EDITED BY

James W. Feldman

NUCLEAR REACTIONS

Documenting American Encounters *with* Nuclear Energy

FOREWORD BY PAUL S. SUTTER

WEYERHAEUSER ENVIRONMENTAL CLASSICS

Nuclear Reactions explores the nuclear consensus that emerged in post–World War II America, characterized by widespread support for a diplomatic and military strategy based on nuclear weapons and a vision of economic growth that welcomed nuclear energy both for the generation of electricity and for other peaceful and industrial uses. Unease about the environmental consequences of nuclear energy and weapons development became apparent by the early 1960s and led to the first challenges to that consensus.

The documents in this collection address issues such as the arms race, "mutually assured destruction," the emergence of ecosystems ecology and the environmental movement, nuclear protests, and climate change. They raise questions about how nuclear energy shaped—and continues to shape—the contours of postwar American life. These questions provide a useful lens through which to understand the social, economic, and environmental tradeoffs embedded within American choices about the use and management of nuclear energy.

JAMES W. FELDMAN is an associate professor of history and environmental studies at the University of Wisconsin Oshkosh. He is the author of *A Storied Wilderness: Rewilding the Apostle Islands*.

"A concise, well-chosen collection of diverse documents. This intersection of nuclear technology, risk politics, and environmental impacts is timely."
—**TOM WELLOCK,** historian for the U.S. Nuclear Regulatory Commission

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WEYERHAEUSER ENVIRONMENTAL CLASSICS

Paul S. Sutter, Editor

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Weyerhaeuser Environmental Classics are reprinted editions of key works that explore human relationships with natural environments in all their variety and complexity. Drawn from many disciplines, they examine how natural systems affect human communities, how people affect the environments of which they are a part, and how different cultural conceptions of nature powerfully shape our sense of the world around us. These are books about the environment that continue to offer profound insights about the human place in nature.

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For
Chris, Sam, and Ben

FOREWORD

Postwar America's Nuclear Paradox

PAUL S. SUTTER

Some time in the near future, the International Commission on Stratigraphy (ICS) will make a momentous decision: whether or not to designate a new geological epoch called the "Anthropocene." This decision, though a complex and technical one, hinges on whether humans have become such a dominant force on this planet that they will leave an unambiguous signature in the earth's strata, one that would constitute a clear dividing line in the planet's geological history. A collection of scholars known as the Anthropocene Working Group has been tasked with making an initial recommendation to the ICS and with deciding when to date the beginning of the Anthropocene. Although there are several viable contenders, including the onset of the Industrial Revolution and the widespread combustion of fossil fuels that came with it, these scholars are increasingly focused on a more recent beginning point: July 16, 1945, the day that Americans exploded the first atomic bomb in Alamogordo, New Mexico. As a result of that detonation, known as the Trinity Test, as well as the two bombs that the Americans subsequently dropped on Japan and the hundreds of aboveground tests that followed over the next two decades, radioactive debris has settled in sediments all across the planet in ways that will be stratigraphically recognizable for a long time. With nuclear radiation, humankind has etched its signature across the earth's surface.

Whether or not the ICS recognizes the Anthropocene as a new epoch with a punctuated beginning in July 1945, it is clear that the dawn of the Atomic Age ushered in a new day in humankind's collective environmental history. The achievement of controlled nuclear reactions capable of generating unfathomable power was a crowning

success of modern American science and technology, one that J. Robert Oppenheimer (lead scientist on the Manhattan Project) famously characterized as "technically sweet." American and international scientists and engineers had unlocked an elemental source of unbounded energy that promised to change human life on earth. To use an apt metaphor, humankind had "harnessed the atom." At the same time, however, many people came to rue the realization of nuclear power as a feat that threatened to destroy the fabric of life on earth. The Promethean act of unleashing the energy of the atom symbolized both unprecedented human mastery of nature and the considerable dangers that came with such comprehensive environmental power and control. Oppenheimer apparently later recognized this too, in an ominous invocation of a verse from the Bhagavad Gita: "I am become Death, destroyer of worlds." The very notion of human progress pivoted as a result of this earth-shattering achievement.

