Resins Raise Problems for TMI Cleanup

A potential new problem has arisen in the cleanup operations at the crippled Three Mile Island nuclear reactor. Highly radioactive resins, used to decontaminate some of the cooling water, may have become unstable. This could pose difficulties for their long-term storage or their ultimate disposal.

Some scientists have argued that the problem has arisen because the wrong materials were used in the decontamination process. Rustum Roy, professor of materials science at Pennsylvania State University, says, for example, that he initially warned against the use of organic resins if they were going to be exposed to high loadings of radioactivity. But organic resins were used anyway and, he says, they were loaded to "fantastic levels."

The resins were used in a process, known as EPICOR II, which removed most of the radioactive elements from some 500,000 gallons of contaminated water. The EPICOR II system works like a commercial water softener. The contaminated water is passed through a series of columns containing tiny resin beads, which act as ion exchangers, removing some dissolved salts from the water.

When the resins had done their work, they were transferred to steel containers 4 feet in diameter and 4 feet high, which are now being stored in special concrete bunkers at the Three Mile Island site. The fear is that the very high levels of radioactivity in the resins may have caused them to deteriorate, and they may be corroding the containers. There are some 47 containers with resins that have been loaded with radioactivity at a level believed to be sufficient to initiate this process.

The possibility that the resins may become unstable under the influence of high levels of radioactivity was raised early last year, and the Department of Energy consequently sponsored a series of tests at Brookhaven National Laboratory, Pennsylvania State, and Georgia Institute of Technology. These tests indicated that three types of changes may be taking place in the resins. First, hydrogen may be formed as the resins deteriorate, raising the internal pressure in the containers. Second, the medium may become acidic and corrode the steel casing. And third, the beads themselves may agglomerate, forming a mass that could be difficult to remove if the wastes are ever processed for final disposal.

The Department of Energy recently shipped one of the containers to the Battelle Columbus Institute, where it will be opened in a special "hot" cell to determine what changes have taken place so far. The results of that examination will determine whether it is safe to continue storing the resins at the site or whether they could safely be shipped to another location for processing and ultimate disposal.

Asked whether it was a mistake to use the resins in the first place, Bernard Schneider, head of the Nuclear Regulatory Commission's Three Mile Island operations office, said that he believes that the problems were not known at the time the EPICOR II system was approved. In future, however, inorganic ion exchange media, which are expected to be more stable, will be used in the first stages of the cleanup process for the remaining contaminated reactor water.

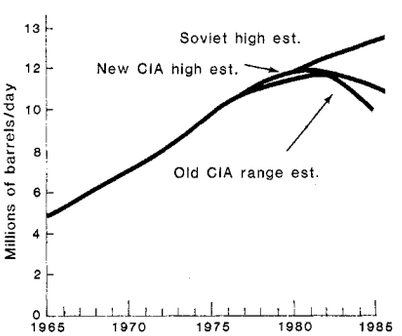
—Colin Norman

Soviet Oil Decline Put Off 3 Years

The Central Intelligence Agency (CIA) in May indirectly admitted an error in forecasting Soviet oil production rates by revising a controversial report first issued with President Carter's energy message in 1977. In effect, the agency agreed with those of its critics who have said the Soviet Union is not about to face an oil crisis in the early 1980's.

The new CIA outlook changes the message of the 1977 study, which estimated that Soviet crude oil production would peak in the near future, perhaps as early as 1978, at 11 million barrels per day (MBD) or as late as 1983 at 12 MBD. After peaking, the CIA predicted, oil output would decline to 8 to 10 MBD by 1985. The implication was that the Soviets would have to buy oil on the world market or tap new sources outside Siberia to supply satellite nations in Eastern Europe. Many people speculated that the invasion of Afghanistan in 1979 was inspired partly by the search for new energy resources.

The Soviets, however, have been producing more oil than the CIA predicted. Instead of peaking in 1978, production has climbed. It stands at about 12.1 MBD and shows no sign of dropping off soon. Furthermore, Soviet planning councils have set an ambitious goal of producing 12.4 to 12.9 MBD by 1985. As a result, the CIA has conceded a point to critics in the United States, including Marshall Goldman, an economics professor at Wellesley College, who claimed that the CIA report was unduly pessimistic. The agency has revised its oil forecast, leading Goldman to tell the *New York Times* recently that "those who think the Soviets must go into the Middle East for oil are wrong."



Although the CIA has made some concessions to its critics, it has not done so gracefully, nor has it abandoned its belief that Soviet oil production will decline in this decade. Because the Reagan Administration ended the CIA's practice of briefing the press on such issues, the agency is not defending its argument in detail. But the CIA did release a terse statement in May noting that the press had "overstated" the extent of the revision. The underlying analysis remains unchanged, the CIA claims, and the advent of the oil crisis has only been postponed a few years.

"All the problems that we foresaw the Soviets facing are emerging, although the [oil] output in the near term will be somewhat higher than we anticipated in 1977," the CIA's announcement says. "Despite extremely costly efforts, Soviet output at most is likely to remain at about present levels of 12 MBD for 1 to 3 years, and then begin to decline. We now expect 1985 outputs to approximate 10 to 11 MBD,

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compared with our original estimate of 8 to 10 MBD. Only the rapid discovery of very large amounts of oil can avert this outcome." So, if the wolf is not gnawing at the door, he may be prowling in the forest nearby.

