zinc smelter.[631]

Completed in April, 1952, the plant turned a harmful waste product, sulfur, into a commercial product, sulfuric acid, used in making fertilizer. The company soon was producing one hundred tons of acid a day, acid that no longer rained down on the trees and plants of the Silver Valley.[632] The story was not initially an entirely happy one for the company, however, as it struggled to find markets for all of its sulfuric acid. In the view of Stanly Easton, this difficulty accrued "because of the remoteness of the plants," but it undoubtedly also was a product of the fact that many U.S. smelters of the day were

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[628] If only in a rhetorical sense, recall that this was presumably an unsent rough draft of a letter.
[629] Rough draft, letter, P.D. Hanson to Ira A. Robson, December, 1946 (?).
[630] Charles R. Stark, Jr., "Stanly Easton: 64 Years in Mining," (unpublished manuscript, MG 5, Box 1, Folder 41, Bunker Hill Records), 1956, 25.
[631] Ibid.
[632] Aiken, *Idaho's Bunker Hill*, 135.

building sulfuric plants to address SO_2 pollution issues.[633] This, not surprisingly, led to a glut on the sulfuric acid market.[634] Although sale of its sulfuric acid would be an ongoing problem for Bunker Hill for the rest of its existence, the difficulty was somewhat lessened in late 1956 with the signing of a contract with Idaho fertilizer company J.R. Simplot Corporation. Simplot pledged to purchase eighty percent of the capacity of Bunker's acid plant for the next eleven years.[635]

Domestic consumption of lead rebounded from Depression era lows during the World War II and immediate postwar years; during the depths of the Depression, in 1932, domestic lead consumption dropped to 396,000 metric tons (t) but by 1947 that figure had nearly tripled to 1,090,000 (t) and by 1953 it had jumped to 1,460,000 (t).[636] Viewing these trends and coming off a record production year at its lead smelter, Bunker executives decided to make a major, three million dollar expansion of the lead smelter that would permit the facility to smelt up to 100,000 tons of ore per year.[637] To give some sense of the scale of the company's lead smelting operation and of its relative significance in the domestic lead smelting economy, this represented slightly over twenty-three percent of primary domestic lead production for 1951.[638] The expanded and modernized facility went fully on line by the end of 1953.[639] With the heightened

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633 "Transcript of Interview with Stanly Easton," October, 21, 1957, MG 5, Box 1, Folder 41, Bunker Hill Records.
634 Aiken, *Idaho's Bunker Hill*, 135.
635 Ibid., 144 and "Bunker Hill Mining and Smelting Company Builds for the Future," *Spokane Chronicle*, June 24, 1953, 24.
636 U.S. Geological Survey (USGS), "Lead Statistics," http://minerals.usgs.gov/ds/2005/140/lead.pdf (accessed on October 14, 2010).
637 Aiken, *Idaho's Bunker Hill*, 135.
638 USGS, "Lead Statistics," http://minerals.usgs.gov/ds/2005/140/lead.pdf (accessed on October 14, 2010). Primary production slightly outpaced secondary lead production, which totaled 401,000 (t) in 1951.
639 "New Facilities at Bunker Hill Smelter Step Up Ore Preparations," *Spokesman-Review*, February 18, 1954, 24.

capacity of its lead smelter, Bunker was forced for the first time to look outside the district for procurement of significant quantities of ore.[640] In hindsight, perhaps the smelter expansion was ill-advised. From at least the time of late 1950s, the company repeatedly struggled to secure enough concentrates to run the smelter at capacity. In the late 1960s, Bunker needed to secure about 60% of its concentrates from outside its own mines; in the mid-1970s that figure was 50% and by 1981 it had reached 75%.[641] The company secured much of this ore from other companies' mines within the district, but it received concentrates from as far away as Peru.[642]

During the second half of the 1960s, Bunker Hill became noticeably more concerned about dealing with its SO_2 problems. Desiring to increase revenues from sulfuric acid sales, faced with a local population that had become less accepting of air tainted by the acrid, foul-tasting substance, challenged by new federal legislation and state standards that addressed air pollution, the company spent significant sums on sulfur-control technology.[643] In September 1965, Bunker Hill announced its plan to spend eight million dollar over the next two years to expand its zinc plant and double the capacity of its sulfuric acid facilities.[644] In 1970, the company spent six-and-a-half million dollars to purchase and install a German-made sintering machine and a new baghouse at its lead

[640] Aiken, *Idaho's Bunker Hill*, 135.
[641] "This Week in Mining," *Spokesman-Review*, January 11, 1969, 28, Philip J. Landrigan, Edward L. Baker, Jr., John L. Earl, Tscihwa J. Chow, "Biochemical Studies of Lead Isotopes Near a Smelter," (lecture, Oak Brook, IL, October, 1975), Art Johnson, "Bunker Hill Said Saved in '70," *Spokesman-Review*, December 2, 1981, 20.
[642] Johnson, "Bunker Hill Said Saved in '70."
[643] The relatively weak Clean Air Act of 1963 and the amended 1967 version were significantly enhanced and strengthened with passage of the 1970 Clean Air Act.
[644] "Bunker Hill Plans $8 Million Expansion," *The Wall Street Journal*, September, 16, 1965, 4.

smelter.[645] The new machine, a Lurgi Updraft Sinter Machine, was designed to remove sulfur from gas before it was sent to the baghouse for further cleaning.

Covering the story was a daily newspaper from the Inland Empire's hub, Spokane, Washington, a city of 170,000 that had prospered greatly via its links to the mining and smelting, logging, and farming activities of a wide hinterland.[646] Addressing central issues raised by the installation of the new sintering machine, the *Spokesman-Review*'s reporter noted the environmental tradeoffs inherent in the eighty-five years of industrial modernity in the Coeur d'Alenes; while mining and smelting had netted two billion dollars in profits, "The costs in terms of a deteriorating environment have been high – the Coeur d'Alene River polluted and the hillsides browned as acid-laden smog killed trees and shrubbery."[647] Not surprisingly, Bunker Hill officials struck a different tone, stressing their perhaps naïve visions of a green future for the mining district. The company forecast that the valley would be green with new plant life within five years. The exact extent to which the company's now silly-sounding talk about a green valley represented an early version of "greenwashing," and the extent to which it signified technological (over)optimism, is difficult to assess, but it seems sure that both strands were in evidence. While company officials expressed optimism that the new sintering machine, their technological fix, had fundamentally solved the problem of sulfur

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[645] Joel Ream, "Bunker Hill Co. Shows Off Costly Clean Air Equipment," *Spokesman-Review,* September 5, 1970, 6.

[646] Spokane is located approximately 85 miles from the Coeur d'Alenes. The ties between the city and the mining district historically have been numerous and strong. D.C. Corbin, builder of the initial narrow gauge railway into the Coeur d'Alenes, lived in Spokane. A number of the city's other first millionaires, builders of its most opulent 19th Century homes, could trace their wealth to the district. The Inland Empire refers to a region, several hundreds of square miles in size, that corresponds to sizable portions of eastern Washington and northern Idaho and smaller parts of northwestern Montana and southern British Columbia.

[647] Ream, "Bunker Hill Co. Shows Off Costly Clean Air Equipment."

pollution in the district, Robert Montgomery, the Chairman of the Idaho State Air Pollution, was more realistic. While admitting that installation of the machine had allowed Bunker Hill to meet current state air standards, Montgomery also noted that in a few years the state likely would toughen the standards, and the company would once again find itself out of compliance.[648]

Despite the outward confidence displayed at the unveiling of the Lurgi machine, at least some in the company were aware of the looming challenges posed by what promised to be an increasingly strict arena of environmental regulations. As Gene Baker, Bunker's Chief of Environmental Affairs, framed the situation in an in-house talk in May, 1970, "As you all know, there has been a lot of emphasis lately on environmental control. A lot of pressure at various points – mostly against industry. This pressure continually changes but out of it are evolving some firm courses which affect us and although we may not agree – they're there and with force."[649] Baker acknowledged the company's role in harming local vegetation and possibly human health with its SO_2 emissions, saying, "*Our emissions have destroyed most of the natural vegetation in the valley* [italics added] and although there is no proof that our SO_2 is damaging to health, there is more and more evidence to support the belief that it is."[650] His chief concern evidenced here, however, was not the preservation of local flora and fauna but of his company. Perceiving the imminent reality of a vastly more challenging and costly climate of environmental regulations, Baker advised his compatriots on how best to approach this stormy sea. Noting that while the new sintering machine would "give us the capability"

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648 Ream, "Bunker Hill Co. Shows Off Costly Clean Air Equipment."
649 "Pollution Control Talk," 1 May 1970, 1, MG 413, Box 242, Folder 4547, Bunker Hill Records.
650 Ibid., 2.

of meeting State of Idaho SO_2 requirements established in 1968, recent federal recommendations were far more stringent than the state standards.[651] Predicting that Idaho soon would revise its rules to bring them more in line with federal guidelines, Baker suggested the company's best strategy was to work to keep the Idaho rules relatively weak. Observing that Bunker's "success in obtaining the most lenient regulations" was dependent upon "having satisfied local citizens" and also on "having an air pollution commission which is sympathetic to industry," Baker targeted upcoming 1971 local public hearings on air quality as the pivotal time and place for the company to effectively pitch its case for relatively lenient state SO_2 standards.[652]

Noting that, "The local citizens are becoming less and less tolerant [of SO_2 levels]," Baker advised that the company needed to use its new sintering machine and sulfuric acid plant to full capacity in the coming year and find markets for all of the resultant sulfuric acid. Only by getting maximum production from its new sulfur-removing technologies, could Bunker reduce "…SO_2 emissions to currently acceptable levels which will restore our credibility with valley people."[653] But here there was a rub. Bunker Hill currently had a market for only fifty-five percent of its sulfuric acid. Unwilling to take a loss on excess sulfuric acid, when faced with this situation in the past, the company had left idle portions of its acid plant. As Baker well-knew, his company remained highly reluctant to produce acid for which it would have to take a loss. This undoubtedly explains why he, along with Bunker Hill President Frank Woodruff, stressed

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651 "Pollution Control Talk," 2.
652 Ibid.
653 Ibid.

the need to "somehow market all of the acid."[654] Unlike its attitude toward purchasing smoke and water easements, Bunker Hill apparently was unwilling to view the production of unsalable sulfuric acid as an acceptable price to pay for the maintenance of good local public relations, let alone a cleaner and more healthful Silver Valley environment. Fully aware of his company's position on this issue, Baker nonetheless iterated the relatively dire consequences of failing to fully utilize the new sulfur collection systems, "If we fail to meet this commitment, we will be condemned by the public and will be in violation of State standards. In this eventuality, we would face possible legal action, and might be forced to curtail operations."[655]

Mentioning air pollution regulations recently adopted by the state of Washington mandating that the state Air Pollution Control Board "obtain and maintain the cleanest air possible consistent with the highest and best practicable control technology," Baker asserted that this type of regulatory approach was likely to be adopted by all the states.[656] The environmental officer warned that in order to keep up with likely mandates to employ "best practicable control technology" to address its issues with SO_2 and aggregate particulate matter, the company would have to spend considerable sums of money on technology purchases and upgrades. His preliminary five-year plan predicted the need for $1,482,000 in environmental expenditures. Of this, roughly one million dollars was to be directed toward air pollution control efforts, with projected expenditures of $690,000 at

[654] "Pollution Control Talk," 2. Woodruff makes the same point in the *Spokesman-Review* article, "Bunker Hill Shows Off Costly Equipment," September 5, 1970.
[655] Ibid.
[656] Ibid., 1.

the lead smelter, $272,000 at the zinc plant.[657] Baker's projections signaled a roughly forty to fifty percent increase in company spending on pollution controls over the previous five year period.

On March 3, 1971, the Idaho Air Pollution Commission held a public hearing in Kellogg. The subject was Gulf-Bunker's[658] request of a three-year delay in the application of state SO_2 standards adopted in 1968. The company, having already been granted extensions on compliance through the present date, now explained that a further extension was required due to fluctuations in the sulfuric acid market that prevented it from selling the excess acid. Numerous local residents took the opportunity to testify before the state commission. Not surprisingly, opinions varied strongly on an issue that pitted economics, local jobs and company loyalty against personal health and environmental quality. An undercurrent of anti-Gulf sentiment suggested that the new company owners had not yet won the type and degree of loyalty in Kellogg that long had been the purview of Bunker Hill. N.C. Perkins, manager of a local bank and past Chamber of Commerce president, represented those who feared that not granting the extension would mean the slowdown or outright closure of the company's local operations, when he stated:

> I think the seriousness of this is quite evident to each and every one of us that is here and that should the variance not be granted, the economic disaster that could happen…I don't believe can be over emphasized…We all depend, whether we know it or not…upon this industry for our livelihood. If there is no way of living here, if we are not going to be able

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[657] "Pollution Control Talk," 4, 5, 7.

[658] As of June 1, 1968, Bunker Hill became a wholly-owned subsidiary of the Houston-based Gulf Resources and Chemical Corporation.

> to work here, the coming generation is not even going to be able to stay here…[659]

Those testifying in favor of the company's request for an extension also referred to what they viewed as Gulf-Bunker's good faith effort to comply with air quality regulations in recent years – the expenditure of six million dollars on pollution control technology including the recent purchase and installation of the Lurgi machine – while entreating the commission to grant the company needed time to figure out how to market its excess acid. Demonstrating its continued company support, the Kellogg City Council, represented at the hearing by Mayor Roger Fulton, went on record as supporting Gulf-Bunker's extension request. A factor in the Council's unanimous resolution was, "…the economic impact that would be imposed on the City of Kellogg in revenue loss if the Bunker Hill Company operations were curtailed or shut down."[660]

Opposition to the company's request for an extension was comprised of, among others, Kellogg doctors, sufferers of respiratory disease and the student body of Kellogg High School. A local resident and practicing physician, Dr. Keith Dahlberg, cast doubt on the integrity of Gulf-Bunker's claims that, given just a bit more time, it soon would have its SO_2 situation handled. He noted that the company had in the past repeatedly promised that it would take care of its SO_2 problem, first claiming that this would happen by late 1969 and later that it would occur by January, 1971. Turning to the health aspects of the SO_2 situation, Dahlberg said that while SO_2 itself is not harmful to humans in concentrations of less than three to five parts per million, in the Silver Valley people were

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[659] "Public Hearing Relative to Application for Extension of Timetables for Control of Air Pollution Submitted by Bunker Hill Company," 3 March 1971, MG 413, Box 242, Folder 4547, Bunker Hill Records.
[660] Ibid.

breathing in not pure SO_2 but "conversion products of combined SO_2, fog, metallic oxides, and other particulate matter that we find in our local smog."[661] Noting that little was known about such "conversion products," the doctor suggested the possibility that they were more harmful to human health than pure SO_2. Speaking from his position as a local caregiver, however, Dahlberg's testified more definitively, saying, "But [for] those who have some respiratory diseases, there is no question that the disease is made worse on days in which the smelter smoke is strong…Certainly something is affecting our asthma and emphysema patients, which appears simultaneously with SO_2 smog, and which does not appear to affect them in its absence."[662] Dahlberg described the case of an asthma patient whom, the previous March, he had felt compelled to discharge from West Shoshone General Hospital before she had received care, "in order to get her out of Kellogg's air," noting that, "She simply could not breathe it."[663]

Dahlberg's testimony, like that of others opposed to granting the company an extension, also asserted that many, including Bunker executives, chose not to live in Kellogg due to its bad air. Noting that Kellogg's population had declined by 2,000 over the past decade, the doctor stated that, "Local business suffers as more and more people move elsewhere to live, because of our air."[664] Turning to the local scenery, Dahlberg indicated Kellogg was not yet the verdant landscape envisioned by Bunker executives the

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[661] "Public Hearing Relative to Application for Extension of Timetables for Control of Air Pollution Submitted by Bunker Hill Company," 19.
[662] Ibid.
[663] Ibid.
[664] Ibid.

previous fall: "The effect of sulfur dioxide on the local vegetation is obvious to anyone who has seen our yellow lawns and hillsides bare of evergreens."[665]

The doctor also questioned Bunker's strategy of marketing all of its potential sulfuric acid on the oft-glutted acid market, and by implication, the company's decision to harness its air quality program to such a dubious economic plan. Dahlberg suggested that instead of "putting all their eggs in one basket," Bunker should develop "alternative methods for disposal of SO_2."[666] Believing that granting an extension to the company would only embolden it in pursuing its misguided SO_2 strategy, Dahlberg urged the commission to deny it "to provide added incentive to change this [company] policy of directing SO_2 only to sulfur dioxide…"[667]

Another local doctor, O.B. Scott, a surgeon and physician in Kellogg since 1952, framed the issue in the following commonsense way, "…I think it has been obvious to many people in the community when your eyes are red and they run, and you cough and gag, that there is something operating besides fresh air."[668] While Scott was willing to grant Bunker "a short, temporary delay" in meeting the state's SO_2 standards, he stressed, "…that sometime in the very near future we should be able to anticipate a full compliance with the law."[669]

Perhaps the most compelling testimony came from Clint Waltham, Student Body President of Kellogg High School. Conveying what he referred to as "a direct representation of the consensus of opinion of the 600-odd young adults who make up the

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[665] "Public Hearing." 3 March 1971, 19.
[666] Ibid.
[667] Ibid.
[668] Ibid., 30.
[669] Ibid.

student body of Kellogg High School," Waltham urged the commission not to grant an extension to Bunker, stating that, "…to continue polluting our atmosphere at the present rate would only be adding to an already dangerous situation."[670] To exemplify the bad air quality situation at the high school, the student body president cited instances in which school activities had been "seriously hampered" by the SO_2 situation: physical education classes were cut short and other classes disrupted by "high concentration of pollution within the building itself" on January 26th of the current year, football practices the previous fall had been shortened, and visiting athletic teams had "complained of the difficulty in breathing" during sporting events held in Kellogg.[671]

Citing examples of mass deaths from air pollution emergencies, such as the 1948 Donora, Pennsylvania incident in which twenty lives were lost, Waltham pointedly queried, "Is a catastrophe of this nature needed to awaken our community to the severe problem that we are facing?"[672] Although he expressed appreciation of pollution control efforts made to date by Bunker Hill and awareness of the importance of economic considerations to the community, Waltham clearly put himself and his compatriots on the side of a cleaner local environment, stating, "…we contend strongly that economy should give way to ecology and that pollution should be stopped at any cost."[673] Questioned by a commission member who wanted to know just how much the young man would be willing to give up for a clean local environment -- "Does this mean you would be willing

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[670] "Public Hearing." 3 March 1971, 20- 21.
[671] Ibid., 22.
[672] Ibid. Addressing the meaning of "catastrophe" for the risk society, Ulrich Beck says that, "Behind all the objectifications, sooner or later the question *of acceptance* arises and with it anew the old question: *how do we wish to live*?...The spreading talk of 'catastrophe' is in this sense an objectivized, pointed, radicalized expression that this development is *not wanted*. See Beck, *Risk Society,* 28.
[673] Ibid.

to have the plants shut down? And for what period of time? And what about the loss to your parents and so on?" – Waltham backed down slightly but still stuck to his fundamental position, saying, "Well, shutting down the plant completely is not what we advocate, but we think that the pollution should be stopped."[674]

Others testified about specific health problems attributable to SO_2. Willie Dahl discussed his fifteen-year-old son, who "…has been excused from school by two different doctors that said he was not to enter out into this SO_2 emission."[675] Lifelong Kellogg resident Laura Williamson summarized the air situation, stating, "The air is bad on many days, but worse on others."[676] She went on to say that, "…I was born and raised here and feel that in the last months the air pollution has been worse than ever."[677] Williamson also related that on fall days she liked to hang clothes out to dry, but that "Several days I came indoors after 15-20 minutes actually gasping for breath!"[678]

It seems worthy of note that in all the testimony before the Air Pollution Control Committee, no one seriously attempted to defend the quality of Kellogg's air. Even those who argued strongly in favor of granting Bunker the extension conceded that they did not like the SO_2-laden air. They argued in favor of the extension based upon economic considerations and their hopes that the company would, given more time, be able to solve its sulfuric acid marketing problems. Those opposing the extension prioritized a more rapid cleanup of what they perceived as a badly fouled, unhealthy environment, and evinced a skepticism over the contention that granting more time to Gulf-Bunker would

[674] "Public Hearing", 3 March 1971, 23.
[675] Ibid., 26.
[676] Ibid.
[677] Ibid.
[678] Ibid.

lead to the environmental outcomes the company had long promised. The debate seemingly divided the Kellogg community into two camps. The pro-extension camp's concerns for the continued economic vitality of the area persuaded it to allow Bunker Hill to continue in essentially a "business as usual" fashion, while the anti-extension camp was saying that the time had come for Bunker Hill to take the necessary steps to improve the air quality, local economic consequences or no. While the former group's arguments conformed comfortably to risk theorist Ulrich Beck's identification of the attitudes characteristic of *classical industrial society*, in which "the 'logic' of wealth production dominates the 'logic' of risk production," the latter group's arguments would have been more at home in a succeeding stage of industrial development that Beck's labels *advanced modernity*, wherein "the 'logic' is reversed…The gain in power from techno-economic 'progress' is being increasingly overshadowed by the production of risks."[679] As this and other 1970s-1980s debates that pitted economy and environment would prove, the question of which stage of industrial development (if one accepts Beck's definitions) had been reached, was far from resolved.

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[679] Ulrich Beck, *Risk Society: Towards a New Modernity* (London: Sage Publications, 1992), 13.

Figure 7: Denuded Hillsides in Government Gulch Surrounding the Bunker Hill Company's Zinc Plant, Circa the Late 1960s[680]

In April, 1972, the State of Idaho promulgated a schedule of compliance and an implementation plan that specifically addressed Bunker Hill's SO_2 problem. The new rules required the company immediately to cut its level of total particulate emission to half the level recorded for 1971 and also to achieve at least an aggregate 74% sulfur recovery rate at its lead and zinc plants.[681] The state order noted that over the past calendar year the company had achieved an SO_2 level of .09 ppm. in Kellogg, or three times the state's primary air quality standard. Henceforth, Bunker Hill would have to

[680] Bunker Hill Photographic Collection. Bunker Hill Records.
[681] "Order and Issuance of Compliance Schedule Environmental Services, Exhibit D," 29 June 1973, 1, MG 413, Box 250, Folder 4688, Bunker Hill Records.
[681] Ibid. The "sulfur recovery rate" refers to the percentage of the sulfur initially entering the zinc and lead plants that the state expected the company to capture or otherwise control.

achieve a maximum annual mean of .03 ppm. and not exceed a daily maximum .14 ppm. The state stipulations also announced that by June, 1975 the company would be required to meet the far more stringent sulfur recovery rate of 85%.[682] In order to better insure compliance with the new sulfur standards, the State also issued a detailed schedule of technological control measures that the company was to implement by specific dates. For instance, by January 1, 1975 it was to install a wet scrubber in the lead smelter's fuming furnace granulator and upgrade the existing wet collector in the pelletizing dryer.[683]

Notwithstanding the difficulty of complying with the State of Idaho's new air standards, Gulf-Bunker officials found it far preferable to deal with the state than with the federal Environmental Protection Agency (EPA). Company executives rightly viewed standards proposed by Idaho's new Department of Environmental and Community Services as considerably more lenient, and its attitude toward company compliance with regulations far more flexible, than those of the EPA. Gulf-Bunker executives' attitude is exemplified by an early 1973 communication from Bunker Hill President Frank Woodruff to Gulf CEO Robert Allen in which Woodruff sums up the situation surrounding new air pollution regulations by saying, "The State of Idaho has proposed regulations which Bunker Hill can meet. These provide for meeting the ambient air standards through 80% emission control and intermittent control of operations. Federal regulations on which hearings were held in Boise do require 96% control and disallow intermittent operation."[684] Though the company later would find even the 80% standard

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[682] "Order and Issuance of Compliance Schedule Environmental Services," 29 June 1973.
[683] Ibid., Exhibit C.
[684] "Current Situation Bunker Hill vs. EPA Air Pollution," Frank Woodruff to Robert Allen, 18 January 1973, MG 413, Box 242, Folder 4545, Bunker Hill Records.

too onerous to meet, its pattern of preferring to work with generally more lenient state regulators over federal officials remained fundamentally the rule.

Evidence of the company and the State's mutually warm and congenial relations were still very much in evidence during September and October of 1973, ironically the first weeks of the severe lead pollution outbreak that followed the smelter's baghouse fire.[685] In mid-September James Bax, Director of Idaho's Department of Environmental Control and Community Services (DECS), wrote Frank Woodruff to share some good news and congratulate him on Bunker's achievements in air pollution control. Addressing "Dear Frank," Bax reported that it appeared the EPA was about to adopt his Department's preferred approach to Bunker's SO_2 situation – the use of "best available technology" coupled with intermittent control of output when needed -- and then offered compliments to Woodruff, who recently had been made Gulf's Vice President for Operations and transferred from Kellogg to the 47th Floor of the Tenneco Building. While recognizing that, "there is yet a long way to go," Bax nonetheless felt it appropriate to, "…give credit where credit is due, and as a public agency we feel you and your key people who have been closely involved in making this progress over the past few years are to be commended for what has been done and to continue in their fine efforts."[686] In his reply to "Dear Jim," the Gulf Resources executive expressed both pleasure at the recent shift by EPA and appreciation of his company's smooth working relationship with Bax's agency, writing:

[685] The baghouse fire and the Kellogg lead-health epidemic that followed it gained great notoriety for Gulf-Bunker. This incident receives more attention in both the "Introduction" and in the following chapter, "Foul Humours II."
[686] Bax to Woodruff, 17 September 1973, MG 413, Box 242, Folder 4545, Bunker Hill Records.

> It is reassuring as a citizen to know that eventually reason has prevailed in setting standards and accepting rational solutions to pollution problems…I have been appreciative of the patience and pragmatic attitude that DECS has taken toward the recognition and solution of pollution problems, and feel that this attitude has been extremely important in gaining industry cooperation.[687]

The metals-laden breezes that blew through Kellogg in the winter of 1973-'74 brought at least a temporary change to the cozy relationship that evidently had developed between Bunker Hill and Bax's agency. By May, 1974 DECS had become alarmed and was growing impatient with the large mining and smelting company. On the heels of the hospitalization of the Thomas children, which triggered the emerging realization that something was terribly amiss *vis-à-vis* the environmental health situation in and around Kellogg, Bax sent off a particularly serious letter to Gene Baker, Bunker's Environmental Control Director.[688] Although prompted by the nascent lead-health scare, Bax's missive also took Bunker to task for its failure to meet the state SO_2 and particulate standards agreed to the previous year:[689]

> Stack test data have indicated that there has been nearly a four-fold increase in particulate emissions since the Implementation Plan was adopted…In order to meet these standards [for ambient air quality] by the prescribed date of July 1975, The Bunker Hill Company was placed on a Compliance Schedule designed to reduce total emissions by 50% of the 1971 levels. With just over a year remaining before July 1975, it appears we are slipping further from our goal of clean air.[690]

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[687] Woodruff to Bax, 1 October 1973, MG 413, Box 242, Folder 4545, Bunker Hill Records.

[688] The hospitalization of these two young Kellogg children in April, 1974 set in motion the detection of the community's lead-health epidemic that had commenced the previous September with the baghouse fire. This crucial episode in the environmental and social history of the Kellogg area will be dealt with at length in the subsequent chapter.

[689] State and federal standards existed for "particulates," as well as SO_2. "Particulates" essentially refers to gaseous matter released from the Bunker Hill smelter and zinc plant that did not fit into other regulatory categories. The company struggled to comply with State and federal particulate standards for much of the 1970s.

[690] Bax to Gene Baker, 22 May 1974, 1-2, MG 413, Box 243, Folder 4455, Bunker Hill Records.

Bax went on to submit a long, detailed list of production and pollution information that the company had to promptly submit to his Department. He ended the letter, not with the friendly tone that previously had characterized much of his correspondence with company officials, but with a warning that, “The gravity of the situation requires prompt action by both this Department and The Bunker Hill Company.”[691]

Responding on behalf of the company, Gene Baker explained that Bunker had adopted “the latest technology available” to address its sulfur problems, but that unfortunately, due primarily to “the difficult meteorological situation existing in Kellogg,” their system at present remained unable to meet the Primary Air Standards.[692] Citing a provision of the Clean Air Act of 1970 permitting a two year variance for firms that, despite having made a good faith effort to comply with the regulation nonetheless had fallen short of numerical targets, Baker referenced his recent request that such a variance be granted.

Granted, there was some merit to Baker’s contention regarding “the difficult meteorological situation” existing in Kellogg, which lies in a steep-walled, narrow valley prone to a weather pattern known as temperature inversions. Inversions occur when a mass of warm air comes to sit upon a colder, heavier layer of air. This layer of relatively cold air is then trapped by the warmer air, often at ground level. On average, Kellogg experienced 150-200 inversions per year, with the bulk of these occurring in the early morning hours during the late fall and winter months. Inversions, as might be imagined,

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691 Bax to Baker, 22 May 1974, 4, MG 413, Box 243, Folder 4455, Bunker Hill Records.
692 Ibid., Baker to Bax, 17 June 1974, MG 413, Box 242, Folder 4545, Bunker Hill Records. The “primary standards” were designed to address human health concerns. Generally more modest “secondary standards” were aimed at protecting plant and animal health.

created substantial air pollution challenges for Bunker Hill. This weather pattern routinely served to trap the company's smelter and zinc plant smoke, replete with heavy metals and SO_2, at ground level, where it came into contact with people, animals and plants. A common complaint of Bunker Hill officials was that they would have little difficulty complying even with the EPA's SO_2 standards, were its works only located on an open plain where inversions did not occur. In Kellogg, however, where inversions lasting from a single morning to a full week were the rule from November through March, the company clearly needed further efforts to solve its SO_2 problem.

For the bulk of the 1970s Bunker attempted to meet the State of Idaho's SO_2 benchmarks through use of the "best available technology," – its three sulfuric acid plants and their related SO_2 control systems. But the company generally failed to comply with these relatively lenient standards, as local temperature inversions commonly raised Bunker's SO_2 levels above permissible levels. Anticipating this result, the company pressed for the option of employing a Supplemental Control Strategy (SCS) during periods of temperature inversion. Implementing an SCS would involve first the use of meteorological data to predict the imminent onset of an inversion, and then the curtailment or outright shutdown of the company's sulfur-producing systems.[693]

Whereas the State of Idaho generally was supportive of Bunker Hill's plans to employ a combination of "best available technology" and SCS to address its sulfur issues, the EPA vacillated in its response, sometimes approving this approach and sometimes demanding the company reach high standards for sulfur capture without resort to SCS.

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[693] The company's primary sources of SO_2 were the sintering machine at the lead smelter and the flash roaster at the zinc plant.

Because the state's standards were easier and less costly to comply with, whenever possible Bunker focused its efforts on meeting those standards and largely ignored those of the EPA. Complying with Idaho's SO_2 standards and implementing SCS, however, required that the company develop the ability to rapidly predict the onset of temperature inversions and to then curtail or shutdown the smelter's sintering machine. In the early 1970s, Bunker began investing in personnel and technology aimed at making the Kellogg's area's weather patterns and ambient levels of SO_2 far more legible. By 1976 the company was operating a weather- and sulfur-monitoring system in the Kellogg area that included five weather stations, five SO_2 monitors, two meteorologists, and a weather center that contained an advanced computer.[694] Monitoring stations telemetered wind speed, wind direction, and ambient SO_2 level data continuously to the weather center. There meteorologists, using a powerful computer, made determinations regarding the imminent likelihood of a temperature inversion. Should one appear likely to occur within the next few hours, the meteorologists would advise personnel at the smelter and zinc plant to begin SO_2 curtailment procedures.

"Legibility" and the New Environmental Regime

In his book *Seeing Like a State*, political scientist James C. Scott discusses the concept of *legibility*. For Scott legibility refers to the ability of the leaders of large institutions such as states and big corporations to clearly "see" subjects of interest to them such as, respectively, citizens and customers. According to Scott, a major reason why

[694] "The Bunker Hill Company Environmental Fact Sheet," December 1976, MG 413, Box 245, Folder 4598, Bunker Hill Records. Some of the SO_2 monitors were run by the State of Idaho.

pre-modern states were so crude and often self-defeating in their efforts at administration is that they possessed such rudimentary knowledge about their territories and subjects. By contrast, a hallmark of the modern state and other large, bureaucratic institutions, is their possession of great amounts of information, often in the form of putatively objective facts and records, about their subjects and areas of operation and administration. Scott refers to the production of information such as censuses, maps, land records, mortality and unemployment records, disease rates and productivity numbers as "state simplifications," and maintains that these are an integral aspect of a larger ambition that he refers to as an ongoing "project of legibility."[695] Scott asserts that institutional leaders quite literally use their instruments of state simplification as the lenses through which they "see" and interpret the landscape and people they oversee. Without such tools, he maintains, large-scale administrative interventions would be impossible.[696]

In Scott's view, the tool of legibility has often been placed in the service of deeply authoritarian schemes of state simplification that have undermined local autonomy and effective traditional practices. His examples include Baron Haussmann's mid-19th century reconfiguration of Paris that permanently displaced thousands of poor Parisians and made it far easier for the military to suppress popular insurrections, the brutal and ineffective Soviet collectivization of agriculture in the 1920s-'30s, and most chillingly, the Nazi use of Dutch census maps of Amsterdam to round up and send away that city's Jews. Although Scott's analysis and examples undoubtedly indicate the capacity of legibility to be employed in service of socially harmful or even evil ends, in the case of

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[695] James C. Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven, CT: Yale University Press, 1998), 80.
[696] Ibid., 78.

the Coeur d'Alenes' airshed, legibility represented at first a worthwhile goal that, once largely achieved, acted as a potent weapon in the battle against air pollution. Even as he describes the horrific uses to which the Nazis put the powerful tool of legibility in Amsterdam, Scott recognizes the potential of using legibility for good. He writes, "That legibility, I should emphasize, merely amplifies the capacity of the state for discriminating interventions – a capacity that in principle could as easily have been used to feed the Jews as to deport them."[697]

Federal and state legislation aimed at achieving major social goals would seem to fit in well with Scott's observations. Ambitious national legislation such as the 1970 Clean Air Act required reams of scientific data to determine what constituted appropriate standards of "clean air," and prodigious amounts of monitoring to ensure that clean air standards were being met in all fifty states. The abstract concept of air quality needed to be made concrete and legible for dozens of different substances and in scores of locales. As a company suddenly faced with the challenge of complying with new, challenging state and federal air quality standards in the 1970s, Bunker Hill officials had to scramble: first to fully understand the precise mark they needed to hit in order to be deemed "in compliance" and then to ascertain how practically they might achieve mandated targets for SO_2 and other substances.

Bunker executives quickly learned that in order to meet the new standards -- particularly employing a technologically demanding system such as SCS -- they needed to transform such formerly amorphous concepts as "Kellogg area weather patterns" and "SO_2 concentrations" into highly legible, discrete entities. This led to the rapid

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[697] Scott, *Seeing Like a State*, 78.

employment of numerous tools of radical simplification such as weather stations, computers and SO_2 monitors -- all designed for the alchemy of framing abstract phenomena into readily-comprehended numerical and verbal data. Bunker Hill's project of legibility for the Silver Valley environment, which as Scott's work suggests ultimately proved unrealizable, only intensified with the outbreak of the lead-health epidemic in 1974. In the wake of that event, federal and state agencies descended upon the Valley's denuded hills, determinedly seeking to confer legibility upon subjects such as the health of the community, the effect of lead upon children, and the imprint of heavy metals upon the landscape. With Bunker's 1982 collapse and the following year's declaration of a twenty-one square mile Superfund site centered upon the lead smelter, the EPA began a cleanup process that continues to this day. Perhaps even to a greater extent than was the case with earlier efforts to reduce ambient SO_2 levels or address the 1974 lead-health epidemic, the Superfund project has levied Herculean demands for the realization of the elusive goal of full legibility.

Regulators and Tall Stacks

In late 1973 the EPA agreed to go along with the state's SO_2 plan for Bunker Hill, but not long thereafter the federal agency demanded tougher standards for the company. At the time, Bunker was operating under the auspices of Idaho's "Regulation S," a sliding scale regulation that permitted SO_2 levels in the Kellogg area to fluctuate between .14

and .28 ppm., depending upon levels of production.[698] In November, 1975 the EPA disallowed Idaho's 72% standard for sulfur capture and insisted that Bunker instead meet a rate of 82%.[699] The company responded that meeting the increased standard was simply unfeasible using current technology and filed a lawsuit against the EPA in the Ninth Circuit Court of Appeals in San Francisco. Bunker's lawsuit alleged that the agency had acted "in an arbitrary and capricious manner" in promulgating its new SO_2 regulations.[700] The State of Idaho submitted a brief backing the company's position.

In November 1975, Gulf-Bunker, after consulting with the meteorological firm North American Weather Consultants, made the fateful decision to construct "tall stacks" at its lead smelter and zinc refinery.[701] Seeking a technological fix to its ongoing SO_2 issues with the EPA, the company decided to build smokestacks tall enough to vent smelter and refinery gasses at a distance from Kellogg and Smelterville and their nettlesome air monitoring systems. The EPA opposed Bunker's decision to build the tall stacks. The agency contended both that the stacks offered no guarantee of compliance with federal SO_2 and other air quality standards, and that merely dispersing the pollution over a wider area, as the stacks would do, offered no real improvement for the environment of north Idaho. EPA Regional Administrator Douglas Costle expressed concern that, "the tall stacks will spread the harmful pollutants to outlying communities, some of which presently have much lower ambient sulfur dioxide concentrations."[702]

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[698] "Environment III," February, 1978 (?), 8. MG 413, Box 242, Folder 4602, Bunker Hill Records. If the company was producing greater levels of lead and sinter, it was permitted to expel less SO_2 into the atmosphere, and vice versa. At this time, the federal SO_2 standard was .03 ppm.

[699] "The Bunker Hill Company Environmental Fact Sheet," December, 1976.

[700] "Environment III," 8.

[701] "The Bunker Hill Company Environmental Fact Sheet."

[702] *The Bend* [OR] *Bulletin* , "Company Hopes to Keep Smelter in Operation," June 2, 1976, 19.

Idaho Governor Cecil Andrus, on the other hand, expressed appreciation for Bunker's decision to build the $11.4 million stacks and hoped that the project would achieve the desired results. Echoing Bunker Hill President James Halley's statement that the tall stacks were essential to keeping the 59-year-old smelter and its 500 workers in business, Andrus remarked, "While I remain concerned about any degradation of the air anywhere in Idaho, we must also recognize that the lead smelter is important to the lead-zinc mining industry in Northern Idaho."[703] Construction of the 610-foot zinc refinery stack began in April, 1976 while construction of the 715-foot smelter stack awaited the following year. They both were completed and in operation by August, 1977. Not only did the stacks tower over the valley floor, but with the aid of powerful fan systems, they usually sent their plumes streaming up hundreds of feet.

In a major victory for Gulf-Bunker, in a July, 1977 ruling the 9th Circuit Court affirmed that the EPA's 82% capture standard had been unreasonable and was not based upon well-grounded evaluation of existing sulfur control technologies.[704] The Court sent the issue back to the EPA with instructions to develop a sounder SO_2 rule for the Kellogg area. At the same time and despite their hefty cost, the tall stacks seemed to be accomplishing their intended goals. Bunker reported that curtailment of operations (SCS) had been "negligible" during the stacks' initial six months of operation.[705] While the company intended to maintain its weather monitoring system so that it could employ curtailment procedures as needed, the tall stacks largely obviated its need. Monitoring data also showed that while Kellogg air still did not meet federal SO_2 requirements, it had

703 *The Bend* [OR] *Bulletin* , "Company Hopes to Keep Smelter in Operation."
704 "Environment III."
705 Ibid., 8.

improved considerably since the company began its reduction efforts in the early 1970s. When the Lurgi sintering machine was put on line at the smelter in 1970, ambient SO_2 levels averaged .17 ppm., nearly six times the federal maximum. The levels fell to less than .09 ppm. by 1973. Three years later they had dropped to roughly .07 ppm., and in 1977, following introduction of the tall stacks, SO_2 levels fell to approximately .05 ppm., within striking distance of the federal standard.[706] Bunker achieved an 80 per cent sulfur capture rate by decade's end, nearly the EPA's mandated 82 per cent rate.[707] In June, 1979, following years of struggle, the company and the federal agency reached a sulfur settlement that did not require the company to do much more than it already was doing.[708] Though Bunker Hill still had numerous air pollution compliance issues with the federal government, and a handful with the State of Idaho, SO_2 had become one of the company's least worries by the end of the 1970s.