In *Nuclear Reactions*, an essential and timely collection of primary source documents on the history of Americans' reactions to nuclear energy, volume editor James W. Feldman helps us to see that the Atomic Age was indeed a profound environmental watershed. This is why this book finds such a comfortable home in the Weyerhaeuser Environmental Classics series. But Feldman also wants us to consider the myriad other ways in which the arrival of nuclear energy shaped postwar American history. If the harnessing of the atom represented a new chapter in the history of human-environmental relationships, it also ushered in a novel moment in the political, social, economic, and cultural history of the United States. Although the environmental frame is thus a necessary and overarching one for understanding American reactions to nuclear energy after World War II, it is not a sufficient one. Indeed, the documents that Feldman has skillfully assembled in *Nuclear Reactions* show us that nuclear energy not only occupied a central place in postwar American history, but that in the Atomic Age mainstream U.S. history was necessarily environmental history. This collection of classic documents will be as useful to modern U.S. history courses as it will be to environmental history and environmental studies courses.

Feldman has adeptly organized these documents around what scholars have called "the nuclear paradox": that nuclear energy, in its various forms, has been the subject of both technological optimism and

apocalyptic pessimism. Americans have seen nuclear energy as both the greatest hope for humankind and our gravest threat. Few scientific and technological achievements, Feldman suggests, have raised so many profound questions about Americans' relations with the natural world, the shape of civil society, and the very meanings of progress. Where some see commercial nuclear power as a vital source of clean energy, others insist that the potential for nuclear accidents and the unresolved problem of radioactive waste make nuclear power anything but clean. Where some see a nuclear-powered future as essential for democratic affluence and the continued flourishing of our consumer economy, others fear that the nature of nuclear power generation, which requires centralized control and tight security, will embolden technocratic elites to remove energy decisions from democratic control. Where many have seen a strong nuclear arsenal as essential to American strength in the world and the protection of the American way of life, others (particularly in the post–Cold War world) have become deeply anxious about how rogue nations or nonstate actors might use nuclear attacks to destabilize the world order and undermine U.S. power. Where some have celebrated nuclear energy as a culminating scientific and engineering triumph, others have used the myriad threats posed by it to fundamentally question whether continuing advances in science and technology constitute progress at all. And although Americans have debated nuclear energy, as they have many other important issues that have become the topics of readers like this one, they have also been deeply confused and conflicted about its promise and perils. Even Oppenheimer, the so-called father of the atomic bomb, could not quite plumb what he had done by unleashing the power of the atom. Most Americans have, in their reactions to nuclear power, experienced this same kind of deep ambivalence.

Nothing better illustrates the paradox at the center of *Nuclear Reactions* than the historical relationship of American environmentalism to nuclear energy. On one level, nuclear technology was an essential catalyst to the rise of postwar U.S. environmentalism, a movement that mixed traditional concerns about environmental protection with fears about novel threats to human health. On balance, and for most of the postwar period, environmentalists have been among the most consistent critics of nuclear energy in all of its various forms. This collection

makes that clear. But, ironically, the very nature of radiation as an environmental threat also allowed postwar ecologists to study and conceptualize environmental systems and energy flows in powerful new ways. Nuclear energy may have threatened the fabric of life on earth, but it also revolutionized how scientists understood that fabric. Moreover, in recent decades, as human-induced climate change has raised the specter of profound environmental instability, some environmentalists have come to believe that nuclear power is necessary to weaning us from our destructive dependency on fossil fuels. Even with its risks, these advocates suggest, only nuclear power has the capacity to meet the world's present and future energy needs while substantially reducing greenhouse gas emissions. To put it more bluntly, while nuclear energy may have ushered in the Anthropocene, it may also be a critical technology for mitigating and managing the Anthropocene's worst effects.

The great virtue of *Nuclear Reactions* is how it uses a thoughtfully curated set of primary source documents to, as Feldman puts it, "connect the nuclear past to the nuclear future." Nuclear energy is not going away, and we will need to make reasoned decisions about whether it can, and how it should, fit into our twenty-first-century world. These are not decisions that we can make only on narrow technical grounds, guided by a naïve faith in the inevitability of technological progress and the capacity of rational actors to efficiently manage nuclear systems. Nor are these decisions that we ought to cede to technical experts. The history of nuclear energy is filled with too many cases of human failure, and of human and environmental harm, to sustain such uncritical trust in expertise or faith in cornucopian progress. But neither can we reject nuclear energy out of hand, insisting that unloosing the power of the atom constituted a fundamental sin against nature. Instead, these documents raise questions about responsible citizenship and the need for Americans to critically engage with nuclear energy in all of its historical complexity. Invariably, the future of nuclear energy will be built upon this history of nuclear reactions.

