

of the [NET2] source code and found very direct copying...." says Lytle. Specifically, USL now claims that more than 100 files, out of the more than 8000 in NET2, have code stolen from UNIX. "I think it will be obvious to the court that they copied our kernel [the core of an operating system]," says Sanford Tannebaum, a vice president for USL. The suit seeks unspecified monetary compensation from both the university and BSDI for damage to USL's business and also asks the court to bar BSDI from selling any software based on NET2.

Tannebaum's optimism, however, faces a tough test. The issue of what actually constitutes copyright infringement of computer software codes is far from clear, and is likely to be the central issue in this suit. Copyright law, as defined by earlier software cases, would appear to permit limited direct copying of source code that cannot be written in any other way—much as chemical formulae can only be expressed in a unique way. University counsel Mary MacDonald says that the school went to great lengths to ensure that NET2 was AT&T-code free, even asking AT&T to review sections (which it declined to do). "Any literal copying is in areas where there is no choice," she maintains. How the court views this argument could set a precedent for future fights over software copy-

right, says intellectual property lawyer Richard Miller.

Berkeley also plans to contest whether AT&T ever obtained a valid copyright on UNIX, since it was not originally distributed in the 1970s with a copyright symbol nor registered with the U.S. copyright office. In response, USL contends that early distribution of UNIX constituted only a "limited publication," which means legally that they could still maintain a legitimate copyright.

Even before these issues reach the court, the combatants have taken their case to the public. In a press release this summer, for example, BSDI went as far as to suggest that AT&T may "threaten to review or withdraw research grants made to any university or research institution using or distributing software based on NET2...." Those kinds of allegations may account for the tremendous outrage the suit has prompted among computer scientists. Some are even boycotting AT&T's long-distance service and sporting buttons that read "NET2 Live AT&T-free or die!" But officials at Berkeley and Carnegie-Mellon, which has also created software incorporating NET2, told *Science* that AT&T has made no such threats. And it's not likely to in the future: AT&T agreed in December to sell USL to Novell Inc., so it no longer has a direct stake in the UNIX suit. Still, the suit has

prompted defensive action by universities. Berkeley has voluntarily withdrawn its NET2 package until the case is resolved, and computer scientists at Carnegie-Mellon have done the same for their software that uses NET2.

A preliminary hearing scheduled for late January should clear up many of the questions surrounding the case and, perhaps, indicate whether USL's suit is simply a business battle or something with much broader implications for software research. No one involved in the dispute, however, believes that this court date will be the last word on the matter. Indeed, most expect the case to drag through the legal system for years. And if USL can obtain a permanent injunction against the commercial release of BSDI software until the case is resolved, the small company may not survive the ordeal. Nevertheless, since neither side is willing to budge from its stance, there appears little chance for an out-of-court settlement. "In many aspects, this is like a religious or political issue. You can present your opinion, but if people don't agree, they just ignore it," says Lytle. "It's really hard to find anyone even slightly objective. [The case] has really polarized the community," comments Bostic. That, it seems, is about the only thing the opposing sides can agree upon.

—John Travis

FEDERAL SCIENCE FUNDING

Wake-Up Call for Sleep Research

Most people assume the *Exxon Valdez* oil spill of 1989 was directly related to the captain's alcohol problem. Not so, says a report from the National Commission on Sleep Disorders Research. The real problem was the "severe fatigue" of the ship's third mate—who was in charge at the time—which led to the disastrous grounding. And the enormous cost of cleaning up the oil spill is only a tiny fraction of the full toll sleeplessness takes on our society. To combat this "silent epidemic," the commission last week called for establishing a new sleep research institute as part of the National Institutes of Health (NIH), and a doubling of the amount the government spends on sleep research.

At a Capitol Hill press conference, members of the commission, set up by Congress in 1988, said sleep problems cost society about \$50 billion a year. Chairman William Dement, the head of Stanford University's Sleep Disorders Center, whose advocacy was in large part responsible for the commission's creation, called sleep the nation's "largest biomedical orphan." Nearly 40 million Americans have chronic sleep problems, says the report. Perhaps 250,000 suffer from narcolepsy, an irresistible urge to sleep that cripples daily functioning. About 15 million suffer from sleep apnea, which often means waking

hundreds of times a night. Another 25 million have persistent sleep problems, many because of illness or psychiatric disorders.

Medical problems aside, almost no one in America is getting enough sleep, said commission member Mary Carskadon, professor of psychiatry and human behavior at Brown University. She said most adults need 8 hours a night—but 50% get less, and 25% get less than 7. Teenagers now average about 2 hours less sleep a night than they did 80 years ago and are using school as the place to recoup. "America has a sleep debt and in our opinion it's every bit as important as the national debt," said commission member James Walsh, director of the Sleep Disorders Research Center at Deaconess Hospital in St. Louis.

The consequences are wide-ranging: damage to physical and mental health, impaired mental functioning, interpersonal problems, on-the-job injuries, and catastrophic accidents. Drowsy drivers cause more fatalities per accident than drunk drivers, says the report. And every nuclear accident, such as Chernobyl, has occurred in the early morning hours, a "down" period for the body no matter when a person usually goes to bed.

The commission's report offers a list of proposals starting with a new National Center

for Research and Education on Sleep and Sleep Disorders (with a \$16 million annual budget) and an "immediate" infusion of \$55.8 million a year for research, especially basic research, on top of the \$44.6 million now spent within the Public Health Service.

Other recommendations include:

- More money for research training. There are "alarmingly few" up-and-coming investigators—the commission counted only 16 postdocs in the country who are getting specialized training in basic sleep research.
- Education of health professionals. Dement said that 95% of cases of sleep disorders are going undiagnosed—"A river of patients are flowing past the unseeing eyes of doctors."
- An education campaign to attack what Dement calls the public's "pervasive, stupefying ignorance about sleep."

The commission seeks nothing less than "a radical change in the way society deals with sleep." Senator Mark Hatfield (R-OR), for one, agrees. He and colleagues have written Senator Edward Kennedy (D-MA), chair of the Labor and Human Resources Committee, urging inclusion of a sleep research center in the NIH authorization bill, and Hatfield plans to introduce a bill to that effect in the next Congress.

—Constance Holden