Greening the Country

Bunker Hill decided to put on a new hat. Following decades of decimating the local greenery, the mining and smelting giant decided it was time to try its hand at making the desert bloom.[709] With its barren hills and streamsides, the Silver Valley in the early 1970s bore more than a passing resemblance to a moonscape. Despite the obvious challenges, in 1972 the company launched an ambitious plan to revegetate 18,000 acres

[706] "Environment III," 9.
[707] Sue Manning, "Bunker Hill – Government Continue Battle," *Spokane Daily Chronicle*, June 8, 1979, 3.
[708] Dick Gentry, "Bunker Hill, EPA Settle," *Spokane Daily Chronicle*, June 8, 1979, 4.
[709] The Kellogg area, of course, only *looked* like a desert. It had come to bear such a resemblance following decades of SO_2 and heavy metals' pollution. Moving far enough away from the mining district, the landscape began again to resemble the heavily forested, verdant scenery typical of the moist Pacific Northwest region, to which the Coeur d'Alenes belong.

of Silver Valley land running from Elizabeth Park to Pinehurst and spanning elevations of from 2,200 to 4,800 feet above sea level.[710] According to the company, by 1972 SO_2 levels "were reduced to the point that revegetation could proceed uninhibited by smelter emissions."[711] Bunker spent the first three years of the project largely researching what species of trees and shrubs were best-suited to grow in the Valley's heavily eroded, metal-soaked soils. In the spring of 1975, the company began its first large-scale planting efforts under the direction of University of Idaho Forestry graduate student Ed Pommerening. Crews of high school and college students, along with troops of Boy Scouts, planted 45,000 trees in the first year. Over 157,000 trees and shrubs had been planted by the end of 1977.[712]

Pommerening, a young forester frequently referred to as "a modern day Johnny Appleseed" in press pieces, developed a number of innovative techniques in the course of the revegetation project. Discovering that for years miners had been growing fruit trees and vegetable gardens deep in the bowels of the Bunker Hill mine, Pommerening decided to use an abandoned ventilation shaft at level five of the mine as an underground tree nursery. Three thousand feet below the Earth's surface, with a constant temperature of 77 degrees and 100 percent humidity, the forester found that plants grew exceptionally well, and at a fraction of the cost of building and maintaining above-ground greenhouses.[713] The oxygen and carbon content of the air was ideal, as was the lack of disease and insects. The only problem, a lack of light, was easily remedied through the installation of

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710 "The Bunker Hill Company Environmental Fact Sheet."
711 Ibid.
712 "Environment III."
713 "The Bunker Hill Company Environmental Fact Sheet."

mercury vapor and sodium lamps.[714] In his unique underground nursery, Pommerening grew ponderosa, lodgepole and Austrian pines. In another innovation, the forester began growing the seedlings in soil-filled containers. The containers provided a nurturing home for the seedlings after their transplant to the hostile conditions outside the mine. The seedlings needed all the help they could get. The revegetation project faced severe challenges in the relative lack of soil on the Valley's steep, eroded hillsides and in the soils' high metallic content.[715] Pommerening, his curiosity and sense of personal challenge motivated by the Valley's adverse conditions, said "I wanted to find out if something would grow on this hostile terrain."[716]

Bunker's turn at environmental remediation included not only tree plantings, but also the planting of willow shoots along the barren shores of the South Fork of the Coeur d'Alene River, shrubs and grasses on dusty former tailings ponds, and the placement of nearly one hundred thousand dollars worth of clean topsoil on the yards of interested residents of Wardner, Kellogg and Smelterville.[717] Through these efforts the company planted tens of thousands of willows and native shrubs.[718] When met with success, as were some of the company's revegetation efforts, they served both to reintroduce plant life into the local ecology and to stabilize area soils. These projects represented a small, albeit worthy, downpayment on Bunker's giant environmental debt in the Coeur d'Alenes.

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[714] "The Bunker Hill Company Environmental Fact Sheet."
[715] "Revegetation Job Praised," *Spokane Daily Chronicle*, July 20, 1977, 40.
[716] "Revegetation Under Way in Idaho," *The Toledo Blade*, November 27, 1975, C20.
[717] J.H. Halley to Frank Woodruff, interoffice memo, 16 May 1975. MG 413, Box 245, Folder 4591, Bunker Hill Records. For a cost, the company also made hydroseeding equipment available to residents of those communities who wished to put down grass seed.
[718] For example, in the first half of 1975, 15,000 willow shoots and 1,500 shrubs were planted, and the spring planting of 1977 included 10,500 shrubs. By 1977, 40,000 willows had been planted.

In what must have been a welcome shift from the barrage of environmental criticism and regulation that beset the company in the 1970s, Bunker Hill was recognized for its environmental reclamation work. In mid-1975, representatives of Washington State University and the University of Idaho's Department of Forestry observed the company's revegetation efforts, prompting James Halley to brag to his superior, Frank Woodruff, that, "We are rapidly gaining a favorable reputation in the revegetation area."[719] The coup d'grace, however, was garnering the Idaho Tree Farmer Association's Industrial Forester of the Year award for the company's novel underground greenhouse work.[720]

While Bunker undoubtedly made important strides, the job of revegetating the Kellogg area was far from complete when it was overtaken by the EPA in the 1980s. It is unclear whether the agency examined Bunker's efforts at greening the landscape, but it too has spent considerable labor and treasure on revegetation efforts. In a 1998 operation that the EPA farmed out to the Army Corps of Engineers, the Corps deployed Sikorsky helicopters to bomb 1,000 acres of hillsides south of Kellogg with grass seed. The Army Corps turned to grass seed after experiencing very slow and stunted growth with the 150,000 white pines and various types of bushes it had planted. The high-tech federal effort, employing a sticky substance known as tackifer to keep seeds from blowing or washing away and thousands of tons of lime to make the soil less acidic, took years and

[719] Halley to Woodruff, interoffice memorandum, 18 July 1975, MG 413, Box 245, Folder 4591, Bunker Hill Records.
[720] "Environment III," 4.

millions of dollars to complete.[721] Even in 2010, however, while the hills around Kellogg host numerous trees and grasses, the vegetation does not have anything approaching the density found in neighboring forests. Rather than a thick coating of trees and grasses, there is a rather patchy forest hosting numerous bald spots.[722] Nonetheless, this represents a tremendous turnaround from the nearly barren landscape of the early 1970s.

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[721] Julie Titone, "Corps Renews Battle for Bunker Hill: Choppers Bombard Superfund Site in Effort to Revegetate Barren Slopes," *Spokesman Review*, September 25, 1998, 1.
[722] Personal visit to Kellogg, March, 2010.

FOUL HUMOURS II

There are always losers and winners in risk definitions. The space between them varies in relation to different issues and power differentials. Modernization risks from the winners' point of view are <u>big business</u>.[723] – Ulrich Beck

If we look behind the sober scenes that the members of our bourgeoisie create, and see the way they really work and act, we see that these solid citizens would tear down the world if it paid.[724] -- Marshall Berman

On September 3, 1973 a fire broke out in sections six and seven of the baghouse at the Bunker Hill smelter. The baghouse functioned as the principal air pollution control system for the company's massive smelter. Thirty-foot-by-eighteen inch orlon bags served to filter out many of the toxic metals and chemicals from the smelter's nearly constant stream of effluent. The fire destroyed 2,800 of the baghouse's 12,000 bags.[725] Unfortunately, due to the fact that the fire extensively damaged the smelter's roof, there was no structure to which new bags could be attached. With the smelter's pollution control system rendered ineffective, Bunker Hill was faced with a major decision.

In the most safety conscious scenario, the company could have decided to suspend smelter operations until the damaged sections of the baghouse could be repaired, though this undoubtedly would have entailed production and profit reductions.[726] Less cautiously, company officials could have chosen to significantly curtail smelter output until the damaged baghouse sections were fixed; since roughly one quarter of the

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[723] Ulrich Beck, *Risk Society: Towards a New Modernity* (London: Sage Publications, 1992), 23.
[724] Berman, *All That Is Solid Melts into Air*, 100.
[725] Julie Titone, *Spokesman-Review*, "Monumental Cleanup: Smelterville Baghouse Was Source of Lead Contamination That Poisoned Silver Valley," March 21, 1995, B4.
[726] It was clear from the time of the fire that it would take months to repair the baghouse. This was due primarily to a major supply shortage of replacement bags.

pollution control system had been taken offline, it might have made sense to decrease production by about twenty-five percent. Alternatively, Bunker Hill could have decided to ignore public health and environmental concerns and maximize short-term profits by running the smelter full-bore. In a decision with major ramifications for the future of their company and the welfare of the people and the environment of northern Idaho, company officials decided to follow the third option: they ran the smelter at full capacity despite the fact that its air pollution control system was not in working order.[727]

Although baghouse seven was replaced by November 3, 1973, baghouse six remained off line until March 17 of the following year, over half a year after the fire.[728] In those six-plus months considerably more than a ton of lead rained down on the people of Kellogg, Smelterville and outlying areas of the smelting district: in fact, as much as 2,500 tons – equal to eleven years worth of the smelter's normal emissions – fell on the area in those few months.[729] That amounted to in excess of thirty tons of lead per square mile for Kellogg and twenty-five per square mile for Smelterville.[730] According to Ian von Lindern, a Yale-trained scientist whose doctoral dissertation focused on the air quality problems faced by Kellogg and its environs in the wake of the baghouse fire, dust samples taken from Kellogg homes near the smelter registered at up to 39,910 parts per million of lead, well above safe levels.[731]

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[727] It probably never will be known exactly which company officials made the decision to keep the smelter running following the baghouse fire. By the summer of 1973, Bunker Hill had been a wholly-owned subsidiary of Houston-based Gulf Resources & Chemical Corporation for five years. Top Gulf officials such as CEO Robert Allen and Vice-President Frank Woodruff always maintained that they had nothing to do with the decision, that it was a routine managerial decision made at the plant level in Kellogg.
[728] Aiken, *Idaho's Bunker Hill*, 180.
[729] "Lead Concentration Worst in Nation," *Spokesman-Review*, September 23, 1981, 3.
[730] "Smelter," *Spokesman-Review*, July 21, 1990, A6.
[731] "Lead Concentration Worst in Nation." *Spokesman- Review*.

The rising price of lead apparently persuaded Gulf-Bunker officials to continue operating the smelter at full capacity *sans* a properly working filtration system. In January 1973, the price of lead stood at $286 per ton. By October, 1974 it had risen to $479 per ton. In September of 1973, when the decision was made to keep the smelter running at full speed, the price of lead was high and rising. In early January, 1974, when company officials opted to bypass the remaining functional sections of the baghouse and spew unfiltered effluent directly out the smelter's main stack, the price of lead was even higher and was still climbing.[732] Indeed, the company's fateful decision was rewarded by a massive profit increase. Its Bunker Hill division went from a 1973 net profit of nine million dollars to a twenty-six million dollar profit in 1974.[733]

This chapter analyzes the relationship between aerosolized lead and human health in the Kellogg area. It begins with the notorious lead-health epidemic of 1973-'74 and

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[732] "Smelter," *Spokesman Review*. It remains unclear who in the Gulf-Bunker hierarchy authorized this decision, although in this case as well Gulf executives denied having had anything to do with it.
[733] Ibid. The literature on human health and the environment is vast and rich. The cornerstone of this canon is undoubtedly Rachel Carson's *Silent Spring* (1962), which limned the risk posed to the web of life by pesticides. The fundamental insight of this body of literature is that human bodies are inseparable from the environments they inhabit, that environmental concerns and human health are inescapably interrelated. Another primary insight is that while humans undoubtedly affect environments, these altered environments in turn shape humans. In addition to *Silent Spring*, the literature that has particularly influenced the writing of this chapter includes Linda Nash's *Inescapable Ecologies: A History of Environment, Disease, and Knowledge* (2007), which examines the 160-year relationship between people and local environments in California's Central Valley, culminating with the study of the varying perceptions of a significant cancer cluster in pesticide-soaked McFarland; Gregg Mitman's *Landscapes of Exposure: Knowledge and Illness in Modern Environments* (2004), which covers similar terrain; the chapter "The Toxic Environment" in Samuel P. Hays's *Beauty, Health, and Permanence: Environmental Politics in the United States: 1955-1985* (1987), which provides a strong overview of controversies over human-made environmental toxins; Andrew Hurley's fascinating study of the politics of pollution in Gary, Indiana, *Environmental Inequalities: Class, Race, and Industrial Pollution in Gary, Indiana*: 1945-1980 (1995); Andrea Peacock's poignant story of the asbestos-poisoning of a small, Montana town by W.R. Grace Corporation, *Libby, Montana: Asbestos & the Deadly Silence of an American Corporation* (2003); Ishimure Michiko's *Paradise in the Sea of Sorrow:Our Minimata Disease* (2003), the story of the mercury-poisoning of a Japanese community; Brett L. Walker's powerful indictment of the toll that Japan's intensive bouts of industrial modernization have exacted on the bodies of its people, *Toxic Archipelago: a History of Industrial Disease in Japan* (2010), and David Rosner and Gerald Markowitz's *Deceit and Denial: The Deadly Politics of Industrial Pollution* (2002), a muckraking-style history that details outstanding examples of corporate harm to human health.

ends with the lowering of Silver Valley children's blood-lead levels to the national average in the 2000s. A fair amount of data is offered in hopes of demonstrating the relative lead pollution levels over time in the Kellogg area, along with the health threats posed by these levels to area residents. The chapter covers the struggle between Gulf-Bunker Hill and federal and state regulators over permissible levels of lead and particulate emissions and appropriate pollution control technologies. It addresses the concept of "legibility," and how both the company and environmental regulators attempted to make air pollution in the Coeur d'Alenes fully transparent and readable. Finally, the chapter addresses the early 1982 shutdown of the Bunker Hill smelter and the effects that this event, along with twenty-five years of subsequent Superfund interventions, have had on the environmental and health landscapes of the area.

This chapter spotlights the inherent risks and environmental destructiveness of industrial modernity but it demonstrates the tendency of those risks to be unfairly distributed, both economically and geographically. Ulrich Beck has noted the class bias of risk, saying, "The history of risk distribution shows that, like wealth, risks adhere to the class pattern, only inversely: wealth accumulates at the top, risks at the bottom. To that extent, risk seems to *strengthen*, not to abolish, the class society."[734] This was certainly the case with the 1973-'74 lead-health crisis, which most-impacted those living closest to the smelter in relatively poor neighborhoods such as Deadwood Gulch and Smelter Heights, and in the town of Smelterville. In addition, the chapter points to the role of decision-making in the "risk society." While Beck is undoubtedly correct in asserting that social risks increase in the move from pre-industrial to an industrial society,

[734] Beck, *Risk Society*, 35.

it is also true that individual and corporate decisions within industrial society also have the potential of increasing or decreasing risks. In the case of the 1973-’74 Kellogg lead epidemic, the decision of Gulf-Bunker Hill to continue to run its smelter at full bore in the months following a fire that destroyed much of the smelter’s exhaust filtration system, reaped massive environmental damage and significantly heightened the risk and social cost of living in the Coeur d’Alenes, particularly for children living within a few miles of the smelter. It is also true that for places in the United States the “price of progress” has been far steeper than for others. This is simply to state the obvious: the health and environmental costs of industrial modernity have been shared unequally. Some places that have contributed greatly to the nation’s industrial progress – Kellogg and Smelterville are prime examples – have suffered mighty health and environmental pains for their efforts, while other places that seemingly have contributed far less have become exponentially wealthier while remaining relatively healthy and environmentally unscarred (e.g., Santa Barbara, California). What Marshall Berman refers to as modernity’s tendencies toward “Faustian development” are on ample display in the chapter.[735]

Gulf-Bunker officials’ were well aware of the health risks associated with high levels of airborne lead. In fact, they had become somewhat preoccupied with a recent outbreak of lead intoxication in children living near ASARCO’s lead smelter in El Paso, Texas. In a pathbreaking 1970 study that raised considerable national attention, Dr. Philip J. Landrigan of the federal Center for Disease Control (CDC), found that children residing nearby the Asarco smelter, suffered from abnormally high, and potentially

[735] Berman, *All That Is Solid Melts into Air*, 74.

dangerous, levels of lead in their bloodstreams. In 1972, the City of El Paso sued ASARCO, and, following several weeks of testimony, the mining and smelting giant agreed to settle out of court.

Leaded Kids and the Company

Alarmed at the potential implications of the Asarco/El Paso situation for their operation, Gulf-Bunker began quietly but intensively researching the details of the El Paso situation. After the State of Idaho's Department of Health and Welfare notified Gulf officials that higher levels of lead had been measured in Kellogg than were found near Asarco's El Paso smelter, the company also quietly began sampling soil near the smelter and hired a young Kellogg physician, Ronald Panke, to begin testing local children for lead intoxication.[736] The soil samplings turned up evidence of very high levels of lead and cadmium – lead over 5,000 ppm.[737] In his 1972 study, Panke performed blood-urine tests of ninety-nine children living near the smelter.[738] The doctor's tests showed the presence of elevated lead levels in 34.4% of the children.[739] Despite this early evidence of apparent lead-health problems in a significant number of the children who lived hard by the smelter, the company did nothing to alert parents of their children's high lead burdens, nor did it alter its smelting practices. Neither did Gulf-Bunker warn residents adjacent to the smelter of the likelihood of high concentrations of dangerous metals in

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[736] Aiken, *Idaho's Bunker Hill*, 172.

[737] *Edna Grace Yoss, et. al., v. The Bunker Hill Company, et. al.*, "Memorandum of Authorities in Support of Plaintiffs' Motion for Partial Summary Judgment," 13 April 1981, 21, MG 413, Box 231, Folder 4434, Bunker Hill Records.

[738] Although not considered as accurate as blood-lead screenings, urine tests remained fairly common in the early 1970s

[739] "Memorandum of Authorities in Support of Plaintiffs' Motion for Partial Summary Judgment," 13 April 1981, 21.

their yard soils. In addition, Dr. Panke's request to Gulf-Bunker to perform follow-up studies to verify his findings went unheeded.[740] The company, evidently satisfied in possessing greater knowledge of its lead-health situation in Kellogg and Smelterville, felt no need at the time to act on that information.

Its close study of the El Paso lead intoxication experience, however, certainly appears to have influenced the Gulf-Bunker chieftains' decision-making process regarding how to proceed immediately following the baghouse fire. Notes handwritten by Gulf Vice-President, and former Bunker president, Frank Woodruff indicate the presence of straightforward cost-benefit calculations in company officials' approach at the time. Woodruff penned, "El Paso – 200 children -- $5 to 10,000 per kid."[741] A Bunker Hill official responded to Woodruff's note with an estimate that Gulf's legal liability for poisoning 500 Kellogg children would be "$6-7 million."[742] Based upon the company's 1974 profit increases over the previous year, and accepting the company's estimate of its legal liabilities for poisoning Kellogg children, Gulf would have come out ahead to the tune of ten to eleven million dollars if forced to pay this amount of compensation. Additional handwritten memos that came to light following the 1990 unsealing of records from the Yoss case against the company on behalf of nine lead-intoxicated Kellogg children, show that Gulf executives examined other alternatives: cleaning up the smelter constituted one option; discrediting doctors who warned of the dangers of lead poisoning

[740] Memorandum of Authorities in Support of Plaintiffs' Motion for Partial Summary Judgment," 13 April 1981, 21.
[741] "Smelter," *Spokesman- Review*, July 21, 1990.
[742] Ibid.

represented another.[743] Gulf-Bunker's cold, calculating approach to its airborne lead problems, while financially beneficial to the company in the short run, ultimately led to a bevy of plaguing problems for both the company and the people of the Coeur d'Alenes.

In early April, 1974, shortly after the company finally fixed its baghouse problem, a pair of young schoolchildren visited a Kellogg doctor complaining of flu-like symptoms. But they did not have the flu. Hospitalized for severe lead intoxication, the Thomas children's illness kicked off a major lead scare in the Coeur d'Alenes. The Thomas children, represented by their parents, sued Gulf for $500,000 in general damages and $500,000 in punitive damages.[744] In early May, Idaho Department of Environmental and Community Services field investigator Ian von Lindern reported to Idaho Panhandle Health official Jerry Cobb that ambient air lead concentrations in Kellogg were running at 16.1 ug/m^3, nearly double the 1972 rate and 1.5 to five times the concentrations found in El Paso.[745] Von Lindern's soil samples showed concentrations of lead that were about twice as high as those found in El Paso.[746] In late May, Dr. James Bax of the Idaho Department of Health and Welfare sent a letter to Bunker Hill's Director of Environmental Control, Gene Baker, expressing concern over environmental quality in the Kellogg area and requesting data on production and sulphur dioxide emission rates.[747] A week later, meeting in Boise, Department of Health and Welfare and

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[743] "Smelter," *Spokesman- Review*, July 21, 1990.These memos came to light following the 1990 unsealing of records from the Yoss case, a 1977-'81 legal action against Gulf-Bunker on behalf of nine lead-intoxicated children from Kellogg.
[744] Aiken, *Idaho's Bunker Hill*, 182.
[745] Ian vonLindern and George Dekan to Jerry Cobb, 6 May 1974, MG 413, Box 236, Folder 4424, Bunker Hill Records.
[746] Ibid.
[747] Statement by Shoshone Lead Project Technical Committee, 4 September 1975, MG 413, Box 236, Folder 4415, Bunker Hill Records.

Center for Disease Control (CDC) personnel agreed to perform environmental and blood sampling during the summer in the Kellogg area.[748] In August, in a large study overseen by the CDC, blood draws and interviews were performed on 919 children in five study areas of varying radiuses from the smelter stack and 137 children in control areas removed from air currents affecting smelter's effluent.[749]

Figure 8: Children Lining Up for Blood-Lead Testing, Kellogg, August, 1974[750]

[748] Statement by Shoshone Lead Project Technical Committee, 4 September 1975, MG 413, Box 236, Folder 4415, Bunker Hill Records.
[749] Dr. Philip J. Landrigan, testimony before the Subcommittee on Health and the Environment (date and chamber of Congress unknown), MG 413, Box 236, Folder 4435, Bunker Hill Records. The five study areas were within radiuses of, respectively; one mile, 2.5 miles, six miles, fifteen miles, and twenty miles from the smelter.
[750] Bunker Hill Company Photographic Collection, Bunker Hill Records.

The study's findings, released in September, were, in a word, shocking. Within one mile of the smelter, 170 of 172 children, or 98.8%, were found to have at least an "elevated" blood lead level of 40 ug/dl.[751] Nearly a quarter of the children, 38, or 22.1%, had levels of eighty micrograms or higher, far above the contemporary 60 ug/dl threshold for emergency hospital treatment.[752] The median blood-lead level children in the study was 68.3 ug/dl.[753] One child, one-year-old Arlene Yoss, suffered from the highest amount of lead ever recorded in a human's bloodstream, 164 ug/dl.[754] All of the parents of children with blood-lead levels of 80 ug/100ml were informed in September that they should place their children under medical care. Arlene Yoss was hospitalized in Coeur d'Alene on September 9.[755]

Table 1[756] Mean blood lead levels of children at varying distances from the smelter stack in 1974 and 1975 (ug/dl).

	1 mi. or less	1-2.5 mi.	2.5-6 mi.	6-15 mi.
August 1974	68.3	49.1	34.7	33.3
August 1975	47.1	39.3	31.4	26.7

[751] An "elevated" blood-lead level means that it is considered medically unsafe and of cause for concern. In 1974, a blood-lead level of 40 ug/dl was the federal standard for unsafe levels of lead in the bloodstream. Since 1991, blood-lead levels have been considered to be elevated at one-quarter the former standard, or 10 ug./dl.
[752] Landrigan testimony before the Subcommittee on Health and the Environment.
[753] *Yoss, et. al.* "Memorandum of Authorities in Support of Plaintiffs' Motion for Partial Summary Judgment," 13 April 1981, 11.
[754] Ibid.
[755] "Statement by Shoshone Lead Project Technical Committee."
[756] Glenn Wegner, *The Shoshone Lead Health Project: Work Summary* (Boise, ID: Idaho Department of Health and Welfare, 1976), 78.

As one might suspect, blood-lead concentrations decreased with increased distance from the smelter. In the area that ranged from one to two-and-a-half miles from the smelter, the number of children with "elevated" blood-leads dropped to 151 out of 199, or 75.9%, and the number requiring immediate hospitalization decreased to three. There was found to be a high correlation between elevated blood-lead levels and high concentrations of ambient lead in the air. Between October, 1973 and March, 1974 -- when the lion's share of the emissions occurred -- the amount of ambient lead in the Kellogg air nearly doubled, going from an average of 6.7 ug/m^3 over the previous year, to 10 ug/m^3.[757] In January 1974, acquiescing to the request of miserable baghouse workers, the company agreed to bypass the baghouse and vent unfiltered smelter smoke directly into the atmosphere. An average of sixty tons of lead a month – four times the average for the previous six years -- spewed from the stack through March.[758] After entering the air stream, and from thence the lungs and bloodstreams of Coeur d'Alenes' residents, the lead particulate matter eventually fell to the ground and settled into the dirt and plant life, to again be ingested by people and animals.

Table 2[759] Mean ambient air lead concentrations at varying distances from the smelter stack, 1974.

1 mi. or less	1-2.5 mi.	2.5-6 mi.	6-15 mi.
18 ug/m^3	14 ug/m^3	7 ug/m^3	3 ug/m^3

[757] VonLindern to Stokes, 29 April 1975, MG 413, Box 241, Folder 4530, Bunker Hill Records. By comparison, the 1978 federal standards for ambient air lead set concentrations of 1.5 ug/m^{3}as the maximum safe level, or less than one-sixth of the level measured around Kellogg in late 1973 and early 1974.
[758] Baker to Jim Keane, interoffice memo, 8 June 1977, MG 413, Box 236, Folder 4415, Bunker Hill Records. In March, 1974, the month of highest emissions, 96.1 tons of lead went up the smelter stack.
[759] *Shoshone Lead Health Project*, 72.

On April 25, 1974, Bunker Hill's Gene Baker mailed a letter to land owners in the Kellogg area, alerting them to the risk involved in pasturing livestock, particularly horses, on certain lands where smelter toxins tended to fall in heavy quantities.[760] For years Bunker Hill had been compensating area horse owners for what the company deemed as legitimate claims of loss. In fact, ever since 1920, just a few years after the smelter first went on line, the company had been buying smoke easements, and making direct land purchases, from area landowners. Typically included among these payments were pathology and veterinarians' bills, presumably for the examination and treatment of smoke-damaged livestock and horses. For instance, in fiscal year 1936-'37, under the heading of "smoke damage" payments, Bunker Hill paid out $1,427.83 for veterinary services, $3,983.58 for pathologist services and $365.00 for "crop damage."[761] Two years later the totals were a bit lower: $249.43 for "crop and livestock damage," $3,869.50 for pathologist services and $1,225.81 in veterinarians' bills.[762]

In the 1970s, Gulf-Bunker employed a relatively routine procedure for dealing with horse deaths in the Kellogg area. If Dr. Roy Larson, a local veterinarian determined the animal(s) had been sickened or killed by heavy metals such as lead or cadmium, the company would make a payment for the value of the lost horse(s). If, however, Gulf-Bunker believed the horse death(s) to have occurred outside of the region that its smelter could have polluted, it would deny claims, as it did in the 1974 case of the owner of two

[760] "Statement by Shoshone Lead Project Technical Committee."
[761] "Smoke Damage Payments: December 1, 1936 - November 30, 1937," MG 367, Box 51, Folder 960, Bunker Hill Records.
[762] Ibid., "Smoke Damage Payments: December 1, 1938 – November 30, 1939."

deceased horses that had been pastured near the Rio Vista Terrace.[763] Larson's reports included cause and place of death, for example noting that the deceased horse had suffered from symptoms that, "were typical for lead and antimony poisoning *and the horse was in a smelter smoke area* [italics added] near Kingston."[764] Sometimes the company payouts were rather costly, as in a 1973 settlement involving the deaths of four registered Morgan horses that had been recently transplanted to the area. That sad case cost Gulf-Bunker $2,842.00. Occassionally, and in a virtual admission of culpability, Gulf-Bunker would warn a landowner who had been paid repeatedly for horse losses on a particular pasturage that the land was clearly toxic to the animals, and that thus the company would offer no future compensation for any horse the individual might be foolish enough to pasture there.[765]

Gulf-Bunker Hill officials knew they needed to do something in response to the outbreak of lead poisoning adjacent to the smelter. After the Idaho Department of Health and the CDC released their findings in September, the national media ran with the story of the "leaded children," shining unwanted negative publicity on Gulf and its subsidiary. In October, 1974, company officials decided upon a course of action – they would sponsor a major medical study of lead pollution, children's health, and the environment in Shoshone County. A company-funded study presumably would address the public's fears about lead contamination in and around Kellogg and likely would have the added advantage of preempting any sort of potentially aggressive, CDC-led study that might be

[763] Baker to Dale Simpson, 17 July 1974, MG 413, Box 234, Folder 4400, Bunker Hill Records.
[764] Ibid., 26 February 1975.
[765] T.D. Tennent to Lawrence Snyder, 11 July 1975, MG 413, Box 234, Folder 4400, Bunker Hill Records. In this missive, Tennant, wisely enough, also specifically admonished Snyder to get his other horse off the land where one of his horses had just perished.

proposed. Bunker Hill first attempted to partner with the International Lead Zinc Research Organization (ILZRO), which had conducted research following the lead scare in El Paso, but that effort was derailed by state complaints that such an industry-financed, industry-run study would not pass muster with the public. The study eventually came to life, however, in October, 1974, as the Shoshone Lead-Health Project. This incarnation of the project featured Bunker Hill aligning with the State's Department of Health and Welfare as a joint partner, with the company agreeing to foot 95 percent of the bill. Idaho Governor Cecil Andrus appointed Glen Wegner, a practicing physician and attorney from Boise, to be the Project's director.[766] The Project was overseen by a Technical Committee that included a number of senior figures from pediatrics and toxicology, though none more so than J. Julian Chisolm, Jr., of the Johns Hopkins Hospital. Ronald Panke, the Kellogg physician who earlier studied the lead-health status of children living near the smelter, comprised the only member of the committee who resided in the Silver Valley and who had personally witnessed the events of 1973-'74.

After fifteen months of work, the Shoshone Lead-Health Project released its final report in January, 1976. The report's authors concluded that, "…at the present time and in our best judgments, we do not feel any permanent clinical impairment or illness [to the children] has occurred. Further, it is not likely to occur in the future due to this particular exposure…"[767] The Technical Committee also noted, however, the presence of "mild anemia" and "minimal degrees of slowing in nerve conduction" in those children who had experienced the highest exposures to lead, although it concluded that, "there is no

[766] "Statement by Shoshone Lead Project Technical Committee."
[767] *Shoshone Lead Health Project*, 3.

evidence to date that these effects will be in any way permanent."[768] The report's authors also called for the continued monitoring through 1980 of the lead-health status of Kellogg-area children, both those who had lived through the 1973-'74 outbreak, and those who moved into the area over the next few years. Finally, the Technical Committee went on record as urging, "all responsible parties – industry and government in particular – to continue to do their utmost to avoid a replication of the precipitating events."[769]

Reading beyond the Shoshone Project report's reassuring final conclusions, however, uncovers a more complex and disturbing portrait of the Kellogg area's environmental situation in the mid-1970s. The report's environmental sections, authored by A.F. Yankel and Ian vonLindern of the state's Department of Health and Welfare's Division of the Environment, leave little doubt as to the cause or the magnitude of the air-lead and human health problems in and around Kellogg. Noting that "levels of lead higher than those found in the existing literature are found in the Kellogg-Smelterville area,"[770] the report offered the conclusion that the Bunker Hill smelting complex was the principal and chief cause of the abnormally high levels of lead found in the area's air and soils. Acknowledging the presence of other active sources of lead – old mining and milling centers, flood plains where tailings had accumulated, ore trains that spilled some of their contents – Yankel and vonLindern nonetheless determined that, "Generally, it is apparent that the center of abnormal lead concentrations in the valley is the Bunker Hill complex…in both magnitude and source strength, the largest and certainly what is expected to be the most significant <u>active</u> source of contamination is air-borne emissions

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[768] *Shoshone Lead Health Project*, 3.
[769] Ibid., 5.
[770] Ibid., 8.

from the Bunker Hill complex."[771] Further confirmation that the Bunker Hill smelter was the prime culprit in the heavy metal poisoning of the valley was provided by the application of mathematics to the pollution data, namely, vonLindern and Yankel's discovery that the dilution pattern of the heavy metals was logarithmic with respect to the point source, the smelter.[772] Not surprisingly, concentrations of lead in children's blood, in the air, and in the soils decreased with distance from the smelter. The highest statistical correlation for blood lead levels was found with levels of lead in the air (.72), but blood lead levels also correlated strongly with the levels of lead found in the soil lead (.55) and house dust (.24).[773]

The environmental sections of the Shoshone Project's final report evinced a world coated in lead and other heavy metals -- relatively high levels of cadmium, arsenic, antimony and mercury also were found in areas where lead particulate was found in quantity. This heavy metal-laden universe was most pronounced in Smelterville and Kellogg, the communities closest to the smelting complex. By the time one reached Pinehurst, a few miles to the smelter's west, or Osburn, several miles to its east, the landscape's heavy metal coating had become significantly thinner. In testing done in September, 1974, following the massive emissions of the previous year, the levels of lead found in blood, air, soil, household dust and on homegrown vegetables in the Smelterville

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[771] *Shoshone Lead Health Project*, 12.
[772] Ibid.,, 34. Mean blood leads also were found to follow a logarithmic pattern based upon amount of an area group's lead exposure; this was in keeping with the previously-discovered pattern of Strontium 90 radiation poisoning cases.
[773] Ibid., 74.

and Kellogg areas were literally off the charts – values like these had never before been measured in North America.[774]

Although the correlation between levels of air and blood lead was the strongest found, the environmental scientists and doctors did not believe that simply breathing the heavily leaded air constituted the primary means by which children achieved high levels of blood lead. Of greater significance in the children's lead intoxication, they concluded, was the potent dust that was formed by mixing the heavily leaded air and soils found in the area near the smelter.[775] The dust found its way into homes in neighborhoods such as Deadwood Gulch and Smelterville Heights where it was easily inhaled or otherwise ingested by children. In other words, the formation of house dusts made lead and other heavy metals that spewed from the Bunker Hill smelter more readily bioavailable to Silver Valley children.

While vonLindern and Yankel found that the single most important factor in determining excess lead absorption in area children was proximity to the smelter, other factors were found to have significance as well. Namely, the age of the children and the hygienic condition of their homes both affected their levels of lead absorption. Children aged two to four were most susceptible to high levels of lead absorption, possibly because of their tendency to "play in the dirt" and put objects in their mouths. Likewise,

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[774] *Shoshone Lead Health Project*, 183. VonLindern and Yankel noted the propinquity of the fact that evidently homegrown vegetables did not constitute a major portion of the Silver Valley diet and recommended that no one eat the vegetables grown in the valley. The mean blood lead for children in the area within one mile of the smelter stack was 68 ug/100ml. For the area between a mile and two-and-a-half miles from the stack, the mean blood lead was 49.1 ug/100ml. At the Silver King Elementary School, located .3 miles from the stack, monthly air lead averages reached higher that 20 ug/m^3 (more than ten times the 1978 EPA standard of 1.5 ug/m^3). Soil lead averages at Silver King reached over 10,000 ppm. in July, 1974.

[775] *Shoshone Lead Health Project,* 73.

houses containing the highest levels of dirt and dust tended to produce the highest blood lead levels in children.[776] Statistically speaking, a three-year-old living in a Deadwood Gulch home that was in bad need of a good mop and vacuum was a prime candidate for a blood lead of 100 ug/dl or greater, while a seven-year-old resident of a well-cleaned Kellogg house was not.

VonLindern and Yankel also showed that because of the pollution burst some children had received much higher levels of lead exposure at the most susceptible ages for development. They concluded that children presently between one and three years of age in September 1975, had, through their lifetimes, "experienced external exposures 1.5 to 2 times greater than the older children in the community. These extremely high exposures occurred during the prenatal and first two years of life, presumably the most influential years in terms of development."[777] Drawing upon evidence offered by the high volume air samplers that had been monitoring the quality of Silver Valley air at different locations since 1971,[778] the scientists determined that a child raised in Kellogg who was born in 1973 would have experienced a lifetime average air-lead exposure of 17.5 ug/m^3, while a Kellogg child of nine, born in 1966, would have been subjected to one of only 11 ug/m^3. The latter child also would have experienced a far lower level of exposure during her critical first three years of life.[779] For children living in Deadwood Gulch,

[776] *Shoshone Lead Health Project*, 73.
[777] Ibid., 76.
[778] Ibid., 9. Six high-volume air samplers were installed by the Idaho Department of Health and Welfare in April-May, 1974 when increased concern prompted by the Thomas' girls' illness prompted the Department's efforts to make the Silver Valley environment far more legible; the other three dated to1971. Of the first three samplers two were located in Kellogg and one in Smelterville. The latter six were spread out all over the valley, ranging from Mullan (18.5 miles distant from the stack) to the Silver King Elementary School (.3 mi. distant).
[779] Ibid., 76.

Smelterville Heights, or another place lying within half a mile of the smelter stack, air-lead exposures would have been approximately fifty to seventy-five percent higher than those found in Kellogg.[780] Summing up the air pollution situation in Kellogg and its environs in 1975, two years after the baghouse fire, vonLindern and Yankel said, “The exposure problem in Kellogg can best be described as an acute period of extremely high air lead exposures, lasting about two years, imposed on a chronic lower level of abnormal exposure from several sources.”[781]

In their conclusions, vonLindern and Yankel called for the continued monitoring of the air conditions in the Silver Valley and expressed their concern that, despite progress-to-date in the air quality, significant strides still needed to be made if the Shoshone Project’s stated goal of bringing the valley’s population below the clinically “elevated” blood lead level of 40 ug/dl by 1977 was to be met.[782] While air and blood lead levels both dropped significantly from September, 1974 through September, 1975, with the mean blood lead within a one mile radius of the smelter falling from 68.3 ug/dl to 47.1 ug/dl,[783] there was reason to believe this pace of improvement in the study’s most dramatically-affected region could not be maintained. In the first place, as vonLindern and Yankel explained, the 1975 blood lead numbers for the area closest to the smelter were skewed by the fact that so many of the children tested the year before had moved out of that area when the homes in those neighborhoods were purchased and demolished

[780] *Shoshone Lead Health Project*, 76.
[781] Ibid. Turning to other heavy metals found in high concentrations throughout the Silver Valley – cadmium, zinc, arsenic, antimony, mercury – the scientists concluded that cadmium, a powerful known toxin, likely posed the greatest danger to human health. Like lead, cadmium and the other heavy metals were found in decreasing concentrations with greater distance from the smelter.
[782] Ibid., 82.
[783] Ibid., 78.

by Bunker Hill as a part of the company's new environmental strategy. Of the forty-two children tested in 1974, only seven were retested the following year.[784] Some of these children certainly moved to other, relatively cleaner parts of the Silver Valley while others left the Valley entirely. Even if one were to take the September, 1975 blood lead data at face value, however, insufficient progress was being made.

In light of their evidence that the Project's blood lead level goals were unachievable within the proposed time frame "without taking extreme measures,"[785] vonLindern and Yankel asked the Project's Technical Committee whether or not the goal of achieving 40 ug/dl should be modified. The Technical Committee responded that the proposed blood lead level "…probably represents the best available and they continue to support this goal."[786] In response to the duo's questioning of the proposed time frame for achieving blood lead reductions, the Technical Committee replied that, "…blood lead levels may have not, as yet, come into equilibrium with the exposure reductions," and they urged vonLindern and Yankel to continue their monitoring efforts.[787]

For the medical portion of the Project's report, the Technical Committee turned for leadership to Philip J. Landrigan, the Harvard-trained medical doctor who a few years earlier had led the investigation of the El Paso lead-health episode. Landrigan, who at the time served as Chief of Environmental Hazards Activity, Cancer and Birth Defects Division, Bureau of Epidemiology, at the federal Center for Disease Control (CDC), headed a nine-member team of medical doctors and scientists who authored a section of

[784] *Shoshone Lead Health Project*, 79.
[785] Ibid.
[786] Ibid.
[787] Ibid.

the Project's Report entitled, "Increased Lead Absorption with Anemia and Slowed Nerve Conduction Velocity in Children Near a Lead Smelter."[788] Landrigan's co-authors included Edward L. Baker, a medical epidemiologist for the CDC; John A. Mather, M.D., Idaho's state epidemiologist, and the aforementioned Anthony J. Yankel and Ian H. vonLindern.

The Landrigan group first took note of the unprecedented severity of the Kellogg situation, commenting that, "To our knowledge, this is the highest prevalence of increased lead uptake ever recorded among children in a community."[789] Like vonLindern and Yankel, the Landrigan team reached the conclusion that the smelter was the principal cause of the lead intoxication crisis and that airborne lead oxide along with lead oxide and lead sulphide in household dusts and outside dirt formed the chief means by which lead entered the bodies of Silver Valley children.[790] Turning to diagnosis, the team found that while no frankly clinical conditions or overt neurological toxicity had surfaced among Silver Valley children, various forms of measureable, lead-inspired impairment were in evidence. They also reported that in addition to such environmental factors as proximity to the smelter and levels of household dust, social factors such as social status, father's employment and length of residence in the area played a role in

[788] Landrigan's co-authors included Edward L. Baker, a medical epidemiologist for the CDC; John A. Mather, M.D., Idaho's state epidemiologist, and the aforementioned Anthony J. Yankel and Ian H. vonLindern.
[789] *Shoshone Lead Health Project*, 102.
[790] Ibid., 103. Lead oxides break down much more easily in the environment than do lead sulphides and thus are more readily bioavailable, and more toxic, to humans and other forms of life.

determining blood lead levels. In all but one of the five geographic areas used in the study, the highest blood leads levels were found in children from lower social strata.[791]

The medical team also found that the children of smelter workers generally had considerably higher blood lead levels than did the children of miners, and that in turn, the children of miners tended to have higher blood leads than did the children of non-miners living in the same areas.[792] These findings suggested that smelter workers, and to some extent miners, who brought home dust on their clothing and skin, contributed, however unintentionally, to the "leading" of their children. Additionally, the team uncovered a link between length of stay in the area and increased blood lead levels. The mean blood lead level of children who had moved into Area 1 within six months of the study was 55.9 ug/dl, significantly less than the overall mean of 68.1 for the area.[793] Simply living in Shoshone County for a period of months, evidently, was enough to guarantee that children attained dangerously high blood lead levels. Landrigan et al. also found that free ethrocite proporphyryn (FEP) levels, another measure of lead burdens in humans, tended to rise progressively during the first four to six months of a child's residence in the area.[794] All of this suggested that, excluding children who ate paint or other leaded materials,[795] children exposed to large quantities of lead particulate matter over

[791] Ibid., 96. The five areas corresponded to radiuses in deepening distances from the smelter; Area 1 lay within a one mile radius of the smelter while Area 5, centered at Mullan, lay 15-20 miles distant. Race was not used as a determinant, as the Silver Valley was (and remains) almost uniformly white.
[792] *Shoshone Lead Health Project,* 97. The mean blood lead for the 174 children of smelter workers living in Areas 1-4 was 55.1 ug/dl, while that for the 233 children of underground miners living in the same areas was 45.8 ug/dl. The mean blood lead for all other children living in those areas was 42.1 ug/dl.
[793] Ibid.
[794] Ibid.
[795] Like vonLindern and Yankel, Landrigan's research led him to conclude that the consumption of household paint did not constitute a significant means by which Shoshone County children had become leaded.

significant amounts of time, presumably well over six months, were the ones who attained the highest blood lead levels.