ACKNOWLEDGMENTS

This project started as a sidelight. As I began the research for a book on the history of radioactive waste management in the United States, I developed a new appreciation for the ways that nuclear energy has touched just about every aspect of American life. The more I learned about the narrow topic of waste management, the more I recognized the breadth of material I would need to understand to do the topic justice. There is no better way to learn a subject than to teach it, so I created a course that explores the many facets of American encounters with nuclear energy from the perspective of environmental history. I first developed this collection of documents for use in that course.

As I delved more deeply into these documents, the more fascinated I became. Movies, comic books, private letters, public speeches—so many interesting and powerful documents to choose from! When people discussed nuclear energy, they grappled with big, sweeping questions in such meaningful ways. While this collection focuses on the themes of relations with nature, the shape of civil society, and definitions of progress, I could easily have chosen other issues: social and environmental justice; the use of science; diplomacy and international relations. Even after narrowing the documents to a set of three themes, I could not include all of the relevant topics and perspectives. For example, these documents do not address the mining of uranium in the American Southwest and the bitter legacy this left for both landscapes and for communities. Indeed, a different editor would look at the same general subject and choose entirely different documents. It is this incredible diversity that makes the subject of American encounters with nuclear energy so rich.

When I first pitched the idea to Bill Cronon and Marianne Keddington-Lang at the University of Washington Press, they offered immediate support and encouragement. So did Paul Sutter and Regan Huff when they picked up the editorial baton of the Weyerhaeuser Environmental

Books series. Their advice and guidance helped keep the project on track and reined in my ambitions for a wider, more diffuse collection.

As I embarked on the search for documents, I turned to friends and colleagues—and sometimes strangers—for advice and for recommendations in their areas of expertise. Almost without fail, they responded, and for this many thanks to Michael Egan, Jake Hamblin, Scott Kirsch, Paul Rubinson, Jennifer Thomson, Marsha Weisiger, and Tom Wellock. I am sure there are others whom I forget to thank. Tom and Jennifer also had extended conversations with me on the general shape of the reader and the table of contents, and Tom's thoughtful commentary in the review process greatly improved the collection. David Stradling helped me understand the process involved in compiling a documentary reader. Chris Wells and David Bernstein twice read drafts of the introduction, providing invaluable comments and critiques.

A number of individuals, archives, and institutions allowed me to reproduce their work free of charge, including the American Philosophical Association, Union Carbide Corporation, Reader's Digest, United Auto Workers, the Bertrand Russell Peace Foundation, the Swarthmore College Peace Collection, the Wisconsin Historical Society, the Minnesota Historical Society, the Wilderness Society, the J. Willard Marriott Library at the University of Utah, Leonard Rifas, the Abalone Alliance, the Massachusetts Medical Foundation, Mark Z. Jacobson, the Nuclear Energy Institute, and Michael Shellenberger. This collection would not be have been possible without their generosity.

At the University of Wisconsin Oshkosh, students unknowingly acted as guinea pigs as I tested different documents in the classroom. Their suffering, I hope, will make this book more appealing to students who read these documents in other classrooms. The University of Wisconsin Oshkosh Office of Grants and Faculty Development provided funds to purchase reprint permissions and grants to help me develop the project. My student Andrea Vitale painstakingly cross-read the majority of the documents against the originals. Jeri Zelke, Kim Bullington, Jessi Stamn, and Kayla Much provided much appreciated office and administrative support. Other colleagues provided hallway—and carpool—encouragement and constant good cheer.

Like many of the authors whose work I studied in selecting documents, contemplating American encounters with nuclear energy makes

me think of the future and wonder about how we will deal with the choices that lie ahead. With the hope that an understanding of the histories described in this book provides guidance—or at least helps us ask good questions—I dedicate this book to my family.