

BREAKING THROUGH EDITORIAL



Overcoming Huizenga's "Miracles" and Unleashing the Promise of Cold Fusion's "Potential Miracle"

Scott Chubb

Some statements become a part of our cultural language, spanning across generations. "Generalissimo Francisco Franco is still dead" is one of these. In November 1975, as Spanish dictator Francisco Franco lay dying, American media sources on slow news days would report on his imminent death, noting that he was still alive or not yet dead. After his death on November 20, Chevy Chase opened his "Saturday Night Live" Weekend Update monologue by saying, "Generalissimo Francisco Franco is still dead." Because of the ridiculous, overblown coverage about Franco being on the verge of dying, Chase's words were an instant sensation. He repeated them at the beginning of Weekend Update every week for more than a year. Thirty years later, the phrase (with different subject, with emphasis on *still*) remains in use, primarily as a wink at news being reported that should be obvious.

"There are still no neutrons in cold fusion." For those of us who have been following cold fusion, this fact should be so obvious that it should be a joke. It should, perhaps, be a part of our cultural language in the same way. But it is sad to say that this isn't true. A key reason for this involves confusion about what actually occurs in cold fusion. Initially, everyone believed that Jones and Fleischmann and Pons (FP) discovered the same thing: "cold fusion." The neutrons that Jones found probably came from either a very low-level, conventional hot fusion reaction, or some other nuclear process that does not involve fusion, while although FP initially said they found neutrons, they found them at a level that was a billion times too low to explain their most important discovery: excess heat.

In fact, we know now that FP excess heat occurs from a form of fusion, but not hot fusion. FP discovered their excess heat from a nuclear reaction that occurs when a deuteron (d) fuses with a second d, to form ^4He (garden variety helium), without the "usual" gamma ray that occurs in one of the conventional (but infrequent) hot fusion reactions. Because FP's discovery is fusion, but not hot fusion, the name cold fusion actually fits. It is more appropriate to think of the neutrons that Jones and FP found as occurring either from hot fusion or through low-energy nuclear reactions (LENR) that do not involve fusion, while the reaction that created excess heat is cold fusion, and it has no neutrons.

A second, more unfortunate reason that the fact that "there are still no neutrons in cold fusion" is not obvious to most physicists is the name "cold fusion" itself. It has caused

confusion, since it suggests that the FP discovery is related to a "colder" version of hot fusion. For this reason, most physicists expected the kinds of nuclear products that occur in hot fusion to be created by cold fusion. The fact that there are no neutrons in cold fusion leads most physicists to believe cold fusion is not fusion because it fails a necessary litmus test of hot fusion. Just as the possibility of Francisco Franco rising from the dead would be a miracle, they believe the possibility that excess heat in cold fusion could be the result of nuclear fusion without neutrons is also a miracle.

As a result, many physicists made very strong, outrageous statements about the impossibility of cold fusion and actually referred to it, derisively, as involving "miracles." For example, John Huizenga wrote a book with the viciously unscientific title, *Cold Fusion: Scientific Fiasco of the Century*, in which he referred to "three miracles" that had to be "overcome" for cold fusion to be real:

- the lack of strong neutron emissions;
- the mystery of how the Coulomb barrier is penetrated;
- the lack of strong emission of gamma rays or X-rays.

Huizenga probably sincerely believed he was justified in referring to cold fusion in this way. As chairman of the Energy Research Advisory Board (ERAB)—where he served as pointman and spokesman for the committee that investigated the initial cold fusion claims for the Department of Energy—he was exposed to a premature, poorly understood caricature of what we now understand to be the relevant science.

Seriously flawed, unscientific statements and opinions about the FP discovery became commonplace after a pivotal event: a late-night session, devoted to cold fusion, that occurred on May 1, 1989, during the spring meeting of the American Physical Society. In editorials in Issues 24, 35, 66 and 90, *IE* has chronicled the tragic misrepresentations of the relevant science that occurred before, during and after this event. Serious ethical breaches took place that have become a subject covered in mainstream ethics in science literature (see the collection of articles in *Accountability in Research*, 8, 1-162 (2000), available at <http://www.lenr-canr.org>).

In Issue 66, I pointed out that the "performance" by Steven Koonin on May 1—which potentially had the most significant impact in initiating the flurry of unscientific statements that followed—stands out as a singular episode that

was and is an embarrassment to the APS and to everyone who was involved. Since writing my comments about this, I have come to more fully appreciate how damaging Koonin's initial comments were by being able to see his presentation online (<http://www.youtube.com/watch?v=wR-AohRWbBo>), through material posted by Steven Krivit.

In 1989, Koonin was a professor of theoretical physics at CalTech. Subsequently he became a provost at CalTech, then chief scientist at BP, and was appointed by Barack Obama to serve as DOE Under Secretary of Energy for Science.

As Under Secretary, Koonin is responsible for overseeing the DOE Office of Science and DOE's national laboratories and is responsible for managing the Science Office's \$6 billion research budget. He plays a dominant role in funding research and development in energy generally and alternative energy in particular.