While the Landrigan team found that heavy metals such as cadmium, arsenic and mercury, like lead, decreased in soil concentration with distance from the smelter, they did not find the levels of these metals in the blood of children following the same formula.[796] In this respect, the other heavy metals followed a different pattern with regard to human absorption. In a bit of welcome, if somewhat unexplicable, news, levels of cadmium, antimony and arsenic in Silver Valley children were found to be almost uniformly low.[797]

Based upon earlier findings showing that occupational lead exposure had led to slowed nerve conduction velocities among workers, the Landrigan team decided to test nerve conduction velocities among Silver Valley children.[798] Using electrodes to provide stimulus, Landrigan et al. tested nerve conduction velocity in 202 apparently healthy Shoshone County children. While "no frankly pathologic conduction velocities were noted," the medical team found that nerve conduction velocity was slowed among children with higher blood leads.[799] As Landrigan, et. al., put it, "…when conduction velocity in each child was compared with blood lead level…, a statistically significant negative correlation was found between the two…[800] The Landrigan team viewed the results of their nerve conduction test as having provided "mild evidence for an association between lead intake and the slowing of nerve conduction velocity" and saw

[796] *Shoshone Lead Health Project*, 98-99.
[797] Ibid. One child in Area One registered a blood cadmium of 3 ug/dl. The other nineteen children tested in that area all had blood cadmiums of less than or equal to 1 ug/dl.
[798] Nerve conduction velocity refers to the speed at which electrical systems move through a nerve.
[799] Ibid., 100.
[800] Ibid.

these findings as consistent with those showing slowed nerve conduction among adult lead workers.[801]

Turning to their hematological findings, the Landrigan group not only discovered FEP elevations among Shoshone County children, but also that anemia was considerably more likely to be found in children with the highest blood lead levels. While only 2.2% of all the children examined were anemic, 17%, or seven of forty-one, of those with "clinical" blood lead levels of 80 ug/dl or higher were in this category. Turning to the mechanism by which lead in the body slowed nerve conduction velocity and caused anemia, the Landrigan group postulated that "inhibition of sulfhydral-containing enzymes in neurons and in red blood cells" was the culprit.[802]

Although Landrigan, et al., did not find evidence of severe harm to the "leaded" children of Shoshone County, the team did uncover manifestations of mild damage done by the highest recorded levels of lead in the bloodstream. Their work indicated the presence of a dose-response effect with regard to lead in children. Anemia and slowed nerve conduction velocities, while not in and of themselves life-threatening medical conditions, nonetheless represented real physical damage to some Kellogg area children.

Among other reports, the Lead Health Project's final report also contained several other sections: an inconclusive chapter dealing with the effects of lead on the intelligence of Shoshone County children, a chapter that questioned the conclusions drawn by the Landrigan group, recommendations by Dr. Panke on the best course of medical treatment

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[801] *Shoshone Lead Health Project*, 103.
[802] Ibid., 104.

for lead-affected children in the Silver Valley, and a concluding section that proffered advice on how best to proceed in the future.

The Landrigan group's chapter was immediately followed by a rebuttal written by P.S. Gartside, an ILZRO-affiliated professor at the University of Cincinnati's Department of Environmental Health and Dr. Panke, who had been on Bunker Hill's payroll. While acknowledging that the work of Landrigan, et al. "…if put in proper context, will add useful knowledge to the literature," Gartside and Panke nonetheless wasted no time in taking Landrigan's experimental methodology, results and principal conclusions to task.[803] The duo focused their attack upon Landrigan's principal negative findings: that the most heavily leaded children had greater tendencies toward slowed nerve conduction velocity and anemia than their less-leaded counterparts. Gartside and Panke pointed to the many potential pitfalls of the Landrigan group's technique of using matched pairs in their work on nerve conduction velocity,[804] discussed the null results in Professor Gregory's separate nerve conduction velocity tests, and mentioned that when retested six months later, Landrigan's high lead group tested in the normal range for nerve conduction velocity. Though none of this spoke directly to Landrigan's experimental results, Gartside and Panke nonetheless maintained that "…because of the inconsistent results of data analysis as shown above, we feel a significant relationship between blood lead and nerve conduction velocity has not been established."[805] Gartside and Panke also attempted to cast doubt on Landrigan's findings of anemia in the highest blood lead

[803] *The Shoshone Lead Health Project*, 116.
[804] For example, pointing out that variables such as sex, cleanliness of house and occupation of parents can skew results.
[805] *The Shoshone Lead Health Project*, 117.

group, in this case by arguing that the medical community was not in complete agreement over the definition of the threshold for the disease: "While Landrigan, et. al., might correctly consider a hematocrit of less than 33% to be abnormal, many clinicians feel that a definite threshold value cannot be defined."[806]

The Technical Committee's Chairman, Dr. Glen Wegner, and two medical doctors from the State of Idaho's Department of Health and Welfare, J.A. Mather and J.T. Ashley, recommended continued monitoring of the lead-health situation in Shoshone County. In addition to providing valuable scientific information, continued monitoring efforts would offer both early detection of any possible regression on the air lead and blood lead fronts and also help prevent the outbreak of another "lead absorption epidemic"[807] like the one experienced in 1973-'74. The Wegner group called for annual blood lead and F.E.P. testing of those they viewed as the most seriously affected of all Shoshone County children, one-to-eight-year-olds living in Areas One and Two –Area One included children who lived within one mile of the smelter when the outbreak occurred and Area Two children lived between one and 2.5 miles distant.[808] In addition, they recommended the testing of all one-to-eight-year-olds who moved into Areas One and Two, first upon their arrivals and then annually thereafter. The Wegner team also

[806] *Shoshone Lead Health Project*, 117.
[807] Ibid., 185. This is vonLindern's and Yankel's characterization.
[808] Ibid., 177. Annual tests were recommended for children with blood leads of 40-59 ug/dl. For those with blood leads of 60 ug/dl and higher, biannual tests were recommended along with home visits by Dr. Panke and Dr. Mather aimed at advising parents on how to decrease the amount of available lead in the home environment. Areas I and II essentially corresponded to the communities of Smelterville and Kellogg, respectively.

called for a one year study of blood cord lead in all Shoshone County newborns. This study was intended to determine how much lead area babies were absorbing *en utero*.[809]

In perhaps their most daring recommendation, Wegner and company suggested testing the approximately eighty children born in Area One during the levels of highest lead emissions for neurological damage. Noting that "children under one year of age are purportedly more susceptible to neurological damage from lead than older children," and that no Shoshone County children had been tested yet for such damage, Wegner and associates called for neurological tests to be done at the University of Washington Medical School or a comparable facility and to compare the results with those for a control group of children not exposed to high amounts of lead. [810] This relatively ambitious and costly monitoring and testing program was supposed to last until June, 1980 or until the last Shoshone County child's lead fell below the 40 ug/dl threshold, whichever came first. Wegner and associates presumably expected that Bunker Hill would pick up the lion's share of the tab, as it had for the Shoshone Project, and that the State of Idaho would make a medical official available to perform the work.[811]

While the Bunker Hill-financed, State of Idaho-administered Shoshone Lead Health Project did not definitively demonstrate that Gulf-Bunker Hill irreparably damaged the children of Shoshone County, neither did it completely exonerate the heavy metals' producer. The Project's final report plainly showed that the company's smelter was chiefly responsible for both the lead intoxication epidemic of 1973-'74 and also for the historically elevated levels of toxic heavy metals found wherever in the Silver Valley

[809] *Shoshone Lead Health Project*, 179.
[810] Ibid., 180-181.
[811] Ibid., 176.

winds carried its effluent. In the final analysis, the Shoshone Lead Health Project's most important contribution was its genesis of tremendous amounts of data that added significantly to knowledge of the greatest example on record of the "leading" of an entire community. This data not only added to environmental and medical understandings, however; it also painted a portrait of a landscape, a world, coated in heavy metals.

Smoke Gets in Their Eyes

> What is at stake in the public dispute over risks is revealed here in exemplary fashion: not just secondary health problems for nature and mankind, but the social, economic and political consequences of those side effects – collapsing markets, devaluation of capital, bureaucratic checks on plant decisions, the opening of new markets, mammoth costs, legal proceedings and loss of face.[812] – Ulrich Beck

The 1970s, as has been noted, ushered in a new and exponentially more challenging era of environmental regulation for Bunker Hill. While the company's most difficult and prolonged air-related environmental battle concerned sulfur dioxide, Bunker also had to respond to strict new federal standards for both particulate matter and ambient levels of lead in the air.[813] The 1970 Clean Air Act promulgated new standards for particulate matter and SO_2. Specific compliance regimes and attainment deadlines left up to the states to determine on a case-by-case basis.[814] Standards for airborne lead, however, were not included in the Clean Air Act of 1970. In part due to the 1973-'74 Kellogg lead-health scare, some health officials, including the CDC's Philip Landrigan,

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[812] Beck, *Risk Society*, 13.
[813] The company also, beginning in 1976, needed to respond to new Office of Safety and Health Administration (OSHA) rules for airborne lead in the workplace. These rules affected the operation of Bunker Hill's lead smelter.
[814] This of course was subject to approval by EPA. The agency also watched over and backstopped the states' monitoring programs.

began pushing for a federal airborne lead standard of 1.5 ug/^{m3}. Although Bunker Hill and the Lead Industries Association (LIA) vigorously opposed adoption of this standard on the grounds that it was overly burdensome and unnecessary on public health grounds, the EPA adopted the regulation in 1978.

The term particulates, in the EPA's parlance, refers to small bits of airborne material that darken the air. Lay people probably would be more inclined simply to label such material as smoke. Though often visible in the airstream, particulates range from as small as less than 1.5 micrograms to as large as fifty microns.[815] For example, aerosolized lead leaving the Bunker Hill smelter's stack and travelling into the Kellogg airstream would have constituted only a portion of the total particulate matter emitted by the smelter.

What regulators referred to as particulates and locals as smoke comprised perhaps the most obvious manifestation of air pollution in the Kellogg area. The gray pall of smelter smoke and the SO_2-denuded hillsides served as constant reminders of the environmental costs of the smelting industry. Kellogg doctor Keith Dahlberg's 1971 letter to the Idaho Pollution Commission reflected local concerns about the issue, "On almost any day…*great pillars of black or brown smoke can be seen rising* [italics added], not from the smoke stacks but from the roof of the Smelter, particularly in the area of the blast furnace."[816] The doctor also noted that, "There are ventilating fans in these areas, but they do not appear to be connected to any conduit taking them to the smoke scrubber.

[815] A micron is one millionth of a meter. A human hair, by comparison, is 100 microns in width. Particulates smaller than 1.5 microns are of particular concern because they readily can be absorbed into lung tissue.
[816] Keith Dahlberg to Idaho Pollution Commission, 25 September 1971, MG 413, Box 243, Folder 4551, Bunker Hill Records.

Following over a year-and-a-half of study and discussions, in early 1973 the State of Idaho and Bunker Hill agreed to an implementation plan for particulates. This highly detailed Compliance Schedule required the company to install numerous new pieces of equipment and make many improvements to existing equipment in the lead smelter and the zinc refinery. Bunker, for instance, agreed to make baghouse upgrades that would cut blast furnace emissions from 465,000 to 330,000 pounds per year by January 1, 1974, and to install a mist eliminator to lower particulate emissions at its #1 Acid Plant from 2,760,000 to 276,000 pounds per year by January 1, 1975.[817] The plan required the achievement of a fifty percent general reduction in particulate emissions below 1971 levels by July 1, 1975.[818]

In May, 1974, Gene Baker wrote Lee W. Stokes, the Assistant Administrator of the Idaho Department of Environmental and Community Services (DECS), to brag and explain. In the letter Bunker's Director of Environmental Control touted the company's "considerable progress" in performing all of the pollution control work required under its Compliance Schedule, completing five of the twenty-five projects "well ahead of schedule," with sixteen "on schedule" and only four behind schedule. Explaining that the four projects were behind schedule due to unavoidable delays in procuring equipment, Baker requested extra time to complete the projects.[819] Baker received a reply eight days later, not from Lee Stokes but from an obviously perturbed James Bax, DECS's chief. In the weeks immediately following discovery of the Thomas children's lead intoxication,

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[817] "Idaho Department of Environmental Protection and Health, Air Pollution Abatement Program Time Schedule for Particulate Control: The Bunker Hill Company, February 6, 1973." MG 413, Box 243, Folder 4552, Bunker Hill Records.
[818] Ibid., "Exhibit A," 1.
[819] Gene Baker to Lee Stokes, 14 May 1974, MG 413, Box 250, Folder 4688, Bunker Hill Records.

DECS was adopting a different tone with Bunker Hill. Bax took the company to task for "a nearly four-fold increase in particulate emissions since the Implementation Plan was adopted [in February, 1973]."[820] Unsurprisingly, not only lead emissions skyrocketed in the baghouse fire's aftermath. Evidently disregarding its compliance schedule, Bunker also increased dramatically its particulate emissions during the period. Bax also noted that three particulate compliance projects would be over five months late in completion and a fourth project, the return sinter tank, over a year late.[821] In addition, the state official hammered Bunker for "the notable absence of both production data and consistent emission data," which it was supposed to regularly report.[822] Bax tasked the company with immediately catching up on its reporting requirements and supplying all the missing back data within three weeks.[823] The state environmental official's change of tack with Bunker likely was spawned by his dawning awareness of the magnitude of the lead outbreak that the company had caused over the previous months. Bax sudden shift to a position of acute vigilance is reminiscent of Ulrich Beck's description of the capacity of a catastrophe, or the threat of one, to powerfully reorient arrangements in an advanced modern society. Beck writes, "In smaller or larger increments – a smog alarm, a toxic spill, etc. – what thus emerges in risk society is *the political potential of catastrophes*. Averting and managing these can include a *reorganization of power and authority*. Risk society is a *catastrophic* society. In it the exceptional threatens to become the norm."[824]

[820] Bax to Baker, 22 May 1974, MG 413, Box 250, Folder 4688, Bunker Hill Records.
[821] Ibid.
[822] Ibid.
[823] Ibid.
[824] Beck, *Risk Society*, 24.

Mr. Hooper Comes to Kellogg

Mark H. Hooper, Chief of the Air Technical Compliance Section of the EPA's Region Ten Enforcement Division, visited the Bunker Hill lead smelter in 1974. He found the company's pollution control measures at the smelter far below the industry standard. Addressing the smelter's particulate problems, Hooper noted that "Large quantities of particulates are apparently emitted from the numerous stacks in the smelter and escape from the sintering, blast furnacing, and ore preparation operations as fugitive emissions."[825] Ironically, while Bunker often maintained that it employed the "best available technology" in its efforts to control SO_2 releases, Hooper used the same point against the company regarding its particulate emissions controls. He noted that, "I made determinations based on my knowledge *of accepted methods for control of fugitive emissions* [italics added] from materials handling and operations that the systems which are being used by the Company were inadequate. In some cases, controls or captive systems are non-existent."[826]

In order to gain perspective on Bunker's pollution control practices and relative achievements, in 1974 Hooper visited three lead smelters in southeastern Missouri's historic "lead belt." Following these visits the EPA official concluded that while "an acceptable level of fugitive emission control" had been achieved at those facilities, the same could hardly be said of the Bunker Hill smelter.[827] While acknowledging that

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[825] Hooper Report, "Concepts for Control of Lead Emissions from the Bunker Hill Smelter," 5 December 1974, MG 413, Box 243, Folder 4553, Bunker Hill Records.
[826] Mark H. Hooper, testimony before the Idaho State Board of Health and Welfare, 18 August 1975, 8, MG 413, Box 243, Folder 4557, Bunker Hill Records.
[827] Ibid.

pollution emissions at the Missouri smelters "still do exist," Hooper judged them to be, "…extremely small in comparison to the problems which currently exist at the Bunker Hill smelter."[828] The difference, as the EPA official made clear, was that the Missouri smelters made use of particulate control methods and technologies that Bunker either had not put into practice, or, in the case of new technologies, had not purchased and installed. A major part of the problem lay with the company's faulty baghouses. According to Hooper, "Furnace exhausts and sinter tail gas presently flow to baghouses. Those baghouses, however, are inadequate, in that large quantities of particulate are emitted from them. Well designed, operated and maintained baghouses in this application should be able to reduce these levels significantly and virtually reduce plume opacity to zero."[829] Another major source of particulate emissions was, "the open transfer points and unhooded conveyor belts" at the smelter's sintering plant.[830] Hooper suggested the best solution for this problem would be, "…to totally enclose all outside belts and transfer points…" in the system,[831] as he had seen done, to good effect, at the Missouri smelters. The EPA official also suggested the need to increase the draft at its sintering plant to increase proper venting of particulate matter.[832]

Addressing another primary source of particulate emissions, blast furnace "upsets" -- periods during which the smelter's blast furnace released exponentially greater levels of pollution than at other times – Hooper recommended making improvements to its hooding and exhaust system similar to the technology at the St. Joe,

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[828] Hooper, testimony before the Idaho State Board of Health and Welfare, 18 August 1975, 9.
[829] Hooper Report, "Concepts for Control of Lead Emissions from the Bunker Hill Smelter."
[830] Hooper, testimony before the Idaho State Board of Health and Welfare, 18 August 1975, 9.
[831] Hooper Report, "Concepts for Control of Lead Emissions from the Bunker Hill Smelter."
[832] Hooper testimony before Idaho State Board of Health and Welfare, 9.

Missouri smelter. Hooper was unimpressed by Bunker's use of scrubbers as a principal means of particulate control.[833] He noted that, "The company appears to be incapable of running them [wet scrubbers] effectively."[834] At the zinc plant, Hooper found the particulate control system to be, "…entirely inadequate to handle all the fugitive emissions…"[835] Here, as at the lead smelter, the inspector believed the solution lay simply in installing proven technologies.[836] As Hooper's comments indicate, by the 1970s if not earlier, Bunker Hill, despite its oft-cited expenditure of millions of dollars on pollution control technology, had fallen far behind industry standards.

In April, 1974 EPA issued a primary standard for particulates of 75 ug/^{m3}, along with a maximum permissible twenty-four hour average of 260 ug/^{m3}.[837] Ulrich Beck contends that the setting of such industrial pollution standards, as a form of determining acceptable social risk, "…are the form in which ethics, and with it also philosophy, culture and politics, is resurrected *inside* the centers of modernization – in business, the natural sciences, and the technical disciplines. They are, one might say, an unwanted means of democratization in the fields of industrial production and management…"[838] When, on July 1, 1975 Bunker Hill, as anticipated, failed to meet the terms of its compliance schedule for particulates, the company fell afoul of state and federal mandates. In September, 1975, EPA issued a compliance order requiring the company to take action to control its particulate emissions and established a new compliance schedule

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[833] Scrubbers constitute a technology that generally employs streams of water to separate out pollutants from desired metals.

[834] Hooper Report, "Concepts for Control of Lead Emissions from the Bunker Hill Smelter."

[835] Hooper testimony before Idaho State Board of Health and Welfare, 10.

[836] Ibid.

[837] "The Bunker Hill Company Environmental Fact Sheet," December 1976, 6, MG 413, Box 245, Folder 4598, Bunker Hill Records.

[838] Beck, *Risk* Society, 28.

deadline of July, 1978.[839] As the company had with SO_2, Bunker turned to the tall stacks for the primary solution to its particulates' problem. Secondarily, the company continued its efforts at the blast furnace and attempted to increase ventilation at the sinter tunnel, the tap floor and the feed belts.[840] At a cost of $1.5 million dollars, the company also built a fourteen-square-foot uptake and steel flue to capture and transfer blast furnace emissions to the baghouse. By the end of 1977, Bunker was capturing ninety percent of its particulate emissions.[841]

Despite Bunker's improvements, in 1977 the EPA sued the company in federal court, citing its zinc fuming furnace at the lead smelter as a source of "excessive particulate emission." The agency asked the court to fine Bunker Hill $25,000 a day until it came into compliance.[842] In December of the same year, Idaho's Department of Health and Welfare proposed declaring Kellogg a "non-attainment area" for particulates and SO_2. Bunker charged that the EPA's mandate involving the zinc fuming furnace required high costs for paltry anti-pollution gains and vowed to fight the lawsuit.[843] Bunker similarly objected to the EPA's additional particulate control mandates, claiming that, "The remaining emissions come from hundreds of tiny contributive sources, or from specific exhaust points where the cost of controlling the emissions is prohibitive in relation to reduction to be gained."[844] Bunker labeled Idaho's determination flawed

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[839] Beck, *Risk* Society, 28.
[840] Ibid.
[841] "Environment III," February, 1978 (?), 12, MG 413, Box 242, Folder 4602, Bunker Hill Records.
[842] Ibid.
[843] Ibid. Maintaining that it would cost 350,000 dollars "to further reduce emissions" from the fuming furnace and that the expenditure would result in only a one percent reduction in "lead particulate emissions," the company charged that the EPA mandate was fundamentally unreasonable.
[844] Ibid.

because it did not account for background levels of particulates in the area's environment.[845]

Bunker Hill had a point on this issue. Background levels of particulate matter in fact did comprise a not insignificant portion of the total suspended particulate burden in the Silver Valley. A 1977 study commissioned by the Idaho Department of Health and Welfare (DHW) estimated a mean background particulate concentration of 35 ug/m^3 in the area stretching from Wallace to Cataldo.[846] The Valley contained numerous sites – for instance, roads, railroad beds and old settling ponds -- where strong winds readily could lift metal-laden dust and blow it about. In an extreme incident that took place in the fall of 1972, a blinding dust storm caused eight automobile wrecks on Interstate 90 near Kellogg.[847] In an October 1977-September 1978 study of particulate distribution in the Silver Valley, the environmental firm PES showed that the contributions of smelter emissions to the total particulate burden decreased with distance from the smelter, ranging from seventy-four percent at Silver King Elementary, one third of a mile from the main stack, to a mere eight percent at Cataldo, ten miles distant.[848] The role of fugitive dust in the particulates problem generally assumed greater prominence at locations more distant from the smelter, but strong winds could make them a significant problem anywhere in the Valley. In its report, PES found that while the Kellogg area fell in compliance with state and federal mandates for particulate emissions on an annual

[845] "Environment III."
[846] PES study of particulate distribution in the Silver Valley, October, 1977-September, 1978, Table 5-4. MG 413, Box 236, Folder 4437, Bunker Hill Records.
[847] DECS Environmental Specialist George Dekan to Bob Olson, memorandum, 29 October 1973, MG 413, Box 243, Folder 4552, Bunker Hill Records.
[848] PES study of particulate distribution in the Silver Valley, October, 1977-September, 1978. The environmental firm used DHW's estimates of background particulate concentrations in making its conclusions.

basis, it exceeded limits for daily emissions on two days. Since emissions on those days contained little lead and were recorded at points relatively distant from the smelter, the firm concluded that they likely were due to a combination of high winds and open fugitive sources.[849] As Bunker developed greater control over its particulates emissions, as it was doing by the late 1970s, the need to deal with open sources of fugitive dust became increasingly apparent.

As with SO_2, Bunker Hill's investment in tall stacks and related systems that increased draft effectively dealt with its regulatory problems concerning particulate matter. Between the July, 1974 – June, 1977 period and the October, 1977 – September, 1978 period area particulate levels decreased by thirty percent.[850] By the fall of 1978 the company was meeting the EPA's 75 ug/m^3 annual particulates standard, even at the Silver King and Smelterville air sampling stations, located nearly in the shadow of the smelter.[851] Bunker's only issue remained the occasional daily particulates' average, and the ability to control this appeared to be largely outside the company's scope due to the role of fugitive dust in the problem. Although the tall stacks appear to have dispersed Bunker Hill's noxious airborne wastes away from Kellogg and its immediate environs, the net effect, as the EPA predicted, was simply to broadcast particulate matter, SO_2 and lead to what had been more pristine places. Still, Bunker Hill by 1978 undoubtedly was a good bit cleaner environmentally than it had been a few years earlier. The EPA entered into discussions with the company about settlement of its 1977 lawsuit over particulate

[849] PES study of particulate distribution in the Silver Valley, Table 5-6.
[850] Ibid., Table 5-2. Both of the tall stacks were on line by August, 1977.
[851] Ibid., Table 8-4. Geometric means for Silver King and Smelterville, respectively, were 65 and 72 ug/m^3.

emissions. Settlement by 1979 was a viable option, said the EPA's Jim Sweeney, "…because of the things they [Bunker Hill] have done to correct problems."[852]

Bunker Hill's Heavy Lead Burden

In September 1978, the EPA promulgated the first federal rules for ambient levels of lead in the air, having adopted the ambitious goal of bringing the blood lead levels of all American children below 30 ug/dl. As levels of air lead represented the most statistically significant factor in determining blood lead levels, the EPA ambitiously set the ambient lead-in-air standard at 1.5 micrograms per cubic meter of air (ug/m^3). Bunker Hill and the U.S. lead mining and smelting industry as a whole, as has been noted, vigorously opposed the new standard. Bunker's position on the proposed standard was unequivocal, "The nonferrous mining and smelting industry is opposing this unrealistic standard. Testimony before a recent EPA hearing on the matter indicated such a standard could not be met in the Kellogg area, nor in the vicinity of 80 percent of the primary and secondary smelters in the United States."[853] Though the company had reduced its lead emissions dramatically from the outlandish levels recorded in 1973-'74 – bringing them below pre-baghouse fire levels -- the 1.5 ug/m^3 standard remained far from its reach. In May 1971, for example, a rather average month for air lead levels at Smelterville City Hall in that year, lead concentrations registered 4.08 ug/m^3.[854] During October 1973, the first full month following the baghouse fire, Smelterville lead levels spiked to 24.81

[852] Sue Manning, "Bunker Hill – Government Continue Battles," *Spokesman Daily Chronicle*, June 8, 1979, 3.
[853] "Environment III," 12.
[854] Lizarraga, "Air Quality in the Bunker Hill Area," Table 1, 1980 (?), Table 1. This data reflected lead-in-air concentrations measured as a geometric average.

ug/m^3, more than six times a typical 1971 reading and nearly seventeen times the 1978 standard. By 1975 Smelterville air lead was returning to 1971 concentrations, with an average month measuring around 4.85 ug/m^3.[855] The otherworldly lead concentrations recorded in 1973-'74 -- measuring as high as 101.98 ug/m^3 at Silver King Elementary – were thankfully a thing of the past by the latter part of the 1970s.[856]

PES determined that by 1977-'78, following the erection of the tall stacks, in-air lead levels had decreased by forty percent from 1974-'77 levels.[857] The highest concentrations were found at the Silver King Elementary, where during the 1974-'77 period the average concentration of air lead measured 16.2 ug/m^3. Though lowered by the 1977-'78 recording period to 9.2 ug/m^3, the air lead concentration at Silver King remained nearly seven times the EPA standard.[858] The PES study made it clear that Bunker Hill would be hard-pressed to meet the new standard. While fugitive emissions unrelated to smelting undeniably constituted a significant portion of the air lead burden in the Kellogg area,[859] Bunker's smelting activities remained the culprit for the lion's share of the total burden. At all five of PES's air quality monitors in the Kellogg area, lead levels topped the 1.5 ug/m^3 standard by a good margin. The firm determined that in order for Bunker to meet the new requirement, "emissions from most smelter sources would have to be reduced by approximately 90 percent."[860] To meet the lead standard at the

[855] Lizarraga, "Air Quality in the Bunker Hill Area," Table 1. The "fairly typical" month used was December.
[856] Ibid., 4. The date of that triple digit reading was October 28, 1973.
[857] PES study of particulate distribution in the Kellogg area, Table 5-2. The study compared lead levels from two periods: July, 1974-June, 1977 and October, 1977-September, 1978.
[858] Ibid., Table 5-1.
[859] As previously discussed, this was true to a greater extent in locales further distant from the smelter.
[860] PES study of particulate distribution in the Kellogg area, Table 8-8.

Silver King school, PES estimated that Bunker would be required to reduce emissions from most smelter sources "by fractions up to 98 percent."[861]

Bunker Hill responded to the EPA's air lead standard with a by-now-familiar stratagem. The company sued, arguing both in court and before the bar of public opinion that the standard was unfeasible, capricious, unnecessary for the protection of human health, and highly dangerous to the economic health of the U.S. lead smelting industry.[862] This time, however, Bunker had numerous litigation partners, as much of the U.S. lead smelting industry joined in support of the Lead Industries Association (LIA) suit against EPA. In a rare, outright courtroom defeat for the company, however, in June 1980 the U.S. Court of Appeals for the District of Columbia ruled in favor of the EPA's 1.5 ug/m^3 ambient lead-in-air standard. The ruling forced the State of Idaho to develop a lead-air implementation plan for the Kellogg area by 1982. The development of this plan, as with previous implementation plans for SO_2 and particulates, required that Bunker provide a good deal of cooperation and detailed technical work. On this occasion, however, the company was not feeling particularly cooperative. By 1980, Gulf Resources had come to view Bunker Hill as more of a liability than an asset and was actively seeking to sell its subsidiary.[863] In March 1980 Bunker informed the EPA that officials seeking to collect data for implementation of the new lead standard would not be permitted access to company property, ostensibly owing to a belief that the EPA should complete its national

[861] PES study of particulate distribution in the Kellogg area, Table 8-8.
[862] Among other things, the LIA, whose suit Bunker joined, pointed to the fact that in major cities such as Los Angeles, ambient air lead levels were high above the EPA standard, due primarily to the effects of leaded gasoline. In Los Angeles, for instance, ambient levels averaged nearly double the 1.5 ug/m^3 rule.
[863] Aiken, *Idaho's Bunker Hill*, 198-99.

studies of the lead smelting industry before commencing its research at Bunker Hill.[864] The EPA elected not to force the issue and deferred its study of the Kellogg site. In September 1981, the month following Gulf's announcement of its decision to shutter its Idaho subsidiary Bunker Hill if it could not find a buyer for the company by year's end, the EPA, acceding to a request by Idaho Governor John Evans, agreed to postpone implementation of the new air lead standards by two years, to November, 1984.[865] Targeted toward making purchase of the mining and smelting giant more attractive by offering "breathing room" to the prospective buyer, the offer of a break on air-lead standards did not usher in a sale of the company.[866]

The Bunker Hill mine, along with the company's smelting and refining operations, closed in early 1982. With the complete shutdown of the lead smelter and zinc refinery in February, 1982, Silver Valley air quality immediately began to improve. Though fugitive dusts from numerous sources -- including roads, railroad beds and old tailings impoundments -- continued to offer up their heavy metal loads to the airstream, particularly during periods of dry, windy weather conditions, this represented but a small fraction of the pollution witnessed when the smelter and refinery were operating. Silver Valleyites literally could breathe easier in February, 1982 than they had in decades, but for the more than 2,000 Bunker Hill employees who suddenly found themselves unemployed, this likely came as small comfort. In the idiom of Ulrich Beck, they had suddenly gone from the advanced modern society dilemma of being worried about the

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[864] "Bunker Snubs EPA," *Spokesman- Review*, April 8, 1980, A6.
[865] "Plan Will Take 8 Months," *Spokane Daily Chronicle*, September 7, 1981, 3.
[866] Ibid.

unwanted by-products of industrialization (e.g., the health risks of pollution) to the pre-modern dilemma of securing adequate shelter and enough to eat.

The Yoss Case

In June, 1977, the nine children of the Bill and Marlene Yoss and Edward and Janice Dennis families sued Bunker Hill for twenty million dollars. The lawsuit alleged that the company, by willfully running its smelter at full bore in the wake of the baghouse fire, knowingly caused physical and mental harm to the children, all of whom resided within a mile of the smelter in 1973-'74. The suit maintained that the children, aged between three and seventeen at the time of the suit, suffered from a variety ailments – from listlessness and stomach aches to impaired cognitive functioning and motor skills – that had been caused by exposure to the lead the Bunker Hill smelter had rained down upon them between September, 1973 and March, 1974. The three Yoss children, Edith, Raymond and Edna, all had registered blood lead levels of over 100 ug/dl when they were tested in September, 1974. Edna had one of the highest blood lead levels ever recorded, 164 ug/dl.[867] The six Dennis children had significantly lower 1974 blood leads than did the Yoss children, but all except one who was *en utero* at the time had blood leads of at least 40 ug/dl, with one testing at a frankly pathological level of between 80 and 90 ug/dl.[868] Many of the children received chelation therapy. The children's blood lead levels all declined over time, but as late as 1976 three still measured 50 ug/dl or

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[867] "Third Party Complaint," December 1, 1977, 23, MG 413, Box 231, Folder 4339, Bunker Hill Records. Recall that any blood lead of 40 ug/dl was, at the time, considered elevated. Anything 80 ug/dl or above was deemed "frankly pathological" and *prima facie* grounds for immediate hospitalization.

[868] To respect the privacy of the Yoss and Dennis children (now middle-aged adults), I am not going to name them individually beyond giving their 1974 blood lead readings.

higher, with one of those registering a shocking 83 ug/dl.[869] Both families lived in neighborhoods hard by the smelter during the period of extreme lead emissions, the Yosses in Deadwood Gulch and the Dennises in Smelter Heights. The fathers in both families worked for Bunker Hill at the time of the baghouse fire, Bill Yoss as a longtime miner.

Bunker responded aggressively to the lawsuit. In the wake of the baghouse fire, the company already had faced a similar lawsuit, a one million dollar suit on behalf of the Thomas children, which the plaintiffs had dropped, for reasons that are unclear.[870] Perhaps thinking that the best defense was a good offense, in the Yoss-Dennis case the company went on the attack, alleging that if the plaintiffs' children had medical problems these were due to unclean homes and neglectful parenting. In court documents, the company's legal team contended that,

> Third Party Defendants [Billie and Marlene Yoss and Edward and Janice Dennis] knew or should have known of the need for cleanliness and the importance of avoiding the contamination of food and the living quarters by said dust, paint or dirt. Notwithstanding said knowledge…parents of said minor children, knowingly, negligently and wilfully failed to exercise their duty of care, custody and control…and allowed said minor Plaintiffs to be exposed to said soil paint and dust…[871]

In an attempt to lay the blame for any medical problems that the Yoss or Dennis children, or by implication any Shoshone County children, might have suffered due to the area's heavy burdens of environmental lead, Bunker held that it was the responsibility of parents, and particularly of mothers, to keep their houses clean and their toddler-aged

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[869] Dr. Robert J. Gregory, "Notes on Yoss and Dennis Children," 22 October 1980, MG 413, Box 236, Folder 4437, Bunker Hill Records.
[870] J.H. Lollar, "June Management Meeting Minutes," memorandum, 11 June 1977, 3, MG 413, Box 242, Folder 4602, Bunker Hill Records.
[871] "Third Party Complaint," 4.

children from eating yard dirt. While the company did not deny that dust in the Kellogg area was high in lead content or that ingesting such dust was potentially bad for one's health, it attempted to place the full responsibility for the prevention of any lead-related children's health problems squarely on the shoulders of parents. Good parents, suggested Bunker Hill, understood how to maintain clean homes and keep their children healthy; bad parents either lacked the knowledge or ability to properly safeguard their children in the Kellogg area's leaded environment.

During the more than four years of the Yoss case, the nine plaintiff children submitted to numerous batteries of physical and psychological tests at medical facilities from Chicago to Seattle. While none of the children showed signs of severe mental retardation or were fully disabled, all evinced significant signs of lead exposure. A number of them complained of severe head and stomach aches. Clear evidence of exposure to large quantities of lead was found in some of the children's bones, where lead lines were visible.[872] Many of the children were diagnosed with hyperactivity and an inability to focus on tasks-at-hand. Although one was identified as mildly retarded, the rest were found to be in the average to low-average range for intelligence.[873] Two of the children, however, experienced unusually large drops in Intelligence Quotients (IQs), of 27 and 21 points respectively, between their November, 1976 and March, 1979 testings.[874]

One of the younger children was found to have severe difficulties with "processing problems" that led the child to experience a good deal of "internal

[872] Deposition Exhibit Number 7, MG 413, Box 236, Folder 4437, Bunker Hill Records.
[873] Ibid..
[874] Ibid., Gregory, "Notes on Yoss and Dennis Children."

confusion." This, in turn, placed the youngster under a burden of emotional distress. The diagnosing psychologist advised offering this child "special learning resources" and "family therapy" to help cope with these ongoing difficulties.[875] Another child, after passing the gross motor section of the Cott Test of Motor Impairment, proceeded to fail the test's fine motor section, a highly unusual occurrence. The overseeing doctor concluded that this result likely was due to the poor condition of the subject's medical/radial nerves.[876] Impaired nerve functioning, of course, is a principal effect of lead intoxication. A majority of the children, and all who were under the age of four at the time of the baghouse fire, were found to have moderate-to-severe visual-spatial impairments. Dr. Agnes Lattimer, who examined four of the children at Cook County Hospital in Chicago in late 1976, diagnosed all as "showing some signs of central nervous system damage," and as currently exhibiting, "clinical manifestations of exposure to lead in toxic amounts."[877] Lattimer recommended additional chelation therapy for all four children.[878]

Most of the children, in addition, were having serious difficulties in school, difficulties that doctors predicted would continue due to the organic impairment the children had suffered. In discussing the likely need for long term special educational help for some of the children, doctors referred to the "organic substrate" that they believed was likely to continue to interfere with the children's development for years to come, if

[875] Honora Simpson, "Summary," (of June 22-23, 1980 tests in Chicago), MG 413, Box 244, Folder 4572, Bunker Hill Records.
[876] Deposition Exhibit Number 7.
[877] Lattimer, "Pediatric Consultant's Report," January 7, 1977.
[878] Ibid.

not for the remainder of their lives.[879] Whether in the ground or in the bones of children, lead remained a heavy, obdurate material that was not easily removed. In addition to predicting that a number of the children would continue to suffer from learning disorders, diagnosing doctors found problems including: brain impairment, poor visual-motor integrations and "bizarre reversals," adjustment problems, extremely low math scores and language comprehension, and an absence of the ability to recognize and deal with problems.[880]

While all of the Yoss/Dennis children showed the effects of their lead exposures, some evidently were more affected than others. The older children generally appear to have been less severely harmed than were the younger ones. According to the doctors, either two or four of the older children were not significantly impaired by their brush with lead.[881] Nonetheless, a lifetime earnings model developed for the trial depicted reductions in the children's incomes, based upon their injuries, of between fifty and ninety percent. This amounted to projected lifetime losses of between $117,777 and $454,416.[882]

Although it is extremely difficult, if not impossible, to prove with certainty that an individual illness was caused by any one factor – witness the nearly unbeaten track record of the tobacco industry in defending against medical claims – the extensive medical

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879 Honora Simpson, "Summary."
880 Deposition Exhibit Number 7.
881 While Dr. Gregory, the University of Idaho psychologist, labeled three of these children as having "test results essentially normal" and one as having a "test battery more typical of normal than abnormal psychological function" in his October, 1980 "Summary," Dr. Dodrill, in his 1979 report, diagnosed two of these four as having "mild" or "mild but definite" brain impairments. See Gregory's comments in: Dr. Robert J. Gregory, "Notes on Yoss and Dennis Children," 22 October 1980 and Dodrill's "Deposition Exhibit Number 7," MG 413, Box 236, Folder 4437, Bunker Hill Records.
882 "% Reduction Earning Based on Janet Mott," Exhibit 10, MG 413, Box 243, Folder 4556, Bunker Hill Records.

records of the children involved in the Yoss case make a strong case. Those records indicate that ingested lead did real, long-lasting physical and mental damage to the children. In some cases, especially those of the younger children, that damage appears to have been particularly severe. A number of the children would need special education for the foreseeable future. All would carry evidence of lead in their bodies for years to come. The children had been marked by lead and it had done them no favors.

After years of depositions, evidentiary disclosure, expert witnesses testimony, medical probing and legal wrangling, the case of *Edna Grace Yoss, et. al. v. The Bunker Hill Company, et. al.* came to trial before U.S. District Judge Roy McNichols in Boise, Idaho in September 1981. The trial lasted six weeks before Bunker Hill and the plaintiffs reached an out-of-court settlement deal. The complex deal, formally ratified by Judge McNichols at the end of January, 1982, guaranteed the seven younger Yoss/Dennis children between $7.1 and 8.8 million over the course of their lifetimes, depending upon how long they lived.[883] Evidently judging the harms done to them as relatively minimal, the settlement awarded the two oldest children only ten thousand dollars each. Monthly annuity payments began immediately and the children were to collect large lump-sum payments in between ten and thirty years.[884] While the settlement certainly granted the seven younger Yoss/Dennis children a significant amount of material wealth, it is doubtful that any type of monetary transfer could serve as an adequate recompense for the losses of health and personal well-being that they seem to have suffered. The Yoss/Dennis children are a classic example of what Beck refers to as the modern era's

[883] *Tri-City Herald*, "Lead Poisoning Suit Settled," February 2, 1982, 4.
[884] Ibid., Interestingly, this settlement closely approximated the eight million dollars of dividends paid by Bunker to Gulf Resources in 1974, the year following the baghouse fire.

uneven "distribution and growth of risks" and the consequent arisal of "social risk positions."[885] Growing up in poor neighborhoods hard by the smelter placed children like the Yosses and Dennises in social risk positions unlike those of children growing up in nearby Pinehurst or Wallace. While they received significant out-of-court compensation for the health damages they sustained, the same cannot be said for their Deadwood Gulch, Smelter Heights, and Smelterville peers who were similarly harmed.

