Infinite Energy Magazine has learned that the official Japanese cold fusion program (the New Hydrogen Energy Program), sponsored by Japan’s MITI since 1993, will not receive continued funding beyond the spring of 1998. The New York Times, the Nikkei and Reuters have also reported that MITI intends to close down the New Hydrogen Energy cold fusion research program.

Infinite Energy reported on the astonishing weaknesses of the NHE program in Vol. 2, No. 10, published after the Sixth International Conference on Cold fusion (ICCF6), which was held in October 1996 in Hokkaido, Japan. Contributing Editor Jed Rothwell pointed out several major technical problems with the research in his ICCF6 review and in An Open Letter to Japan's NHE Lab Directorate, written in Japanese and English, on page 28 of Issue #10. The letter includes 17 references to the literature, and it lists concrete problems with the protocols and materials used at the NHE lab, including low cell temperatures, improper cell and cathode materials, inadequate preparation and pre-testing of cathodes, and so on. These technical criticisms did not originate with Infinite Energy. They were suggested by Drs. Stanley Pons, Martin Fleischmann, John Bockris, Edmund Storms, T. Mizuno, Hideo Ikegami and the others cited in the footnotes. We pointed out that the French Atomic Energy Commission has successfully replicated the Pons-Fleischmann IMRA boil-off experiments (originally reported in Physics Letters A, 176 (1993) 118-129), because they were more careful about replicating every detail of the experiment, without making any changes.

The NHE is staffed mostly by scientists and engineers new to the cold fusion field. They are on 6 to 12 month assignments to the NHE lab. We urged the NHE researchers to pay more attention to the literature; to hire some electrochemists for the research; and to try the techniques suggested by these leading workers, but as far as we know, they have not done so. We did not receive any official response to the Open Letter, nor did we expect any. Unofficially, NHE researchers denied that there is anything wrong with their techniques, and they refused to address any of the technical points in the Open Letter. They accused us of plotting to bring down the lab in league with arch-enemies of cold fusion such as John Huizenga and Frank Close.

A MITI spokesman, quoted in news reports, pointed out that the $20 million spent on cold fusion was “was a pittance” compared with what is spent on other energy programs, like nuclear fast breeder reactors. Unfortunately, Japan’s official NHE program could have had a major impact on the world’s future in sustainable energy—eliminating not the need for fossil fuels but dangerous and problem-plagued programs such as breeder reactors. Instead, the news about the NHE program, certain to be abused by critics of cold fusion—it already has been abused, will simply muddy the waters.

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Excellent experimental continuing work that totally confirms the original cold fusion claims, and more, has been done in Japan. We cite, in particular the work of Drs. Yoshiaki Arata and Yue-Chang Zhang, which was recently the topic of a 56-page special issue of the journal of the High Temperature Society of Japan, “Solid State Plasma Fusion (‘Cold Fusion’)” Vol. 23, January 1997. This work has also been published in several papers in the Proceedings of the Japanese Academy of Sciences. Dr. Arata is an esteemed physicist who had been instrumental in Japan’s hot fusion program.

Among other continuing activity in Japan, Infinite Energy has profiled the work of Dr. Mizuno on excess energy from solid state (solid proton conductor) cold fusion devices and established transmutation in metals of more conventional cold fusion devices. Drs. Ohmori and Enyo have obtained excellent excess heat results in light water systems. They have also observed and published evidence of metal transmutation phenomena. These scientists have been ignored in the official NHE program. In general, the NHE program has not given serious, appropriate attention to the excess energy phenomenon in light-water cold fusion cells, which is the preferred embodiment in many US-based efforts.

