crunch occurred, suggests that Exxon's actions in respect to technology and research are at least in part a matter of "history, tradition, corporate culture." He notes that Exxon is "reverting to type as a natural resource company," and "the role of research in a natural resource company is indeed minor."

Observers agree that the assumption that Saudi Arabia can raise oil production at will and swamp the market has discouraged U.S. companies' interest in investment in the exploration and production end of the business. Most U.S. companies have deeply cut back research that supports exploration and refining activities.

Another negative influence on oil industry R&D is seen in the restructuring of the industry that began about 1980. In a talk on energy R&D in May, Phillips Petroleum Company vice president for research and development Charles F. Cook noted the effect of corporate takeover bids and mergers. Examining what he called "merger mania," Cook cited "ten acquisitions which resulted in $58 billion transferred or added as debt since 1980. These acquisitions, regardless of the justification, did not add one additional barrel of oil to U.S. reserves. It did, however, take a lot of money out of research and the search for oil.

"In reaction to raids, a number of oil companies have taken on excessive debt and/or have buy-back programs of their own stock. This too has removed cash or added debt to the oil industry."

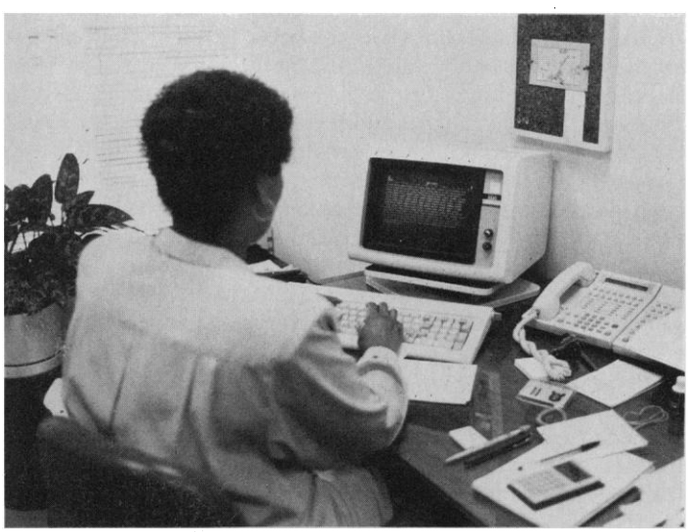
Taken together, Cook said in an interview, the collapse of prices and restructuring caused "a significant reorientation of thinking. You've got to plan in a fluctuating oil price scenario." In remarks at the AAAS Colloquium on R&D Policy in March, Cook said that "Stability in R&D and exploration budgets is history and rapid changes will be a way of life." He predicted a "down cycle for R&D in the oil patch" for at least the next 5 years, with the date of a turnaround unknown. ■ JOHN WALSH

Federal VDT Study Finally Wins Approval

First proposed in 1982, it was held up by OMB because critics charged that the design was flawed

"It's been a long time coming," says Philip Bierbaum of the National Institute for Occupational Safety and Health (NIOSH). After 4 years of planning, the agency on 6 June finally won approval from the Office of Management and Budget (OMB) to begin a study of the potential reproductive hazards among women who use video display terminals (VDT). The project is one of the first major attempts to determine scientifically if VDT use is linked to spontaneous abortions and birth defects.

In December, the budget office rejected NIOSH's original proposal for the study, but has now approved a revised version. The budget office objected to the study after Brian MacMahon, head of epidemiology at the Harvard School of Public Health, and Sally Zierler, assistant professor of public health at Brown University, criticized its design. The two scientists reviewed the proposal as paid consultants to Bell South, whose employees, along with workers at AT&T, were to be the focus of the study. Supporters of the study, including workers' groups, consequently have charged that Bell South was trying to squelch the study and that OMB was meddling in scientific affairs.



Marjorie Sun

Spontaneous abortions and other reproductive problems have been reported among women VDT users, but the number of women are too small and the problems too varied to draw any conclusions.

The company, MacMahon, and Zierler argued that they were not opposed to the study, but said that its design was badly flawed. Their criticisms, and the lengthy dispute over this research, highlight the complexities of planning a sound epidemiological study of reproductive effects that are likely to be encountered at very low levels, if at all.

From the beginning, the project was difficult to design. NIOSH first proposed the study in 1982 after several widely publicized reports indicated that clusters of women VDT operators in the United States and Canada suffered high rates of spontaneous abortions, birth defects among their children, and other reproductive problems. But the groups were too small and the reproductive problems too varied to draw any scientifically valid conclusions. The likelihood of an association is considered small because VDT's emit trivial amounts of nonionizing and ionizing radiation, according to NIOSH.

Teresa Schnorr, the NIOSH epidemiologist who drafted the study protocol, says that right off the bat, agency scientists had trouble forming a hypothesis to test. "There were no patterns among the clusters," she says.

In general, reproductive studies are more difficult than others in epidemiology because medical records on miscarriages and birth defects are not as reliable or consistent as records pertaining to disease or death. Some doctors, for example, only report miscarriages that occur late in pregnancy. Also, medical records of miscarriages and birth defects often are not included in company personnel records. Although the information may be available through medical insurance files, a comprehensive study would

require a survey of several insurance companies. Schnorr said that although NIOSH has the authority to obtain medical insurance files, such a survey would be too time-consuming and expensive.

As a result, NIOSH scientists decided to gather data by interviewing individuals, a method that is common, but raises the possibility of recall bias. In this study, for example, publicity about potential hazards associated with VDT use might cause women who work with VDT's to remember their miscarriages with greater accuracy. Unreported miscarriages among the control group would skew the study results.