During his May 1 "performance," Koonin was blunt and derisive: "My conclusion based on my experience, my knowledge of nuclear physics, and my intuition is that the [cold fusion] experiments are just wrong and that we're suffering from the incompetence and perhaps delusion of Drs. Pons and Fleischmann." He also said, "We have no reliable report of reproduction of these experiments, despite strenuous effort by many groups around the world who bring to bear resources and expertise far greater than Pons and Fleischmann had to do this. Moreover, even the people at Harwell, who have Professor Fleischmann as a consultant, have been unable to reproduce the effect."

Koonin was utterly and completely wrong in these assertions about excess heat. Fleischmann is one of the foremost electrochemists in the world and continues to be the foremost expert in measuring the excess heat effects that he and others measured in the kinds of experiments that he conducted. Because an incubation time lasting as long as six weeks is frequently necessary in excess heat experiments, Koonin questioning the reliability of these experiments was premature since he raised this issue only five weeks after the initial FP announcement. Ironically, even his comment about Harwell being unable to reproduce the effect is incorrect; a later analysis by Hansen and Melich indicates there was evidence of excess heat in the Harwell experiments (<http://www.lenr-canr.org/acrobat/mMelichMEsomelesson.pdf>).

Koonin concluded his APS talk by mocking the cold fusion claims by Fleischmann and Pons, using an irrelevant, irreverent Aesop Fable, in which he likened their claims to an exaggerated claim by "The Boasting Traveler": "A certain man who visited foreign lands could talk of little when he returned home, except the wonderful adventures he had met with and the great deeds he had done abroad. One of the feats he told about was a leap he had made in a city called Rhodes. That leap was so great, he said, that no other man could leap anywhere near the distance. A great many persons in Rhodes had seen him do it and would prove that what he told was true. 'No need of witnesses,' said one of the hearers. Suppose this city is Rhodes. Now show us how far you can jump.'" Koonin used the fable to imply that it was necessary to "witness" cold fusion, in person, to believe it.

In fairness to Koonin, the possibility of a radiation-less, aneutronic fusion reaction that releases ordinary, garden-variety helium was not on anyone's radar screen. Virtually all mainstream physicists thought that the effect, if it was real, had to involve some exotic form of electronic screen-

ing, associated with a palladium or titanium lattice, and that neutrons had to be created.

I made my comments about Koonin's presentation in Issue 66, by chance, just before I had a brief confrontation with him after a talk he gave about future energy during the March 2006 meeting of the APS. During the exchange, it became apparent his views have changed since 1989. After his talk, I invited him to attend the cold fusion session the following day. He said: "So, here's what I think about condensed matter nuclear science. BP pays me to pay attention to lots of technologies...And we have money to invest...And they pay me to make judgments about that, okay? For better or worse, I have decided that's not something that I want to be investing in right now. You know, if I make a wrong call, I'll lose my job." Then, he said, "Let me say that there are a lot of people in the venture capital business who are just hungry for energy technologies. I hope one of them picks it up and then pursues [it]."

In fact, the patent office has embargoed cold fusion patents. They justify this by claiming that cold fusion devices fall into the same category as perpetual motion machines. For this reason, although "people in the venture capital business [might be] hungry for energy technologies," they are not "hungry" enough to fund cold fusion. Obviously, at the time, Koonin was not aware of this fact.

Steven Krivit taped the exchange; it is available online (<http://www.newenergytimes.com/v2/audio/2006Chubb-Versus-Koonin-March17.mp3>). Bob Bass covered it in Issue 67, expressing his optimism about potential cold fusion funding from a new initiative that Congress had recently approved. It involved the creation of a new office, the Advanced Research Projects Agency (ARPA-E), whose mission would be to "support ground-breaking energy research." Congress had also stipulated that this new office would "report to the Under Secretary for Science" (the position that Steven Koonin now holds).

Almost universally, today, funding agencies—including ARPA-E—and science journals ignore cold fusion. Papers and proposals are rejected without review or are reviewed by people who do not believe cold fusion is real. These problems reflect a more major problem, resulting from cold fusion being rejected by the scientific Establishment.

An argument can be made that John Huizenga's "miracles" are not insurmountable at all, and that they have been overcome through the normal process of science, while the "scientific fiasco" that he suggested actually never took place but merely reflects a perception that occurred as a result of preconceptions and biases that resulted from the lack of information that was available to the individuals who were involved with the ERAB committee.

Ironically and, in fact, arguably, "Huizenga's Miracles" have been useful to cold fusion and LENR theorists. In particular, as opposed to believing these "miracles" have to be "overcome," theorists have used the three statements that he posed as a starting point for creating relevant, appropriate theories of the effects. Instead of the major political, economic or social changes that have been suggested, it may be possible to change the existing climate by informing physicists that the initial picture they had for rejecting cold fusion is wrong. This could be as simple as saying, "Just as Generalissimo Francisco Franco is still dead, there are still no neutrons in cold fusion."