In the United States, commercial activity in cold fusion energy has accelerated

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beyond the Japanese work, Clean Energy Technologies, Inc. of Sarasota Florida (CETI), BlackLight Power, Inc. of Malvern, Pennsylvania, and ENECO of Salt Lake City—to name the more well-known efforts—are developing commercial heating and electricity generating devices. Several major utility companies have established investment positions within some cold fusion/new energy companies. The Cincinnati Group in Ohio has recently announced for sale a commercial demonstration device that transmutes radioactive thorium into benign nuclides in less than an hour. CETI, whose cold fusion heating devices have been profiled several times on ABC TV “Good Morning America” and “Nightline,” also has a radioactivity reducing process for which a United States Patent has been granted. A cold fusion and New Energy investment fund, New Energy Partners, has just been launched (see Infinite Energy, Vol.3, Issues #13/14 as well as this double issue.)

The New York Times, which influences all other science reporting in the United States, has regrettably not being covering progress in cold fusion research. Its last comprehensive report on cold fusion was on November 17, 1992, by Andrew Pollack, who is based in Japan. Mr. Pollack has not attended cold fusion conferences in Japan or anywhere else, but he was quick to report MITI’s decision on the NHE program. The Times report was published on August 26, 1997, in an article titled “Japan, Long a Holdout, Ending Cold Fusion Quest.” He states that the research “has failed to confirm that the phenomenon exists.” This is a gross misunderstanding of the situation. We also point out that New York Times science reporter, William Broad, shown the work of Drs. Arata and Zhang by a representative of Dr. Arata, refused to report on it. Broad has previously (1991) written on accusations by cold fusion critics of alleged (and disproved) ethical violations by Drs. Pons and Fleischmann. While giving major attention to announcements of US hot fusion program achievements, Mr. Broad and his US-based colleagues have not covered cold fusion in the United States or Japan since his article in 1991.

The recent Times article by Pollack quotes Hideo Ikegami: “We couldn’t achieve what was first claimed in terms of cold fusion. We can’t find any reason to propose more money for the coming year or for the future.” Jed Rothwell of Infinite Energy points out that hot fusion scientist Ikegami himself obtained positive results in his lab, which he transmitted to Rothwell. But Ikegami never published them, for reasons that remain unclear. Unless he is being misquoted by the New York Times, we do not understand why he is ignoring the many positive experimental results in Japan.

The Nikkei reported the NHE story on August 24, 1997. It quotes a MITI spokesman, “regrettably, we have not seen the effect in our experiments,” but “we do not deny that the cold fusion effect exists.” To cite but a single example of the ineptitude of the official Japanese NHE program, let us discuss the absurd debacle at NHE in analyzing the Fleischmann-Pons boil-off experiment:

The Boil-Off Entrainment Problem

The Yomiuri quoted the NHE program manager:

“In the Pons replication experiment, we saw excess heat and by the same token we saw examples of a heat deficit, where the energy appeared to vanish,” explained program manager Naoto Asami, looking back over the work. “We found problems with their calorimeter, and we feel that their entire data set is weak and questionable.”

No further details about the problems were described in the newspaper article, but in an Internet discussion group, Elliot Kennel, an American researcher now with the NHE who will be returning to the US, said there are huge flaws in Pons and Fleischmann’s technique and data. He described these as “holes in the data big enough to drive a truck through.” He cited this example:

“In the case of boiling cells, we were able to verify that the electrolyte is entrained in the vapor column by measuring the pH of the condensate. Whenever excess heat was calculated, it was always due to overestimating the vapor mass transport. This is not to say that P&F did not have valid results. It may be that their equipment generates nuclear excess heat in France and false positives in Japan. All we can say is that our results, using their equipment, was susceptible to false positives, and for that reason we are not convinced by the data set which now exists. . . .

“Anyway, for these reasons I believe that excess heat is at best elusive, and I’m no longer convinced that it exists at all. Mr. Rothwell claims to have some easy solutions, and I hope that he will soon convince some reliable laboratories to put them to the test. They might even work. But my view is that these laboratories also will become scapegoats when unambiguous results are not quickly obtained.”