NIOSH researchers also had problems finding a suitable control group for the project. They considered workers from a variety of sectors, including the insurance industry, airline reservation offices, and the federal Social Security Administration. They eventually settled on the phone companies because Bell South directory assistance operators use VDT's, while AT&T long distance operators perform similar tasks without computers. The two groups are also similar in socioeconomic class.

NIOSH put the finishing touches to the study design in May 1985, after it had been honed and approved by a group including four nonagency scientists—three epidemiologists specializing in reproductive studies and a stress expert, and two agency scientists—a statistician and a psychologist. The agency decided to focus mainly on whether VDT use is linked to miscarriages and, second, to birth defects in general rather than to a few specific defects. It proposed to interview 2000 VDT users and an equal number of nonusers, which would provide enough data to detect a 50% increase in miscarriages among VDT users. To ensure that both groups are comparable, women would be questioned about stress on the job and their ability to conceive. And, reports of spontaneous abortions would be checked against medical records.

MacMahon and Zierler, however, harshly criticized the study, asserting that because of recall bias, "The likelihood that the study as described will achieve its stated objectives . . . is nil. It is in our view inconceivable that the study would yield results that are definitive, unequivocal, or credible. . . . " They suggested several revisions:

- To minimize the possibility of recall bias, they said that NIOSH should verify unreported miscarriages by examining medical records.
- The questions about stress and fertility should be eliminated because they are "intrusive" or "irrelevant" to whether VDT use is associated with spontaneous abortion.
- The sample size should be enlarged in order to detect less than a 50% increase in spontaneous abortions.

Drawing upon these comments, Bell South went to OMB, which has the authority under the Paperwork Reduction Act to review the study and approve all federal questionnaires. The company said that even though it supported the concept of a study, the project should be expanded to include women from other industries. The telecommunications industry was being unfairly singled out by NIOSH scientists, it argued. OMB subsequently disapproved the project, an action that is not unusual. Since 1984, for example, it has disapproved five out of 25 surveys proposed by NIOSH.

The budget office now says the study may proceed if NIOSH incorporates many of MacMahon and Zierler's suggestions. It said questions concerning stress and fertility should be eliminated, and that NIOSH should investigate the possibility of unreported miscarriages to minimize recall bias if the study does show a link between miscarriages and VDT use. It did not say, however, that the agency must expand the project to include more telephone operators or workers from other industries.

In an interview, MacMahon expressed satisfaction with OMB's decision. "We got almost everything we wanted," he says. "Our main concern was recall bias. I think the study is now scientifically sound."

NIOSH officials say they will likely go along with the budget office's revisions, although they have expressed concern about OMB's intervention. Schnorr remarks that the changes "reduce our ability to detect" some potential differences between the two groups, but, as a whole, they do not substantially change the study design. The study will take 2 years to complete and cost about $500,000.

Carl Shy, a professor of epidemiology at the University of North Carolina and an adviser to NIOSH on the study, says that by striking the fertility questions, OMB eliminated the chance to uncover a potential complicating factor in the study results. But, because the questions are not related to the main purpose of the study, he says, they are no great loss. And, in his opinion, a reproductive study that can detect a 50% increase in miscarriages is relatively sensitive.

Bell South spokeswoman Kathleen Hughes said the company had no comment other than to say that "it would continue to participate" in NIOSH's efforts.

NIOSH official Bierbaum said of the budget office's approval, "This is great. It's too bad [settling on a design] took so long." Schnorr said that agency researchers may be ready to begin the VDT study this fall. ■

MARJORIE SUN

Briefing:

High Court Says No to Administration's Baby Doe Rules

The Supreme Court has finally foiled attempts by the federal government to mandate the type of medical treatment accorded newborns with severe birth defects. In a case decided on 9 June, the court said that the "Baby Doe" guidelines promulgated 2 years ago by the Department of Health and Human Services (HHS) cannot be justified on the basis of the Rehabilitation Act, which forbids discrimination against the handicapped.

The guidelines were struck down by a New York district court in early 1984 after a suit spearheaded by the American Medical Association. An appeals court affirmed the decision, but the government decided to pursue the case to the Supreme Court. Still in place are Baby Doe–type regulations that were passed last year as part of the Child Abuse and Protection Act.

Specifically, the Supreme Court struck down rules which would have required the posting of informational notices in hospitals, expedited access by the federal government to medical records, and ordered expedited compliance actions on the part of state child protective services.

The HHS has tried to assert that the infants in question are protected under the law that says handicapped individuals "otherwise qualified" for services may not be discriminated against. But the court wrote that "the 'otherwise qualified' criterion . . . cannot be meaningfully applied to a medical treatment decision" related to the handicap. It asserted that in cases where treatment has been withheld, the decision has not been based on the handicap but on the wishes of the parents.

The HHS guidelines as originally proposed would have mandated treatment with or without parental consent, but this stance was later reversed to say parental decisions should not be overruled. Since in none of the 49 cases cited by the secretary of HHS was treatment denied in violation of parents' desires, the court points out that the secretary's concerns are largely "theoretical."

Ironically, in view of the philosophy of this Administration, the tartly worded opinion by Justice John Paul Stevens comes across not only as "profamily" but anti–federal intervention. It says "state child protective services agencies are not field offices of the HHS bureaucracy, and they may not be conscripted against their will as the foot soldiers in a federal crusade."