Proof of Harm

While the Yoss case provided evidence that indicated harm was done to Silver Valley children by the 1973-'74 lead outbreak, it took another fifteen years for more definitive proof of damage to emerge. In 1996, the federal Agency for Toxic Substances and Disease Registry (ATSDR) published a report on the long-term health of Silver Valley children who were exposed to high doses of lead in the aftermath of the baghouse fire. The study tracked 1,466 adults who lived in the communities of Kellogg, Smelterville, Wardner, Page, and Pinehurst in 1974-'75 and who were between nine months and nine years of age at that time.[886] Researchers interviewed 917 and tested the nervous systems and the levels of bone lead of 281 of the former Silver Valley children.[887] As a control group, the study used 754 Spokane residents between nineteen and thirty, 287 of whom participated in the tests. The test results showed striking differences between the Silver Valley group and the control group. The Silver Valley

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[885] Beck, *Risk Society*, 23.

[886] Susan Drumheller and Craig Welsh, "Children Left in the Dust: Lead Affected Generation of Silver Valley Children," *Spokesman-Review*, March 9, 1997, A1.

[887] Drumheller and Welsh, "Children Left in the Dust: Lead Affected Generation of Silver Valley Children." Lead-in-the-bone is a good measurement of lifetime exposure to lead.

group suffered from significantly higher rates of a long list of disorders that included: infertility, learning disabilities, sleep disorders, high blood pressure, anemia, arthritis, depression, anxiety disorders, memory loss, and trouble concentrating.[888] Additionally, as compared with the Spokane group, the Silver Valley cohort performed worse on nerve conduction tests, had reduced hand-eye coordination and grip strength, diminished nerve sensitivity, and limited vocabulary.[889] The retinue of health problems found in the Silver Valley group twenty-plus years following the baghouse fire, along with the group's heightened rate of disorders as compared with a non-leaded control group, strongly indicated that many children who lived near the Bunker Hill smelter in 1974-'75 had suffered long-term health damage from their extreme lead exposures of that era.

Some of the children who grew up in the midst of North America's worst environmental lead outbreak, now middle-aged adults, believe they were irreparably harmed by the experience. Calling themselves "the leaded," a group of them gathered in 2010 in Smelterville to tell their story and urge Silver Valley parents to have their children's blood-lead levels tested. Members of the group complain that they have suffered physical and emotional problems since the mid-1970s. Jeannie Stancik, a forty-eight year old Kellogg resident, said, "I tell everyone I'm leaded. That's how I deal with it."[890] According to Cass Davis,[891] "People don't want to know the truth. I flunked the first grade and was sent to be tested for retardation." There are numerous other examples of children who evidently were seriously harmed by their 1973-'74 exposures. Lori

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[888] Drumheller and Welsh, "Children Left in the Dust."
[889] Ibid.
[890] Nicholas K. Geranios, "Victims of North Idaho Pollution Still Suffer Physical, Emotional Ills," *The Missoulian*, September 5, 2010.
[891] Ibid.

Wilson grew up two hundred and fifty yards from the smelter and had a blood lead level of 98 ug/dl in 1974. As a twenty-five-year-old in 1996 she could not read, had been unable to complete high school, and was living with her parents.[892] Dain Milholand, who was a baby in Smelterville in 1974, failed his driving education exam eight times before finally passing.[893] But, as Bunker Hill partisans liked to point out, not all children who underwent the mid-1970s lead exposures suffered later difficulties. Kyle Wombolt, for example, a five-year-old in 1974 who grew up right next to Lori Wilson, played high school football, graduated at the top of his class from the University of Idaho law school, and became a Wall Street lawyer.[894] A number of other, similarly exposed, children won awards, went on to college and had successful careers. Because of differences in diet, exercise, metabolism, and other factors, even very high lead exposures did not affect all Silver Valley children in the same way.[895] A common refrain in Kellogg was that such children came from households that practiced good hygiene, where children were required to bathe and wash their hands frequently. In reality however, the lead health situation was never as cut-and-dried as proponents of hygiene as a prophylactic contended. According to Jerry Cobb, the leading Shoshone County official on lead-health issues since the mid-1970s, "I knew of families with floors one could eat off who had kids with high blood leads. The smelter didn't discriminate."[896]

In the wake of the 1974 lead-health epidemic and all of its attendant bad publicity, Gulf-Bunker officials realized the need to take some remedial environmental measures.

[892] Drumheller and Welsh, "Children Left in the Dust."
[893] Ibid.
[894] Ibid.
[895] Ibid.
[896] Ibid.

In addition to footing most of the bill for the Shoshone Project and hiring a public relations firm, in October 1974 the company intensified an existing policy of purchasing homes and lots in the neighborhoods of Deadwood Gulch, Smelter Heights and Silver King -- all located within half a mile of the smelter. After purchase, Bunker razed the homes to prevent anyone from living in this most heavily leaded portion of the Valley. By September of 1975, the company had purchased sixty-two of the area's seventy-seven homes.[897] In October, 1974, for the first time in roughly twenty years, Bunker shut down the smelter for three days of general cleaning and repair.[898] The company also began providing clean topsoil to locals who wanted to try to grow a lawn and purchased street sweeping equipment to limit the dust on the streets and playgrounds of communities nearby the smelter.

The company for a number of years also funded the annual blood testing of willing children living within 2.5 miles of the smelter. Overall mean blood lead levels decreased dramatically in 1975 with greater distance from the baghouse fire incident, and they continued to decline for the next few years. Mean blood leads for children living within a mile of the smelter declined consistently each year, going from 71.6 ug/dl in 1974 to 40.0 ug/dl in 1977. In 1978, however, they increased slightly, to 42.0 ug/dl.[899] For children living between one and 2.5 miles from the smelter, blood lead levels declined only very slightly from 1974 to 1975, going from 58.9 to 58.4 ug/dl, but saw consistent decreases the following two years, reaching the "safe" level of 35.5 ug/dl in

[897] "Interrogatories to Bunker Hill Company," 16 September 1975, 10, MG 413, Box 236, Folder 4415, Bunker Hill Records.
[898] "Memorandum of Authorities in Support of Plaintiffs' Motion for Summary Judgment," 23, MG 413, Box 231, Folder 4343, Bunker Hill Records.
[899] "Memorandum of Law in Opposition to Defendants' Motion for a Protective Order: Mean Blood Leads for Cohort Children by Area & Year," MG 413, Box 231, Folder 4341, Bunker Hill Records.

1977.[900] At the end of the 1970s, however, mean blood and air lead levels rose again.[901] Data for the late 1970s was less meaningful than was desirable, however, due to severely decreasing numbers of subjects. Numbers began to drop off with the 1976 blood draw, when only 193 children living within 2.5 miles of the smelter showed up. The previous year, 623 children volunteered for testing. By 1979, a mere twenty-eight children participated in the blood draw.[902] While it cannot be know with any certainty why so few parents were having their children tested by the late 1970s, the speculation was that a certain degree of fatigue and complacency had set in regarding the issue of children's lead health.

In 1980, responding to pressure from CDC Director Dr. William Foege, and Bunker's longtime thorn-in-the-side, Dr. Philip Landrigan, the State of Idaho and Bunker Hill renewed their efforts to study and address lead-health issues in the Kellogg area. In a letter to the Idaho Department of Health and Welfare, Foege encouraged the agency to accept CDC's offer to conduct a comprehensive, follow-up investigation of the health of the "leaded" children studied in 1974-'75. Aware that the agency was contemplating accepting financial support from Bunker Hill to do its own study of the issue, Foege urged the state officials to reconsider. The CDC Director wrote Dr. Edward S. Gallagher, Idaho's State Health Officer, to stress both that a company-financed study would lack the full scientific credibility of a CDC study and that the severity of the Kellogg's lead-health problems warranted the level of seriousness and professional standards that only the

[900] "Memorandum of Law in Opposition to Defendants' Motion for a Protective Order: Mean Blood Leads for Cohort Children by Area & Year."
[901] Idaho Department of Health and Welfare, "Kellogg Revisited – 1983 Childhood Blood Lead and Environmental Status Report," 1. MG 413, Box 253, Folder 4716, Bunker Hill Records.
[902] "Status of Blood Lead Determinations in Shoshone County April 1980, Table I." MG 413, Box 236, Folder 4424, Bunker Hill Records.

federal agency would bring to bear. Referencing the 1973-'74 lead-health epidemic, Foege wrote, "Although we have no wish to be alarmists, we must point out to you that…the Silver Valley is *the site of the worst community lead exposure problem in the United States* [italics added]."[903]

At about the same time, a fair amount of news coverage attended the EPA's decision to implement its new ambient air-lead standard. In December, 1979, U.S. Representative Henry Waxman (D-CA) held hearings on the issue before the House Subcommittee on Health and Environment. Among those Waxman called before his subcommittee were Janice Dennis and Philip Landrigan. Dennis, in her testimony, painted a grim picture of living conditions near the smelter and of an insensitive company that ruled over a wasteland, noting that, "There was no grass, and flowers didn't grow; there weren't even weeds." The mother of six also mentioned the difficulty of keeping domestic animals alive in Smelter Heights – the family's five puppies, and assorted chickens, rabbits and turkeys all had perished.[904] In his testimony, Landrigan suggested the State of Idaho was dragging its feet in conducting, or allowing the Public Health Service to conduct, needed follow-up studies of children affected by the lead outbreak of 1974.[905] Landrigan recently had stirred the pot by disputing the official conclusion of the Shoshone Project that children's health had not been damaged and distancing himself and his agency, the CDC, from the Project. The government doctor had stated that the Shoshone Project glossed over more troubling aspects of the study's own findings and

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[903] William H. Foege to Edward S. Gallagher, 8 April 1980, 2, MG 413, Box 234, Folder 4402, Bunker Hill Records.

[904] "Stenographic Transcript of Hearings Before the Subcommittee on Health and Environment of the Committee on Interstate and Foreign Commerce," 27 November 1979, 74, MG 413, Box 246, Folder 4617, Bunker Hill Records.

[905] Ibid., 105-08.

that CDC officials such as himself had "had as little to do as we could with the Shoshone Lead Project."[906] In addition to their call for the State of Idaho to permit CDC to conduct a comprehensive lead-health review in Shoshone County, both Foege and Landrigan asked that the state heed the Shoshone Project's call to perform neurological testing of the most heavily-leaded of the previously tested children.

Idaho's Department of Health and Welfare declined the CDC's offer to manage and coordinate a renewed lead-health study. Once again, despite CDC warnings that doing so would compromise the study's credibility, Idaho permitted Bunker Hill to largely bankroll the project, this time to a tune of $125,000.[907] The 1980-'81 lead-health study included three components: blood lead monitoring of children between the ages of one and twelve living in the areas of Smelterville, Kellogg and Wardner; efforts by a community health team to conduct lead-health educational activities and to identify and reduce lead exposure in high risk family and community settings; and neurological testing of Shoshone County children whose blood leads had measured higher than 80

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[906] Bill Graves, "Kellogg Lead Controversy Still Raging," *Coeur d'Alene Press*, October 20, 1979. In addition to Landrigan, another Shoshone Project contributor, psychologist Robert Gregory, broke ranks with the Project's findings. In October, 1980, Gregory, speaking on a television broadcast, said that "even in 1974" the Project's conclusion that no Shoshone County child had been clinically impaired by lead exposure had been wrong, that "it's a virtual certainty" that some of the children had suffered minor neurological impairment, and that some of the children might manifest further decline in intellectual ability in the future. Adding medical and scientific credibility to positions such as those taken by Landrigan and Gregory was the 1979 publication, in the *New England Journal of Medicine*, of "Deficits in Psychologic and Classroom Performance of Children with Elevated Dentine Lead Levels" (for more detail, see discussion of the article in Chapter 1, "The Useful Metal"). The article, authored by Dr. Herbert L. Needleman, a pathbreaking lead-health researcher, detailed the IQ and classroom deficits of a group of Boston-area children all of whom, like Kellogg-area children, manifested no overt symptoms of lead poisoning. The Boston children, however, had median blood-lead levels that were but fractions of those experienced by Kellogg area children in 1974.

[907] "Shoshone Lead Grant," 1, MG 413, Box 250, Folder 4670, Bunker Hill Records.

ug/dl and of children born between October 1972 and March 1975 who lived within a mile of the smelter during their first year of life.[908]

The new, better-publicized round of blood testing, which paid children fifteen dollars apiece, attracted far more participants than had other recent efforts. They also displayed more favorable trends for children's blood leads. Whereas only twenty-seven children had been tested in 1979, the October 1980 screening attracted 147.[909] While mean blood leads within a mile of the smelter had measured 42 ug/dl in 1978, by October 1980 they had dropped to 30.5 ug/dl, more than a twenty-five percent decrease. For the area between one and 2.5 miles from the smelter, blood leads also declined significantly over the same period (see Fig. 5-3). Both trends continued over the next few rounds of testing: relatively robust numbers of children showing up for blood draws and decreasing amounts of lead in children's bloodstreams. Eliminating the Valley's primary source of aerosolized lead apparently already had made a difference in the bodies, and presumably the health, of area children. Blood lead levels continued their welcome decline in testing done in August 1983 (see Table 3).

Table 3[910] Mean blood-lead levels for children living 1-2.5 miles from the smelter (ug/dl). The 1980 blood testing was done in October. In other years the testing was performed in August.

1974	1975	1978	1980	1981	1982	1983
49	38.7	35.5	31	27.2	21.2	< 18

[908] "Shoshone Lead Grant," 1, MG 413, Box 250, Folder 4670, Bunker Hill Records.
[909] Idaho Department of Health and Welfare, *Kellogg Revisited – 1983 Childhood Blood Lead and Environmental Status Report*, 17, MG 413, Box 253, Folder 4716, Bunker Hill Records.
[910] Idaho Department of Health and Welfare, "Kellogg Revisited – 1983 Childhood Blood Lead and Environmental Status Report," 17-18, MG 413, Box 253, Folder 4716, Bunker Hill Records.

Unsurprisingly, following the February, 1982 closure of the Bunker Hill smelter and zinc refinery, ambient levels of air lead declined dramatically. Smelterville and Kellogg air came into comfortable compliance with the federal 1.5 ug/m^3 standard, likely the first time that Valley air had been so free of lead since 1960s seven month strike, or perhaps even since 1917 when the blast furnace was first blown in. Since lead is less easily leached from the soil than from the air, however, levels of the metal in area soils remained high even following the smelter closure, with soil lead means around area homes measuring as high 6,372 ppm. and individual levels reading as high as 18,400 ppm.[911] 1983 soil lead levels, in fact, were comparable to those detected in the 1974, indicating that cleansing the soils of the Kellogg area would be a more daunting challenge than cleaning its air and water.[912] Lead concentrations found in household dust, though still elevated, decreased to a fraction of their 1974 concentrations (see Fig. 5-4). The primary threat to Valley children's lead health – the smelter -- was gone. The secondary and tertiary threats, however, respectively elevated lead levels in soil and household dust, remained.

Table 4[913] Mean household lead dust levels at Smelterville (ppm).

1974	1983
10,000	3,994

[911] "Kellogg Revisited," 23.
[912] Bunker Hill research in 1972 detected soil lead means of greater than 5,000 ppm. and 1974 studies found levels of greater 10,000 ppm. at Silver King school.
[913] *Shoshone Lead Health Project*, 53 and "Kellogg Revisited," 25.

Progress continued to be made during the 1980s. By 1989, about half of the children tested measured under 10 ug/dl.[914] During the 1990s hundreds of children residing in "The Box,"[915] went under the blood drawing needle each year. In 2000, the Panhandle Health District reached its goal of bringing the blood leads of 95 percent of these children below 10 ug/dl.[916] Reductions in the blood lead levels of Silver Valley children undoubtedly were aided by the EPA's massive efforts to reduce soil lead levels in the Valley. Commencing in 1989, the federal agency oversaw the digging up of household yards, city parks, and roadside shoulders. By July, 2008, when the EPA officially announced completion of this project, approximately 3,000 residential and other properties had had their soil dug out up to a depth of four feet and replaced with clean topsoil.[917] With this, the problem of lead in the soil had been largely addressed. Significant strides also have been made with regard to house dust. The EPA judged the Valley's house dust to be below the standard of concern in 2010.[918] As levels of air, soil and house dust lead decreased in the 1980s and 1990s, children's blood lead concentrations also declined. By 2007, Silver Valley children's blood lead means were in line with the national average of 2 ug/dl.[919]

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[914] "Lead Victims Say Their Health Was Hurt," *Seattle Times*, September 5, 2010. In 1991, CDC again defined "unsafe levels" of blood lead downward, to 10 ug/dl. This remains the definition of "undue lead absorption" in the United States.

[915] "The Box" runs roughly from Elizabeth Park in the east to Pinehurst in the west.

[916] Suzanne Jacobsen, "Blood Testing Efforts to Heighten," *Shoshone News-Press*, August 31, 2007.

[917] "EPA: Lawn Remediation Complete," *Shoshone News-Press*, July 10, 2008.

[918] "Lead Victims Say Their Health Was Hurt."

[919] Sean Garnire, "IDEQ Seasonal Effort Ends," *Shoshone News-Press*, October 11, 2007. National blood lead levels also had dropped considerably, though not as far or as fast as those of the Silver Valley. The phasing out of leaded gasoline in the 1980s had a good deal to do with this outcome nationally. The average blood lead levels of American fifteen-year-olds declined from 15.0 ug/dl in the 1976-'80 period to 2.7 ug/dl in the 1991-'94 period.

Due to the massive amounts of lead and other toxic heavy metals that spewed into the atmosphere of the Silver Valley over the sixty-five year life of the smelter, there likely will long remain ample reason to keep close watch on the health of area people, especially children. It is nonetheless encouraging to see the steep declines in children's blood lead levels over the past thirty-five years. Barring the unlikely start-up of a new lead smelter in the Valley, it is improbable that lead-health issues again will cast the shadow over the area that they did over much of the 20th Century.

Although lead-health improvement of Silver Valley children in recent decades is encouraging, it must not be forgotten that there are many adults who grew up there who still suffer from a variety of serious ills due to their lead exposures as children. With lead in their bones that will be with them until they die, it is perhaps difficult for these Silver Valleyites to shrug off the area's history of environmental harm and health degradation. As historian William G. Robbins has noted, the tradeoffs of industrial modernity have been spread unevenly over the United States. Some places have suffered far greater environmental damages than others. Some places have become far wealthier and more beautiful than others. Some community members have been sickened far more than others. Discussing the American West, Robbins suggests that the region's "hinterlands" often have suffered from economic neglect and environmental despoliation, while its urban centers have thrived. He employs Kellogg and the Coeur d'Alenes as a prime example of this phenomenon, writing in 1994, "Begin with Kellogg, Idaho, where more silver has been mined in the last century than any other place in the world. The famed Silver Valley, with its ribbon of mining towns…was once alive with the vital stuff of working-class life. Today, the barren hillsides around Kellogg and the huge slag heap at one end of town are the singular reminders of those industrial successes."[920] While Kellogg and the rest of the Coeur d'Alenes undoubtedly received a good deal of revenue from its industrial work – money that went toward building strong, vibrant communities – the area never would be confused with a truly wealthy, glittering hub such as an Aspen, a Palm Springs, or a Denver. On the other hand, when one is asked to come up with a list of the places in the U.S. that have suffered the greatest damage to environmental and human health, the short list likely would include the infamous Love Canal, New York; former nuclear arsenals such as Rocky Flats, Colorado and Hanford, Washington; and such onetime mining and smelting hubs as Butte-Anaconda, Montana and Kellogg, Idaho.

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[920] William G. Robbins , *Colony and Empire: The Capitalist Transformation of the American West* (Lawrence, KS: The University Press of Kansas, 1994), 163.

ON LEAD'S FRONT LINES

Bunker Hill's lead and zinc plant workers – the company employees who experienced the highest exposures to toxic heavy metals – lie at the heart of this chapter. These workers literally put their bodies and health on the line for the job. Many suffered very real health costs as a result of their years of in the plants.[921] Often subjected to extremely high concentrations of airborne lead and zinc at work, the workers commonly returned to homes in the Coeur d'Alenes only to be surrounded by air, dust and dirt containing among the highest concentrations of those metals that could be found anywhere in the United States. Bunker Hill's lead and zinc plant workers, however, were far from passive proletarian victims of corporate environmental insult. This chapter illuminates their struggles -- voiced primarily through Local 18 of the Mine-Mill union and later Local 7852 of the United Steelworkers -- to improve working and health

[921] There are many works that deal with the subject of mining accidents and health-related issues (e.g., silicosis), but relatively few that focus on the issue of worker health in smelting facilities. That said, mining long has been, and remains, a highly dangerous industry in the Coeur d'Alenes. Silicosis was not uncommon among miners, nor were mining injuries and deaths. Mining accidents have claimed the lives of approximately 976 miners during the District's century-and-a-quarter history. The worst, and most notorious, mining disaster, occurred in the Sunshine Mine on May 2, 1972, when a fire caused the death of 91 miners by smoke inhalation and carbon monoxide poisoning. To give some idea of the rate of accident and death in the district, in July, 1912, Bunker Hill Manager Stanly Easton was distressed to report to company President F.W. Bradley that there had been twelve deaths at the Bunker Hill Mine over the previous eighteen months. These twelve deaths represented two-thirds of the total deaths (eighteen) over the previous decade at the mine. During its most dangerous period, 1913-'14, the Mining District averaged two deaths per month. Around 1930, the District's death and accident rates began to drop precipitously due to improvements made in mine safety. Looking at two of the District's largest mines, the Bunker Hill Mine suffered 97 accidents and no deaths in 1924. Its rate of accidents per 1,000 shifts was .1783. By comparison, the Hecla Mine experienced a rate of 2.51 accidents per 1,000 shifts. During Easton's long tenure at Bunker Hill (1902-1957), the company made mine safety a significant priority, consistently investing in the latest safety technology and boasting a Mine Rescue Safety Team that competed in national competitions. Major improvements in overall safety at the District's mines, however, particularly from 1930 onward, could not negate the reality that mining has taken a high toll on the communities of the Coeur d'Alenes, in the form of killed and incapacitated community and family members and their lost earning power.

conditions at the plants. As times changed, so did governmental, worker, and corporate attitudes toward acceptable levels of worksite pollution. The shifts in federal policy that accompanied the environmental turn of the late 1960s and early 1970s and the struggles those policy changes precipitated on the shop floor of Bunker Hill's plants are tracked in the following pages, as are the painful efforts of Bunker workers to suspend hard-won federal health rules in a desperate attempt to attract a buyer for their failing company in the early 1980s.

Of course, neither Bunker Hill managers nor certainly smelter employees themselves, *wanted* workers to be sickened or injured on the job. But, as environmental historian and legal scholar Arthur F. McEvoy notes, such injuries to workers, like harm to nature, were long viewed as simply unavoidable, albeit unevenly shared, costs of development. McEvoy writes that, "Like pollution, occupational injury and disease are unwanted consequences of industrial development. They are part of development's social cost, typically falling at random to a diffuse body of victims and figuring only marginally, if at all, in the management decisions that prepare the ground for them."[922] This chapter seeks to place the health of Bunker Hill Company smelter and zinc refinery workers, or what historian Conevery Bolton Valencius refers to as "the nature within us," at the heart of a story that describes the shifting workplace ecologies of the Bunker Hill lead smelter and zinc plant.[923] Bunker Hill employees knew these highly complex ecologies through their labor. In the mid-1990s, McEvoy called for technological-

[922] Arthur F. McEvoy, "Working Environments: An Ecological Approach to Industrial Health and Safety," in "Snapshots of a Discipline: Selected Proceedings from the Conference on Critical Problems and Research Frontiers in the History of Technology, Madison, Wisconsin, October 30-November 3, 1991," special issue, *Technology and Culture* 36, no. 2, (April, 1995), S146-47.
[923] Conevery Bolton Valencius, *The Health of the Country: How American Settlers Understood Themselves and Their Land* (New York: Basic Books, 2002).

ecological studies of work environments "of which the worker's body is the biological core," and characterized these highly engineered, profit-oriented spaces as "the product of ongoing, reciprocal interaction between biology, political economy and consciousness."[924] This chapter will explore some of the ramifications of these complex, reciprocal interactions upon two constantly shifting workplace ecologies.[925]

As Ulrich Beck has shown, risk is a necessary aspect of industrial modernity, but it is rarely distributed evenly through society. Within industry, it almost goes without saying, the physically riskiest jobs will be found on the shop floor, not in the executive suite. This was certainly the case for the Bunker Hill Company, where miners, along with lead and zinc plant workers, assumed the lion's share of the risk within the company of serious injury or health damage from exposure to aerosolized heavy metals. Although Bunker workers undoubtedly were paid somewhat higher wages and benefits due to the dangerous and unhealthy nature of their jobs, these payments almost certainly came well short of covering the bill for the health and injury damages the workers sustained. Arthur McEvoy observes that, "Just as they do in environmental areas…market forces *overdiscount* [italics added] the costs of industrial injuries (thus subsidizing employers at the expense of injured workers) particularly when the harms involved are long-term, hard to identify, or difficult to value in money terms."[926]

From the beginning of smelter operations in July, 1917, top Bunker Hill officials knew that the problem of "leading" workers at the new facility was one that had to be

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[924] McEvoy, "Working Environments," S164.

[925] In addition to McEvoy's pathbreaking essay, and the texts mentioned as influences in Chapter 5, "Foul Humours II," this chapter has been shaped by *Dying for Work: Workers' Safety and Health in Twentieth-Century America* (1987), a trenchant collection of essays addressing a variety of historical worker health and safety situations, edited by David Rosner and Gerald Markowitz.

[926] McEvoy, "Working Environments," S170.

addressed. By this time the work of pioneering American industrial hygienist Alice Hamilton was well-known. A more immediate concern for Bunker Hill managers, however, was simply securing an adequate workforce at the smelter. A chief problem in this regard was the smelter's at-best-unpleasant working environment. As Bunker Hill Manager Stanly Easton complained in a 1917 letter to company President F.W. Bradley, "The labor situation remains very unsatisfactory, more so at the smelter than the mine, few men are applying for work…*the intense heat and the discomforts of smoke and dust around the new equipment at the smelter* [italics added] has caused the rapid falling away of former employees."[927]

In June, 1918, Dr. Royd R. Sayers, a surgeon with the Public Health Service, spent a few days visiting the new smelter, investigating worker complaints of occupational disease on behalf of the Bureau of Mines.[928] In his report, Sayers expressed the view that silicosis was a greater threat to smelter workers than lead poisoning, still he pointed out a number of areas in the plant that threatened workers with lead poisoning.[929] Among these spaces were the tapping floor, where Sayers concluded, "The fumes…are very bad and extremely dangerous from the standpoint of lead poisoning."[930] In addition, the public health official determined that the current method of removing dust from the Cottrell precipitator "unnecessarily exposes the workmen," and that the "droppings from the Dwight and Lloyd machines…was creating quite a little dust as it fell onto the

[927] Easton to Bradley, 20 July 1917, MG 367, Box 10, Folder 129, Bunker Hill Records.
[928] Easton to Labarthe, 22 August 1918, MG 367, Box 12, Folder 155, Bunker Hill Records.
[929] Sayers to Easton, 16 July 1918, MG 4, Box 12, Folder 155, Bunker Hill Records.
[930] Ibid., 15 July 1918.

conveyor."[931] This dust, Sayers believed, was "…dangerous from the standpoint of lead poisoning."[932]

Succinctly noting that, "Whoever works in or about a lead smelter may become leaded," the industrial health expert stressed the relative importance of cleaning the plant environment over that of encouraging improved worker hygiene, while encouraging the pursuit of both courses of action.[933] Sayers's specific recommendations included settling leaded dusts with water wherever possible; providing physical examinations to smelter employees every six months, with "especial attention being given to signs or symptoms of lead poisoning," and the notification of workers of the dangers of lead poisoning and of the best means of avoiding this condition.[934] Among the health official's nuggets of hygienic advice for workers were the following: "Avail yourself frequently of the shower baths furnished by the Company…When passing to the leeward side of fumes, hold your breath as much as possible…Where fume or dust is abundant, tie a handkerchief around your nose, or better wear one of the respirators provided by the Company… Put a little plain vaseline in your nose at the beginning of your shift," and "Do not allow yourself to become constipated."[935] In spite of Sayers' conclusion that control of dust and fumes at the plant was more crucial than improving worker hygiene, the company chose to emphasize the latter.[936]

Bunker Hill stood both to save money and also to lower its potential legal liability by laying the lion's share of the responsibility for worker health safety at the lead smelter

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931 Sayers to Easton, 15 July 1918, 2.
932 Ibid., 4-5.
933 Ibid.
934 Sayers to Easton, 15 July 1918, 4-5.
935 Ibid., 4.
936 Aiken, *Idaho's Bunker Hill*, 93.

on the workers themselves. In so doing, the company remained aligned both with the industry standard of the day and with prevailing legal doctrines such as "assumption of risk" and the "fellow servant rule."[937] Nonetheless, as Easton confided in a 1924 letter to F.W. Bradley, lead poisoning cases at the smelter, "while not as frequent or as severe as formerly still occur."[938] Although, to the company's relief, the State of Idaho in that year ruled lead poisoning to be an occupational disease not covered under the state's workmen's compensation law, Bunker Hill decided to offer compensation to "worthy employes" whom the company judged to have lead poisoning.[939] Despite this policy, however, Easton and Bradley worried over the possibility of a successful lawsuit on the part of "leaded" employees unsatisfied with the amount of offered compensation. To defend against such a threat, Easton advocated the posting of "repeated warnings" and "conspicuous notices" at the smelter. They warned of the dangers of working in a leaded environment, and gave instructions on "effective ways of preventing lead poisoning."[940] Thus insulated by its warnings and advice, Bunker Hill bargained on employing the 19th Century legal doctrine of assumed risk to avoid liability for any illness from lead poisoning that smelter workers might contract.

Although Bunker remained unwilling to expend significant resources to remove leaded dust and fumes from the working environment, it did try various "technological

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[937] According to the "assumption of risk" doctrine, if a worker was properly informed of the inherent risks of his occupational workplace and still chose to pursue his occupation in that place, his employer could not be held liable for any sickness or injury that befell him while working there. The "fellow servant rule" placed the burden of maintaining a safe workplace upon one's fellow workers, not upon the employer.

[938] Easton to Bradley, October 8, 1924, 1, MG 367, Box 12, Folder 149, Bunker Hill Records.

[939] Ibid. Before the adoption of a Workman's Compensation Act by the State of Idaho in 1917, Bunker Hill adopted the same policy toward "worthy employees" who suffered mining injuries and for the widows of those who had been killed in the Bunker Hill Mine.

[940] Ibid., October 14, 1924, 1, MG 367, Box 12, Folder 149, Bunker Hill Records.

fixes" in hopes of eradicating the problem of leaded workers. It first employed the Clague electrolytic system in 1919, urging all workers to take the treatment regularly.[941] The Clague treatment involved the immersion of hands and feet in a warm saline solution, through which a weak electrical current then was passed.[942] Hour-long treatments for up to forty men at a time were conducted at the Wardner Hospital.[943] The system, unfortunately, did not meet with much success. The company hoped for better luck with its highly touted solarium, opened in September, 1929 at a cost of ten thousand dollars.[944] Company officials believed the artificial sunlight of the solarium would counteract the effects of lead on workers' bodies, and that it offered additional health benefits to workers and their families, particularly during the long, frequently overcast north Idaho winters.[945] Capable of treating 300 people per hour, during 1930 the solarium provided 3,845 free treatments to Bunker Hill workers, their wives and children.[946]

Given the inherent dangers of working in the leaded smelter environment or in the mines of the Coeur d'Alenes, it is not surprising that access to adequate health care was long a priority of the area's miners and smelter workers. In the early days of the district, mining companies typically deducted one dollar from miners' paychecks to support medical care through a Mutual Aid Fund.[947] Bunker Hill maintained an in-house physician in the 1890s-1900s, Dr. Hugh France, who treated many company workers.

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[941] Aiken, *Idaho's Bunker Hill*, 93.
[942] Ibid., 95.
[943] T.A. Rickard, *The Bunker Hill Enterprise: An Account of the History, Development and Technical Operations of the Bunker Hill & Sullivan Mining & Concentrating Company at Kellogg, Idaho, U.S.A.*, (San Francisco: The Mining and Scientific Press, 1921), 107.
[944] Rickard, *The Bunker Hill Enterprise*, 94, "Solarium Proves Success," *Spokesman-Review*, September 26, 1929, 11.
[945] Aiken, *Idaho's Bunker Hill*, 94.
[946] Ibid., 94 and "See Model Mines," *Lewiston Morning Tribune*, October 5, 1929, 3.
[947] Aiken, *Idaho's Bunker Hill*, 11.

Miners, however, often resented their lack of control over medical care. In 1892, the Miners Union demanded control over the Mutual Aid Fund. The union wanted to use the money to build and run a hospital that would specialize in mining injuries.[948] Rather than let inquisitive miners delve into the operations of Mutual Aid Fund, Bradley and Easton dissolved it in 1909 and turned their support directly to the new Wardner Hospital, built by the company on Bunker land in 1907 at a cost of approximately $12,000. Initially administered by Dr. France,[949] the Wardner Hospital functioned essentially as a company hospital until the 1958 completion of the public Shoshone County Hospital in Kellogg. In the 1930s, Bunker continued to offer health care services to employees through the Wardner Hospital. By the end of the decade, the hospital offered forty beds and boasted "modern X-ray and surgical apparatus."[950] The facility boasted three doctors and a staff of a dozen nurses. Perhaps naturally, given its role in a decent-sized mining and smelting community, Wardner Hospital provided a specially trained industrial health nurse and a public health nurse, both of whom made "…visits to employees homes when there might be an unreported illness or other need."[951] Additionally, the hospital provided an out-patient department offering treatment for injured workers at all hours.[952] Annual physical examinations for Bunker employees were conducted at the hospital, during which, "A close check is maintained on the status of silicosis and tuberculosis throughout the

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[948] Aiken, *Idaho's Bunker Hill*, 11.
[949] Ibid., 48 and Easton to Bradley, October 10, 1907, MG 367, Box 10, Folder 110, Bunker Hill Records.
[950] "The Bunker Hill and Sullivan Enterprise Today," *The Engineering and Mining Journal* (*E&MJ*), August, 1939, 82.
[951] Ibid.
[952] Ibid.

plant."[953] Bunker Hill also used the examinations as a means of determining when older or sicker workers needed to be shifted to less hazardous jobs or workspaces.[954]

In 1917, the Idaho Legislature enacted a Workman's Compensation Act, modeled closely on that of its neighboring state, Montana. While the law was somewhat more robust than Bunker Hill executives would have liked, they nonetheless were relieved that the Idaho act was not as strong as those of states such as Washington and Oregon.[955] Following the provisions of the new law, Bunker Hill entered into a contract with the Wardner Hospital to offer medical and surgical services to injured company employees. To compensate the hospital for these services, the company paid twenty-five cents per month for each employee and employees each paid one dollar per month, the maximum they were permitted to contribute under the law.[956]

In the 1930s, shifting political winds gave control of the Idaho state legislature and governorship to New Deal-leaning Democrats. Under unaccustomed political pressure from Boise and Washington, D.C., Bunker Hill agreed to implement changes at its lead smelter advocated by Dr. Sayers nearly twenty years earlier.[957] The company sent one of its engineers, Harold Carlson, to the Air Hygiene Foundation of America, located in Pittsburgh, for specialized training in dust control methods.[958] In the latter part of 1936, Bunker adopted a program that consisted of physical examinations for all employees at the time of hiring and at regular intervals thereafter, routine sampling of air

[953] "The Bunker Hill and Sullivan Enterprise Today." 82.
[954] Ibid.
[955] Easton to Bradley, 3 December1917, 2, MG 367, Box 10, Folder 130, Bunker Hill Records. In 1939, an occupational diseases section that covered silicosis was added to the Act.
[956] Ibid., 29 December 1917.
[957] Aiken, *Idaho's Bunker Hill*, 93.
[958] "The Bunker Hill and Sullivan Enterprise Today," 79.

in the smelter, zinc refinery and in the mines, installation of equipment for reducing dust in these facilities, and periodic sampling to test the effectiveness of dust-controlling systems.[959] Company officials used an Impinger dust collecting apparatus and an Owens jet dust counter to collect dust from the smelter and other facilities, and a Zeiss circular konimeter with a built-in microscope to test the dust's contents.[960] To decrease the amount of heavy metals'-laden dust in the facilities, water sprays and exhaust systems were installed.[961] In an effort to protect at least some workers, "dust-producing machinery was isolated to prevent escape of dust throughout the entire building."[962] This measure, however, likely concentrated the remaining dust in other spaces within the plants, where workers would have been subjected to greater concentrations of leaded dust. It may have come as small solace to workers faced with these sorts of situations to be informed that under the company's new policies, they would be provided with respirators to wear "when exposed to excessive amounts of dust."[963]

In the 1930s, Bunker continued to offer health care services to employees through the Wardner Hospital. By the end of the decade, the hospital offered forty beds and boasted "modern X-ray and surgical apparatus."[964] The facility boasted three doctors and a staff of a dozen nurses. Perhaps naturally, given its role in a decent-sized mining and smelting community, Wardner Hospital provided a specially trained industrial health

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[959] "The Bunker Hill and Sullivan Enterprise Today," 79.
[960] Ibid.
[961] Ibid.
[962] Ibid.
[963] Ibid. Dust of course was also a problem for miners, as it had been tied to the incidence of silicosis. Under Bunker's new rules, however, efforts also were made to address the problem of mine dust. Water began to be used to wet down walls and muck piles before shoveling and blasting was postponed until the ends of shifts.
[964] "The Bunker Hill and Sullivan Enterprise Today," 82.

nurse and a public health nurse, both of whom made "…visits to employees homes when there might be an unreported illness or other need."[965] Additionally, the hospital provided an out-patient department offering treatment for injured workers at all hours.[966] Annual physical examinations for Bunker employees were conducted at the hospital, during which, "A close check is maintained on the status of silicosis and tuberculosis throughout the plant."[967] Bunker Hill also used the examinations as a means of determining when older or sicker workers needed to be shifted to less hazardous jobs or workspaces.[968]

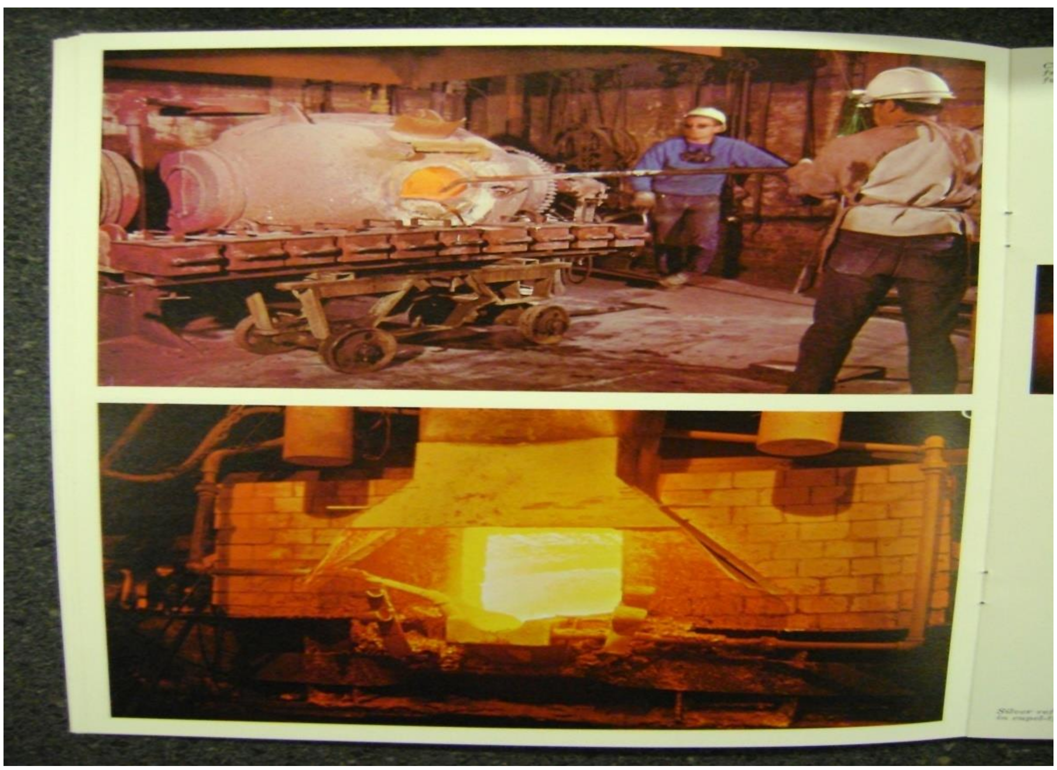

Figure 9: Bunker Hill smelter workers. From "The Bunker Hill Company," a 1966 corporate brochure.

[965] "The Bunker Hill and Sullivan Enterprise Today," 82.
[966] Ibid.
[967] Ibid.
[968] Ibid.

