

## Till health' still plagues nuclear industry

For roughly a decade, developers of nuclear power have publically lamented the chronic ill health plaguing their industry. Last October, the Reagan administration announced its "revitalization" plan for the ailing industry (SN: 10/17/81, p. 249). But as developments since January 1 illustrate, eight months later the industry is sicker than ever.

On January 22, the Washington Public Power Supply System (WPPSS) announced it was killing plans to complete its partially constructed WPPSS-4 and -5 plants. The Public Service Co. of Oklahoma followed suit February 16, canceling work authorizations for Black Fox-1 and -2. On February 23, Duke Power Co. in North Carolina joined the club, terminating purchase agreements for its Perkins-1, -2 and -3 plants.

Only 10 days later, the Tennessee Valley Authority announced "indefinite deferral" of its Yellow Creek-1 plant in Mississippi, and Hartsville A-1 and A-2 plants in Tennessee. Construction had already begun on each, which made the decision costly. But last week TVA acknowledged it was actually considering cancellation of all eight reactors it had until then postponed. Philadelphia Electric Co. is in a similar situation, unable to decide whether to mothball construction of its Limeric-2 plant for three years, or to kill it outright. A decision is expected within three months.

Similarly important are the number of orders that have been taken for new U.S. reactors — zero in more than three years (SN: 10/10/81, p. 228). At a joint meeting of the European and American nuclear societies in Brussels six weeks ago, Alvin Weinberg of the Institute for Energy Analysis in Oak Ridge, Tenn., forecast that "the current moratorium on new nuclear plants in the U.S. may last for at least a decade."

Two decisions affecting the undamaged Three Mile Island-1 plant (SN: 4/24/82, p. 283) may have far-reaching implications. On May 14, a federal appeals court in Washington ruled that it could not reopen until its required environmental assessment had factored in the potential anxiety and socio-economic impacts its opening could yield nearby residents. In a dissenting opinion, Judge Malcolm Wilkey noted that "the [National Environmental Policy Act] decision today suffices to give petitioner People Against Nuclear Energy essentially what it has sought: a court-imposed paralysis of nuclear power at Three Mile Island, and potentially elsewhere as well. If, as PANE alleges, the TMI-2 accident caused severe psychological harm, then any nuclear facility has the potential for 'causing' such harm." Four days later, residents of three Pennsylvania counties surrounding Three Mile Island voted against restarting the undamaged TMI-1 plant in a nonbinding referendum. NRC attorneys are awaiting further court orders on how the agency

must amend regulations.

The April 29 NUCLEONICS WEEK noted that Yugoslavia has scaled down its energy-production program, seriously downplaying nuclear's prospects in favor of coal. The Spanish parliament is rumored to be weighing a major delay in completion of its Trillo-2 reactor in Guadalajara Province, and assassination of the Lemoniz nuclear plant's project manager by Basque terrorists forced the Spanish utility, Iberduero, to temporarily halt that

plant's construction in May.

Finally, Mexico announced on May 18 that owing to its economic crisis, an ambitious nuclear-power development plan was being shelved. Firms from five countries had been bidding on 20 separate power plants, which could have yielded \$30 billion in contracts over 18 years.

Not surprisingly, these developments have led the nuclear power industry to budget a national public-relations campaign. It will be five to eight times greater than its current \$5 million effort, according to the May 13 NUCLEONICS WEEK.

—J. Raloff

## Sifting the cosmic haystack for aliens

Films, books and television shows featuring intelligent beings living on other planets in the universe — or seemingly on no planet — continue in their popularity. According to this week's newspapers *Star Wars* is about to be rereleased. This enthusiasm seems to testify to a popular wish that such beings should exist.

It is, of course, possible that such beings do exist. The scientific search for them, however, is neither as spectacular nor as well funded as *Star Wars*. It amounts to sorting through hundreds, thousands, millions and more than millions of radio signals coming to us from the cosmos and looking for evidence of intelligent modulation. As Frank Drake of Cornell University recently put it in a discussion at the 24th meeting of the International Council of Scientific Unions' Committee on Space Research in Ottawa, Canada, it is like sifting through "a cosmic haystack." The search for extraterrestrial intelligence, or SETI, as it is usually designated, remains on the margins of radioastronomy. As Stuart Bowyer of the University of California at Berkeley put it at the same meeting, a scientist likes to see some evidence of achievement in his career. A person could participate in SETI for a lifetime and never see anything.

Drake outlined just how formidable SETI is as a radioastronomical task. The probability of finding something depends on six variables: direction, frequency of signal, bandwidth of signal, polarization, modulation and time in the history of the supposed alien civilization. To which might be added a seventh, receiver sensitivity. The searches that have been done in the last two decades — according to Bowyer there have been 20 — have hardly cut the thinnest hyperslice out of the six-dimensional volume that represents all the possibilities.

To cover that volume better and faster, Drake proposes to deploy a spectral analyzer capable of processing a million signal channels at once. One arm of that analyzer has been built and is working, he reports. The whole thing would have 128 arms, each with the same circuitry. If the money can be found, the rest will be built,

he says. It would cost about \$2.5 million per year for 10 years to build the analyzer and mount a reasonable search.

Bowyer reported on a 10-year search of the type that is called parasitic. Project SERENDIP, as it is called, attached a signal analyzer to the Hat Creek radio telescope in northern California and analyzed all the signals that came in as other astronomers used it for their purposes. The cost is modest, \$500 a year from university funds. Bowyer and associates have analyzed about 100,000 spectra. Of these, 4,000 showed intelligent signals, but nearly all could be classified as of local origin. There is nothing yet that looks like an alien signal. The search continues.

If such creatures exist, in what body do they come? Dale Russell, who describes himself as a vertebrate morphologist, addressed that question. Russell is working at the University of California at Berkeley on sabbatical leave from his post with the Canadian National Museum of Natural Sciences in Ottawa. Russell maintains that primates are not the only order of animals that show an evolutionary trend to develop more and more intelligent species. If capacity for intelligence is measured by the so-called encephalization quotient, the ratio of brain size to body surface area, anthropoid apes have a quotient of 2.37, hominids have 6.21. Other orders, however, show similar progressions: for cetaceans, baleen whales 2.24, toothed whales 3.83; for insects, cockroach 0.092, honeybee drone 0.1499. Given enough time, Russell says, any class of animals could develop an intelligent species, especially his own favorites, the dinosaurs. Had it not been for the great saurian extinction, dinosaurs might today dominate the earth with intelligence, he says. Given the large variety of possibilities on earth alone, there's no telling what might have occurred elsewhere.

Juan Oró of the University of Houston, who had organized and convened the sessions on the origin and development of life, added one caveat: They have to be capable of manipulation. The most intelligent dolphins in the ocean couldn't build a radio antenna.

—D. E. Thomsen