Goldman says he now agrees with the CIA's analysis of the Soviet oil industry.—***Eliot Marshall***

Amniocentesis: Be Prepared

The new top-ranking physician in the Department of Health and Human Services says that an abortion should only be performed if the mother's life is in danger, even if amniocentesis reveals severe birth defects or if a woman becomes pregnant after rape or incest. Assistant Secretary of Health Edward N. Brandt, Jr., said at a meeting with reporters on 27 May that amniocentesis is "a justifiable procedure to know whether a child will have an abnormality." That knowledge, he said, could prepare parents to deal with the infant's problems. Brandt also commented at his first meeting with reporters since he took office in May that he favors a constitutional amendment that would outlaw abortion.

Prior to his appointment, Brandt was vice chancellor of medical affairs for the University of Texas medical system. He also has a Ph.D. in biostatistics. As assistant secretary, Brandt directs the Public Health Service, which includes the National Institutes of Health, the Centers for Disease Control, the Food and Drug Administration, and the Alcohol, Drug Abuse, and Mental Health Administration.

Although many scientists believe that current congressional efforts to define the beginning of human life should be left to private individuals or philosophers and theologians, Brandt, who is also a Church of Christ minister, takes no clear-cut stand on the issue. "It's a difficult and complicated issue," he said.

Brandt predicted that the controversial candidate for Surgeon General, C. Everett Koop, will be confirmed. Brandt seemed to try to allay fears that Koop's outspoken opposition to abortion, homosexuality, and women's rights will spill over into the formation of public health policy. Brandt said the job of Surgeon General was largely "symbolic" and that Koop "would still have to report to me." Historically, however, surgeons general have been significant in shaping public health policy.

In response to other questions, Brandt said there would not be great shifts in priority at the National Institutes of Health. "NIH has set a record that's absolutely unparalleled, but it will have to adapt to economic reality."—***Marjorie Sun***

Gene Therapy Pioneer Draws Mikadoesque Rap

Biologist Martin Cline, who in July 1980 performed the first known recombinant DNA experiments in humans, has been decreed by the National Institutes of Health to have broken both the federal regulations on human experimentation and the NIH guidelines on recombinant DNA research. Cline "has violated both the letter and the spirit of proper safeguards to biomedical research," NIH director Donald Fredrickson declared in an unwontedly censorious statement. The verdict marks the fourth known infraction of the recombinant DNA rules since 1976.

The NIH is asking various of its advisory committees to consider whether Cline should be denied his present or future research grants. Cline has already stepped down from his post of division chief at the University of California, Los Angeles, where he remains a tenured professor (see *Science*, 3 April, p. 24).

The NIH report on the Cline affair, released on 29 May, makes plain that Cline acted alone in performing the unauthorized gene therapy experiment. His colleagues at UCLA, who prepared the recombinant DNA molecules, and his collaborator at the Hadassah hospital in Israel, where the patient was located, were all informed only after the event that Cline had followed a version of the protocol different from that approved.

Cline is quoted in the report as conceding that he "exercised poor judgment" and that, despite the promise of the experiment for thalassemia patients, "I profoundly regret that I conducted these studies without adhering strictly to written guidelines."

The NIH committees that have to consider further sanctions against Cline will find themselves weighing the seriousness of the political implications of Cline's disobeyal against the triviality of its scientific consequences. As the first attempted gene therapy, Cline's experiment has gotten the morally fraught but medically propitious field off to a thoroughly muddied start. Moreover, flouting authorities in a foreign institution is a different matter from thumbing one's nose at those at home.

On the other hand, the significance of the infraction was almost purely formal. Cline had permission to insert two genes separately into his patient's marrow cells; his offense was to insert them in combined form. In both cases the genes had been manufactured by recombinant DNA techniques, but only when linked to each other were they deemed to constitute a recombinant DNA molecule, use of which had not been sanctioned. Cline has contended that genes inserted separately tend anyway to recombine within the cell, so that there is no substantive difference between the protocol which was approved and that which he actually followed.

In devising his experiment Cline had to negotiate with five separate committees, two at UCLA and three in Israel. Though each committee doubtless acted reasonably, the cumulative delay must have been frustrating to a researcher who believed he had developed a promising new approach to a painful and intractable group of diseases.

The NIH's response to previous infractions of its gene splicing rules has been to commute punishment to whatever discomfort the offender may already have suffered. Its more energetic reaction to Cline may perhaps have been colored by recent congressional hearings in which the agency's avenging roar against miscreants emerged as generally less than petrifying. For any who might sympathize with Cline over his entrammelment with review committees, the NIH's verdict may seem as condign as if devised by the Mikado himself. In effect, Cline is to be suspended in red tape while yet another series of committees reviews both his and each other's works, at the conclusion of which the NIH will render an actual decision as to whether further sanctions are necessary.—***Nicholas Wade***