U.S. entry into World War Two (WWII) brought major changes to the Bunker Hill Company and to the Coeur d'Alenes. Heightened demand for area metals such as lead and zinc spurred renewed activity at the area's mines and in Bunker's smelter and zinc refinery.[969] In addition, the federal government's role in the mining district became decidedly more pronounced. Under the auspices of the National War Labor Board's Non-Ferrous Metals Commission, fifty percent of the district's zinc and fifteen percent of its lead production was set aside for the war effort.[970] Perhaps most significant, however, was Bunker Hill's reluctant decision to recognize union representation of its workers for the first time in company history.[971] Following the National Labor Relations Board's (NLRB) ruling that Bunker's zinc plant was an appropriate bargaining unit, workers at the plant voted in October, 1941 to organize under the International Union of Mine Mill and Smelter Workers (IUMMSW).[972] In late December, the company signed a contract with the newly unionized plant. The following year, the NLRB ruled that the remaining Bunker Hill workers had a right to organize. In May, 1942, workers at the company's mine and lead smelter also voted to join the union, becoming, along with their zinc plant brethren, Local 18 of the IUMMSW.[973] Although the company hoped to roll back union

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[969] Among other wartime uses, zinc was combined with copper to make brass shell casings.
[970] Aiken, *Idaho's Bunker Hill*, 122.
[971] Initial efforts at unionizing the company, led by the Western Federation of Miners, had ushered large-scale outbreaks of violence and recrimination in the District in 1894 and 1899. Under the fiercely anti-union leadership of Bradley and Easton, Bunker had held independent unionism at bay while sponsoring the Wardner Industrial Union, a "company union," as its surrogate. By the early 1940s, however, the effects of the New Deal's pro-labor stance, federal policy changes such as the Wagner Labor Relations Act of 1937 and wartime control of industry, evidently proved sufficient to overwhelm the company's longstanding opposition to trade unionism.
[972] Aiken, *Idaho's Bunker Hill*, 118.
[973] Ibid., 119.

recognition and wartime concessions following the end of the global conflict, this was not to happen. Bunker Hill remained a closed shop until shuttering its operations in 1982.

During WWII, Bunker faced a chronic shortage of workers. Taking advantage of increased leverage granted by the employment situation, Local 18 asserted its position on a number of issues. Among these was workplace conditions. Meeting high production goals with relatively few workers meant a production "speed-up" for employees. This, in turn, brought worsened dust and gas conditions at the smelter and refinery.[974] Workers at the smelter baghouse argued for higher wages on the grounds that they needed to be provided added compensation for enduring such hardships. Employing the same logic, granulating men called for a raise due to the great amounts of dust created by the crusher; ore unloading crew members demanded an extra seventy-five cents per shift due to dust and gas conditions they maintained were the worst of any at the plant; and the union advocated time-and-a-half pay for those doing the unusually dirty job of flue cleaning.[975] During the war period, smelter and zinc plant workers evidently viewed particularly unhealthy working conditions as grounds to demand higher pay for exposed workers, while stopping short of insisting that the company remedy such conditions. The plants' internal environments, company labor and management seem to have tacitly agreed, could remain relatively dirty and unhealthy. Instead of battling specifically over pollution levels within the lead and zinc facilities, Local 18 and the company struggled over the issues of proper levels of compensation for particularly unhealthy jobs at the plants and

[974] Aiken, *Idaho's Bunker Hill*, 121.
[975] Ibid.

provision of sufficient quantities of adequate health-protecting equipment (e.g., respirators) to workers.

The Bunker Hill Company experienced a major change of leadership in the mid-1950s with the retirement of longtime company President Stanly Easton and his replacement by John D. "Jack" Bradley, the son of former company President F.W. Bradley.[976] The accession of the forty-five-year-old Jack Bradley represented a generational shift in leadership as well. The younger Bradley brought a number of new priorities to the job, significant among these was modernizing operations and increasing worker productivity at the seventy-year-old company. The latter concern would bring the company into direct conflict with Local 18. What Bunker management viewed as "increasing worker productivity," workers saw as submission to the dreaded speed-up with all its attendant health and safety ramifications.[977] Viewing time spent in high concentrations of fumes and gases as central to the problem of lead intoxication, the union demanded larger crews and more relief men to enable particularly dirty jobs to be done more quickly.[978] In January, 1954, Local 18 posted a warning about lead-health dangers at the smelter on the facility's bulletin board. The warning advised workers that, "There have been two men leaded at the smelter due to the speed-up since our conference with the smelter management…We hope that this will alert the membership to the hazards that exist here."[979] Workers also attempted to curb what they viewed as the negative health effects of the speed-up through changes in contractual bargaining

[976] Aiken, *Idaho's Bunker Hill*, 137. Easton stepped down as Bunker Hill President in 1954 and Bradley assumed that position on March 29, 1955. Longtime company executive J.B. Haffner served as President in the interim period.
[977] Ibid., 142.
[978] Ibid., 142-43.
[979] Warning, January 16, 1954, MG 367, Box 73, Folder 1525, Bunker Hill Records.

language. A large-scale smelter grievance in 1954, dealing with the general operation of the smelter, attempted to limit contractually the size of work crews and the pace of work, in an effort to protect worker health. The company, however, preferred to increase production first and deal with health and safety concerns later.[980]

In early 1957, Bunker Hill announced a fifteen million dollar, five-year plan to expand and modernize its plant and equipment.[981] While doubtless many were heartened by the prospect of the economic benefits that would accrue to the community from the company's expansion, some Kellogg residents expressed concerns as well. As all knew, expansion of the lead smelter and zinc plant meant increased production, which, in turn, meant greater venting of heavy metals'-laden smoke into the air of the community. In response to Bunker's announced expansion, the Kellogg City Planning Commission inquired about company efforts to curb the "smoke problem." In response, President Bradley presented the community with a classic tradeoff. He stated, "I wish to emphasize that the production of gas is a necessary result of the operations of our reduction plants. As we enlarge these operations, more men will be employed resulting in more business activity in Kellogg – but more gas will be produced."[982] Kellogg citizens could have prosperity or clean air, but not both. Observing the fact that, in 1957, Jack Bradley essentially was able to stifle the Kellogg community's concerns about its air quality problems by trotting out the old "price of modernity" argument, risk philosopher Ulrich Beck might say, showed the community still to be living well within the confines of what he identifies as the *classical industrial* stage, wherein "the production of risks…can be

[980] Aiken, *Idaho's Bunker Hill*, 143.
[981] *Kellogg Evening News*, January 15, 1957, 1.
[982] Aiken, *Idaho's Bunker Hill*, 145.

legitimated as 'latent side effects.'"[983] During this phase of modernity, according to Beck, the material benefits of industrialization outweigh its risks and other "side effects" for society.

More so than their neighbors, however, workers at the smelter and zinc refinery faced the burdens of the increased pollution. Though the company, in efforts to combat "dangerous lead gases," installed twenty-four fans to the smelter round house and twenty-two to the lead refinery, silver refinery, and D and L roasters, lead refinery workers still complained of "Intolerable conditions of smoke," and blast furnace workers noted that their health and safety were "endangered by the vast amount of smoke, gases and noxious fumes in and around their work area."[984] During tense 1959 contract negotiations, Local 18 argued that the company had neglected worker health and safety. The union specifically complained that by failing to take advantage of opportunities to clean the smelter's blast furnace during times of routine maintenance, the company had subjected workers to excessive quantities of toxic fumes. Local 18 used this example to illustrate the point that unless compelled by contractual language to adequately safeguard employee health and safety, Bunker Hill could not be relied upon to do so.[985]

In the battle for local public opinion during the epic, seven-month-long Mine-Mill strike of 1960, the union portrayed Bunker Hill, among other things, as a despoiler of the local environment. Local 18 radio broadcasts talked of "how much our children's throats

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[983] Beck, *Risk Society*, 13. Beck contrasts this stage of industrial society with the subsequent stage, which he has dubbed *advanced modernity*, in which concern over the risks of industry come to outweigh the focus upon its benefits.
[984] Aiken, *Idaho's Bunker Hill*, 145.
[985] Ibid., 150.

clear up each day they do without smelter smoke," while union members claimed they were able to get suntans now that smelter fumes were not blocking the rays.[986]

The 1960 strike ended with a vote that narrowly rejected Mine-Mill in favor of a new union organization, the Northwest Metal Workers Union (NWMW). A central issue during the contentious strike was communism. Bunker Hill long had made political use of the fact that members of the IUMMSW's national leadership either were or had been members of the Communist Party, and alleged that local Mine-Mill leaders also were Reds.[987] Anti-communism, a strong force in the district since at least August, 1951, when an allegedly pro-Soviet talk on local radio station KWAL prompted popular outrage, proved potent in the resolution of the 1960 strike.[988] The charge of communism became a weighty burden for Mine-Mill to carry; the organization that succeeded it, the NWMW, portrayed itself as strongly anti-communist. Indeed, following its ascent, the NWMW refused to allow membership to much of the former leadership of Local 18, on the grounds that these individuals either were Communists or Communist- supporters.[989] This group of twenty-five workers became a vocal opponent of the NWMW, first dubbing itself the "Reject Club," later adopting a more formal name, the Committee for United Trade Union Activity.[990]

Since 1954, Bunker had conducted regular urinalysis screening of smelter workers to determine whether individuals were leaded. Depending upon their presumed

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[986] Aiken, *Idaho's Bunker Hill*, 154.
[987] A 1950 CIO investigation confirmed that some of the IUMMSW's national leadership were members of the Communist Party. Following this investigation, the CIO expelled Mine-Mill from its ranks. With Cold War tensions on the rise in the early 1950s, the issue of Mine-Mill's connections to "international Communism" became more politically potent in the Coeur d'Alenes.
[988] Aiken, *Idaho's Bunker Hill*, 138.
[989] Ibid., 158-59.
[990] Ibid., 159.

levels of exposure within the smelter, employees were tested monthly, quarterly, or semi-annually.[991] Smelter employees whose urine lead levels reached 300 ug/liter were referred to the doctor.[992] Workers who tested high for lead were transferred to another, presumably more lead-free job. In addition, smelter workers in particularly dusty or dirty parts of the plant were required to wear respirators. Despite these measures, in the militants' view work speedups at the smelter were resulting in greater numbers of lead-poisoned workers.[993] According to the Reject Club, eighteen of twenty-three workers in one department showed elevated lead levels. Maintaining that this was indicative of the lead-health situation throughout the smelter, the group called for a relief man on all shifts so workers could take breaks from the dust and fumes.[994]

In June, 1961 this group of dissidents sent an open letter to several state and federal officials, including Idaho Governor Robert Smylie. The letter, signed by the Committee for United Trade Union Activity, asserted that, "The incidence of lead poisoning [at Bunker Hill's lead smelter]…has increased to the point where local action is inadequate and governmental action is needed to safeguard the health and safety of the employes and general population living in the area of the smelter."[995] The group went on to request an investigation into "the incidence of lead poisoning" at Bunker Hill's lead smelter.[996] While company officials shrewdly declined to respond to the allegations, NWMW president Eddie Adams said his union was aware of the fact that leading had

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[991] "Interrogatories to Bunker Hill Company," 16 September 1975, 8, MG 367, Box 236, Folder 4415, Bunker Hill Records.
[992] Ibid.
[993] Aiken, *Idaho's Bunker Hill*, 161.
[994] Ibid.
[995] "Lead Poisoning Charge Aired by Unknowns," *Kellogg Evening News*, June 29, 1961, 1.
[996] Ibid.

become more prevalent at the smelter and added that "we are fighting for an adequate solution to this problem."[997] Apparently trying to show that his union was working effectively to solve the problem, Adams stated, "We have registered many complaints and have a meeting set up [with Bunker Hill management] to iron out the time of exposure these people have to gas, dust and fumes…"[998]

While the dissidents and the Northwest Metal Workers union evidently agreed on the nature and scope of the leading problem at the smelter, if not on the appropriate tactics for addressing the problem, the State of Idaho was dismissive. The State, represented in this instance by Mine Inspector George Fletcher, chalked the charges up to "inciters" involved in a petty intra-union squabble and declined to investigate conditions at the smelter, saying "We know the dangers of lead poisoning and they are no greater than they have ever been."[999] The Mine Inspector's prompt refusal to investigate allegations of a lead poisoning problem at the smelter must have been gratifying to Bunker Hill officials, but this outcome hardly would have been surprising. With the exception of the early 1930s decision of the State Legislature to authorize a study of the condition of the waters of the Coeur d'Alene River system and some air and water regulatory activity in the 1970s, the State of Idaho consistently maintained a firm

[997] "Lead Poisoning Charge Aired by Unknowns," *Kellogg Evening News*, June 29, 1961, 1.

[998] Ibid. The issue of lead-health for workers evidently still was potent in union politics a few years later. In a 1964 "Informational Bulletin" that, among other things, blasted rival IUMMSW's record on occupational health when that union represented Bunker workers, the NWMW stated that plumbism was "…a word that need not be looked up in the dictionary by Northwest officers or their members." The NWMW bulletin also took credit for the decrease in cases of plumbism at Bunker since that union took over, citing statistics to the effect that the number of cases had decreased from 36 in 1961 to 16 in 1962, and then to 4 in 1963. See "Informational Bulletin," 1964, 1, in author's possession.

[999] "Mine Inspector Derides Charges," *Kellogg Evening News*, June 30, 1961, 1.

tradition of turning a blind eye to the environmental and health consequences of the activities of the state's most powerful mining company.

By the early 1960s, however, Bunker Hill, contrary to its public façade, was aware that it faced a growing environmental and employee health problem. The chief problem issued from the fact that its zinc and lead plants, built respectively in 1928 and 1917, were simultaneously showing the signs of age and being forced into increased production. This combination of factors invariably led to greater levels of pollution exposure both for plant workers and for the local community. At the same time, residents of the Coeur d'Alenes and Bunker Hill workers, members of a 1950s "consumer's republic" that increasingly valued environmental commodities such as outdoor recreation, clean air and clean water, were becoming progressively less tolerant of the air quality conditions within and without Bunker Hill's processing plants.[1000] As A.Y. Bethune, Bunker's manager of metallurgy, reported to the 1961 Board of Directors' meeting, the public was "becoming more and more aware of, and critical of, our physical operation. No matter how we may think or whatever the facts may dictate, we are in for a harder and harder fight to control dust and fume."[1001] Perhaps in response to changing local environmental attitudes, the company's proposed capital budget for 1960 advocated spending some of the roughly $300,000 that had been appropriated but not spent between 1957-'59 for pollution control at the smelter.[1002] Of this, $43,000 in expenditures was

[1000] Samuel T. Hays, *Beauty, Health and Permanence*: *Environmental Politics in the United States, 1955-1985* (Cambridge, U.K: Cambridge University Press, 1987). The phrase "consumer's republic" refers to Lizabeth Cohen's highly acclaimed 2003 book, *A Consumer's Republic: The Politics of Mass Consumption in Postwar America*.
[1001] Aiken, *Idaho's Bunker Hill*, 161.
[1002] "Proposed Capital Budget for 1960 Kellogg Operations of the Bunker Hill Company," MG 367, Box 3, Folder 10, Bunker Hill Records.

recommended for "…dust areas carrying high lead content and with a high incidence of plumbism" and another $24,000 to "…correct a very dusty situation."[1003]

Despite these corrective measures, when industrial hygiene engineer Clarence Weber examined the smelter in 1964, he found a number of problems relating to the lead-health of workers. Certainly, environmental dangers within the facility still remained. Weber noted that, "As most lead smelter dusts and fumes contain lead *maintenance workers lead exposures can be very high while performing some…jobs* [italics added] such as taking out or repairing old timber structures, building maintenance repairs and ect."[1004] The industrial hygienist also observed the continued necessity that at least some smelter workers wear protective breathing apparatus in order to safeguard themselves from the environmental hazards posed by their workplace, writing that, "At times respiratory protection is essential for these employees [maintenance workers] to maintain a safe status in regard to their lead health. Better housekeeping and operational dust and fume control will improve their environmental lead exposure but it cannot eliminate the lead health problem for these employees."[1005] Weber also concluded that, "Employees who can't wear a respirator should not be working at the lead smelter."[1006] While noting that, "…the severity and incident rate of lead absorption have both lowered" at the smelter in recent years, Weber saw a number of areas in which there remained room for improvement.[1007] In addition to his advocacy of an improved and enhanced use of

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[1003] "Proposed Capital Budget for 1960 Kellogg Operations of the Bunker Hill Company," MG 367, Box 3, Folder 10, Bunker Hill Records.
[1004] "Memorandum: Smelter Carpenter Lead Health Information," 17 June 1964, 1, MG 367, Box 243, Folder 4551, Bunker Hill Records.
[1005] Ibid.
[1006] Ibid., 2.
[1007] Ibid., 3.

respirators by at-risk workers, the hygienist also called for an improved effort on behalf of workers to clean up their work areas and a more serious attitude on behalf of workers toward the problem of plumbism. Weber suggested that overtime be kept to a minimum, "especially for employees with a lead health problem," and that workers testing high for lead in urinalysis be immediately moved to jobs offering significantly less lead exposure, rather than awaiting the time-consuming results of doctor visits.[1008]

While A.Y. Bethune's 1961 comments were prescient, it is doubtful that either he or any other Bunker administrators had any idea of how the scope and pace of change in the environmental and worker health arenas would accelerate in the late 1960s and early 1970s. Whereas for decades Jack Bradley's classic formulation of a tradeoff of prosperity for pollution had held sway in communities such as Kellogg, in the post-war era such "bargains" became increasingly unpalatable. Likewise with regard to regulation. While for the first eighty years of its existence, Bunker Hill experienced little to no federal or state health or environmental control, in the late 1960s and 1970s an avalanche of federal legislation, often containing requirements for State enforcement, hit the company. Bunker, like many natural resource companies, suddenly found itself in a new, and far more challenging, world of public opinion and federal and state regulation. Among the most demanding of the new federal laws that the company would face was the 1970 Occupational Safety and Health Act.

The Act, signed into law by President Richard M. Nixon in December, 1970, set the lofty goal of ensuring all American workers "safe and healthful working conditions."

[1008] "Memorandum: Smelter Carpenter Lead Health Information," 17 June 1964, 5, MG 367, Box 243, Folder 4551, Bunker Hill Records.

To realize this new federal guarantee, the Act created two new agencies, the Occupational Safety and Health Administration (OSHA), designed to both set and enforce workplace health and safety standards, and the National Institute of Occupational Safety and Health (NIOSH), a research institute housed within the Centers for Disease Control (CDC). The Act granted OSHA the authority to investigate the premises of nearly all U.S. workplaces within eight hours of having made a formal request to do so. This was a power OSHA would use frequently in the Coeur d'Alenes during the 1970s and early 1980s.

OSHA first investigated the Bunker Hill lead and zinc plants in 1972. What the federal investigators found surely convinced them of the need for return visits to Kellogg. Airborne lead concentrations at the smelter were well above OSHA's workplace standards. The new agency and the company subsequently agreed to a program geared to bring ambient lead levels at the smelter down to federally acceptable levels. Under the plan, Bunker would undertake twelve maintenance and construction projects at the facility, to be completed by April, 1975.[1009] Until that time, smelter workers were supposed to wear respirators for health protection.[1010] In addition, shortly prior to OSHA's first visit to the Bunker Hill smelter, a NIOSH evaluation of worker health at the plant determined that forty-four percent of the 190 smelter workers tested had abnormal concentrations of lead or cadmium in their bloodsteams and that approximately one

[1009] "Heavy Metal Screening and Medical Program for Bunker Hill Employees," February 13, 1975, 5, MG 367, Box 245, Folder 4587, Bunker Hill Records.
[1010] Ibid.

quarter of them reported having received at least one course of chelation therapy, the standard medical treatment for severe lead intoxication.[1011]

A front page editorial in a March, 1971 issue of the local Northwest Metal Workers Union publication, *The Carrier*, indicated that plumbism remained an ongoing and resonant issue with Bunker Hill workers. The piece charged Bunker with breaching its contract with the union in various ways, one of which was continuously failing to provide workers with "safe, sanitary and healthy work places."[1012] For any who might doubt this assertion, the author referenced "…the number of lead cases and respiratory ailments caused by acid fumes, SO_2 [sulphur dioxide] and silica dust at the Bunker Hill."[1013] The editorial concluded with an unsubstantiated allegation that many Bunker workers died "long before their time." This sad fact the author ascribed to "the grim reaper" and "industrial disease," before challenging that, "A comparable age group from industries with better kept up and ventilated work places live longer and healthier lives."[1014]

Later in the same issue, under the headline, "A Tickled Man," the union publication expressed delight at the fact that company foreman and supervisors, due to a strike by some local AFL-CIO craft unions, currently were having to perform dirty work in the smelter.[1015] The author queried, "Tell me how you like working in the filth and conditions you've been putting your men into. See how you like getting your body

[1011] Philip Landrigan to John T. Ashley, Idaho State Health Officer, 28 May 1975, 1, MG 413, Box 236, Folder 4424, Bunker Hill Records and Cassandra Tate, "Union Spurs Probe of Bunker Hill Smelter," *Lewiston Morning Tribune*, August 16, 1975, 1.
[1012] "The Carrier," March, 1971, 1, Northwest Metal Workers Union, Piekarski Papers, in author's possession.
[1013] Ibid.
[1014] Ibid. The author did not supplement this charge with any supporting evidence.
[1015] Ibid., 5.

covered with lead dust; see how you like wearing inefficient respirators; see how you like packing some lead around in your body…If you're lucky you may get to enjoy some I.V.'s [for chelation therapy]."[1016] Raising the issue of company punishment of workers who complained about unhealthy working conditions at the smelter, the author opined, "My only wish is this – If you should complain, maybe the Company will be as fair to you as it has been to the employees it's discriminated against for trying to make it a better place to work."[1017] The piece concluded with the admonition for the affected managers to, "Take good notice and let it penetrate. Maybe, just maybe you'll learn something. Maybe our gripes haven't been so petty after all."[1018]

Likely more as a response to regulatory pressures than to worker concerns, in the first half of the 1970s, Bunker Hill significantly increased the number of urine tests it performed on its roughly 500 smelter employees, going from 2,736 in 1970 to 3,694 in 1974.[1019] Disconcertingly, however, the number of seriously leaded workers seems to have been increasing at an even more rapid pace. Blood tests and doctor visits, both triggered by high urine lead readings, increased respectively from 300 to 570 and 242 to 470 between 1970 and 1974.[1020] Whereas in 1970 fifty-two leaded workers had required medical action, by 1974 that number had risen to eighty-two. Transfers and temporary layoffs of smelter workers for reasons of lead-health also increased during this period, with transfers rising from twenty-two to twenty-six and layoffs going from six to twenty-

[1016] "The Carrier," March, 1971, 5, Northwest Metal Workers Union, Piekarski Papers, in author's possession.
[1017] Ibid.
[1018] Ibid.
[1019] "Heavy Metal Screening Program for Bunker Hill Employees," 13 February 1975, 6, MG 367, Box 245, Folder 4587, Bunker Hill Records, Special Collections. The highest number of screenings actually was performed in 1973, however, when 3,990 were done.
[1020] Ibid. The 1970 numbers of urine and blood lead readings were annualized from seven months of data.

six.[1021] In addition, by 1974 seventy workers were receiving intravenous treatments of the drug EDTA (i.e., chelation therapy) in an effort to reduce their bodily burdens of lead. For ten of these workers, the treatment represented a repeated effort.[1022]

In early 1974, the barrier between the work environment inside the smelter and the local environment of the Kellogg area was breached when a fire in the baghouse destroyed much of the Bunker Hill smelter's lead filtration system in September, 1973. The result was the infamous "lead epidemic" that beset the Silver Valley. For the first few months, workers inside the smelter took the brunt of the heightened air lead burden, but in January, 1974 company management listened to their complaints about unbearable working conditions and began venting the toxic effluent directly out the smelter's main stack.

In early 1975, in response to OSHA requirements, Bunker Hill implemented new health safety standards at the smelter designed to bring down workers' blood lead levels. While the company stated that it was making major efforts to clean up the interior of the smelter – by, among other things, hooding the blast furnaces, making modifications at the sinter plant, installing large new scrubbers, and shutting down for four days the previous fall for general cleanup and repair – Bunker Hill President James Halley said that these measures alone would not be sufficient, at least in the short run, to guarantee worker health.[1023] Therefore, said Halley, in certain high lead areas of the smelter and zinc plant, and for specific high lead jobs, workers henceforth would be strictly required to wear

[1021] "Heavy Metal Screening Program for Bunker Hill Employees," 6.
[1022] Ibid.
[1023] James Halley, memo to all smelter and zinc plant employees, "Industrial Health Protection in Lead Exposure Areas," 24 April 1975, MG 367, Box 14, Folder 221, Bunker Hill Records.

respirators at all times. Workers also were "encouraged" to wear respirators at all times in the smelter.[1024] In addition, under the company's new rules, all workers in "high lead areas" were required to trim facial hair so as to insure a proper seal of the respirators; regularly check their respirators to make sure of proper functioning; refrain from eating, smoking or carrying food or tobacco in open containers except in the lunchroom; wash hands and faces well before consuming food or tobacco; have work clothes washed daily by the Company's laundry service; shower and change clothes before leaving the plant after work; and report as scheduled for blood-lead testing.[1025] While workers did not object to most of these rules, many objected strenuously to the requirement that they wear respirators at all times, complaining that they were bulky, hot and uncomfortable. Ken Flatt, a former smelter worker who served as Local 7854 President in the late 1970s and early 1980s, recalls that most workers in high lead areas understood the need for respirators, but also notes the devices' chief drawback, commenting that, "They're uncomfortable…they sweat."[1026]

A final rule required that smelter and zinc plant workers keep their blood lead levels under 80 ug/dl, the OSHA standard for worker blood lead, or risk firing. Regardless of whether or not other a worker had been implicated in other policy violations, Bunker maintained that a blood lead level of 80 ug/dl or higher constituted *prima facie* evidence of "habitual violation" of other of the company's lead safety

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[1024] James Halley, memo to all smelter and zinc plant employees, "Industrial Health Protection in Lead Exposure Areas," 1.

[1025] Ibid., 1-2. In March, 1975, Bunker Hill substituted the more effective technique of blood-lead testing for urine sampling. A number of smelter workers signed a petition to "strongly protest" a new rule barring the wearing of beards by smelter employees. Stating that smeltermen were not "second class citizens," the workers went on to say that they considered the order "a brazen and unwarranted invasion of our private affairs."

[1026] Ken Flatt, telephone conversation with the author, March 22, 2012.

policies.[1027] Under the new policy, if after 90 days of being tested at 80 ug/dl or higher, a worker's blood lead had not dropped below that level, he would be fired.[1028] Although smelter and zinc plant workers -- since April, 1971 organized under the aegis of Local 7854 of the Pittsburgh-based United Steelworkers of America (USWA) -- did not object to the other new lead-health rules, they voiced strong objections to the provision that triggered employee dismissal at a certain blood lead level. David Duthie, Local 7854 President, complained that the rule, "…puts the monkey on the employes' back…It says that if you're leaded, it's your fault."[1029] James Halley responded that the policy was necessary to insure that workers wear their respirators.[1030]

Although its long-term plans may have included the environmental cleanup of the lead smelter and zinc refinery, in the short run Bunker Hill chose to rely upon its traditional policy of shifting the burden for worker health to the workers themselves. Whereas in 1918 the success of that policy rested largely upon such hygienic techniques as showering, handkerchief-wearing, and avoiding constipation, by 1975 it rested principally upon the proper and continual use of respirators. Rather than committing to reform the smelter's dusty, heavily leaded environment, the company's efforts were principally geared toward ensuring that workers employed specific methods and technologies to shield their bodies from harm.

In 1975, Local 7854 launched two formal grievances over Bunker's new lead-health policies for smelter and zinc plant workers. The first contested the rule that

[1027] Halley memo, "Industrial Health Protection in Lead Exposure Areas," 2.
[1028] Ibid., 3.
[1029] "Smelter Workers to Protest," *Spokesman-Review*, September 9, 1975, 9.
[1030] Ibid.

permitted the dismissal of employees with high blood lead levels. The second involved a rule intended to protect female smelter and zinc plant workers and their fetuses from the dangers of high levels of lead absorption. In 1972, in an effort to comply with equal opportunity laws, Bunker Hill hired Judy Etherton, the first woman employed at the smelter since World War II.[1031] Between 1972 and 1976, Bunker Hill hired forty-five women for production jobs, thirty at the smelter and fifteen at the zinc plant.[1032] In early 1975, the company announced that fertile women no longer would be allowed to work in "high lead areas" of the smelter and zinc plant because lead had been linked to high rates of stillborn children and miscarriages in female smelter workers.[1033] Unless the female workers could prove that they were too old to bear children or had been sterilized, they were transferred to another job involving less exposure to lead. From the workers' perspective their new jobs often were problematic, tending to offer lower pay along with work that might be less interesting or far more demanding physically than what they had been doing. Sheri Rutherford, the 23-year-old former smelter worker on whose behalf Local 7854 filed its grievance, was required to stack sixty pound zinc slabs in her new job at the zinc plant. When Rutherford proved unable to handle the demands of the new job, Bunker fired her.[1034]

In September, 1980, OSHA fined Bunker Hill $10,000 for the company's "sterilization policy," the maximum penalty the agency could assess for a single

[1031] Aiken, *Idaho's Bunker Hill*, 181.
[1032] Ibid.
[1033] "Smelter Workers to Protest," *Spokesman-Review*.
[1034] Ibid. In some cases, though, there were positive unintended consequences of the transfers. Such was the case for Judy Etherton and three other female workers, who ended up getting to work at the Bunker Hill Mine. They were the first women ever to work in any of the mines of the Coeur d'Alenes, where the superstitions of male miners had kept them out.

violation.[1035] The agency labeled the company's policy a "willful violation" and stated that Bunker, like other employers, did not have the right to make female employee choose between working in an unhealthy environment and sterilization.[1036] In a challenge to Bunker's fundamental approach to the issue of worker health at the lead and zinc plants, OSHA spokesman James Foster said, "OSHA's basic philosophy is that the hazard should be eliminated, rather than doing something [like requiring sterilization] or appending something [like personal protection devices] to the worker."[1037] Nothing could have been more at odds with Bunker's time-honored practice of shifting the burden of health protection to workers themselves and employing technological "solutions" such as respirators and sterilization to protect bodies.

A number of women smelter workers evidently did take the company up on its offer of continued employment in return for proof of sterilization. OSHA spokeswoman Susan Fleming reported that "a number of women" at Bunker Hill underwent sterilizations, though she could not provide a precise figure.[1038] Although the "sterilization episode" undoubtedly smacks of paternalism on the part of Bunker Hill executives - in a rather literal sense, for the rule actually represented an effort to protect not female workers but their fetuses from lead-health problems – it also represents a rare instance in which Bunker Hill actually made a strong, decisive effort to protect human health at its plants.[1039] Though the choice the company offered female smelter and zinc

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[1035] *New Scientist*, September 25, 1980, 908.
[1036] "Bunker Hill Company Cited for Sterilization Policy," *Spokane Daily Chronicle*, September 13, 1980, 1 and "Sterilization Rule Results in Fine," *Tri-City Herald*, September 16, 1980, 5.
[1037] *New Scientist*, September 25, 1980, 908.
[1038] "Sterilization Rule Results in Fine," *Tri-City Herald*, September 16, 1980, 5.
[1039] While by the 1970s considerable scientific evidence existed of the dangers of environmental lead to fetuses, it is interesting to note that some, albeit less conclusive, evidence also existed of its dangers to the

plant employees potentially placed them in a difficult, sexist double bind, there are ironies in the fact that Bunker received one of its largest OSHA fines for actions taken in a genuine, if misguided, effort to protect health.

In response to the requirement that all workers in high lead areas of the smelter and zinc plant wear respirators, the Steelworkers local complained to NIOSH that Bunker was not adequately protecting employee health. Local 7854 President Duthie claimed that the union had difficulty getting access to Bunker records of the urine and blood testing programs, with the result that, "We just don't know how widespread this problem [leading of workers] is…"[1040] The company, not surprisingly, downplayed the need for a health study of the smelter. According to company President James Halley, "You can work in that lead plant and follow the rules and have no problem whatsoever, unless you are one of those people who are extremely sensitive to lead," and added that, "My two sons have both worked in the smelter during summers and I had no particular qualms about sending them in there."[1041] Halley's lack of qualms about his sons' health, however, evidently failed to convince NIOSH that the union's concerns were without merit. The federal agency prepared a large and intensive study of the health of lead and zinc plant workers and of working conditions at the plants. The study was conducted between 1975 and 1976, and its results were released in 1985.

In October, 1975, OSHA proposed significant downward revisions of the air lead standards for places of work and of the blood lead standards for those who worked with

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reproductive capacities of men. It does not appear, however, that Bunker Hill ever seriously considered transferring male smelter or zinc plant workers due to concerns over their abilities to father children.

[1040] "Sterilization Rule Results in Fine," *Tri-City Herald*.

[1041] Cassandra Tate, "Union Spurs Probe of Bunker Hill Smelter."

"the useful metal," suggesting a reduction in the air lead standard from 200 to 100 ug/m^3 and in the blood lead standard from 80 to 60 ug/dl. Bunker joined other lead producers in backing the Lead Industries Association's (LIA's) efforts to oppose adoption of the agency's proposed air lead standard, and contended that the cost of complying with the new standards would be $17,000,000.[1042]

Winds of Change

In January, 1977 a new Democratic Administration took over at 1600 Pennsylvania Avenue. Under President Jimmy Carter, OSHA became a more aggressive advocate of worker health and safety. More than any other figure, OSHA's new undersecretary, Eula Bingham, personified the new agency's new orientation. Bingham, an industrial toxicologist who had worked at the Kettering Institute and the University of Cincinnati, was highly sympathetic to labor's health concerns.[1043] In 1977, OSHA held public hearings on the workplace lead standards the agency had proposed eighteen months earlier. The hearings generated tens of thousands of pages of testimony and written comment from labor advocates, industry representatives, feminists and scientists.[1044]

Much of the testimony was reminiscent of the ecological concerns raised in the 1950s and 1960s regarding the health effects of relatively low levels of toxins such as

[1042] Halley to Woodruff, 12 December 1975, MG 367, Bunker Hill Company Records, Special Collections, University of Idaho.
[1043] Gerald Markowitz and David Rosner, *Deceit and Denial: The Deadly Politics of Industrial Pollution* (Berkeley: University of California Press, 2002), 119.
[1044] Markowitz and Rosner, *Deceit and Denial*, 119.

radiation and pesticides.[1045] The new, ecological approach to worker health, which had begun to develop during the 1960s, of course, represented a direct challenge to the older industrial hygiene model. Where the ecological approach often looked for subclinical manifestations of harm from industrial toxins, the older model sought out the highest threshold values of exposure to a toxin at which persons did not manifest overt symptoms of illness. Industrial hygienists and toxicologists, whose research generally was funded by industry, had developed workplace blood level thresholds for various toxins. Robert Kehoe, for instance, who dominated the field of lead toxicology from the 1920s-1960s, was instrumental in developing the 80 ug/dl blood lead standard for workers that governed for decades.[1046] Kehoe, whose work focused largely on the effects of lead on adult males, did numerous studies that sought to prove that humans were perfectly safe at this level of blood lead. In addition, ecologically-based scientists who challenged the work of Kehoe and other industrial toxicologists were concerned not just with bodily markers of toxins such as blood lead levels, but also with levels of environmental exposure. Thus, they pushed to require measures of lead in the air in lead-producing facilities in addition to the traditional blood lead readings.[1047]

The new, ecological approach to occupational health was very much reflected in the workplace lead standards that OSHA issued in November, 1978. The standards, even more ambitious than those the agency proposed in 1975, phased in dramatic reductions in permissible blood and air lead levels over the coming decade. By 1989, air lead levels

[1045] Markowitz and Rosner, *Deceit and Denial*, 119. A watershed moment in this transformation undoubtedly was the 1962 publication of Rachel Carson's *Silent Spring*.
[1046] Kehoe's work at the University of Cincinnati was largely funded by the gasoline and automobile industries.
[1047] Markowitz and Rosner, *Deceit and Denial*, 118, 122-123. The new generation of "ecologically-based" scientists tended to be funded by government.

were to drop from 200 to 50 ug/m^3 and worker blood lead levels from 80 to 50 ug/dl.[1048] In a victory for labor, the new standard also mandated that employees with blood lead levels above the requirements be retained at their present pay levels and seniority statuses and transferred to lead free jobs until their blood leads returned to acceptable levels.[1049] Not surprisingly, Bunker Hill joined the LIA in mounting a legal challenge to the new OSHA standards. In its suit, eventually heard by the U.S. Court of Appeals for the District of Columbia and the U.S. Supreme Court, the LIA argued that OSHA's standard was politically rather than technically based and that the Agency had ignored its mandate to factor in economic impacts on industry when crafting the new rules.

Although in the first year of the new standard employees were to be removed from the workplace only when their blood lead levels reached the longstanding trigger point of 80 ug/dl, Bunker Hill still experienced difficulties with compliance and had to remove thirty-three workers from the smelter.[1050] This, however, is unsurprising given that at the time roughly half of the company's smelter workers had blood leads of over 60 ug/dl and forty-seven of them registered above 70 ug/dl.[1051] Facing the imminent need to remove a number of additional smelter workers when OSHA's blood lead standard

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[1048] The 50 ug/dl standard for workers was still somewhat higher than the 1978 standard for "undue absorption" of lead for the general population. That standard had been lowered to 30 ug/dl in 1975.
[1049] Markowitz and Rosner, *Deceit and Denial*, 133. By 1984, workers could only return to the job when their blood leads had fallen below 40 ug/dl.
[1050] "Declaration of Michael J. Wright," in *United Steelworkers of America, AFL-CIO-CLC v. Ray Marshall, Secretary of Labor, et. al.*, 12 February 1980, 4, MG 367, Box 14, Folder 241, Bunker Hill Records.
[1051] "OSHA Lead Standard," 1 and "Declaration of Michael J. Wright," 12 February 1980, 10, MG 367, Box 14, Folder 241, Bunker Hill Records.

dropped to 70 ug/dl on March 1, 1980, Bunker filed a legal motion to stay implementation of the standard.[1052]

It appears that the company had more than ample reason to fear the ever-tightening OSHA workplace lead standards. In February, 1980, Michael J. Wright, a young industrial hygienist employed by the United Steelworkers of America, toured the Bunker Hill Smelter. Wright found that lead dust levels in the dirtiest areas of the smelter – not coincidentally also the areas of work for nearly all those who had been removed due to high blood lead levels during the previous year – "almost uniformly exceed[ed]" the 200 ug/m^3 air lead standard.[1053] All but two of the thirty-three workers removed in 1979 labored in one of four areas of the smelter. Eight worked in the high line area (which included the crushing operator), where the mean air lead level measured a whopping 2,059 ug/m^3; seven in the lead refinery, where the mean was 540 ug/m^3; five in the blast furnace, where the mean measured 1,359 ug/m^3, and four in the silver refinery, where the mean was 440 ug/m^3.[1054] Although Wright noted that a respirator program was in use at the smelter, he judged that, "No practical respirator program is capable of adequately coping with the excessive concentrations of lead dust…that exist in the Bunker Hill lead smelter."[1055] The company's longstanding policy of having smelter workers protect themselves from a toxic work environment through the use of air filtration systems designed to isolate bodies from their surroundings, was evidently, as late as 1980, proving ineffective in the face of the pollution levels found in the plant.

[1052] "Opposition of United Steelworkers of America to Bunker Hill Motion to Modify the Stay," in *United Steelworkers of America v. Ray Marshall, et al.*, 2.
[1053] "Declaration of Michael J. Wright," 4.
[1054] Ibid., 4-5.
[1055] Ibid., 5.

The young industrial hygienist found "extremely poor housekeeping" to be the foremost reason behind the excessive concentrations of lead dust at the smelter.[1056] Wright also made note of the vital importance of removing leaded dust from the workplace due to the fact that otherwise such dust will tend to continually recirculate, and thus repoison workers.[1057] Getting to specifics, the industrial hygienist wrote, "It would be a gross understatement to say that there are "accumulations" of lead-bearing dust on the surfaces…Every floor I observed was dusty…In some areas of the smelter…there are significant accumulations of lead-bearing dust on every surface."[1058] Wright also observed, "…standing piles of lead-bearing dust, which, in some cases, reached the depth of six inches to one foot," and noted that piles of this size were "…so egregious that it could independently constitute a citable OSHA tripping hazard."[1059] Turning to the smelter's lunch shower rooms, areas where workers necessarily did not wear respirators, Wright observed the presence of still more "lead-bearing dust."[1060] While noting that Bunker had "…equipped many of these facilities with positive pressure, filtered air systems," the hygienist also pointed out a number of "fundamental deficiencies" in these spaces; namely, inadequate clothing decontamination and lunchroom door seals systems and the lack of any procedure for the rinsing of lead-bearing dust from boots before entering those facilities.[1061] While piping clean air into shower and lunch rooms was helpful, suggested Wright, this measure on its own hardly rendered such facilities lead free when dusty clothes and boots were still permitted to enter them.

[1056] "Declaration of Michael J. Wright," 5.
[1057] Ibid., 6.
[1058] Ibid.
[1059] Ibid.
[1060] Ibid.
[1061] Ibid.

Looking beyond the smelter's hygiene problems, Wright found the facility to be severely lacking in dust control technology, and faulted the company for failing to implement "…numerous control devices that have been available for quite some time that Bunker Hill could have employed to reduce occupational exposures to lead."[1062] Wright's recommendations included: enclosing and ventilating conveyers used to move lead sinter and lead ore; placing a portable hood over a drossing operation where he observed the creation of "…a thick cloud of fumes and lead-bearing dust," the use of better hooding and local exhaust ventilation on the blast furnace tapping operation; enclosing the cabs of the numerous front end loaders, tow motors, fork lifts and other vehicles used in the plant to protect their drivers from lead fumes.[1063] The industrial hygienist used the foregoing as examples of technological improvements that a company serious about complying with the nine-year-old, workplace air lead standard of 200 ug/m^3 would have long ago made.[1064]

Comparing the situation at Bunker's smelter with that he found at the Ronnskar lead smelter he had recently visited in Sweden, Wright noted that while air lead levels at the latter facility were roughly 200 ug/m^3, during the previous year only one worker had been found to have a blood lead level of over 70 ug/dl.[1065] This record, far superior to Bunker Hill's, Wright attributed primarily to the intense focus at Ronnskar upon

[1062] "Declaration of Michael J. Wright," 7. In referring to "numerous control devices that have been available for some time," Wright was taking issue with the suggestion of Bunker's Safety Manager, Wallace Kenyon, that the company was taking all available measures to lower the blood lead levels of its smelter workers.
[1063] Ibid.
[1064] Ibid.
[1065] Ibid.

