



A book to help save nuclear power

Review by TED ROCKWELL

Power to Save the World: The Truth About Nuclear Energy, by Gwyneth Cravens, New York, N.Y.: Alfred A. Knopf (2007). 464 pp. \$27.95.

A FAVORITE RANT OF mine is to anguish over the pathetic inability of the nuclear community to tell our own story—that nuclear power is virtually inexhaustible, nonpolluting, affordable, and far easier on the earth than its competitors. This is a demonstrated fact. But for some reason, we don't seem to be able to convey that simple message. Repeatedly, after responding to a friend or neighbor on some fearful but baseless concern, I'm asked: "Why haven't you guys ever told us that?"

We're quick to blame the sensationalist media, fact-bending antis, nit-picking regulators, opportunistic politicians, or the scientifically illiterate public. But as the comic-strip hero Pogo told us, "We have met the enemy, and he is us." Jane Fonda didn't invent the China Syndrome. We did. We also invented the ridiculous notion that no amount of radiation is small enough to be harmless. And that nuclear power plants represent such an unprecedented public health hazard that the government must create a whole new form of insurance to cope with it. And, although one of nuclear power's biggest advantages is that its waste problem is trivial, we've managed to make it into a nearly insurmountable technological challenge. The fact that radioactive materials have the uniquely convenient property of *decreasing* their toxicity automatically is somehow made out to be a problem, compared with the poisons we have learned to deal with whose toxicity remains undiminished *forever!*

All of this has led to a situation where the public and the policymakers don't know what to believe or whom to trust. And the rest of us find ourselves arguing with our friends and colleagues, trying to establish a level platform to begin to make our case.

Into this situation steps popular novelist Gwyneth Cravens, with her new book,

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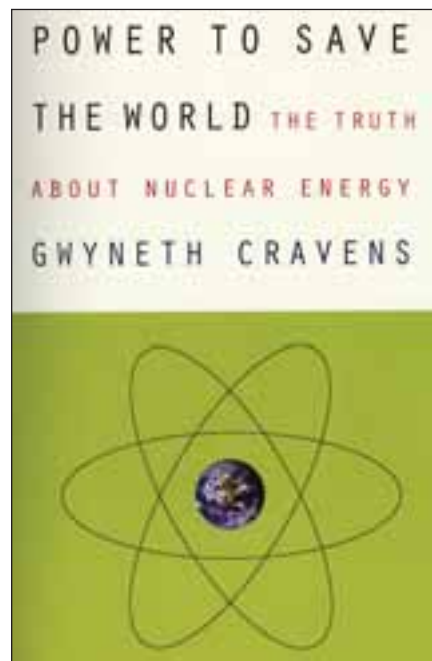
Power to Save the World: The Truth About Nuclear Energy. Who is she, and what does her book say that our friends and colleagues haven't already said more authoritatively? Why should we go to her to learn "the truth about nuclear energy"?

You'd be surprised what you can learn from this wonderful book. The fact that prize-winning nuclear chronicler Richard Rhodes, well-known as a stickler for historical accuracy, has endorsed it and written the introduction, tells us we're on solid ground here. Although he is an authority on the nuclear enterprise, Rhodes says he learned "something new on every page." Environmentalist Stewart Brand calls it simply "the best introduction to the current realities and benefits of nuclear power." And popular storyteller Tony Hillerman says, "I'd like to see this on every bookshelf in America and on student reading lists."

So, what makes it so special? First of all, the author herself. Her background makes clear that she is no shill for the nuclear industry. In fact, she was quite an aggressive antinuclear activist for many years, and so she has a personal, battlefield familiarity with the questions and concerns that bother many people about the technology. Second, she is a highly skilled writer, author of five well-received novels, praised by her fellow writers, winner of many writing awards and fellowships, and visiting writer in the graduate program in writing at the University of California at Irvine. As a fiction editor at *The New Yorker* (1980–1987) under the legendary William Shawn, she worked with such noted writers as Milan Kundera and Susan Sontag.

But, most important for this book, is that in addition to having a novelist's easy, graceful writing style, she brings many years of experience as a reporter for some of the world's top publications: *The New Yorker*, the *New York Times* (the magazine and book review sections and the op-ed page), the *Washington Post*, *The Nation*, *Harpers*, the *Village Voice*, and others.

Power to Save the World is Cravens's first nonfiction book-length opus. The



unique way she carried out the eight-year chore of creating it makes it particularly easy to follow, both for nuclear specialists and for those wholly new to the subject (as she was). She used to make offhand antinuclear comments to her friend, Dr. D. Richard "Rip" Anderson, chemist, oceanographer, and environmental health and nuclear safety analyst, now retired from Sandia National Laboratories. Rip would patiently explain in each case that her concern was based on misinformation. It finally reached the point where he said, "Would you really like to get the facts on this subject?" and she realized that she would.

And so they started "at the beginning," learning about uranium mines, milling, and fuel fabrication, and step by step, branching off from time to time to cover it all, finally ending with waste handling and storage. This is certainly the best way for a newcomer to develop an understanding of the subject. The reader learns as the author learned. As each concern is explored and dealt with, the reader comes up with the

next question: “Yes, but what about . . . ?” And that is the very moment that the author has already asked the question, and we are listening to the answer as she did. This gives readers who are new to the subject a basis for keeping the overall context continually in view and having a feeling as to where they are at any moment.

Nuclear technology is a large, complex enterprise, as readers of *Nuclear News* are well aware. Its various parts were severely compartmentalized during World War II. As a result, very few of us, even the earliest pioneers, are informed about all the parts. Thus, Cravens’s approach, so appropriate for newbies, is also an excellent process for even the most knowledgeable. Although the language is intelligible to laypersons, it is scientifically accurate, and at no time does any reader feel condescended to. This is a major accomplishment, and Cravens’s great gift to us all.

