

Three Mile Island one year later

The first anniversary of the Three Mile Island nuclear accident, March 28, served as a time for the world to reflect on the effects of the catastrophe and on the changes that have followed in its wake.

For General Public Utilities, parent company of the utility that ran the power plant, the year has proved costly. Its stock, which before the accident sold for more than \$17 per share, now goes for less than \$5. GPU says buying replacement power costs 10 times more than the utility paid to generate its own power at TMI, so the company claims it is providing consumers power at below cost. A review of its rates by the utility commission serving the region affected by TMI's shutdown could bring the firm more revenues, but many Wall Street analysts peg GPU's expectations there as "overly optimistic."

Hoping to recover its substantive losses, GPU brought suit on March 25 against both Babcock & Wilcox Co., designer of the TMI reactors, and against B&W's parent company, J. Ray McDermott. GPU is asking to recover \$500 million in damages already incurred together with future costs; that could bring the total close to \$1 billion. Spokesmen for McDermott & Co. "vigorously defend" their position that it has no liability for the accident despite GPU's charges of "gross negligence, strict liability for equipment failure, intentional breach of contract and breach of express and applied warranties." In particular, TMI's owner claims that the reactor manufacturer failed to train reactor operators properly and failed to improve "incorrect, incomplete and inappropriate" procedures after learning of an accident sequence—similar to the one triggering the

TMI accident—18 months earlier with another one of its reactors at the Davis-Besse nuclear station in Oak Harbor, Ohio.

So bad have been the economic consequences and public reaction to the TMI accident that GPU officials are even considering conversion of the crippled nuclear station into a coal-fired power plant.

But GPU hasn't been the only corporate accident victim. According to the Washington Post, orders for 11 new reactors were canceled last year, followed by cancellations for six more this year. Another seven reactor orders have been delayed indefinitely. Public reaction and the cost of implementing new safety measures as a result of the accident were held at least partly responsible for many of these decisions.

Among safety-related changes attributable to TMI is creation of the Institute for Nuclear Power Operations, established by the nuclear industry to develop improved reactor-operator standards and to train reactor operators better in responding to both minor and serious accident scenarios. Two telephone hotlines—one for reactor emergencies, another for radiological ones—now link every reactor in the country with the Nuclear Regulatory Commission's emergency response center in Bethesda, Md. All reactor operators have taken additional training during the past year, and by Sept. 30, each reactor will have two resident NRC inspectors.

Finally, President Carter is handing over to Congress legislation that would restructure the NRC, putting at its head a single administrator. Both the President's Commission on TMI and NRC's special task force recommend an end to NRC's current collegial management by five commissioners, charging that both the timeliness and effectiveness of its actions were generally stymied while the panel tried to reach a consensus on which to act. □

Gene-spliced amino acid

In the first formal application of recombinant DNA techniques to nutrition, a private biochemical company last week reported the production of the amino acid proline by gene-splicing means. The technique, though not novel in its approach, may lead to cheaper production of amino acids for feed supplements and other uses, and, consequently, to a less costly world food supply, said the company's president.

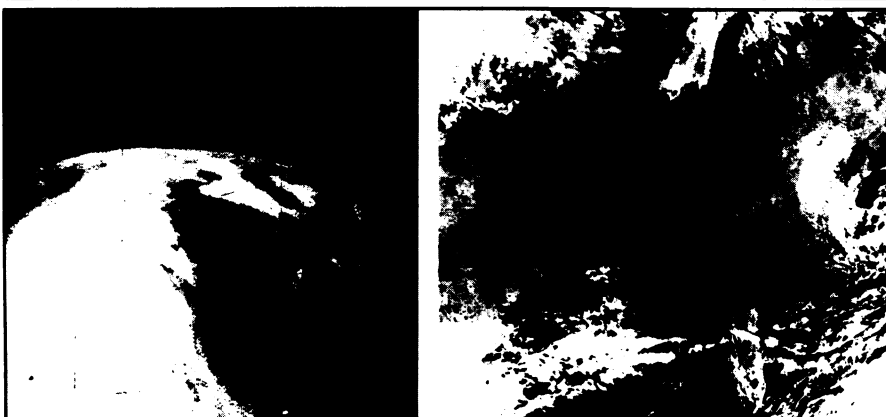
Proline is one of 20 amino acids used in building proteins, but it is not nutritionally essential for humans or other animals because it can be synthesized by the body. It is, however, added to livestock feed and used in intravenous feeding as are other amino acids.

Currently, Japan produces by fermentation methods about 90 percent of all commercially available amino acids and the United States imports about \$500 million worth of amino acids, according to Stephen Turner, president of Bethesda Research Laboratories, Inc., in Bethesda, Md. Turner said his five-year-old firm—which primarily produces laboratory reagents—hopes to reduce the cost of amino acids from between \$50 and \$200 per kilogram to less than \$10 per kilogram. And that price decrease, he says, may eventually be reflected in a decline in the price of meat and other food.

While standard fermentation methods rely on the output of enormous batches of bacteria that naturally produce amino acids, BRL plans to cut costs by recombinantly coercing each bacterium into producing 20 to 50 times more amino acids. Recombinantly produced proline may be on the market in two to three years, Turner said.

In order to isolate the proline gene, according to researcher Will Burton, the BRL scientists chemically chopped up bacterial DNA and slipped the pieces into the DNA of a virus that infects *Escherichia coli* bacteria. The virus particles, each containing different pieces of bacterial DNA, were then allowed to infect an *E. coli* strain that does not naturally produce proline. The presence of proline in the cell culture indicated that the bacteria were expressing the gene for proline carried into the cells by a virus. That virus, with the bacterial proline gene, was then recovered and the gene removed. The proline gene was then added to a plasmid, a ring of natural bacterial DNA, which was introduced into *E. coli* where the gene was again expressed. By improving incubation conditions and by introducing more plasmids into each cell, BRL researchers hope to boost each cell's output of proline. The method used for proline is applicable to all amino acids, says Turner, and the laboratory is currently working on two other amino acids. □

Twenty years of weather satellites



On April 1, 1960, the first weather satellite photograph (left) was sent back to earth. Since then, 27 satellites have produced the familiar pictures of swirling clouds. The first covered only 25 percent of the earth each day; the two now in orbit each cover the entire earth twice a day, producing high resolution photos like the one on the right. They also take the temperature of the atmosphere and the sea surface, track sea ice and check electron and proton activity around the earth.