"rigorous housekeeping," along with "clean locker, shower and control rooms."[1066] The hygienist pointed out that normally in situations where rigorous respirator use programs were in force worker blood lead levels would be expected to be declining, but added that given the Bunker Hill smelter's "inordinately excessive concentrations of lead dust" a rise in the number of leaded workers was possible.[1067] In Wright's view, the air and blood lead problems at the Bunker Hill smelter were the direct results of conscious choices made by the company.[1068] Both problems, by the same token, could be effectively addressed by changes in housekeeping techniques and through the installation of pollution control technologies.

OSHA Draws More Fire

In 1979, OSHA came down on Bunker Hill, levying over $50,000 in fines against the company. Early in the year, the agency fined the lead giant $13,700 for safety violations at the smelter. In May, in the largest fine ever levied against an Idaho employer, OSHA added nearly $37,000 to the company's tab.[1069] While still tasking the company for permitting excessive worker exposure to lead at the smelter and zinc refinery, the agency added a new charge to Bunker's docket – allowing workers to be exposed to excessive amounts of arsenic. OSHA recently had lowered its standard of employee exposure to arsenic by a factor of fifty, from 500 to 10 ug/m^3, but the company was penalized for violations of the old arsenic standard. Among the more than thirty-five

[1066] "Declaration of Michael J. Wright," 7.
[1067] Ibid., 10.
[1068] Ibid., 12.
[1069] "Idaho Mine Firm Fined for Lead Dust Exposure," *Spokesman-Review*, May 4, 1979, 17.

violations that Bunker was charged with were: failure to provide all smelter workers with respirators, letting workers consume food and beverages in more than a dozen arsenic-laden lunchrooms, failing to warn workers of the presence of potentially carcinogenic compounds in the lead and zinc plants, refusal to turn over employee health records to federal safety inspectors, and failure to provide separate storage areas for workers' work and street clothes.[1070]

Bunker immediately contested OSHA's charges and the accompanying fines. The company was already on record as opposing the arsenic standard as "unworkable" and "not supported by any reasonable evidence of adverse health effect."[1071] Although Bunker appears to have had a decent working relationship with OSHA inspectors who visited company plants, the company often took potshots at the agency in the press. For instance, immediately following the May, 1979 fines, Bunker's Vice President for Environmental Affairs, Jim Boyd, sniped, "OSHA has not been making working conditions safer. There are more accidents now than before."[1072] In a June, 1978 speech in Kellogg marking the tenth anniversary of Gulf Resources' acquisition of Bunker Hill, Gulf CEO Robert Allen blamed federal regulatory agencies such as the EPA and OSHA for bringing major natural resource companies "to the brink of economic disaster."[1073] Labeling EPA and OSHA officials as part of an "arrogant bureaucracy," whose overzealous actions made him "gravely concerned for the future of Bunker Hill," Allen

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[1070] "Idaho Mine Firm Fined for Lead Dust Exposure."
[1071] E. Viet Howard to Secretary of Labor Secretary F. Ray Marshall and Assistant Secretary of Labor Eula Bingham, 30 January 1978, MG 367, Box 14, Folder 219, Bunker Hill Records.
[1072] Sue Manning, "Bunker Hill-Government Continue Battles," *Spokane Daily Chronicle*, June 8, 1979.
[1073] Robert Allen Speech in Kellogg, press release, 6 June 1978, 1, MG 367, Box 14, Folder 231, Bunker Hill Records.

singled out OSHA for adopting standards "that are clearly as impossible to meet as they are unnecessary."[1074]

In late May, 1979, a visit to Kellogg by Idaho's Republican Senator, James McClure, amplified a small dissident worker protest against OSHA. McClure, a second term senator who enjoyed unusual popularity in heavily Democratic Shoshone County, was known as a friend of the mining industry. During his stop in Kellogg, McClure visited with a number of Bunker Hill lead and zinc plant workers, some of whom had asked him to hear their concerns about recent OSHA requirements.[1075] At the meeting, workers complained to the senator about the "ill-fitting" coveralls and "bulky" respirators they had been required to wear in the wake of OSHA's latest round of penalties against Bunker Hill and stated that some of their fellow employees were resigning rather than comply with the new equipment requirements.[1076] In the meeting, McClure exacerbated workers' concerns by suggesting that excessive OSHA regulations ultimately could lead to the closure of Bunker Hill's operations.[1077] A few days following Senator McClure's visit, the group of dissidents sent a letter to all their fellow Local 7854 members. Referring to OSHA as "a Frankenstein monster" that had been created with union support, the missive charged that the agency was threatening their jobs and contended that despite strong support from both the Kellogg local and the national union (USWA)

[1074] Robert Allen Speech in Kellogg, press release, 6 June 1978, 1-2, 4.
[1075] E. Viet Howard to Robert Allen, "Anti-OSHA Movement by Bunker Hill Hourly Employees," July 25, 1979, MG 367, Box 14, Folder 217, Bunker Hill Records.
[1076] "OSHA Rapped by Employees," *Spokane Daily Chronicle*, June 5, 1979, 25.
[1077] Ibid.

OSHA remained "…the federal agency that is making regulations that make our jobs ever more unbearable."[1078]

In early June, 1979, Senator McClure stated that OSHA's new arsenic exposure standard was "threatening the existence" of jobs at Bunker Hill, called the standard "excessive" and said it was "hampering" the work of Bunker Hill employees. In addition, Idaho's junior senator requested a formal examination of the arsenic rule.[1079] Shortly thereafter, Local 7854 held a meeting to air grievances over the new protective gear requirements. The meeting drew approximately 200 workers. While complaints were registered over the forced use of respirators at the lead and zinc plants, no groundswell of opposition to OSHA materialized.[1080] Disputing Bunker's contention that OSHA regulations were forcing it to mandate the wearing of coveralls and respirators in all areas of both the lead and zinc facilities, OSHA's Idaho director Richard Jackson told workers the company was requiring use of the protective gear in areas of the plants where the agency did not feel it was necessary.[1081] Local 7854 President Ken Flatt said that in plant lunchrooms and dressing rooms the gear became necessary because Bunker Hill had refused to end the lead and arsenic contamination of those facilities. Following the meeting, Flatt accused Senator McClure of "playing politics" with the issue of worker safety.[1082] While it was clear that a few smelter and zinc refinery workers were willing to

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[1078] "OSHA Rapped by Employees." By July, the dissident group had formed itself into an organization called Committee for Employees Against Governmental Over-regulation (CEAGO). The group appears to have been an independent, self-starting organization that was not beholden to Bunker Hill management, although management certainly applauded their efforts. CEAGO evidently had four leaders, three of whom worked at the zinc plant.
[1079] "OSHA Not Opposed at Bunker Hill," *Lewiston Tribune*, June 8, 1979.
[1080] Ibid.
[1081] Ibid.
[1082] Ibid.

side with conservative politicians and Bunker Hill managers in their criticisms of OSHA, the rank-and-file was not yet willing to join in their protests.

Far from backing down in the face of opposition from Bunker Hill and its allies, in September, 1980 OSHA cited the company for 108 violations and assessed it $82,765 in penalties.[1083] While the $10,000 fine for Bunker's "sterilization policy" garnered much of the public's attention, the company faced a litany of other workplace violations, many of them of the repeat variety. Despite high earnings based upon record silver prices during the previous year, Gulf/Bunker evidently still had not seen fit to expend the resources necessary to clean up its lunchrooms -- the company was fined $10,000 for "excess lead exposure in eating areas."[1084] The Idaho mining giant also received repeat violations for failure to monitor workers' blood lead level, failures in record keeping, and failure to insure adequate use of respirators by lead and zinc plant workers.[1085] Unsurprisingly, Bunker also received a citation for its failure to comply with the new arsenic standard.[1086]

Shifting Winds Bring A Different Tack

In August, 1981, Gulf Resources shocked northern Idaho with the announcement that it planned to shutter its Bunker Hill operation by the end of the year unless a buyer for the ninety-four-year-old company could be found. It soon came to light that the Texas company had shopped its Idaho subsidiary for two years with no luck before making the

[1083] "Bunker Hill Company Cited for Sterilization Policy," *Spokane Daily Chronicle*, September 13, 1980, 1.
[1084] Ibid.
[1085] Ibid.
[1086] Ibid.

announcement. The prospect of Bunker Hill's closure -- devastating to the economy of north Idaho where the company's 2,100 jobs and annual payroll of fifty million dollars represented sizable fractions of the whole – quickly galvanized people to action.[1087] In the frantic efforts to entice a buyer for Bunker's aging mine and plants, Local 7854 proved more than willing to make major concessions. The union offered a fifteen percent pay cut and worked with OSHA to effect less onerous lead-health compliance requirements. As Ken Flatt succinctly summarized his union's efforts to essentially undo health regulations it had worked for years to put in place, "When you start playing with a guy's livelihood…things change."[1088] With strong bi-partisan support from Idaho's Democratic Governor John Evans and the state's congressional delegation, Local 7854 pressured OSHA into granting a prospective Bunker Hill purchaser a five-year exemption from the requirement that workers be removed from the smelter and zinc plant when their blood lead levels reached 60 ug/dl.[1089] Agreeing to this deal on behalf of the new Reagan Administration was OSHA head Thomas Auchter, who stated that while protecting workers "is our paramount concern," the need, "to sustain jobs for workers can't be ignored."[1090] As part of the three-way deal, however, Gulf-Bunker made some concessions to the Local 7854 and OSHA. Specifically, the company agreed to spend $880,000 to finally clean up lunchrooms and break rooms at the smelter and zinc plant, to

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[1087] "Negotiating with Bunker," *Spokesman-Review*, September 17, 1981, 8.
[1088] Joann S. Lublin, "Union Wins OSHA Concessions to Save Idaho Smelter Despite Health Risks," *Wall Street Journal*, September 25, 1981, 14.
[1089] Ibid.
[1090] Ibid.

settle an OSHA complaint from the previous year, and to increase employee medical checkups from once to twice a year.[1091]

In the event, however, all of the efforts to find a buyer for Bunker came to naught and the last of the company's works was closed in February, 1982. The desperate final months' efforts to make the company saleable, however, shed some interesting light on the core values of workers, community members and politicos of various ideological stripes. When push came to shove, and it became clear to all concerned that they were facing the imminent shutdown of the largest business in northern Idaho, normally antagonistic interests, such as labor and management and liberals and conservatives, came together to try to save the company. To paraphrase Ken Flatt's blunt assessment of the issue, issues like blood lead levels and long-range health concerns suddenly become far less important when one is faced with the impending loss of one's job. The fact that jobs in Bunker's lead and zinc plants, while undeniably dirty, were by Idaho standards relatively high-paying, along with the fact many zinc and lead plant workers had held jobs in those respective facilities for numerous years, undoubtedly compounded the desire to do whatever it might take to preserve those jobs. Until the advent of the "environmental era," circa 1970, with but a few exceptions lead and zinc plant workers had been willing to use health concerns as a bargaining chip with which to gain higher wages or other benefits. Following the creation of OSHA, however, Bunker smelter and refinery workers, now with the federal government in their corner, began an outright push for worker health studies and for improved health and safety conditions at the plants. Local 7854's 1981 concessions on health safety at the plants, while significant, were

[1091] Joann S. Lublin, "Union Wins OSHA Concessions to Save Idaho Smelter Despite Health Risks."

simply temporary strategems meant to attract a buyer for the aging, dilapidated lead smelter and to help that purchaser "get on its feet." Once that happened – a five-year grace period was offered on OSHA blood lead standards – the full health standards were expected to kick back in. In other words, while Bunker's smelter and zinc plant workers were willing to make health concessions in order to preserve their livelihoods, they were not willing to work in unhealthy plants once their employer's survival was secured.

Health and Mortality Studies Shed Light

In 1975 and 1976, at the request of United Steelworkers Local 7854, NIOSH, in conjunction the Bureau of Epidemiology and the Centers for Disease Control (CDC), conducted an industrial hygiene study of Bunker Hill's lead smelter and zinc refinery along with medical surveys of workers at those plants. The purpose of the investigation was to determine both the health of the environment inside the smelter and refinery, and also the epidemiology and health consequences to workers of exposure to heavy metals. The study examined 173 male and 48 female smelter workers and 209 male zinc refinery workers.[1092] For purposes of comparison, the study also examined 97 male and 42 female Kellogg residents who did not work at the smelter or zinc plant, along with a control group of residents of Spirit Lake, a community located forty-five miles from Kellogg.[1093]

The industrial hygiene portion of the investigation revealed air lead concentrations at the smelter that were significantly higher than those found by Michael Wright five years later. Mean air lead exposure measured 3,530 ug/m^3, more than

[1092] "Summary" (of NIOSH study), 1, MG 413, Box 247, Folder 4633, Bunker Hill Records, Special Collections.
[1093] Ibid.

seventeen times the prevailing OSHA standard of 200 ug/m^3 and more than fifty percent higher than Wright would find in the area of highest concentration during his 1980 visit.[1094] Lead smelter workers also were exposed to high levels of zinc and arsenic; mean air levels were 1,850 and 18 ug/m^3 respectively.[1095] At the zinc plant mean lead levels were lower, 401 ug/m^3, but still twice the recommended maximum. Workers at the zinc plant, however, were exposed to high mean concentrations of zinc, 6,850 ug/m^3, cadmium, 38 ug/m^3, and sulphur dioxide, 6.72 ppm. Arsenic levels were relatively lower, 7 ug/m^3, albeit still above the proposed OSHA standard. Workers in the zinc plant's baghouse, however, were even less fortunate. Their mean lead exposure was a stratospheric 5,590 ug/m^3 and their mean cadmium exposure factored in at 521 ug/m^3.[1096] The study also found, predictably, that workers' blood lead levels essentially mirrored the environmental levels found in the facilities where they worked. Nearly two of five smelter workers tested (38%) had blood lead levels of 60 ug/dl or higher, while 14 per cent of their zinc plant counterparts measured that high for blood lead.[1097]

When the NIOSH team turned to the effects of such high concentrations of lead and other heavy metals on the smelter and zinc refinery workers, they, perhaps not surprisingly, found a number of maladies. As the report's official summary stated, "Gastrointestinal, constitutional, and neurological symptoms were significantly more prevalent than in community residents. Also, the frequency of those symptom complexes

[1094] "Summary" (of NIOSH study), 1.
[1095] Ibid.
[1096] Ibid.
[1097] Ibid.

correlated positively with blood lead…concentrations."[1098] The NIOSH team found that smelter workers, like the high blood-lead children in the wake of the 1973 baghouse fire, "…demonstrated an increased prevalence of symptoms of peripheral nerve dysfunction as compared to community residents."[1099] In addition, the study also discovered that workers manifested increased feelings of depression and hostility, lengthened choice reaction times and a significant decrease in motor nerve conduction velocity (1 to 3 m/sec.).[1100]

This was not all, however. The study also uncovered "…an increased prevalence of tubular renal dysfunction and of disordered calcium metabolism in Bunker Hill workers."[1101] Neither of these findings was particularly surprising, as high levels of lead ingestion already were strongly correlated with kidney problems and lead was known to substitute for calcium in the body. As compared with Kellogg community residents, hardly a lead-free population,[1102] lead and zinc plant workers were found to have elevated urinary protein and blood serum calcium levels.[1103] Adding to evidence of the relative dangers of working in certain, high lead areas of the plants, abnormalities in blood calcium and phosphorus concentrations, along with elevated B-2-microglobulin levels, "…were found in many male workers in several work areas in both the lead smelter and zinc plant."[1104] Additionally, abnormalities in renal function and elevated uric acid levels were found in workers who had been treated by chelating agents for lead intoxication.

[1098] "Summary" (of NIOSH study), 1.
[1099] Ibid.
[1100] Ibid.
[1101] Ibid., 2.
[1102] Recall that Kellogg's air-lead and dirt-lead levels were still among the highest in the nation in 1975-'76 and that just two years earlier they had been among the highest ever recorded.
[1103] "Summary," 2.
[1104] Ibid.

The severity of these abnormalities increased with the number of courses of chelation therapy, indicating that far from being "cured" of lead-health problems once chelation therapy had lowered their blood lead levels enough to allow them to return to work, workers who became entrapped in this particular vicious cycle likely were courting heightened lead-health problems.[1105]

Turning to pulmonary-respiratory health issues, the NIOSH study found that while no statistically significant differences in pulmonary function were found in Bunker Hill workers as opposed to the local population, "…the consistent ordering of results across various types of tests suggest that some deleterious effect on pulmonary function may be occurring."[1106] Examining other health effects of these work environments, the investigation's dental evaluation of zinc plant workers found, perhaps unsurprisingly, "…a significant increase in the prevalence of decayed, missing, or filled anterior lower teeth in workers exposed to *sulfuric acid mist* [italics added] as compared to workers with less exposure."[1107]

In summary, the 1975-1976 NIOSH investigation uncovered significant evidence of high exposure to lead and other heavy metals and of health damage to workers at Bunker Hill's lead and zinc plants. This damage ranged from the relatively minor issue of losing teeth to potentially life-threatening renal and pulmonary dysfunction.

In 1985, an article on the mortality rates and causes of death of workers at the Bunker Hill lead smelter appeared in the *American Journal of Epidemiology*. The article,

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[1105] "Summary," 2. Medical evidence shows that those who have suffered lead intoxication sufficient to require chelation therapy are thereafter more susceptible than others to lead intoxication.
[1106] Ibid. The study did, however, find "a significantly high prevalence of respiratory symptoms in the female production workers."
[1107] Ibid.

entitled "Mortality of Lead Smelter Workers," was an outgrowth of the 1975-1976 NIOSH study. Among its four co-authors was Philip Landrigan, a longtime thorn in Bunker's side who had participated in the 1974 lead-health study of Silver Valley children and also in follow-up investigations that culminated in the Shoshone Lead-Health Project Report. The NIOSH study examined mortality rates for 1,987 men who worked at the Bunker Hill smelter for at least one year between 1940 and 1965.[1108]

The study found that as of December 31, 1977, 1,281 workers (64.5%) were still living, 665 (33.4%) were deceased, and 41 (2.1%) could not be accounted for.[1109] Although the investigation found that the smelter workers' mortality rate was roughly equal to that of the U.S.'s white male population as a whole, with a Standardized Mortality Ratio (SMR) of 98, other discoveries evinced excessive mortality rates from specific sources.[1110] The study's major findings were of excess mortality due to chronic renal disease in long-term lead workers (SMR = 192) and of an increase in mortality from renal cancer (SMR = 204). The former finding was consistent with the results of four other studies of occupational lead exposure, while the latter was consistent only with experimental studies on animals and so warranted further study.[1111] For workers with more than twenty years of lead exposure, the SMR for chronic renal disease rose to 392. In the case of lead it appears that longtime occupational familiarity often proved lethal.

[1108] S.G. Selevan, P.J. Landrigan, F.B. Stern, J.H. Jones, "Mortality of Lead Smelter Workers," *American Journal of Epidemiology*, 1985, Vol. 122, No. 4, 673-683.
[1109] Ibid., 677.
[1110] Selevan, Landrigan, Stern and Jones, "Mortality of Lead Smelter Workers," 677. The Bunker Hill smelter workers' population was considered "white" for the purposes of this study. Although racial data could not be obtained for all the workers, based upon the fact that in 1976, 96% of the smelter's workers were white, the investigators felt safe in making this definition. Standard Mortality Ratio refers to the ratio between the observed number of deaths in a study population and the number of deaths that would be expected in a standard population.
[1111] Ibid.,682.

Describing the severe kidney problems that beset a number of Bunker Hill's smelter workers, the article's authors wrote, "Nephritis (inflammation of one or both kidneys) has been recognized as a component of occupational lead intoxication since the late nineteenth century…it appears that nephropathy (damage or disease to the kidney) is a consequence of prolonged, relatively high- dose exposure to lead. The end stage of neuropathy is chronic renal failure…"[1112]

While renal issues were the most serious, widespread health problems uncovered by the NIOSH study, they were by no means the only ones. In any event, long tenures of service at the Bunker Hill smelter evidently were not good for employee health. Investigators found that for those who worked longer mortality rates were heightened, with "an upward trend over time in mortality from cardiovascular disease."[1113] The NIOSH team also found elevated mortality levels from emphysema, silicosis and other occupational respiratory diseases. These results, however, could be largely discounted due to the fact that a considerable percentage of the smelter workers had at some time worked as hard rock miners in the Coeur d'Alenes, where they experienced a decent likelihood of contracting a respiratory disease.[1114] A high number of the smelter workers died from accidents, but this too appears to have much to do with the fact that it was relatively commonplace in the Coeur d'Alenes to move back and forth between employment in the numerous mines and at the Bunker Hill smelter.[1115]

[1112] Selevan, Landrigan, Stern and Jones, "Mortality of Lead Smelter Workers," 680.
[1113] Ibid., 677.
[1114] Ibid., 681.
[1115] Ibid., 680. Six of these deaths occurred in the Sunshine Mining disaster.

Updated in 1985 and 1988, the NIOSH mortality study continued to show high rates of death for Bunker Hill smelter workers from kidney disease and kidney cancer, along with elevated rates from a new source, stroke. By 1988, when nearly 400 more workers had died, deaths from kidney disease stood at four times the national average for white males, while mortality from renal cancer and stroke ran respectively at nearly double and at one-and-a-half times of the national averages.[1116] The updated NIOSH reports offered further proof, if any was needed, that working in the Bunker Hill lead smelter was bad for workers' health in general, and was particularly hard on their kidney functioning. Workers, of course, had long maintained that the smelter was overly dusty and dirty. For just as long, they had expressed concern about the effects of that leaded dust and dirt on their health. Health inspectors, too, since the time of Royd R. Sayers' 1918 visit, had called upon the company to take steps to clean its dirty, unhealthful facility. While Bunker had, in the 1930s and at other times, made real efforts at improving hygiene at the smelter, and while the company had also spent capital on new, cleaner-operating equipment, these efforts did not keep pace with the problems developing at the increasingly dirty, aging facility or with the changing regulatory culture. By the 1970s, the more-than-half-century-old smelter, and to a lesser extent the decade-younger zinc refinery, were very far out of compliance with federal standards for ambient levels of lead in the air. Somewhat desperately, the company turned to the mandatory use of respirators by all smelter workers in an effort at least to meet OSHA requirements for workers' blood lead levels. But, as industrial hygienist Michael

[1116] Cynthia Taggart, "Bunker Hill Men Still at Risk From Lead," *Spokesman-Review*, May 21, 1994.

Wright's 1980 study showed, even these efforts fell far short of bringing the smelter into compliance with federal standards.

Probably for reasons of cost, Bunker, throughout the existence of its lead smelter, remained largely wedded to a strategy of placing the onus of worker health upon workers themselves. In the 1920s, this strategy took the form of placing prominent warnings of the dangers of lead intoxication throughout the smelter and encouraging workers to practice personal hygiene. In the 1970s, it morphed into respirator requirements and frequent blood-lead testing. Judging from the Wright report, however, as late as 1980, the company remained fundamentally unwilling to make the changes to its smelter operations, or to embark on the serious hygiene campaign, that were necessary to bring the facility into compliance with current health regulations. By this late date, though, Bunker's hygienic problems at the aging smelter had become far more severe, and the company's fiscal position far less strong, than they had been in earlier days. Had Bunker chosen to significantly remodel, or replace, the facility in the mid-1960s when the company was fiscally robust, it might have been able to weather the challenges of the new regulatory era of the 1970s.[1117] The company, however, did not follow this course of action. During the 1970s, Bunker, by now a subsidiary of the Houston-based Gulf Resources, appeared increasingly beleaguered and unable to keep up with the regulatory and competitive burdens it faced. In the end, the company proved unable to meet those burdens. One of the chief reasons why was its old, technologically-laggard lead smelter.

[1117] Hays, *Beauty, Health and Permanence*, 250-53, 374-75. Such a facility likely also would have operated far more efficiently as well and produced greater profits for the company. While natural resource companies such as Bunker Hill like to frame debates over environmental regulation in terms of "imposed costs" to them that presumably make them less healthy, wealthy businesses, companies that get ahead of the curve and invest in new, cleaner technology can stand to reap both environmental and business rewards.

As is the wont under industrial modernity, however, the burdens and risks of Bunker Hill's dirty smelter were not shared equally. As Ulrich Beck might point out, Bunker's lead and zinc plant workers occupied distinct "social risk positions" within the company and the community.[1118] Not surprisingly, these decidedly risky social positions were largely held by workers, many of them basically unskilled, who did not have much class status. While the company's 1982 closure threw nearly all of Bunker Hill's employees out of work, only Bunker's smelter workers (and to a lesser extent its zinc plant workers) were left to shoulder the health effects of working closely with aerosolized heavy metals.[1119] As the 1975-1976 NIOSH health study of smelter and zinc plant workers and NIOSH's later mortality studies clearly showed, there *were* significant health problems associated with working in those facilities. Although they were certainly loathe to part with their relatively high-paying blue collar jobs, as the Steelworkers Local's 1981 concessions on workplace standards showed, workers undoubtedly "paid for their work" at the smelter and zinc plant with a host of maladies including anemia, slowed nerve conduction velocities, colic, hypertension, depression, stroke, and various forms of kidney malfunction.[1120] As Peter Piekarski, a twenty-seven year veteran of the smelter, longtime union activist, and kidney disease sufferer, said following release of the

[1118] Beck, *Risk Society*, 23.
[1119] This is certainly not to minimize the health effects of working for Bunker Hill on miners who suffered high rates of accident and also were beset with serious health problems including silicosis, nor that on community members, particularly those who lived nearby the smelter, and thus resided in an environment that was heavily impregnated with lead and other heavy metals.
[1120] Arthur McEvoy, in his 1995 article "Working Environments: An Ecological Approach to Industrial Health and Safety," noted that, "Just as they do in environmental areas, however, market forces *overdiscount* [italics added] the costs of industrial injuries (thus subsidizing employers at the expense of injured workers) particularly when the harms involved are long-term, hard to identify, or difficult to value in money terms."

results of the 1988 NIOSH mortality study, “I could’ve told them those results a long time ago…We knew we were working in a hazardous industry.”[1121]

[1121] Taggart, “Bunker Hill Men Still at Risk From Lead.”

A BRAVE NEW WORLD

Stunned disbelief greeted the announcement. On August 25, 1981, Bunker Hill announced over Osburn radio station KWAL that it would be liquidated and its Kellogg works closed by year's end unless its parent company, Gulf Resources & Chemical Corporation, could find a buyer for the 94-year-old company, producer of twenty percent of the nation's silver and seventeen percent of its lead. The announcement triggered a frantic, roller-coaster search to find a buyer for "the Bunker," whose workforce of 2,100 and $50 million annual payroll established the company as northern Idaho's most significant employer by a wide margin. Idaho's senior U.S. senator, Republican James McClure, telephoned Vice-President George Bush at the latter's vacation home in Kennebunkport, Maine to enlist his support for imposing a five-year moratorium on the application of any new federal environmental regulations to the Kellogg concern.[1122] North Idaho's Republican Congressman Larry Craig, in a meeting with President Ronald Reagan, briefed the President on the imminent closure of Bunker Hill and on the devastating impact that it would have on the north Idaho economy.[1123] Idaho Governor John Evans created a special committee, The Silver Valley Economic Task Force, to develop a formula to attract a buyer, and assigned an aide, George Tway, to assist the Kellogg-based group.[1124]

[1122] "Bunker Hill: Bush Aid Enlisted," *Spokesman-Review*, September 6, 1981, A13. Such environmental regulations were viewed by many as a significant roadblock to sale of the company.

[1123] "Bunker Hill: Congressmen Brief President on Problems," *Lewiston Tribune*, September 22, 1981. According to Craig, Reagan "showed real alarm" over Bunker's impending closure.

[1124] "Negotiating with Bunker," *Spokesman-Review*, September 17, 1981, 8.

Assessing the significance of losing Bunker Hill, Tway remarked, "This would be one of the most serious economic disasters the state has ever seen."[1125] A study by Eastern Washington University economics professor Shik Young appeared to confirm Tway's grim assessment. According to Young, if jobless workers did not emigrate following the Bunker Hill closure, the unemployment rate for Shoshone County soon would approach fifty percent and that for neighboring Kootenai County (Coeur d'Alene) would hit twenty percent.[1126] The economist concluded that the closure would cost Shoshone County roughly 3,570 jobs and 67.5 million dollars in lost wages, while Kootenai County stood to lose 1,680 jobs and 27.5 million in wages. In Young's analysis, Spokane County (Spokane, Washington) would escape with the least damage, suffering losses of "only" 800 jobs and 14.2 million in wages.[1127]

Although Idaho's Democratic governor and its Republican congressional delegation pulled together in efforts to find a buyer for the mining and smelting giant, their task was daunting. Gulf Resources President Robert Allen had announced projected losses of $40 million for the coming year for Bunker.[1128] The severe headwinds facing the company included: metals prices that were hitting rock bottom; an insufficient supply of concentrates to keep the company's lead smelter running at anywhere near capacity, an ongoing recession that showed no sign of letup; Bunker's aging smelter, which faced an expensive makeover to comply with EPA and OSHA regulations; and the company's

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[1125] "Negotiating with Bunker," *Spokesman-Review*, September 17, 1981, 8.
[1126] Frank Bartel, "Bunker Hill Closure to Cost Spokane 800 Jobs," *Spokane Chronicle*, November 19, 1981, 44.
[1127] Ibid.
[1128] "Bunker Union Recommends Rejection of Wage Cuts," *Kellogg Evening News*, January 14, 1982, 1. Duane Hagadone, a leader of the investor consortium that eventually materialized as a possible Bunker buyer, estimated that a more accurate forecast of 1982 losses was $54 million.

large, relatively high-cost, unionized workforce. Throughout the late summer and fall, Bunker Hill proceeded with shutdown efforts at its industrial complex, laying off workers and shuttering operations. On December 11th, however, residents of the Coeur d'Alenes were given a reason for optimism, when it was announced that a group of investors that included Wallace mining magnate Harry F. Magnuson and Coeur d'Alene publisher-developer Duane Hagadone, had acquired an exclusive purchase option "for the entirety of Bunker Hill's holdings."[1129] The streets of Kellogg were quiet between eleven and noon as people crowded around radios to listen to the KWAL broadcast of the Coeur d'Alene news conference announcing the pending sale of the company.[1130] The investor group, though prepared to spend $65 million for Bunker, demanded major concessions from the union representing most of Bunker's workers and from the federal government. From Steelworkers Local 7854, the investors called for, among other things, a twenty-five percent pay reduction for the coming year, the right to assign workers without regard to seniority, and a reduction of medical insurance payments.[1131] From the federal government, the group successfully lobbied for a five-year moratorium on the application of new environmental and work safety rules.[1132] On January 11th, the investor group was shored up with the addition of Idaho potato king, J.R. Simplot, who emerged as the consortium's majority investor.[1133]

[1129] Jim Fisher, "Bunker Hill Purchase Option Raises Hopes," *Kellogg Evening News*, December 11, 1981, 1.
[1130] Sue Lancaster, "Cautious Elation Greets Announcement," *Kellogg Evening News*, December 11, 1981, 1.
[1131] Doug Barker, "Union Members to Review New Labor Agreement," *Kellogg Evening News*, January 15, 1981, 1. The group, which offered Gulf $50 million in cash and $15 million in payments from future profits, also planned to trim the company's workforce by 500 in the coming year.
[1132] "Bunker Hill: Bush Aid Enlisted," *Spokesman-Review*, September 6, 1981, A13.
[1133] Jim Fisher, "Simplot Says 'Yes;' Unions to Get Proposal," *Kellogg Evening News*, January 12, 1982.

There remained firm opposition to the deal from the union, however. Local 7854 President Ken Flatt urged his membership to reject the Simplot group's proposal, maintaining that doing so would bring the group back to the table to negotiate a better agreement. Hagadone, speaking for the investors, averred that he was presenting the group's last, best offer.[1134] On January 17th, Local 7854 and Bunker's six small craft unions assembled to vote on the proposed contract. By a 695-506 (58-42%) margin, the workers voted to accept the deal. The vote, however, was ruled to be merely "advisory," and thus not binding, by the leadership of the Pittsburgh-based International Steelworkers Union, representatives of whom were on hand for the session.[1135] Among the International's chief concerns regarding the proposed contract evidently was the contract's reduction of employee retirement benefits and the likelihood of facing numerous lawsuits from aggrieved Local 7854 members should it go into effect.[1136] Following the invalidation of the vote by its parent organization, Local 7854 split into warring factions. While one group remained loyal to President Ken Flatt, a large splinter faction emerged, led by Ron Byrd.[1137] The splinter faction, which favored ratification of the Simplot group's contract, enjoyed strong community support.[1138] The Simplot group

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[1134] "Bunker Union Recommends Rejection of Wage Cuts," *Kellogg Evening News*, January 14, 1982, 1.

[1135] Doug Barker, "Bunker Pact in Limbo After Vote, Resignations," *Kellogg Evening News*, 1. Despite the International's ruling, Ken Flatt signed the deal, believing the January 17th vote represented the will of his Local's membership. Flatt's signature, however, of course did not override the International's decision and the January 17th vote remained unofficial. According to Flatt, he felt strongly "ambivalent" about the International's stance on the vote, believing that while it acted against the expressed will of a majority of his membership, it also was a necessary action to prevent an unending round of lawsuits against the International by Local 7854 members aggrieved by the loss of retirement benefits that the proposed contract entailed. Ken Flatt, telephone conversation with the author, March 22, 2012.

[1136] Ken Flatt, telephone conversation with the author, March 22, 2012.

[1137] Jim Fisher, "Steelworkers Remove Officers, Elect New Leaders," *Kellogg Evening News*, 1.

[1138] Flatt, telephone conversation with the author, March 22, 2012. Shortly after the vote, the Ron Byrd faction occupied the Local 7854 union hall in Kellogg. Following the "occupation," Flatt was stopped on the highway outside of town on his way to work and told by a Kellogg police officer to return home, announced that, unless the international union promptly approved the January 17th vote, its efforts to purchase Bunker were at an end.

The announcement swung Idaho politicians and Kellogg residents into action. Bunker Hill salaried personnel supporting ratification of the contract sent a petition protesting the Steelworkers' position to Congressman Larry Craig, who promised to deliver it to President Reagan. The petition contained the signatures of over 6,500 Silver Valley residents.[1139] KWAL broadcast the telephone numbers of the executive offices for the White House, the Vice President and the Assistant Secretary of Labor, while Silver Valley citizens sent an estimated 1,000 telegrams to President Reagan petitioning him for help in rescuing Bunker Hill.[1140] On February 2, Idaho Senator Steve Symms and Congressman Larry Craig met with International Steelworkers President Lloyd McBride in Pittsburgh in an unsuccessful effort to persuade him to sign the agreement approved two weeks earlier by Local 7854.[1141] The refusal of the International Steelworkers to approve the Kellogg local's vote created significant bitterness in the Silver Valley. Some likened it to the contemporaneous situation in Poland, where the Eastern Bloc government was cracking down on the pro-democracy trade union Solidarity, while others drew comparisons to the way Bunker was being dealt with by another out-of-state

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apparently because the officer feared a violent confrontation at the hall. Flatt would not return to work at the Steelworkers Building for approximately a year.

1139 Jim Fisher, "Petitions Protesting Union Pact Refusal Sent to Reagan by Salaried Employees," *Kellogg Evening News*, January 28, 1982, 1.

1140 "Rescue Effort Continues," *Kellogg Evening News*, January 22, 1982, 1.

1141 "Symms and Craig Meet with Union Chief," *Kellogg Evening News*, February 2, 1982, 1; "McBride Rejects Plea to Save Pact," *Kellogg Evening News*, February 3, 1982, 1.

concern, Gulf Resources.[1142] The effort to persuade McBride to approve the vote in favor of the Simplot group's contract represented a last gasp for the months-long effort to save Bunker Hill. Following its failure, the Simplot group withdrew from the field, and Gulf sold off much of the old Bunker works for scrap.[1143]

This chapter explores the most recent phase in the history of Kellogg and the Silver Valley, the post-industrial period that runs from 1981 through 2011. The Silver Valley communities' radical shift in economy was not one they chose but rather one that was forced upon them with the closure of the Bunker Hill operations in late 1981 and early 1982 and the subsequent curtailment of much of the Valley's mining industry. Although mining has persisted in the Valley over the past thirty years, its character has been far more intermittent and significantly less robust than was the case prior to the 1980s. At the chapter's heart lies the City of Kellogg's choice to reinvent itself as a Bavarian-themed skiing community and the subsequent ramifications of this "devil's bargain" decision for the community.[1144]

The contemporary, post-industrial story of Kellogg and the rest of the Silver Valley of course has numerous parallels. Over the past forty years, many Western and

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[1142] Jim Fisher, "Petitions Protesting Union Pact Refusal Sent to Reagan by Salaried Employees," *Kellogg Evening News,* January 28, 1982, 1 and Jim Fisher, "Steelworkers Remove Officers, Elect New Leaders," *Kellogg Evening News,* 1.

[1143] Doug Barker, "Bunker Hill Sells Sinter Machine, No Rescue Seen," *Kellogg Evening News*, February 15, 1982, 1. Although many in the Silver Valley blamed the International Steelworkers' stance for the failure the keep Bunker Hill running, it must be noted that the bid to keep the company, and particularly its aged smelter, going, always faced steep odds. Evidence of this came in the fact that a smaller version of the Simplot group purchased Bunker Hill in November, 1981, but chose not to reopen the mine for several years due to low silver prices, and never reopened the lead or zinc plants.

[1144] "Devil's bargain" is a reference to Hal K. Rothman's history of tourism in the 20th century American West, Hal K. Rothman, *Devil's Bargains: Tourism in the Twentieth-Century American West* (Lawrence, KS: The University of Kansas Press, 1998), 10. Rothman finds that the choice of tourism by communities as an economic strategy, "…typically fails to meet…expectations...Tourism transforms culture into something new and foreign; it may or may not rescue economies."

other U.S. communities have faced the closure of their principal industries as the nation has shifted from an industrial to a services and information economy. From steel cities such as Youngstown, Ohio and Pueblo, Colorado and to copper enclaves like Butte and Anaconda, Montana to textile towns such as Mount Airy, North Carolina, longstanding, relatively high-paying blue collar jobs have been lost, and communities have been forced to redefine themselves following the disappearance of the industries that defined them for generations. Many deindustrialized communities, like Kellogg, also suffer from industrial pollution.[1145] At the heart of a massive Superfund site, the town has had to conduct its efforts at reinvention in the midst of one of the Environmental Protection Agency's (EPA's) biggest and most complicated cleanup efforts. It is hoped that this chapter, through its examination of the post-industrial history of northern Idaho's Kellogg and the Silver Valley, will help to illuminate the struggles of other communities that have grappled and will grapple with the loss of their defining industries and forge new futures. One of the hallmarks of global capitalism is its dynamism, and while that can mean the mushrooming of a new industrial plant virtually overnight almost anywhere, it just as easily can mean the sudden shutdown of a longstanding plant in a factory town. According to Marshall Berman, "to be modern…is to experience personal and social life as a maelstrom, and to find one's world and oneself in perpetual disintegration and renewal, trouble and contradiction: to be part of a universe in which all that is solid melts

[1145] Particularly affected are those involved in such "dirty industries" as mining, smelting, steel, oil, chemicals, and nuclear and/or chemical weapons.

into the air."[1146] Those who have lived through the past thirty years of Kellogg history have experienced a particularly intense version of the "maelstrom" Berman describes.

A Difficult Day Dawns

The disintegration of the Simplot group's efforts to purchase Bunker Hill and keep it running plunged Kellogg back into precisely the situation it had been dreading since late August. By April 1, 1982, all 2,100 Bunker Hill employees would be released. Though all faced challenges, those of the 700-800 unskilled workers employed predominantly at the lead and zinc plants appeared to be the greatest. While, according to Bunker President Jack Kendrick, skilled craft workers and miners might face a reasonable chance of finding work elsewhere under decent economic conditions, that same likelihood did not exist for the "cadre of loyal and dedicated unskilled workers" who ran the company's surface facilities.[1147] Ken Flatt estimated that only ten percent of former Bunker Hill workers would be able to find jobs.[1148] Though referring to himself as "in the lucky ten percent" who had found work, former fertilizer plant superintendent Bob Smith was regretful that his new position as a plant manager in Omaha, Nebraska would force him to leave his wife, daughter and home behind in Kellogg. Smith, a Kellogg native and third generation Bunker Hill employee, voiced the shock that many locals must have felt over the recent dramatic turn of events and what that meant for a long-established way of life in the Coeur d'Alenes: "Bunker Hill was always there. Jobs

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[1146] Marshall Berman, *All That Is Solid Melts into Air: The Experience of Modernity* (New York: Simon and Schuster, 1982), 347.

[1147] Jim Fisher, "Unskilled Workers Bunker Hill's Main Concern, Kendrick Says," *Kellogg Evening News*, December 2, 1981, 1. Decent economic conditions, however, hardly existed at the time, as Kendrick admitted.