In an introductory talk at the July 2010 Colloquium on Lattice-Assisted Nuclear Reactions (LANR) at MIT, Dr. Mitchell Swartz provided an overview of the reasons that the “promise” of cold fusion includes a “potential miracle.” He illustrated this using a concrete example: energy consumption in the city of Boston. He estimated that in Boston, the average daily consumption of energy from electricity requires the equivalent of 54,000 tons of coal. He pointed out that cold fusion could potentially lead to technologies that could produce the equivalent amount of energy from 6 pounds (three-quarters of a gallon) of heavy water. Even more astonishing are the environmental implications. Each day, burning the amount of coal associated with consuming this energy would create 180,000 tons of CO₂, 3,600 tons of SO₂ and 480 tons of NO₂. In contrast, to produce the same amount of energy, cold fusion would create 24 garbage size bags of an entirely pollution-free product—ordinary helium gas.

A number of new, important results were presented at the colloquium. These included reports by Dr. Swartz about: 1) New, innovative procedures for producing electricity, directly from nuclear processes involving nanometer scale size electrodes, in electrolysis experiments, and inducing similar electrical effects from nuclear processes, using ultrasound, in these kinds of materials; 2) Discovery of a new effect involving sudden variations in resistance that can accompany these processes and can be used to develop a new kind of Zener diode; and 3) Identification of new effects and procedures for characterizing and reproducing excess heat, using analytical tools associated with relating input power to important parameters associated with the nuclear processes. Dr. Swartz also provided important information about the potential impact of heavy water additions in experiments involving Ni and light water that suggests that excess heat in these systems may be the result of the kinds of d+d cold fusion reactions that occur in FP electrolysis experiments. Dr. Brian Ahern reported that using samples provided by Yoshiaki Arata, he has created excess heat six times, in six attempts, in gas-loading experiments involving the procedure that Arata has developed. This issue includes a condensed report of this meeting (p. 16), but an in-depth summary appears on our website.

To unleash the “promise” of “cold fusion’s miracle” (outlined in Dr. Swartz’s talk) is not a miracle at all. It simply requires that the kind of sound scientific research that has been taking place in the field for the last 21 years continue. Provided that adequate funding occurs, there is every reason to believe this will happen. The developments that were presented during the 2010 Colloquium at MIT suggest that considerable progress will be made as the implications of using nanometer materials in these experiments are more fully understood.

ARPA-E receives \$100 million each year to fund research efforts that “accelerate innovation in green technology, increase America’s competitiveness and create new jobs.” In response to ARPA-E’s first solicitation, a number of CMNS researchers submitted proposals. To my knowledge, ARPA-E did not fund any of these proposals. A number of researchers have suggested that because Steve Koonin directly oversees ARPA-E, his negative attitude and statements about cold fusion in the past have had a negative impact on these funding decisions. Whether or not this is true is an open question. However, it is clear that although in his capacity as BP

chief scientist in 2006, Koonin had justification for his recommendation that funding cold fusion-related research might be too risky for BP to undertake, at the present time, in his present role, he cannot justify ARPA-E’s failure to invest in cold fusion for this reason. Indeed, ARPA-E is supposed to be modeled after the DOD’s Defense Advanced Research Projects Administration (DARPA), which not only is required to fund new, potentially risky areas of research, but has funded cold fusion-related projects in the past.

The potential pay-off, which involves the development of new, ultra-clean energy sources that are as much as 20 million times more efficient than the ones that are used today, is so revolutionary that ARPA-E’s decision to *not* fund cold fusion research must be questioned.

I urge Under Secretary Steven Koonin to support cold fusion as one of the breakthrough technologies worthy of support by the ARPA-E program. This would make clear that he is in step with the current progress in the field and remove any misunderstanding about his current position.

With this proposal in mind, if you are from the United States, I urge you to contact Under Secretary Steve Koonin, DOE Secretary Steven Chu, Presidential Science Advisor John Holdren and your Congressman and Senators and ask for their support of ARPA-E funding of cold fusion research:

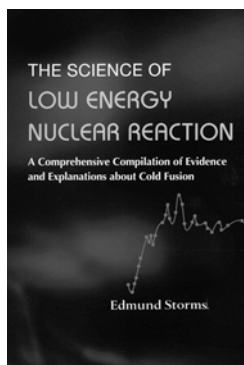
Office of Science and Technology Policy
 Attn: Dr. John Holdren
 725 17th Street Room 5228
 Washington, DC 20502
 Email: askdrh@ostp.gov

U.S. Department of Energy
 Attn: Under Secretary Steve Koonin
 Attn: Secretary Steven Chu
 1000 Independence Avenue SW
 Washington, DC 20585
 Email: The.Secretary@hq.doe.gov

□ □ □ □

**The Science of Low Energy Nuclear Reaction:
 A Comprehensive Compilation of Evidence and
 Explanations About Cold Fusion**

by Edmund Storms



This long-awaited book by prominent cold fusion researcher Dr. Edmund Storms catalogues and evaluates the evidence for cold fusion and shows why the initial reaction to cold fusion was driven more by self-interest than fact. (Hardcover, 2007, 312 pages)

\$85.00 North America

\$100.00 Foreign

Prices include shipping.

New Energy Foundation • P.O. Box 2816 • Concord, NH 03302-2816
 Phone: 603-485-4700 • Fax: 603-485-4710
www.infinite-energy.com