Kennel refers to the mass transport or entrained water problem. During a boil-off, if water leaves the cell as a liquid in unboiled droplets, this invalidates Pons and Fleischmann’s calorimetry, which is based upon the heat of vaporization of water. It takes a great deal of energy to vaporize water. It takes much less energy when foam or something else removes the water as droplets. If you assume it was vaporized instead, you would greatly overestimate the energy during what looks like a boil-off. NHE researchers condensed the steam from the boil-off, and measured the acidity (pH) of the condensate. They found it contained lithium. This means that some electrolyte lithium left the cell in droplets; the water was not perfectly distilled.

As long ago as ICCF4, Rothwell recalls that NHE researchers and others in Japan told him they suspected entrained water is a problem with the Pons and Fleischmann experiments. NHE researchers have circulated rumors about this, alluded to it during press conferences, and discussed it informally on Internet. But they have never published a formal paper about it or discussed it at a conference. They never told Pons or Fleischmann about their suspicions. When Rothwell brought up this subject with Martin Fleischmann, he expressed surprise. It was obvious from his reaction that he knew nothing about the NHE’s statements. It is equally clear that the NHE researchers did not know that Pons and Fleischmann addressed this issue years ago. Miles, McKubre, Bockris, Fleischmann and others have repeatedly warned it can happen. Some heavy water supplies produce a lot of foam which can reach the top of the cell and expel unboiled electrolyte out of the cell. Miles and Fleischmann say they have identified the cause: heavy water can be contaminated with surfactants (surface-adhering chemicals, often used in detergents). Fleischmann explained to Steve Jones in September 1993:

“One could say some of the D₂O is expelled as droplets (actually, we recover ~95% of the alkali by dissolving the residues and titrating; some is undoubtedly lost by irreversible reactions with the glass walls of the Dewars.)”

Biberian told Jed Rothwell that the French AEC researchers check for entrained water by weighing a Kleenex tissue with a precision scale and placing it under the steam venting from the test tube. Entrained droplets will fall onto the tissue. Melvin Miles comments on the problems of foam:
of years, people have been distilling water till water with a test tube? For thousands wondered, do they claim you cannot distill water from the bottom of a tall test tube. Rothwell thinks the NHE researchers are casting about for a reason to discredit the water from the bottom of a tall test tube. Rothwell thinks the NHE researchers have not been able to replicate, so they want the world to believe there is nothing to replicate. They have not been able to replicate, so they want the world to believe there is nothing to replicate, it was all a mistake in the first place. Rothwell told Fleischmann about the NHE’s entrainment hypothesis, his first response was the same as Rothwell’s. He wondered, do they claim you cannot distill water with a test tube? For thousands of years, people have been distilling water and concentrating solutions by boiling small amounts at the bottom of a tall vessel. When they say they can explain “all of Pons and Fleischmann’s results” these hypotheses can fail catastrophically. If they could prove such a radical claim about an ancient technique, they would win a Nobel prize.

Fleischmann agreed that the NHE results were probably caused by foam, as others have observed. He pointed out another possible problem with the NHE set up. At various times when he visited the NHE lab, he noted that they added too much water to the cell, which raised the water line too high, which would greatly enhance entrainment. During open cell electrolysis, water continually leaves the cell. Every day or every few days, new water must be added. This is done with a syringe at the NHE, to avoid contaminating the heavy water by exposing it to air. The amount that leaves

One section of the NHE Laboratory in Sapporo—Wasted Space? —Photo: EFM

the cell can be computed by Faraday’s law. Unfortunately, someone at the NHE made a mistake, and they began adding 4 ml per day instead of 2 ml. Fleischmann warned them about this, but they did not appear to fix the problem. Kennel also claimed there are significant problems with isoperibolic calorimetry:

problems with boiling isoperibolic calorimetry, [add] another level of complexity . . . [W]e are also able to achieve 100% reproducibility of excess heat using Pons and Fleischmann’s own ICARUS-2 boiling calorimeter cells (we use their cell, their palladium, their calorimeter). Unfortunately, here again we are quite sure that our positive results are due to flaws in the calorimetry, rather than to real excess heat."

Rothwell asked him whether he meant