[1148] "Bunker Workers Face Tough Job Hunt," *Spokesman-Review*, December 9, 1981, A7.

were plentiful and the pay was good…The kids in school could say, 'I don't want to go to school, I want to work for Bunker'…The kids who wanted to go to college could go. The kids that wanted to work could do that also."[1149]

To address the unemployment situation in and around Kellogg, federal officials appropriated $700,000 for job retraining and Governor Evans turned over $50,000 from the governor's emergency fund for job search training.[1150] Idaho Senator James McClure secured special Trade Adjustment Assistance from the U.S. Department of Labor that enabled about 1,200 ex-Bunker workers to receive up to twelve months of unemployment benefits.[1151] Additionally, a federal grant made high school equivalency classes available to locals. In 1982, 800 Kellogg residents returned to the classroom. When "the Bunker" was active a high school diploma was unnecessary to get a good job. Three out of four Silver Valley workers lacked a high school diploma, but the company's disappearance suddenly changed the equation.[1152]

Nascent economic realities showed this federal and state aid to be much-needed. During the 1982-'83 school year, in response to a $600,000 drop in revenues, the Kellogg School District closed a school and eliminated thirty-four positions, including those of fourteen certified teachers.[1153] The City of Kellogg's assessed property values dropped

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[1149] "Bunker Workers Face Tough Job Hunt," *Spokesman-Review*.

[1150] Sue Lancaster, "Evans: Gulf Won't 'Walk Away' Without Leaving Help," *Kellogg Evening News*, December 1, 1981, 1.

[1151] "Aid Aimed at Kellogg Jobless," *Spokane Chronicle*, March 31, 1982, 10. The benefits issued from a federal program designed to assist U.S. workers forced out of jobs by the pressure of foreign competition. Only Bunker's former zinc workers were deemed eligible.

[1152] "Silver Valley Responds," editorial, *Spokesman-Review*, January 19, 1983, A4.

[1153] Steven Pike, "Silver Valley Schools Counting on Emergency State Funding," *Spokesman-Review*, March 4, 1983. The projected decrease in revenues, in turn, was caused by a sixty percent loss in property tax assessments over the past two years. This was due in large measure to the loss of much of Bunker Hill's plant and equipment from the school district's tax base.

forty-four percent between December, 1981 and the following December.[1154] As of May, 1983, the unemployment rate for Shoshone County was running at thirty percent.[1155] By August, 1983 the Kellogg School District had eliminated more than forty positions. Things undoubtedly would have been worse, however, had the District not received over $323,440 in emergency state assistance.[1156] In a sign of the times, Wallace High School's program in mining education, unable to secure employment for its eighteen students from mining companies during the summer of 1982, instead sent them to work as guides for tourists visiting the non-working Sierra Silver Mine.[1157]

Census data further bears out the impression of an area reeling under the weight of an economic implosion. Between March, 1981 and March, 1983 the number of employed persons in Shoshone County dropped by about forty-three percent, plummeting from 6,203 to 3,532, while annualized payrolls fell from $125,119,000 to $78,593,000.[1158] The ripple effect of major losses in the area's industrial base can be seen in the impact on the service sectors of the county's economy. Over the two-year period, 24 jobs were lost in wholesale trade; 221 in retail trade; 44 at auto dealers and gas stations; 116 at eating and drinking places; and 149 at hostelries and recreational services.[1159] Not only were miners and Bunker Hill plant workers forced to look for new employment in 1982-'83, so too were many who had been employed in service industry

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[1154] "Wallace Schools Seek Economic Lifeline," *Lewiston Morning Tribune*, August 5, 1983, 3D.
[1155] "Schools Face Cuts if Budget Not Hiked," *Spokesman-Review*, May 9, 1983.
[1156] "Wallace Schools Seek Economic Lifeline," *Lewiston Morning Tribune*, August 5, 1983, 3D.
[1157] "Schools Face Cuts if Budget Not Hiked," *Spokesman-Review*, May 9, 1983.
[1158] U.S. Bureau of the Census. *County Business Patterns, 1980, Idaho: Employment and Payrolls, Number and Employment, Size of Establishment, by Detailed Industry: Table 2: Counties – Employees, Payroll, and Establishments, by Industry: 1981*, 44 (Washington, DC, 1983). In tabulating employment data, the Census Bureau does not include government or railroad employees or the self-employed.
[1159] Ibid.

jobs that ceased to exist after the paychecks to the area's miners and plant workers evaporated.[1160]

The impact of the Bunker Hill closure on the regional economy can be seen in its effect on the Union Pacific (UP) Railroad. Bunker Hill had been the UP's major shipper in the Spokane region. Every week forty rail carloads of lead and zinc concentrates and phosphate rock had traveled from Spokane to Kellogg and twenty-five to thirty-five carloads had carried lead and zinc ingots, fertilizer, cadmium and sulphuric acid on the return trip.[1161] The Bunker Hill closure led to the furloughing of eight crews – thirty-two trainmen – who had worked on the daily trains between Spokane and Kellogg. In mid-1983, the railroad was sending only two trains a week on the route.[1162]

Despite a rebound in the price of silver and the reopening of some area mines by 1987, the Silver Valley economy was still reeling.[1163] Shoshone County's unemployment hovered at around fifty percent. The County, long one of Idaho's most prosperous, had become its poorest. Lack of work drove many out. The county's population had dropped by one quarter, from roughly 20,000 to roughly 15,000.[1164] Quite a few of the Valley's mining families appear to have left the District during the disastrous year of 1982,

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[1160] I am using the term "service industry" loosely here, not just to refer to the hostelry and recreation industries, but to all those industries that essentially exist to provide services to basic industry (e.g., law, banking, real estate, transportation, utilities).

[1161] Bill Morlin, "Railroads Hurry to Catch Up," *Spokesman-Review*, July 31, 1983, C1.

[1162] Ibid.

[1163] U.S. Bureau of the Census, *County Business Patterns, 1980, Idaho: Employment and Payrolls, Number and Employment, Size of Establishment, by Detailed Industry: Table 2: Counties – Employees, Payroll, and Establishments, by Industry: 1987,* 54 (Washington, DC). In many ways the picture actually was worse by 1987, the economy more hollowed out. Annualized March, 1987 U.S. Census figures showed only 2,530 people employed in Shoshone County, down from 3,532 in 1983, and payrolls of $9,581,000, slightly over half of 1983's $17,622,000. By this time, far more so than in 1983, the area's old industrial economy had really faded and had yet to be meaningfully replaced by tourism or revenues from the EPA Superfund cleanup.

[1164] David Bond, "Hope and Fear in Silver Valley," *Spokesman-Review,* June 21, 1987, 1.

searching for work in other western mining and smelting communities. According to Ray Frank a former miner at the Sunshine Mine who in the mid-1980s was collecting statistics for the Idaho Department of Employment's Job Service Office in Kellogg, families had relocated to places such as Silverton, Colorado; Troy, Montana; Rock Springs, Wyoming; Trail, British Columbia; Republic, Washington; and El Paso, Texas.[1165]

Larger numbers of Silver Valley families, however, about fifty in each case, migrated to San Miguel, Arizona and the Stillwater Valley in Montana. San Miguel boasted a large copper mine and Nye, Montana was the site of a new platinum mine. Many of the families still owned homes and had family back in the Coeur d'Alenes. While a number of people expressed nostalgia for northern Idaho and for the higher wages they had been paid in the Silver Valley, no one seemed to miss the job insecurity that had become part and parcel of working in the Coeur d'Alenes.[1166] Some miners took another route, however, and stayed in the Silver Valley to seek job retraining, still others departed for work in other fields. According to Ray Frank, about 85 miners stayed in Kellogg to seek retraining, while an undetermined number left in 1982 to work on the Hanford Nuclear Reservation in Washington State.[1167]

[1165] David Bond, "Tramp Miners Try, Try Again," Spokesman-Review, June 22, 1987, A5. At the time, both El Paso and Trail were the sites of lead smelters. At this writing the Trail smelter is still operating while the El Paso smelter has long since been shuttered.

[1166] Ibid. The Bunker Hill shutdown was a big part of the employment problem in the Valley during the 1980s but certainly not the entire story. Big mines in the District such as the Sunshine, the Lucky Friday, and the Galena either shut down completely or were only open intermittently during the decade, largely in response to highly fluctuating metals' prices. Regarding the lower pay outside the Coeur d'Alenes, whereas miners as the Sunshine Mine made about $25/hour in 1987, those at the Stillwater Mine in Nye, Montana earned about $13/hr.

[1167] Ibid.

Picking a Future

The sudden annihilation of its economic *raison d'etre* presented those who remained in Kellogg, and much of the Silver Valley, with an opportunity few ever get to undertake – choosing the economic future of their communities. Kellogg residents held a brainstorming session on the subject months before the last Bunker Hill employees left their posts. Ideas suggested included bottling black granular slag for sale and turning Kellogg into a gambling town. Many of the ideas, however, revolved around the theme of transforming the community into a tourist theme town. Suggested options included Western, Alpine, and Mining Camp.[1168] The community, however, did not coalesce behind a vision for a few years. In 1985, groups of Kellogg civic leaders traveled to Leavenworth, Washington and Park City, Utah to learn how those communities had successfully transformed themselves into destination tourist towns following the collapse of their traditional economic bases. Leavenworth, a onetime timber community that nearly died after the mill closed, revived its fortunes in the 1960s through its full-scale transformation into a mock Bavarian village. Park City, once a booming silver mining town, by the 1950s had fallen on hard times. The small community reemerged in the 1960s as a ski town that would eventually boast a gondola and easily accessible ski resorts. Kellogg civic leaders returned from their visits to Leavenworth and Park City

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[1168] Doug Barker, "Silver Valley Residents 'Brainstorm' to Rebuild Area's Economy," *Kellogg Evening News*, February 9, 1982, 3. The idea of playing on Kellogg's western and mining heritage in the creation of a theme town was given serious consideration, but city leaders eventually decided to cede that field to Wallace, its neighbor eleven miles to the east. While Kellogg's architecture lacked a common theme, Wallace's revolved around its many interesting, turn-of-the-century red brick buildings located in the town's compact business district. Its architecture made Wallace something of a natural to pursue the "historic mining town" theme. In a unique example, the entire town eventually was placed on the National Historic Register. Among other historic attractions, Wallace boasts the Northern Pacific Depot Railroad Museum, the Wallace District Mining Museum, and the Oasis Bordello Museum.

inspired by the examples of what those communities had done to resurrect their fortunes. Following his visit to Park City and his viewing of its gondola system, Kellogg Chamber of Commerce member John Reynolds enthused, "We learned that it can be done. Somebody else has done what we want to do and more."[1169]

Unlike Park City in the early 1960s, Kellogg did not need to build a ski resort. It already had one. In early 1968, the Jackass Ski Bowl opened in the mountains above Kellogg and Wardner, operating on 1,524 acres of land leased at no cost by Bunker Hill to the Fabulous Valley Corporation, an entity comprised primarily of local investors.[1170] Following Fabulous Valley's default on its Small Business Administration loans in 1973 and the subsequent foreclosure, Gulf-Bunker Hill purchased the ski resort and renamed it Silverhorn. The mining and smelting company ran the ski hill through its 1982 demise. The City of Kellogg took over the operation at the beginning of the 1983-'84 season.[1171]

By 1985, Silverhorn comprised Kellogg's greatest asset. But there was a problem. The seven-mile-long dirt road from Kellogg to the ski resort – whose base lay 3,400 vertical feet above town -- was windy, treacherous and slow. Ski resort consultants explained that there was no way to turn Silverhorn into a destination ski resort if the road remained the sole means of access to the ski hill. It was at this point that the gondola idea began to take shape. Civic leaders started discussing the concept of a long gondola that

[1169] "Gondola Scheme Gaining Support," *Spokane Chronicle*, June 22, 1985, 10.
[1170] L.M. Griffin to R.L.Haffner, 4 November 1969, MG 367, Box 98, Folder 2231, Bunker Hill Records. In addition to leasing the land at no charge, Bunker also donated at least $70,000 in money and services to Fabulous Valley, and owned a little less than one-sixth of the company's shares.
[1171] In the fall of 1982, the Bunker Limited Partnership, Inc., owned by Jack Simplot, Duane Hagadone, Harry F. Magnuson and Jack Kendrick, purchased ownership of the remaining former Bunker Hill properties. These included the Bunker Hill Mine and Silverhorn. The consortium ran the ski resort for one season before deciding to sell the business to the City of Kellogg. In 1987, they reopened the Bunker Hill Mine and ran it with a reduced, non-union crew into the early 1990s, when they went out of business.

would transport skiers from Kellogg directly to the base of Silverhorn. A feasibility study completed in the fall of 1985 concluded that the ski hill, coupled with the proposed gondola, "could generate 900-1,000 new permanent jobs."[1172] Impressed by the transformations wrought by Park City and Leavenworth, Kellogg leaders decided to marry them and transform their community into a Bavarian-styled ski town. The underlying concept was that a Bavarian theme would better-complement Kellogg's new identity as a destination ski resort, and better-fit the stylings of the eventual resort, than would the town's somewhat gritty, mining town décor.

In December, 1985, the Kellogg City Council passed an ordinance requiring that "Bavarian"-style lettering be used on all new signage in the town's business district. Additionally, all new construction henceforth had to be done in "Alpine" style, with exposed beams, flower boxes and murals painted on blank walls.[1173] In the summer of 1986, Kellogg voters approved offering eight million dollars in revenue bonds to finance gondola construction. In a measure of community support for the "if you build it, they will come" gondola project, the measure passed by a ninety-seven to three percent margin.[1174] Despite passage of the revenue bonds measure, securing funding for the gondola remained a longshot, in no small part because the bonds were to be repaid by receipts from the non-existent gondola. Kellogg turned to the federal government for aid for the $12 million project, pitching it to the Economic Development Administration and the Farm Service Agency, and seeking an Urban Development Action Grant and a

[1172] "Kellogg Facing Need to Diversify Economy," *Spokesman-Review*, June 24, 1986, 4.

[1173] "City to Get Bavarian Look," *The Bulletin* (Bend, OR), December 27, 1985, A3 and Timothy Egan, "Resort or Mining Town? Kellogg Makes a Change," *Harlan Daily Enterprise* (Harlan, KY), July 14, 1989, 8. Under the ordinance, existing signage was "grandfathered in" and allowed to remain as it was until 1993.

[1174] "Big Gondola Funding Goal for Kellogg," *Spokane Chronicle*, September 10, 1986, 3.

Community Development Grant.[1175] While none of these efforts ultimately bore fruit, in the end it was a far older form of federal funding, pork-barrel spending, that came to Kellogg's aid. Senator James McClure managed to slip a $6.4 million grant for Kellogg's gondola into the $600 billion omnibus appropriations bill that Congress approved in late 1987, tucking the grant away in the appropriations for a U.S. Forest Service program that was supposed to pay for the development and management of forests.[1176] The federal grant, however, needed to be fully matched by September 30, 1988, or it would disappear. Kelloggites once again were forced to scramble for money, securing matching funds from VonRoll Transport Systems, the Swiss manufacturer that secured the bid to construct the gondola, within weeks of the federal deadline.[1177] In order to secure the deal with VonRoll, the citizens of Kellogg agreed to back their revenue bonds with an additional special tax levy of $2 million over the next twenty years.[1178]

Ski Town

June 30, 1990 was a day of celebration for Kellogg. That was the date for the official opening of the gondola and for Silver Mountain, the renamed and enhanced

[1175] David Bond, "Federal Aid for Gondola Is Uncertain," *Spokane Chronicle*, June 20, 1986, 1.
[1176] "Idaho Town Wants Lift from Taxpayers," *The Vindicator* (Youngstown, OH), February 1, 1988, 3. Although a staunch Republican with strong conservative credentials, McClure was skewered in the press for securing this type of funding for the Kellogg gondola. *Newsweek* labeled the project "ridiculous;" national radio personality Paul Harvey blasted it on his show; conservative columnist James J. Kilpatrick skewered it, the national group Citizens Against Public Waste was critical, and President Ronald Reagan singled the gondola appropriation out, calling for Congress to rescind it and labeling the grant, "a prime example of the use of federal tax dollars to finance a local project which benefits a very limited area." For the Reagan and Kilpatrick critiques, see James J. Kilpatrick, "Of Cops, Games and Gondolas," *Lewiston Daily Sun* (Lewiston, ME), March 29, 1988, 4.
[1177] "Gondola Firm Offers Hope for Kellogg," *Spokesman-Review*, September 2, 1988, 1.
[1178] Ibid.

Silverhorn.[1179] Appropriately enough, Senator McClure was on hand as a special guest for the grand opening of "America's newest ski and summer resort."[1180] The centerpiece of that resort, of course, was the 3.1-mile-long gondola, the longest in North America, which ferried passengers up 3,400 vertical feet from the emerging Alpine-styled Base Village on the western end of Kellogg (not far from the old smelter site) to the Mountain Haus upper terminal in the shadow of Kellogg Peak. Fittingly, the gondola would carry skiers and sightseers – the area's new, hoped-for revenue source -- along the same path where in the 1880s and 1890s Bunker Hill's tramway had hauled ore from the mine to the Kellogg mill. On its 500 acres of skiable terrain, Silver Mountain offered 2,200 vertical feet of skiing divided up into 38 runs. In addition to construction of the gondola, three connecting lifts had been added to the resort.[1181] Though the resort had plans to expand, its size placed it in the middle range of U.S. ski areas, a far cry from the size and scope of such famous destination ski areas as Telluride, Vail and Park City.[1182] Owned jointly by the City of Kellogg, VonRoll, and the Hagadone Hospitality Corporation, Silver Mountain would be managed by Coeur d'Alene-based Hagadone Hospitality. Hagadone

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1179 "Destination North Idaho," *Spokane Chronicle*, June 29, 1990. Silverhorn was closed for the 1989-'90 season, while the gondola was being built. About $200,000 was put into improving the resort and it was reopened with its new name, under VonRoll's management, on June 30th, 1990.

1180 Ibid.

1181 Cary Ordway, "New Silver Mountain Ski Area Will Be a First Class Resort," *Spokane Chronicle*, January 5, 1990, 10. Perhaps fittingly, the primary means of production for Kellogg's new, leisure economy, the gondola's wheelhouse, was located close to the cornerstone means of production for Kellogg's former mining and smelting economy.

1182 "Ski Resorts by Vertical Feet," http://verticalfeet.com/, (accessed October 14, 2011) and Slackpacker, "Colorado Ski Area Guide – Very Complete, http://www.skiernet.com/ski_co.html, (accessed October 14, 2011). In 2011, Silver Mountain has expanded to 2,202 vertical feet and 1,500 acres of skiable terrain, served by six lifts and the gondola. Despite its expansion, the resort remains a mid- to upper-midsized ski area, trailing far behind such destination resorts as Telluride (4,425', 1,700 acres), Vail (3,330', 5,289 acres), and Park City (3,100', 2,200 acres) and even lagging behind nearby Schweitzer Mountain (2,400', 2,900 acres) and northwest Montana's Whitefish Mountain Resort (2,300', 3,000 acres).

hired Peter Forsch, a top manager for seventeen years at the renowned Aspen Ski Resort, to oversee Silver Mountain's development and operations.[1183]

Figure 9: The View from Gondola Village, Looking up Toward Silver Mountain, Picture Taken by Author, March, 2010

Much of the early buzz surrounding the new resort was enthusiastic. Seizing upon the vision of a year-round recreation hub with summer hikers, mountain bikers and mine tourists replacing winter snowboarders and skiers, Silver Mountain Director of Sales

[1183] Cary Ordway, "New Silver Mountain Ski Area Will Be a First Class Resort," Hagadone Hospitality was owned by Duane Hagadone. In 1987, the company opened the large, luxury Coeur d'Alene Resort on the shores of Lake Coeur d'Alene. Since his involvement in the failed effort to purchase the Bunker Hill Company and keep it running in 1981-'82, Hagadone had become heavily involved in Silver Valley affairs. In addition to his interest in Silver Mountain, as a member of the ownership group the Bunker Limited Partnership, Hagadone controlled the defunct Bunker Hill Company's remaining holdings in the Kellogg area. In 1985, he purchased the old *Kellogg Evening News*, renaming it the *Shoshone News-Press*. As of 2011, the newspaper is the only daily operating in the Silver Valley.

Todd Lund forecast, "We're going to be just like Knott's Berry Farm, where you have tons of activities going on."[1184] Although he admitted that Kellogg presently lacked the accommodations to house most of the visitors that would be generated by Silver Mountain, Peter Forsch predicted that the resort's presence would spawn a real estate boom throughout the Silver Valley.[1185] Encouraged by the gondola's strong summer ridership, Silver Mountain's owners announced plans to inject an additional $5.3 million into the resort over the next six months -- the capital going toward building a 3,000-seat amphitheatre near the gondola's upper terminal, adding forty additional gondola cabins, purchasing snow-making equipment, and installing a lighting system for night skiing.[1186]

Wilkommen zu Kellogg

While the new ski resort received mostly positive press, the same was not necessarily true for the "new Kellogg," replete with its "Bavarian" stylings. Some mocked the town's new welcoming sign, which read "Wilkommen zu Kellogg."[1187] In an article that received national distribution via the Associated Press, *New York Times* columnist Timothy Egan depicted Kellogg as, "Slouching toward trendiness," concluding that the town was, "trying to avoid a future as a ghost town by embracing the quaintness of a Bavarian village."[1188] A harsher assessment came from a *Spokesman-Review* reporter who opined that, "When local boosters chose a Bavarian theme to turn this depressed

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[1184] Ordway, "New Silver Mountain Ski Area Will Be a First Class Resort."
[1185] Steve Massey, "Skier Turnout Forces Resort to Make Room," *Spokesman-Review*, December 12, 1990, A12. Forsch's prediction proved to be prescient, although the boom he anticipated would not arrive for a good many years and then proved to be relatively short-lived.
[1186] Steve Massey, "$5.3 Million Will Improve Ski Resort," *Spokesman-Review*, September 13, 1990, A3.
[1187] Or "Welcome To Kellogg."
[1188] Timothy Egan, "Resort or Mining Town? Kellogg Makes a Change," *Harlan Daily Enterprise* (Harlan, KY), July 14, 1989, 14.

mining town into a fairy-tale tourist village, they had in mind a Cinderella transformation…After four years, what they've got is more like Beauty and the Beast."[1189] Objecting to the perceived inconsistency and ramshackle nature of Kellogg's makeover, the reporter, noting that fewer than a quarter of downtown Kellogg's businesses had "gone Bavarian" and that "even these aren't entirely convincing," concluded that "the 'theme town' concept…faces a serious challenge in this northern Idaho town…Kellogg still resembles more the rough mining town it is than the charming village it wants to be."[1190]

As the *Spokesman-Review* article suggests, not everyone in Kellogg was totally on board with the "Bavarian theme" idea. A number of opponents insisted that the town should proudly reflect its mining and smelting heritage rather than adopting a false front. Such contentions went to the very identity of the community. Katie Lutz, a merchant who had worked in the Bunker Hill Mine, expressed such concerns, saying, "I have some real reservations about going Bavarian…We should never forget that we're mining people in a valley built on the mines."[1191] In the early 1990s, city efforts to punish Kellogg merchants who were not complying with a sign ordinance mandating the use of Bavarian lettering in all commercial signs, touched off controversy, both over the restrictive nature of the ordinance and over the adoption of the Bavarian theme itself. The sign ordinance, and the deeper issue of community identity, divided Kellogg. Dale Brown, a local gift shop owner supportive of the ordinance, argued that it and the Bavarian theme represented Kellogg's best opportunity for economic development and that the sign

[1189] "Kellogg's Face Still in Need of a Lift," *Spokesman-Review*, May 22, 1989, A6.
[1190] Ibid.
[1191] Egan, "Resort or Mining Town?

ordinance was supported by "the majority of business owners" in the town.[1192] Others saw things differently. Jack De Feo, owner of an Italian diner, believed the town should promote its western and mining heritage and felt the Bavarian theme was, "a slap in the face to the miners in this valley."[1193] Other merchants complained that the ordinance was overly restrictive and compliance too expensive. Dave Smith, owner of Dave Smith Motors, one of the Silver Valley's largest employers, branded the Bavarian lettering illegible and promised to fight it "with every legal means at our disposal."[1194]

On Silver Mountain

Silver Mountain's inaugural ski season started strong, perhaps spurred by continuing curiosity about the gondola, but eventually faded. Based upon early season activity and overcrowding at the area's facilities, Forsch predicted the ski hill would record 100,000 skier visits for the 1990-'91 season. The resort's ultimate failure to reach that target was met with disappointment by some in the Kellogg community.[1195] Despite the investment of another million dollars in the resort following the initial ski season, over the next few years Silver Mountain failed to move to the level of the top national destination ski resorts, or even to the top shelf of regional ski hills. For the 1995-'96 ski season, for instance, while Big Mountain, a top regional resort, recorded 295,000 skier visits, Silver Mountain managed only 95,000, little or no improvement above its initial

[1192] "Kellogg Torn by Campaign," *Lewiston Morning Tribune*, January 3, 1993, 6C.
[1193] J. Todd Foster, "Bavarian Motif for Store Signs Bugs Merchants," *Spokesman-Review*, December 16, 1992, A1.
[1194] "Kellogg Torn by Campaign," *Lewiston Morning Tribune*, January 3, 1993, 6C.
[1195] Steve Massey, "Skier Turnout Forces Resort to Make Room," *Spokesman-Review*, December 12, 1990, A12 and Steve Massey, "Silver Valley Launches $1 Million Expansion," *Spokesman-Review*, August 30, 1991, A12. "Skier visits" is the terminology employed by the snow sports industry to catalogue the number of lift tickets sold at a given ski resort.

season.[1196] While this level of use placed Silver Mountain in roughly the same attendance category as nearby ski areas Schweitzer Mountain and Mount Spokane, it showed the Kellogg resort to be worlds removed from the league played of Vail or Aspen, both of which were averaging over a million annual skier visits by the early 1990s.[1197] In May, 1996, having once again, "finished near the bottom of the ski resort league," Silver Mountain was sold to Eagle Crest Partners, a resort-management subsidiary of Oregon's Jeld-Wen, a major manufacturer of windows and doors.[1198] The news panicked some in Kellogg, in no small part because the terms of sale permitted Jeld-Wen to sell or move the gondola if the company so chose, although to date the company has made no move to do so.[1199]

Resort Community

It almost goes without saying that a destination ski resort is far more than simply lifts, runs, and skiers. A big part of the experience of such a place for visitors, not to mention a significant source of revenues for resort owners, comes in the form other amenities. Eateries and bars, clothing stores, art galleries, lodges, golf courses, and real estate opportunities ranging from tiny condominiums to palatial homes, have become part and parcel of the contemporary ski resort scene. While it took some years for Silver Mountain to really engage in this side of the ski resort business in earnest, by the mid-

[1196] PRN Newswire, "Winter Sports, Inc. Seeks to Acquire Silver Mountain Ski Resort," April 8, 1996, http://www.thefreelibrary.com/WINTER+SPORTS,+INC.+SEEKS+TO+ACQUIRE+SILVER+MOUNTAIN+SKI+RESORT-a018171033 (accessed October 14, 2011). Big Mountain has since been renamed, the Whitefish, Montana resort is now named the Whitefish Mountain Resort.
[1197] Becky Kramer, "Ski Season Verges on Legendary," *Spokesman-Review*, April 13, 1999, A8 and "Telluride's Formula for Success," *The New York Times*, November 17, 1991.
[1198] Eric Torbenson, "Details of Ski Hill Plan Still Lacking," *Spokesman-Review*, May 31, 1996, A10.
[1199] Ibid.

2000s the resort had jumped in with both feet, entering the real estate frenzy of the era. In 2004, Jeld-Wen's construction and real estate arm, Jeld-Wen Communities, broke ground on Phase I of its Morning Star Lodge condominiums at the Gondola Village (the renamed Base Village), selling out the 68 units in short order.[1200] The following year, the Phase I condominiums were opened for use; Phase II of the Morning Star project was announced and 104 units were sold, and ground was broken for Silver Rapids, an indoor waterpark in the Gondola Village. Things continued apace in 2006, with Phase III's ninety-nine condominiums selling out in little time.[1201] The following year, construction began on Galena Ridge, an eighteen hole golf course and real estate development lying to the west of the Gondola Village on the site of the former Bunker Hill works.

Kellogg seemed finally to be emerging as the recreation community it had so long strived to become. Tourists and investors began buying up older homes for ski rentals and vacation cabins.[1202] Long-depressed real estate prices in town climbed. Although Kelloggites could hardly fathom the idea of local condominiums selling for as much as $800,000, by the mid-2000s the town had begun to emerge as a draw for winter recreationists seeking a second home that was significantly more affordable than what could be found in places such as Park City or Lake Tahoe, California.[1203] Condo-flipping commenced. Developers talked of building as many as 3,000 new condominiums and single-family dwellings.[1204]

[1200] Silver Mountain Resort, "History of Silver Mountain Ski Resort," http://www.silvermt.com/site_Our-Resort/OR-Default.aspx?page=OR-History (accessed October 14, 2011).
[1201] Ibid.
[1202] Becky Kramer, "Wal-Mart Considers Store in Silver Valley," *Spokesman-Review*, April 7, 2005, A8.
[1203] Becky Kramer, "Silver Turns to Gold: Condominium Surge Gives Silver Valley an Economic Lift," *Spokesman-Review*, February 4, 2007.
[1204] Ibid.

As it turned out, the timing of all of this development could hardly have been worse. The summer of 2007 saw the bursting of the national housing bubble, and the fall of 2008 witnessed the beginning of the worst economic slowdown to grip the United States since the Great Depression. As might be expected, the pace of construction in Kellogg slowed dramatically. By April, 2008, chain-link fences surrounded two stalled condominium projects and Silver Mountain had dropped its asking price for new townhouses from $585,000 to $395,000.[1205] Nine holes of the proposed eighteen-hole Galena Ridge golf course finally opened in 2010, years behind schedule. It is unclear when, or if, the remaining nine holes will be built.[1206] Fortunately for residents of Kellogg and other parts of the Silver Valley, a simultaneous and unexpected resurgence of the price of silver led to renewed activity in the "old west" sector of the area's economy that buoyed the County's otherwise faltering economy.[1207] With the price of silver rising past seventeen dollars an ounce, the Valley's three remaining mines quickly added 200 miners to their payrolls. Paying an average of $57,000 a year, the County's 700 mining jobs sustained a far higher standard of living than did those of the assorted ski

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[1205] William Yardley, "In High Prices, Moribund Mines Find Silver Bullet," *New York Times*, April 3, 2008.

[1206] Silver Mountain Resort, "History of Silver Mountain Ski Resort," http://www.silvermt.com/site_Our-Resort/OR-Default.aspx?page=OR-History (accessed October 14, 2011).

[1207] I use the term "old west" here to contrast the Rocky Mountain West's traditional natural resource extraction economy, with all its benefits and harms, with an idea popularized over the past twenty years of a "new west," in which a tourist- and second-home economy replete with cappuccino bars, ski slopes, "blue ribbon" trout streams, and mountain biking trails is often hailed as a preferable, more ecological way of life for westerners. While it may be somewhat "cleaner," ecologically speaking, than were its "old west" alternatives, it is also true that multi-national corporations often have turned to the former Third World countries to harvest raw materials in ecologically unfriendly ways, while many "new west" communities have been hollowed out economically and demographically, as wages in the tourist economy drop precipitously and longtime community residents can no longer afford to live in homes whose property taxes have risen to reflect new market prices.

lift operators, maids, waiters, indeed, nearly all, employed in the area's tourist economy.[1208]

A Superfund World

> With reactor accidents or chemical catastrophes, "blank spots" on the map arise again in the most advanced stage of civilization. They are monuments of what threatens us.[1209]
>
> – Ulrich Beck

In 1983, a seven-by-three mile stretch of the Silver Valley centered on the former Bunker Hill smelter was designated a Superfund Site and placed on the Environmental Protection Agency's (EPA) National Priorities List. The twenty-one square mile area, known as "The Box," encompassed the communities of Pinehurst, Page, Smelterville, Kellogg, and Wardner, and was home to about 7,000 people.[1210] Although by 1983 Silver Valley residents had already experienced more than a decade's worth of contact with the EPA, the relationship between the north Idahoans and the federal agency was about to enter a new, far more intensive, stage. Phase I of the cleanup was dedicated to minimizing the health threats posed to children by soil lead in and around the site's

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[1208] Yardley, "In High Prices, Moribund Mines Find Silver Bullet." According to 2006 economic data cited in the article, the miners' average wage of $57,000 was more than double the average for the county's other jobs.

[1209] Beck, *Risk Society*, 39.

[1210] Idaho Department of Environmental Quality, "Records of Decision," http://www.deq.idaho.gov/regional-offices-issues/coeur-d'alene/bunker-hill-superfund-site/records-of-decision.aspx (accessed October 17, 2011). At the time the Bunker Hill site was the largest in the Superfund system. It has since fallen into second place in this dubious category. In the mid-1980s, the EPA gave serious consideration to the idea of physically moving the entire town of Kellogg due to the fact that the community had been built atop mine tailings and stood to be so difficult to clean up. The idea eventually was dropped because of negative reaction from the community.

communities. Amidst wrangling over who would pay for the cleanup and apparent foot-dragging by Robie Russell, the EPA administrator who ran the agency's Pacific Northwest Division from 1986-'89, the yard cleanups that lay at the heart of this effort did not commence until 1989.[1211] By 2008, when this phase was completed, over 2,700 residential yards had been excavated and had their metals-laden soil replaced clean dirt. In a sign of the success of this project, area children's blood lead levels fell with the soil removal. As noted previously, these now stand at approximately the national average.[1212] Phase II of the EPA cleanup centered on the old Bunker Hill works. This Herculean task involved the hauling of about 2.4 million cubic yards of mine tailings and contaminated materials, and the demolition of more than two hundred buildings in the industrial complex. The waste was buried in the sixty-foot-high, 260 acre Central Impoundment Area that runs for over a mile along the south side of Interstate 90, the site's mercury encased in concrete and the rest wrapped in a thick plastic sleeve before being capped and covered with dirt.[1213] In 1995 Kellogg lost major industrial landmarks when the EPA dismantled and razed the lead smelter and zinc refinery. The following year those who had fought to preserve as tourist attractions and historical monuments the tall stacks built twenty years earlier to vent smelter and refinery gases, lost their battle.[1214] On Memorial

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[1211] "Bulldozers Signal the Cleanup of Contaminated Community," *Eugene Register-Guard* (Eugene, OR), January 13, 1989, 6C and Timothy Egan, "Some Say Mining Company's Move Could Thwart U.S. Plan for Cleanup," *New York Times*, October 2, 1990. The EPA's Inspector General wrote in 1990 that Russell "took extraordinary steps to prevent formal enforcement actions from being initiated against the owners" of the Bunker Hill mining site. It remains unclear why this occurred. Russell's critics, however, alleged that the Idaho native was trying to protect local businesses.

[1212] Idaho Department of Environmental Quality, "Records of Decision," http://www.deq.idaho.gov/regional-offices-issues/coeur-d'alene/bunker-hill-superfund-site/records-of-decision.aspx (accessed October 17, 2011).

[1213] Ibid.

[1214] Rich Roesler, "Move Afoot to Save Valley Smokestack," *Spokesman-Review*, June 29, 1995, A1.

Day, 1996 many locals and tourists turned out to watch as the towers were blown up and toppled.

In the years since the original Superfund designation, the EPA has served as a lightning rod in the Silver Valley. The storm surrounding the Agency intensified, however, following its 1996 decision to expand the size of the coverage area from twenty-one to roughly 1,500 square miles focused on the Coeur d'Alene River Basin. In that year, the EPA joined a U.S. Justice Department suit against Silver Valley mining companies for natural resource damages in the Coeur d'Alene Basin and reneged on its pledge not to expand the Superfund project beyond the twenty-one square mile Bunker Hill "box."[1215] In September, 2002 the Agency announced plans to expand the Project to cover the one hundred-plus miles between Mullan, Idaho and Spokane, Washington. The Basin cleanup plans called for the expenditure of an estimated $357 million over the next thirty years.[1216] The reversal tapped a vein of anger in the Silver Valley, where many viewed Superfund as a stigma that hampered efforts to build a tourist economy and the EPA's presence as a barrier to the continued practice of mining.[1217] In the early 2000s, a time when anti-EPA signs dotted the area, nearly three in five surveyed Silver Valley residents rated the agency poorly for gaining their trust.[1218] The EPA itself described the Silver Valley cleanup as "unusually contentious."[1219] Following the admonition of a *Shoshone News-Press* columnist that locals should be required to arm themselves against

[1215] Karen Dorn Steele, "EPA Strikes Vein of Anger," *Spokesman-Review*, July 21, 2002.
[1216] Ibid., "EPA Plan for Basin Unveiled," *Spokesman-Review*, September 13, 2002. This proposed expenditure came atop the $253 million that already had been spent on the Bunker Hill Superfund Site. Because Gulf Resources went bankrupt in 1993, the bulk of these funds had to be drawn from the Superfund trust fund.
[1217] Karen Dorn Steele, "EPA Cleanup Plan Spreads into Basin," *Spokesman-Review*, October 21, 2001.
[1218] Steele, "EPA Strikes Vein of Anger."
[1219] Steele, "EPA Strikes Vein of Anger."

federal agents seeking access to their property, uniformed police and undercover officers accompanied EPA officials to their next Silver Valley meeting.[1220]

Despite the opposition of many in the Valley to the expansion of the Superfund site and the continued presence of the EPA in the area, some locals supported the Agency's decision. Barbara Miller, the leading voice of the Silver Valley People's Action Coalition, an organization formed in 1986 to advocate for children's health and a full cleanup of the Valley, put the case succinctly, "The EPA is our only hope for this community being cleaned up."[1221] Miller and others contended that serious health problems remained in the Silver Valley and that the only realistic opportunity to remedy them lay in further environmental scouring of decades' worth of mining and smelting wastes.