In his introduction to the book, Richard Rhodes refers to Cravens’s text as a pilgrimage, in the tradition of John Bunyan’s 17th century classic, *Pilgrim’s Progress*. And that is appropriate. But I am more impressed with the fact that she applied to the task her well-honed skills as an investigative reporter. In a constant swirl of rumors, she was determined to learn firsthand what the real facts were. And when she gets a firm grasp on the facts, and a lucid description of them on the page, there is really no room for the unsupported rumor to survive. Without being dogmatic or simplistic, she shows over and over again that many of the “controversial issues” with which our field is plagued are not complicated or controversial at all, once the facts are made clear and the fears dispersed.

Cravens exposes the sham that supports the notion that low-dose radiation can be harmful. That, in turn, eliminates the possibility that thousands of deaths could result from a core meltdown. She throws factual light on other supposed nuclear hazards. As each new fear is examined in light of what is physically possible, the dreaded “what ifs” are shown to be classic bogeymen, spooks composed of nothing but fear itself. She shows that nuclear energy is not a Faustian bargain too powerful and mysterious to trust to human hands. Instead, it is a providential gift to humankind, born out of our growing understanding of the laws that govern all technology—a gift given just as all other gifts are proving inadequate for our future needs.

We can all learn from this book how controversial and scary subjects can be explained, simply and clearly. You have to wonder why it took us so long to find this out. But you don’t have to wonder what to get your friends and colleagues (and adversaries) for Christmas this year. Ms. Cravens has given us the answer to that question, too, and just in time.

Pieces of truth

Cravens found that most fears and concerns about nuclear technology and radiation are simply the result of factually incorrect premises, and so she kept digging to get the relevant facts. Once she had the science straight, she put considerable effort into stating it in simple terms that anyone can understand. When stated in homely terms, facts can be mistaken for casual opinions. But in the book, facts are shown to be the inevitable consequence of certain scientific truths. “We are entitled to our own opinions,” she says, “but not our own facts.”

Cravens summed up her conclusions in the words of her friend and atomic guide, Dr. D. Richard “Rip” Anderson: “One day God could say to us: I gave you the brainiest men and women in human history to come up with an understanding of the atom and its nucleus. I gave you enough uranium and thorium to last you for thousands of years. I gave you an understanding of how when uranium [fissions] it releases energy. You didn’t need to invent anything else. You had everything you needed to provide energy for yourselves and your descendants without harming the environment. What else did you want?”

Below are just a few of many enlightening quotes from the book. If some surprise you, look up the cited page to see the context and explanation.

n Page 9: Anderson: “If you got all your electricity for your lifetime from nuclear power, your total share of the waste would weigh two pounds and fit into one Coke can. . . . [From coal], that person’s mountain of solid waste would be 68.5 tons. Picture a soda can next to that. [That mountain doesn’t include the person’s 77 tons of carbon dioxide from coal, nor does it include other gaseous products that coal combustion releases into the environment.—T.R.]

n Page 74: Smoking releases radionuclides accumulated by the tobacco leaf from soil and phosphate fertilizers. . . . Secondhand tobacco smoke contains radium, radon gas, and other short-lived radium daughters like polonium-210 and lead-210 that are released when tobacco is burned. . . . The exposure is as high as 8000 mrem a year. That’s the equivalent of 800 chest X rays. Two packs a day adds up to 16 000 to 20 000 mrem per year.

n Page 86: [Evan] Douple [staff director for the BEIR-VI and -VII reports] debunked the idea that radiation from atomic bombs has caused an abundance

of genetic mutations. . . . “Among Japanese children born to one or both parents who are [A-bomb] survivors, there has been no observable increase in defects or abnormalities.”

n Page 146: Curiously, I discovered that the same environmental activists who implicitly believe in the models of global climate-disruption that have been derived from probabilistic risk assessment nevertheless distrust that same methodology when it is applied to nuclear safety.

n Page 197: On average, every year, fossil fuels expose the American population to about 100 times more low-level radiation than nuclear plants do. . . . The big ones in the Four Corners area [where Utah, Colorado, New Mexico, and Arizona meet] . . . give off 400 times more radionuclides than a nuclear plant.

n Page 240: Anderson: “People don’t want fossil fuels, don’t want nuclear. But nobody is willing to give up electricity.”

n Page 258: Nuclear power uses a million times less raw material than do fossil energies, and therefore produces a million times less waste.

n Page 309: A paper by Dr. Larry Foulke, past president of the American Nuclear Society: “Predicting deaths by adding up trivial individual doses over large populations or over large periods of time is scientifically indefensible. Questioning this invalid premise is not attacking an established scientific theory; it is merely challenging an administrative judgment. . . . We do not become safer by portraying the world unrealistically.”

n Page 310: Chris Crawford, nuclear engineering student: “If you misallocate health and safety spending because of hysterical concerns on the part of the public involving nuclear dangers, real people will die of otherwise preventable diseases and accidents.”

n Page 310: A person making his or her home next to one of the sealed portals [of Yucca Mountain] would . . . receive an annual radiation exposure of 0.01 mrem—the amount you get by eating one banana a year.

n Page 354: I’d come to realize that . . . radiation is the most misunderstood and misapplied of topics. As the novelist George Eliot described a controversy in *Middlemarch*: “Everybody liked better to conjecture how the thing was, than simply to know it; for conjecture soon became more confident than knowledge, and had a more liberal allowance for the incompatible.”—T.R. **■**