The controversy surrounding Miller's 2001 nomination for a Ford Foundation award symbolizes tensions in the Silver Valley over the federal cleanup. Nominated by a Valley woman who remained anonymous fearing reprisals, the Kellogg activist became one of thirty-six finalists for the honor which recognized people worldwide who had improved life for others.[1222] In response to the nomination, *Shoshone News-Press* editor Dan Drewry wrote an editorial encouraging locals to send the Ford Foundation letters opposing Miller's receipt of the award, opining that, "We, as a community, know Barbara Miller and her claque represent a tiny, disaffected minority. You have a chance today to

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[1220] Karen Dorn Steele, "EPA Cleanup Plan Spreads into Basin," *Spokesman-Review*, October 21, 2001. The columnist, David Bond, a reporter who prior to his service with the *Shoshone News-Press* and his adoption of an anti-EPA advocacy position, already possessed years of experience covering the Silver Valley for the *Spokesman-Review*, claimed he only made the comment in jest.
[1221] Nicholas K. Geranios, "EPA Confronts Silver Valley Cleanup Plan," *Beaver County Times* (PA), October 23, 2001, B10.
[1222] Cynthia Taggart, "Kellogg Activist Honored Nationally," *Spokesman-Review,* September 7, 2001, 1.

help choke off the stream of lies, half-truths and distortions that emanate from the organization [the Silver Valley People's Action Coalition]." In a community reaction that a Ford Foundation official described as "highly unusual," the Foundation received a flurry of letters of opposition to Miller's nomination.[1223] Valley opposition notwithstanding, the Ford Foundation named Miller one of its twenty award winners and granted her $130,000 to continue her efforts.[1224] Kellogg Mayor Roger Mangum's response to the national recognition bestowed on his town's native daughter was less-than-enthusiastic. "I don't think we'll have a parade," said the mayor, "It's a slap in the face. Talk to 1,000 normal people and they'd be surprised to see she was even considered for it."[1225] In an implicit acknowledgment of the threat of retribution against Miller, however, Mangum urged townspeople to remain peaceable in their treatment of the activist, saying, "I'll just remind people, especially after last week [the events of September 11, 2001 were fresh at the time of the mayor's comments], that we have freedoms in America…Don't tread on others. Let's not do anything."[1226]

In 2009, as part of a nationwide settlement with the U.S. Justice Department, international mining and smelting giant ASARCO, Inc., legal successor to the Federal Mining & Smelting Co., owner of such valuable district properties as the Tiger-Poorman, Morning, and Standard-Mammoth Mines and the Page Mine and Mill, handed over $494 million for EPA cleanup efforts in the Coeur d'Alene Basin.[1227] In June, 2011, Coeur d'Alene-based Hecla Mining Company, owner of the Silver Valley's Lucky Friday Mine,

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[1223] Taggart, "Kellogg Activist Honored Nationally."
[1224] Cynthia Taggart, "Activist Wins Gold for Getting Lead Out," *Spokesman-Review*, September 20, 2001, B1.
[1225] Ibid.
[1226] Ibid.
[1227] Nick Rotuno, "Cleanup Moving Forward," *Shoshone News-Press*, February 22, 2010.

announced the settlement of its federal lawsuit for $263 million, approximately $197 million of which would go toward the EPA's continuing Basin cleanup.[1228] Taken together, the settlements represented an infusion of nearly $700 million into the EPA's coffers. In 2010, the Agency began taking public comment on another proposed expansion of the Superfund project, this one projected to cost $1.3 billion and take between fifty and ninety years to complete.[1229] The stated aims of this next, most lengthy, proposed phase of the cleanup were preventing repollution of the Basin via flooding, protecting groundwater sources, cleaning up abandoned mine sites, continued progress *vis-a-vis* human health, and enhanced protection of wildlife.[1230] Silver Valley skeptics postulated that the huge ASARCO settlement, more than sound scientific rationale, drove the EPA's decision to push for another expansion and extension of the Bunker Hill Superfund cleanup project.[1231]

Although anti-EPA signs no longer dot the Valley, the Agency's recent decision to continue its cleanup efforts for a seemingly indefinite period has been met with widespread local condemnation. Local and state officials seem to be united in their opposition as well. When, in the fall of 2010, the EPA held hearings in Wallace for the Record of Decision (ROD), the official blueprint that will guide its work on the next phase of the Superfund cleanup, seven Silver Valley mayors, area state legislators, and a

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[1228] Nicholas K. Geranios, "Mining Co. to Pay $263M to Settle Superfund Suit," *Bloomberg Businessweek*, June 13, 2011, http://www.businessweek.com/ap/financialnews/D9NR5ODO0.htm, (accessed October 18, 2011). The remaining $66 million was slated to go to the Coeur d'Alene Indian Tribe, the State of Idaho, and other federal agencies, for use in their own cleanup efforts in the Basin.
[1229] Dick Harwood, "EPA Editorial," *Shoshone News-Press*, October 7, 2010 and Nicole Nolan, "Residents Blast EPA Proposal," *Shoshone News-Press*, October 21, 2010.
[1230] U.S. Environmental Protection Agency, Region 10: the Pacific Northwest, "ROD Amendment for Upper Basin and Box," http://yosemite.epa.gov/R10/CLEANUP.NSF/sites/bh+rod+amendment (accessed October 18, 2011).
[1231] Dan Drewry, "Stop the EPA Steamroller," editorial, *Shoshone News-Press*, November 17, 2010.

representative of Governor Butch Otter, all showed up to express their disaffection with the plan.[1232] Numerous speakers at the hearing aired their belief that the "listening sessions" were a waste of time because the federal agency did not really consider locals' opinions in making their decisions.[1233] In an editorial written shortly before the hearing local state representative Dick Harwood said, "Public opposition to this plan is nearly unanimous…their plan is too expensive, too big and the wrong approach."[1234] In characteristically florid prose, editor Dan Drewry suggested that the EPA was, "a crazed bureaucracy throwing money at a non-existent problem," before urging that, "Our elected [congressional] representatives, by reining in EPA, could save hundreds of millions of tax dollars. Work a little Tea Party magic on EPA, gentlemen."[1235] Though unlikely to mollify its more ardent Silver Valley critics, the EPA announced in early 2011 that, in response to the nearly 6,000 local comments the Agency had received for its upcoming ROD, it was giving serious consideration to trimming $300 million from the Project's proposed $1.3 billion budget.[1236]

While the overall wisdom and efficacy of the EPA's quarter-century cleanup effort might be argued, it is hard to dispute that the Agency has spent a great deal of money in the economically depressed Silver Valley during its tenure. In fact, the unpopular federal agency likely has been the leading economic driver in Kellogg, and

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1232 Nicole Nolan, "Residents Blast EPA Proposal," *Shoshone News-Press*, October 21, 2010.
1233 Ibid. John Magnuson, son of the late Wallace mining magnate Harry F. Magnuson, opined that the sessions should be renamed "talking sessions" for this reason.
1234 Dick Harwood, "EPA Editorial."
1235 Drewry, "Stop the EPA Steamroller."
1236 Alecia Warren, "EPA Funding Will Help Assess Cleanup Sites," *Shoshone News-Press*, May 19, 2011. The proposed savings would come from dropping plans to line the bottom of a long stretch of the South Fork of the Coeur d'Alene River with a plastic liner. Instead, the Agency would install much less expensive groundwater treatment.

perhaps in the Valley, over the past twenty years. As of 2002, Superfund spending accounted for $77 million in jobs and community improvements in Kellogg and other Silver Valley towns, with $42 million of that total going to hire locals to work on the cleanup.[1237] Some 600 contractors worked the cleanup, and eighty-five to ninety percent of the labor force was local.[1238] With Gulf Resources' 1993 bankruptcy, the EPA assumed financial responsibility for the Superfund cleanup. Under the federal Davis-Bacon Act, the Agency and its subcontractors on the project were required to pay prevailing union-scale wages. Thus, about 500 Silver Valley workers made between twenty-two and thirty dollars an hour on the cleanup, or roughly two to three times what they otherwise would have earned, while also receiving union medical and pension benefits.[1239] While this practice undoubtedly inflated the cost of the cleanup, it meant extra money and benefits for a good number of Silver Valley workers. In addition to its direct injection of cash and jobs into the Valley's economy, the EPA also provided the City of Kellogg with $10,000 worth of computers for its schools and libraries, a $230,000 "greenbelt" that transformed the area adjoining the former rail line through town (now a bike path) into a parklike space, $542,000 worth of street maintenance funds, and $17 million in flood control and street projects.[1240] Though some argued that Superfund jobs were not particularly helpful economically because they tended to be seasonal – and certainly they were no replacement for the full-time jobs that Bunker Hill once offered –

[1237] Karen Dorn Steele, "Superfund's Silver Lining," *Spokesman-Review*, July 28, 2002.
[1238] Ibid.
[1239] Ibid.
[1240] Ibid.

in the post-Bunker era these jobs represented some of the best opportunities to be found in the Silver Valley outside of the mining industry.[1241]

Bike Paths to the Future

A telling example of the Silver Valley's transition from an industrial to a recreational economy is the transformation of two of the area's former railways into bike paths. In 1998, the Route of the Hiawatha Trail opened on the Montana-Idaho border near Lookout Pass. The bike trail ran along the old right-of-way of the Milwaukee Railroad, a perpetually troubled line that went out of business in 1980. In 2001, the trail added the Taft Tunnel, a 1.66 mile tunnel through the Bitterroot Mountains on the Idaho-Montana border. The fifteen-mile-long Route of the Hiawatha Trail, considered by some to be the "crown jewel" of the national rails-to-trails system, contains nine tunnels, seven high trestles and abundant mountain scenery.[1242] Lookout Mountain Ski Area manages the Trail and does a brisk seasonal business renting bike equipment and running the shuttle bus service that assists the many who only want to ride the trail as a one-way trip. The Route of the Hiawatha has proven to be extremely popular, especially since the opening of the Taft Tunnel, drawing many recreation-seeking families to the Silver Valley. In 2010, for example, the trail drew 11,321 riders in July and another 12,263 in August,

[1241] Nolan, "Residents Blast EPA Proposal." At the public hearing, State Representative Mary Lou Shepherd (D-Wallace) took issue with the EPA's contention that it was helping to sustain the local economy by providing jobs. Rep. Shepherd countered that the Agency actually was hampering economic development because its jobs were only seasonal (summer). Interestingly, I have not run across any complaints about the seasonality (winter) of the bulk of Silver Mountain's employment.

[1242] Greg Marsh, "Route of the Hiawatha: Mountain Bike Trail," http://wallace-id.com/skilookout/taft.html (accessed October 19, 2011).

shattering usage records set the previous year.[1243] The trail likely will only become more popular when an additional thirty-three mile stretch extending it to St. Regis, Montana is completed.

The Route of the Hiawatha Trail, however, is not the area's only popular bike path. Since 2004, its first official year of use, the 73-mile-long Trail of the Coeur d'Alenes has been ridden by about 100,000 cyclists annually.[1244] The Trail runs from Mullan, in the mountain country on the east end of the Silver Valley, to Plummer, Idaho, in the hilly lands west of Lake Coeur d'Alene on the Coeur d'Alene Indian Reservation. Those who manage to make the long trek will ride through mountains, wetlands, mining country, the area of the old Bunker Hill works, the lush lower Coeur d'Alene River country, and the picturesque Coeur d'Alene Lake. The ribbon of asphalt now carries cyclists over the path where heavily-laden Union Pacific Railroad trains once ferried lead, silver and zinc to distant markets. Because over the years those trains spilled large amounts of toxic metals, camping along the trail is strictly prohibited and numerous trail signs remind riders to stay on the asphalt.[1245]

In April, 1993, the Union Pacific stopped running its trains to the Silver Valley. In order to preserve its 150-foot right-of-way, the railroad proposed building a recreational trail on its former line under the guidelines of the federal Rails to Trails Act. Under an agreement with the EPA, the State of Idaho, and the Coeur d'Alene Indian Tribe, the Union Pacific removed its track and other features, scraped away a good deal of

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[1243] Nicole Nolan, "A Record for Route of the Hiawatha," *Shoshone News-Press*, September 7, 2010.

[1244] Becky Kramer, "Portions of CdA Trail Closed by Flood Damage," *Spokesman-Review*, June 13, 2008.

[1245] Karen Dorn Steele, "Bike Path Cleanup Assailed," *Spokesman-Review*, October 13, 2002 and personal experience of riding the Trail, September, 2008.

contaminated dirt, built protective barriers, and capped the rail bed with a 2.5 inch layer of asphalt. The railroad also set up a $2.6 million escrow account for trail maintenance.[1246] Although the path is far from pristine – hence the frequent warning signs – the EPA has deemed it to be safe for cyclists who follow the rules.

Perhaps surprisingly, the nation's only bike path through a Superfund site has proven highly popular and is a significant economic engine in the Silver Valley. Visiting cyclists who ride the Trail tend to be from higher income brackets, and they spend money on local gas, food and lodging during their excursions in the Valley. Jon Ruggles, president of the group, Friends of the Coeur d'Alene Trails, estimated the Trail's local economic impact at $6 million during the 2004 season.[1247] Speaking of the Trail of the Coeur d'Alenes, Mike Domy, owner of Kellogg's Excelsior Bike Shop, said, "We're becoming a playground for people in Seattle and Portland…It [the Trail] helps us round out our tourism economy. It's not just skiing anymore."[1248]

Over the past two decades the bike trails and Superfund spending have emerged as the only reliable bright spots on Kellogg's and the Silver Valley's economic horizon. Mining has been somewhat resurgent over the past years with the high price of silver, but as a commodity industry remains dangerously susceptible to price fluctuations. Skiing and snowboarding, while an important part of the winter economy, have never proven to be the recreational draw their supporters had hoped they would become. Silver Mountain's strong early first season numbers, likely based upon the novelty of the

[1246] Ibid. Under its agreement, the Union Pacific maintains perpetual responsibility for maintenance of the Trail. The State of Idaho and the Coeur d'Alene Indian Tribe perform this maintenance.
[1247] Becky Kramer, "Silver Valley Trail Bringing in Gold," *Spokesman-Review,* July 21, 2005.
[1248] Ibid.

gondola, did not prove to be an accurate forecast of future results. It has not become a major destination ski resort, and in fact is not well-known outside the Inland Empire. The real estate and construction boom that centered on the Gondola Village in the mid-2000s came to a screeching halt with the 2007 bursting of the national housing bubble. While resort-based development on the west end of Kellogg may eventually revive, this is far from a certainty.

In the first decade of the 21st century, both Shoshone County and Kellogg continued to lose population. The County's total dropped to 12,765, a seven percent decline from 2000, and its largest city shed 11.5 percent of its population to finish the decade with 2,120 residents.[1249] Although the Kellogg real estate boom helped to increase median household income by thirty-one percent between 2003 and 2008, the subsequent bust and recession led to a nine percent decrease in 2008-'09.[1250] The County's August, 2011 unemployment stood at 15.9 percent, meaning that nearly one in six job-seeking adults was without work.[1251] The local mining industry, resurgent in 2007-'08, saw reversals in response to the global recession in late 2008-'09 that led to the closure of the Sunshine Mine and the loss of over 200 mining jobs in the Silver Valley. By 2010, the resurgent price of silver had led to the employment of additional miners at the Valley's two operating silver mines, the Galena and the Lucky Friday. In that year, Shoshone County's 539 miners earned an average of $70,919, or well over twice the average wage

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[1249] Idaho Department of Labor, "Shoshone County Work Force Trends, September, 2011," http://labor.idaho.gov/publications/lmi/pubs/ShoshoneProfile.pdf site checked October 19, 2011. These figures show Kellogg to have shed nearly two-thirds of its population since the late 1950s.
[1250] Ibid.
[1251] Ibid.

in the county.[1252] The April, 2011 death of veteran Silver Valley miner Larry "Pete" Marek from a cave-in at the Lucky Friday, however, is a reminder that mining remains a dangerous profession.[1253]

Moreover, the City of Kellogg's, and to a lesser extent Shoshone County's, decision to embrace recreational tourism as an economic development strategy, appears to have met with rather paltry results. In 2010, the 407 Silver Valley people identified as employed in the leisure and hospitality industry represented less than eight percent of the County's total workforce, only marginally greater than the nearly 350 people employed by Kellogg's Dave Smith Motors.[1254] And they do not make much money. In 2010, when Shoshone County's per capita income stood at $30,811, the average wage for one of the area's leisure and hospitality industry jobs hovered at an anemic $12,106, or below the federal poverty line for a married couple.[1255] Another way of framing this is to say that Shoshone County's post-industrial, tourist economy jobs paid slightly more than one-sixth of what its remnant industrial economy, mining jobs did. No wonder many locals yearned for a return of large-scale mining to the Valley. Ulrich Beck's *advanced modernity* generally might be able to support both green values and a vibrant, diversified economy in large cities such as Seattle and Boston, or in successful tourist communities such as Aspen and Park City, but in former one-industry towns such as Kellogg that now

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[1252] Idaho Department of Labor, "Shoshone County Work Force Trends, September, 2011," http://labor.idaho.gov/publications/lmi/pubs/ShoshoneProfile.pdf (accessed October 19, 2011). The Lucky Friday is near Mullan and the Galena is near Wallace. Both are owned by Coeur d'Alene mining companies, the Lucky Friday by the Hecla Mining Company and the Galena by Coeur Mines.
[1253] Becky Kramer, "Mine Death Put on Bosses," *Spokesman-Review*, September 17, 2011.
[1254] Ibid., and Sarah Rose Fredlund, "Dealership Honored Again," *Shoshone News-Press*, January 7, 2010.
[1255] Idaho Department of Labor, "Shoshone County Work Force Trends, September, 2011," and CoverageforAll.org: Foundation for Health Coverage Education, "2011 Federal Poverty Level," http://www.coverageforall.org/pdf/FHCE_FedPovertyLevel.pdf (accessed October 19, 2011).

struggle to find a sustainable economic basis, it is likely that many residents wish they somehow could transition back to Beck's *classical industrial* stage, with all of its environmental and social pitfalls

Although a fair amount of money was made, few of the proceeds of Kellogg's real estate boom of the mid-2000s appear to have trickled down to Uptown Kellogg. Though Uptown's commercial district had been the small city's throbbing heart during the Bunker Hill days, Kellogg's switch to an economy based on recreational tourism shifted the center of the town's geography of commerce to Silver Mountain's Gondola Village, located approximately half-a- mile northwest of Uptown. The mega-recession of 2008-'09 hit all of Kellogg hard but its results were particularly noticeable in Uptown Kellogg, where boarded-up windows and abandoned buildings became familiar landscape features, as did vacant storefront windows displaying "For Sale" and "For Rent" signs.[1256] In September, 2010, Kellogg business leaders held a town hall meeting at the former Steelworkers Building to generate ideas for reviving the town. In language reminiscent of the early 1980s efforts to develop a vision for the future of the onetime mining and smelting city, Brenda Stinson, an Uptown merchant spearheading the effort, encouraged creative participation in the forum, saying, "…any ideas will be welcome, no matter how crazy."[1257]

[1256] Nicole Nolan, "Uptown Kellogg Ideas Sought," *Shoshone News-Press*, September 10, 2010. Among the long-boarded-up Uptown structures is the big, red brick YMCA building, "Uncle Bunker's" old pride and joy. In addition to the heightened signs of urban blight in Uptown, the City of Kellogg experienced a dramatic uptick in crime rates during 2009.
[1257] Nolan, "Uptown Kellogg Ideas Sought."

Figure 10: Kellogg YMCA, Photo Taken by Author, March, 2010.

At the town hall meeting some expressed concern over the blight that was overtaking Uptown. A number of attendees voiced the view that the city should embrace its identity as a mining and smelting community and discard its languishing efforts to be a faux Bavarian village. One resident, Michael Murphy, maintained simply, “We’re not Austria…this is not Austria.”[1258] Playing upon this theme, Brenda Stinson suggested Kellogg should draw upon its heritage as “the only town in the U.S. founded by a jackass” and host a variety of tourist events based upon the jackass theme, such as an

[1258] Nolan, “Worried about Uptown” Murphy’s point was clear even if he was mistaken about the precise country his town was trying to ape.

annual Jackass Days, a “running of the jackass” and the naming of a local “jackass of the year.”[1259] Although a series of town hall meetings was held in 2010, a new vision for the direction of the community did not emerge.[1260]

As the current state of Kellogg and continuing struggles of Kelloggites to craft a viable future for their town attest, the transition from an industrial to a post-industrial community is fraught with challenges. Thirty years into the process, Kellogg and the Silver Valley still are wrestling with fundamental questions of identity, direction, and viability. Economic restructuring has proven far more difficult than all the initial hype and hope surrounding Bavarian signs, resort development, or a gondola would indicate. As it turns out, if you build it, they might or might not come. And even if they do come, they almost certainly will not support the kind of pay scales that the community’s former basic industry did. Although Kellogg and the rest of the Silver Valley are undoubtedly far cleaner, healthier places to live today than they were thirty years ago, it is doubtful that as communities they are as strong or as vibrant as they were when mining and smelting ruled the Valley. The smoke is gone, but so too is much of the money that went with it.

[1259] Ibid. In making her case, Stinson cited the recent return to I-90 of a billboard sign that for years had welcomed highway visitors to Kellogg. The sign, bearing a large depiction of a jackass, read “You are now nearing KELLOGG, the town which was Discovered by a JACKASS – and which is inhabited by its Descendants.”

[1260] Brenda Stinson, editorial, “Improved Signs for Visitors Is a Must for Kellogg,” *Shoshone News-Press*, November 9, 2010. Numerous process improvements were suggested, however, such as improving street and highway signage to better-direct visitors to local businesses, doing more grant-writing, and establishing a Kellogg Facebook page.

EPILOGUE

Changqing, Shaanxi Province, China: In August 2009, 851 children living near the Shaanxi lead and zinc smelter in north-central China tested positive for lead poisoning. More than 170 were hospitalized. Angry residents of Changqing and a nearby village marched on the Shaanxi smelter, the fourth largest lead smelter in China, tearing down fences and attacking trucks before police restored order.[1261] In response, the Chinese government closed the smelter. Although the Chinese Environment Minister, Zhou Shengxian, called for "powerful measures" to prevent pollution by lead and other heavy metals, many were skeptical that any real change would come. Enforcement of national regulations was problematic. Many local officials emphasized short-term profits over the health effects of industrial pollution.[1262]

The lead poisoning episode at Changqing was not the only one to occur in August, 2009. Days later a larger case, involving 1,300 children, was reported at an illegal manganese smelter operating in Hunan Province. Later in the month 200 children in Kunming, the capitol of Yunnan Province, showed signs of lead poisoning during routine testing of 1,000 children.[1263] Children's lead poisoning, unfortunately, is not an uncommon problem in China's numerous smelter towns. A Chinese health official estimates that between fifty and sixty percent of children under fourteen in the country's mining regions suffer lead poisoning.[1264] Such regions are numerous. China has emerged

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[1261] Michael Wines, "Lead Sickens 1,300 Children in China," *New York Times,* August 21, 2009.
[1262] Sky Canaves, "Beijing Says New Measures Needed to Fight Lead Poisoning," *Wall Street Journal,* September 4, 2009.
[1263] Ibid.
[1264] Ibid.

as the world's largest producer of refined lead and lead batteries. Its lead output rose nearly twenty percent in 2008 to 3.26 million tons.[1265]

The process of the export of dirty industries from wealthier to less-prosperous regions continues. In 1977, for example, there were six primary lead smelters operating in the United States.[1266] By 1995 that number was down to two. Today there is one, the Doe Run facility at Herculaneum, Missouri, thirty-five miles south of Saint Louis. Primary lead smelting has arisen in places like China where development pressures are strong and environmental regulations lax. With the recent outcry over lead poisoning cases and the closing of some lead plants, however, there has been a trend for smelters to move to poorer, more remote areas of China.[1267]

China's ongoing outbreaks of childhood lead poisoning in and around smelter communities seem all-too-familiar. It is part of a story that is as old as the ancient Greeks and as new as the latest legal or illegal lead smelter to be hastily assembled in a poor country.

[1265] Wines, "Lead Sickens 1,300 Children in China."
[1266] All of these facilities smelted ore concentrates.
[1267] "Lead Poisoning Haunts Chinese Smelter Communities," *New York Times*, August 26, 2009.

CONCLUSION

The legacies of the Coeur d'Alenes are outsized. The area has produced more silver than any other in world history and has been one of the largest producers of lead and zinc in U.S. history, all told, more than twenty-six billion dollars worth of metals.[1268] Home to the nation's three richest silver mines – the Sunshine, Galena and Bunker Hill – the area also claimed sizable lead smelting and silver and zinc refining facilities. For decades, the Coeur d'Alenes' mines, mills, smelter and refinery employed thousands of workers and supported a vibrant working class culture. The area has another legacy, too, one of environmental degradation and despoilage that since 1983 has caused it to be one of the nation's largest and most challenging Superfund sites. Over 56 million tons of mine tailings were sent down the South Fork of the Coeur d'Alene River by mining and milling companies, polluting an estimated 25,000 acres of farmland with lead and other heavy metals by 1900 and rendering the Coeur d'Alene River and its tributaries nearly devoid of aquatic life by the early 1930s.[1269] Until the late 1960s, the mines and mills of the Coeur d'Alenes essentially used the Coeur d'Alene River and its tributaries as an industrial sewer to transport wastes away from their worksites. Even today, after more than forty years of proper tailings impoundment and nearly thirty years of cleanup efforts, roughly twenty miles of streams remain unable to sustain a reproducing fish population, and about ten miles of tributaries have virtually no aquatic life. In addition, lead poisoning is responsible for a large number of waterfowl deaths each year in the lower

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[1268] Keith R. Long, *Production and Disposal of Mill Tailings in the Coeur d'Alene Mining District, Shoshone County, Idaho: Preliminary Estimates*, Open-File Report 98-595, special report prepared at the request of the United States Geological Survey, 1998, 2. This figure is measured in 1997 dollars.
[1269] Ibid., Coeur d'Alene River and Lake Commission, *Report and Recommendations*, 50.

Coeur d'Alene River Basin: more than 15,000 acres of wildlife habitat contain sediments and soils that are acutely toxic to waterfowl.[1270]

Even worse than the environmental legacy from its mining and milling activities is that related to the Coeur d'Alenes' lead smelting and zinc refining. Visitors to the area often commented on the denuded hillsides surrounding the town of Kellogg. The reason for this treeless condition was the large quantities of sulphur dioxide ($SO_{2)}$ produced as effluent by the Bunker Hill Company's zinc refinery and lead smelter. This acrid, foul-tasting gas killed vegetation, and on days of stronger concentrations, impaired human health. The smelter's excretions of lead fumes, however, generally represented a more serious threat to human health. Before Gulf Resources'-Bunker Hill's ill-fated decision to continue running the lead smelter at full capacity despite the loss of much of its air filtration system following the September, 1973 baghouse fire, many Kellogg area residents undoubtedly suffered from chronic lead poisoning due to their exposure to the smelter's noxious vapors. In the wake of the massive emissions that followed the baghouse fire, acute lead poisoning became the rule for those living within 2.5 miles of the smelter stack. This, of course, was particularly damaging to the health of young children, who face significantly heightened health risks from lead intoxication. Ample evidence attests to the fact that a good many children who lived near the smelter in 1973-'74 suffered real and permanent harm. Tests conducted in the mid-1970s evinced tendencies toward slowed nerve conduction velocity and anemia. A mid-1990s follow-up study revealed a host of continuing maladies affecting a number of the former "baghouse

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[1270] U.S. Environmental Protection Agency, Region 10: the Pacific Northwest, "Cleanup Work: Site Background," http://yosemite.epa.gov/R10/CLEANUP.NSF/bh/Cleanup+Work, (accessed April 9, 2012).

kids," which included anxiety, infertility, learning disabilities, high blood pressure, anemia, diminished hand-eye coordination and grip strength, slowed nerve conduction velocity, poor vocabulary, depression, memory loss and trouble concentrating.[1271]

Another group affected by the Coeur d'Alenes' air pollution consists of zinc, and, to a greater degree, lead plant workers, who consistently bore the burden of the community's highest levels of exposure to aerosolized lead and other heavy metals. Although the problem of occupational lead poisoning was already well-understood by the time of the Bunker Hill smelter's construction in 1917, the "leading" of workers remained a significant problem at the smelter throughout its history. As health and mortality studies of lead smelter workers from the 1970s-'90s have shown, they paid a price for working at the facility. In addition to peripheral nerve dysfunction, lengthened choice reaction time, increased feelings of hostility and depression and disordered calcium metabolism, the studies charted elevated rates of renal disease, renal failure, and increased mortality from these causes and from stroke in Bunker Hill smelter workers.[1272] With their bodies at the "biological core" of the lead smelter's environment, workers' elevated rates of renal disease and other severe health issues showed that environment to be troublingly toxic. Their sickened kidneys spoke of a heavily leaded work environment.

The Coeur d'Alenes' mining, milling, and smelting has enriched numerous corporate managers and shareholders, sustained tens of thousands of workers and a string

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[1271] Susan Drumheller and Craig Welsh, "Children Left in the Dust: Lead Affected Generation of Silver Valley Children," *Spokesman-Review*, March 9, 1997, A1. The study interviewed 917 former Silver Valley children and tested the nervous systems and bone lead of 281 of them. For a control group, the study used comparable numbers of Spokane residents of roughly the same age.

[1272] "Summary" (of NIOSH study), 1, MG 413, Box 247, Folder 4633, Bunker Hill Company Records, Special Collections, University of Idaho.

of working class communities running from Mullan to Kingston. The industry provided substantial economic support to more distant centers such as Coeur d'Alene and Spokane. The area's prodigious production of base metals (e.g., lead and zinc) and a precious metal – silver – has played a meaningful role in the construction of global industrial civilization. Over the past 125 years, lead from the Coeur d'Alenes' has found its way into numerous products, including the world's supply of electrical cable, x-ray shielding vests, paint, gasoline, and batteries; the area's zinc has been integral to the production of die castings, alloys such as brass and aluminum solder, and zinc oxide, while its silver can be found in electrical conductors, jewelry, coins and photographic film the world over. The social costs of this production, however, have been large, to say the least. Those run from the incalculable losses of potential and opportunity for the children affected by the 1973-'74 lead epidemic to the more quantifiable deaths of fish, geese, swans, horses and trees that unluckily were in the path of the mining district's toxic effluvia. They range from the leaded paint and gasoline that saturated the planet and decreased the intelligence of millions and killed thousands to the renal disease and early death suffered by Bunker Hill smelter workers, and from the ongoing health issues faced by onetime children who grew up in the shadow of the smelter to the "monster" that lies at the bottom of Lake Coeur d'Alene – millions of tons of toxic heavy metals. The social costs of the Coeur d'Alenes' mining, milling and smelting activities have been immense.

For the most part, these costs have been shifted. As is the rule under capitalism, instead of being shouldered by the companies responsible for creating them, or their consumers, the social costs largely have been borne by the local environment and by the bodies of relatively powerless groups of people – in this case primarily Bunker Hill smelter workers and residents who lived to the smelter. When it comes time to pay for the cleanup of an area, or the medical treatment of a sickened worker, the responsible company often is not around.[1273] In a corollary to what has been termed "the fisherman's problem," private individuals or corporations have little incentive to refrain from polluting the public commons (e.g., air, water); the gains from doing so will accrue to them individually, while the costs will be borne by society generally.[1274] The environmental history of the Coeur d'Alenes conforms closely to this rule. Although Bunker Hill and the other large companies in the District made some, relatively minor, efforts to protect the environment and worker health before the "environmental turn" of the 1960s-'70s, the lion's share of such measures came after federal and state law, backed by regulatory agencies, compelled them to do so.

It goes without saying that not all industries are created equal. Some offer higher pay, some better benefits, some more job security, while some industries are cleaner and more healthful for workers than others. By any measure, lead smelting is a relatively dirty and unhealthful industry. As Peter Piekarski, a retired, longtime Bunker Hill smelter

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[1273] Although Hecla and ASARCO, two companies long-involved in mining and milling in the District, recently agreed to large payouts for remediation of the Coeur d'Alene Basin, the early 1990s bankruptcy Gulf Resources left the U.S. taxpayer to foot the bill for Gulf-Bunker's significant share of the cleanup costs for the northern Idaho and eastern Washington environment. Although former Gulf-Bunker employees receive contractually-obligated health insurance benefits from their former employer, to my knowledge no direct payout has been made to former smelter employees who have suffered renal disease or other health problems contracted while working for the company. In any event, it is doubtful that any monetary recompense can ever fully compensate an individual for lost health or fully restore a badly fouled environment.

[1274] Arthur McEvoy, *The Fisherman's Problem: Ecology and Law in the California Fisheries: 1850-198*0 (Cambridge, UK: Cambridge University Press, 1986), 9-13. The fisherman's problem, as employed in McEvoy, refers to the tendency of individuals to overharvest natural resources (e.g., fish) that are not privately owned because the social costs of the unsustainable gathering of such resources are borne primarily by society in general while the gains to be made are realized individually.

worker said of himself and his comrades, “We knew we were working in a hazardous industry.”[1275] Still, there existed meaningful differences between smelters. Because of conscious decisions made by corporate managers, some smelters were relatively less unhealthy places to work than others. Certainly by the 1970s, but probably far earlier, the Bunker Hill smelter had fallen far behind the U.S. industry standard for cleanliness. Health experts who visited the facility during this period commented upon its lack of adequate hooding and venting equipment, relative dustiness, and need for improved “housekeeping.” The company’s longstanding policy of placing responsibility for smelter worker health squarely upon the workers’ shoulders – represented in the mid-1970s by the requirement that all smelter workers wear respirators in the facility – permitted the company to save money that it might otherwise have spent on cleaning up the smelter environment. By the 1970s, the aging facility faced a steep, uphill battle to bring its air-lead levels into compliance with increasingly demanding federal requirements. Had Bunker kept pace with the industry standard for the environmental health of the interior of its smelter, as was done at Doe Run and other smelters in Missouri’s historic “lead belt” and at the Ronnskar plant in Sweden, smelter workers would have been healthier and the cost of compliance with the new rules far more manageable.[1276]

In a similar vein, the major mining and milling companies of the District, as represented by the Mine Owners Association (MOA), in 1931 opted not to invest in the tailings disposal system recommended by fisheries biologist M.M. Ellis and supported by

[1275] Cynthia Taggart, “Bunker Hill Men Still at Risk From Lead,” *Spokesman-Review*, May 21, 1994.
[1276] Declaration of Michael J. Wright,” in *United Steelworkers of America, AFL-CIO-CLC v. Ray Marshall, Secretary of Labor, et. al.*, February 1980, 7, MG 367, Box 14, Folder 241, Bunker Hill Company Records, Special Collections, University of Idaho and [1276] Mark H. Hooper, testimony before the Idaho State Board of Health and Welfare, 18 August 1975, 9, MG 413, Box 243, Folder 4557, Bunker Hill Company Records, Special Collections, University of Idaho.

two of the three members of the Coeur d'Alene River and Lake Commission. This proposed system was modeled upon that employed in Kimberly, British Columbia by the Sullivan Mines and Mills, a lead and silver mining and milling company. The Kimberly system used wooden flumes to transport mine wastes to a number of settling basins. There, mill tailings settled out to the extent that plankton, aquatic insects and fish life could be observed at the point where the "tailings water" reentered the local stream, the St. Mary's River.[1277] Although Ellis warned that the MOA's preferred option, the employment of a suction dredge at Cataldo alone, would be a far from adequate means of restoring the ecological health of the Coeur d'Alene River and Lake Coeur d'Alene, this was nonetheless the course followed by the District's principal mine and mill owners. While it might have cost more than the dredge, installing a "Kimberly system" in the early 1930s almost certainly would have limited the ecological harm to the Coeur d'Alene Basin's ecosystem and begun the restoration of plant and animal species more than three decades before it would actually occur.[1278] The MOA's decision not to use a proven tailings removal system with obvious benefits for the health of the local environment amounted to a choice to inflict relatively greater harm on an already-battered watershed.

In another example of the significance of corporate decisions for local environments, the Consolidated Mining and Smelting Company (COMINCO), a major Canadian mining and smelting firm that operated a lead-zinc smelter at Trail, British

[1277] U.S. Bureau of Fisheries, *Special Scientific Report, No. 1, Pollution of the Coeur d'Alene River and Adjacent Waters by Mine Wastes* (Washington, DC, 1940), 55.

[1278] It is unclear that the "Kimberly system" would have cost more. If, however, the MOA already had gone ahead and begun to install the dredge, the mine owners may well have deemed the additional cost of the flume system too great an expense.

Columbia, in the late 1930s adopted a Supplemental Control System (SCS) that significantly reduced SO_2 emissions at its smelter and consequent damage to vegetation.[1279] The firm did so in response to a mandate from the International Joint Commission (IJC), a U.S.-Canadian body established to resolve a dispute over smelter smoke damage to Northport, Washington farmers' crops from the nearby Canadian smelter. Although by the late 1940s locals and U.S. Forest Service officials were complaining vigorously about the Bunker Hill smelter's and zinc plant's SO_2 damage to area vegetation and health, the company did not adopt a COMINCO-style SCS until the 1970s.[1280] Once again, though technology existed that would have allowed Bunker to inflict less harm upon the local environment, the company chose to save money by not employing it.

The ultimate example of Bunker Hill's conscious cost-shifting of its pollution to the environment can be found in the 1973-'74 lead epidemic, where the company, in the wake of the baghouse fire, made the Faustian decision to continue running its smelter at full bore for months even though much of its air filtration system was missing. Even worse, from January – March, 1974, the company vented unfiltered smelter fumes and gases directly into the atmosphere, bypassing what remained of the baghouse and sending its toxic effluent up the smelter's main stack. In other cases of Bunker's environmental cost-shifting, although the company certainly was not using the best available pollution control technology, it was not dramatically out of line with common industry practice at

[1279] Wirth, *Smelter Smoke in North America*, 82-83.
[1280] The company did, however, bow to these pressures to the extent of constructing a sulphuric acid plant in the early 1950s. This constituted a lower cost, less onerous, and significantly less effective means of addressing its "sulphur problem."

the time. Following the baghouse fire, however, the company's actions, apparently representing a bald willingness to sacrifice community health for short-term profits, at the very least verged on the criminal.

The history of the Coeur d'Alenes is in part a story of the operation of industrial modernity, and its stepchild, risk, in a specific place -- a mining, milling and smelting center set in the midst of what until the 1880s would have been widely viewed as the most raw and peripheral sort of wilderness. Mining, with its capacity to rapidly generate great wealth, and thus to quickly summon large quantities of labor, technology and capital, is an emblem of modernity. Mining communities formed in the late 19th and early 20th centuries were among the most technologically advanced places on the planet. Copper capital Butte, Montana, in the early 1880s, became one of the first American cities to have electric lighting. Similarly, the Coeur d'Alenes went from having no railroad lines in 1885, when Noah Kellogg's jackass made its great discovery, to having two by 1891. In 1903, the Washington Water Power Company completed a 60,000 volt electrical power line from Spokane Falls, Washington to Burke, a Coeur d'Alenes' mining and milling center. At eighty miles, it was the longest high voltage power line in the world.[1281]

In the late 19th and early 20th centuries, with its rapid influx of workers from across the globe, its attraction of some of the nation's foremost capitalists and mining engineers, and its rapid establishment of a number of large mining corporations, the

[1281] Aiken, *Idaho's Bunker Hill*, 37.

Coeur d'Alenes represented a sort of idealized version of rapid modernization.[1282] The area's intense labor strife of the 1890s, however, serves to leaven any tendency toward bland celebration of what often has been a very raw, if not brutal, process.[1283] Following the labor violence, Bunker Hill decided to forge the town of Kellogg into its anti-union Gibraltar. In keeping with "progressive" corporate labor practices of the time, Bunker began engaging in numerous forms of corporate welfare and transformed Kellogg into a type of company town. Along with its other efforts at labor pacification and community relations, in 1911 the company built and helped maintain an "industrial YMCA" in the heart of Uptown Kellogg, where the Wardner Industrial Union, a company-sponsored union intended to forestall efforts to create an independent union, was granted a floor for its own use.

As Ulrich Beck makes clear, risk in modern society is generated by the successes of industrialism, not its failures. It is the unintended byproduct of modernity's tremendous achievements in material development.[1284] This can be seen clearly in the Coeur d'Alenes, long a major supplier of lead, one of the more environmentally-problematic materials used by global industry. As long as Kellogg and its environs remained in the stage Beck labels *classical industrial society*, Bunker President Jack Bradley's paradigmatic mid-1950s formulation that "increased smoke and fume" for

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[1282] Among the capitalists who were "present at the creation" of the mining District were Simeon Reed, Cyrus McCormick, D.O. Mills and William H. Crocker. Among the largest corporations were the Federal Mining & Smelting Company, which eventually was controlled by the Guggenheims, and Bunker Hill. John Hays Hammond was among the famous mining engineers who plied their trade in the Coeur d'Alenes during this period.

[1283] This strife culminated in the 1899 hijacking of a train in Burke by unionists and the blowing up of the Bunker Hill mill in Kellogg. Following that, union (WFM) leaders and their suspected supporters were rounded up and put in stockades ("bullpens") in Kellogg, in some cases for months.

[1284] Beck, *World at Risk*, 22.

Kellogg residents was the unavoidable tradeoff for continued industrial expansion and local prosperity, resonated with the town's citizenry. Once people began to question that tradeoff, however, as Kellogg High School student body president Clint Waltham did in 1971, expressing concern about the health risks of local air pollution and a desire to "put ecology ahead of economy," Beck would contend that they were moving into another stage, *advanced modernity*, wherein the inherent risks of industrial society begin to outweigh its benefits.[1285] Although in the early 1970s, Kellogg, along with the rest of the Coeur d'Alenes, very much retained its identity as a mining, milling and smelting region, the fact that Waltham and others increasingly questioned the need for the region's air and water to be *so fouled*, indicates that at least for a segment of the population, the old environment for economy tradeoff no longer was acceptable.

If one face of modernity is rapid development – examples proliferate, from "resource frontiers" like the oil boom towns of western North Dakota and eastern Montana today, to mega-cities such as Chicago in the late 1800s and Shanghai in the early 2000s – another is accelerated entropy and decay. Though financial and governmental centers such as New York City and Brussels seem to be relatively well-insulated against the effects of rapid economic downturns, industrial, resource-extractive, and tourist communities can be hollowed out in next to no time. Since the 1970s, numerous American towns and cities have lost their economic rationale overnight and found themselves scrambling to develop a new *modus operandi*. Steel towns like Youngstown, Ohio, textile enclaves such as Mount Airy, North Carolina, lumber communities like Potlatch, Idaho, and mining and smelting cities such as Butte and

[1285] Beck, *Risk Society*, 13.

Kellogg, all have been forced to face the problem of suddenly evaporated jobs, wages, tax bases, and community identities. In recent years, once-booming tourist towns such as Las Vegas and Orlando have demonstrated that recreational economies are also vulnerable to economic downturns.

One of the hallmarks of modernity is the greatly increased pace of social change over that of previous epochs. In the modern world, nearly everything seems to be perpetually in rapid motion. Modernity, with all its dynamism, is marked by often unpredictable, irregular, flows of commodities, workers, capital, ideas and images. In 1981-'82, following the frantic, ultimately unsuccessful, efforts of Coeur d'Alenes residents to find a buyer for Bunker Hill, with the abrupt closure of Bunker and the Stillwater Mine, the tide swiftly moved out on the Coeur d'Alenes' century-old economy. Dazed miners, smelter workers, merchants and local government officials, were left to pick up the pieces as they watched all that had appeared solid in their world suddenly melt into air.[1286] By the mid-1980s, Kellogg's civic leaders had made the fateful decision to transform their gritty, mining and smelting town into a Bavarian-themed, ski resort community. Raising the capital to build a long gondola connecting the town to the ski hill and passing an ordinance requiring merchants to erect their signage in "Bavarian" lettering, while certainly difficult, ultimately proved far easier tasks than creating a prosperous resort community out of the old mining town, or forging an authentic new identity for the community. The difficulties that Kellogg, and the rest of the Coeur d'Alenes, have faced in successfully reinventing themselves in a post-industrial setting, are reflective of the wider sorts of issues and problems faced by the many

[1286] To paraphrase Marx and Engels.

deindustrialized, and often also polluted, communities that presently dot the U.S. and the world.

It is hoped that there is something instructive in this study of the environmental and social history of a small, albeit immensely profitable and polluted, mining and smelting area in northern Idaho. Although perhaps seemingly extreme in some ways – most communities have not produced more silver than any other place in world history or witnessed anything like the 1973-'74 lead epidemic – the story of the Coeur d'Alenes contains many of the same elements that have factored prominently in shaping the histories of the nation and its communities over the past century-and-a-half: the overarching quest for profits and power on the part of much of its social and economic elite and the search by most of the rest for comfortable sustenance and contented existence; the sharply alienating, objectifying relationship with the natural world that characterized the 19^{th} and much of the 20^{th} century; the advent of a new environmental view in the latter part of the 20^{th} century that places greater value on ecological relationships and on the intrinsic qualities of non-human nature; the tendency for market actors to shift social costs like pollution onto the environment and leave the bill for society-at-large to pay; the significance of individual and corporate decision-making in determining environmental outcomes; the inherent volatility and dynamism of modernity and its tendency to produce risks that societies only become concerned about once they attain certain prosperity thresholds; the ability to create a powerful sense of community in even the most environmentally-challenging circumstances. The Coeur d'Alenes may not superficially resemble most of America, or the world, but it is likely that many of the forces that molded the area's social and environmental world have been at work where you live.

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