

THE PROFESSION

Congressman hits NSF shortfall study

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its own political agenda. In a statement, Wolpe expressed his belief that the NSF wanted to boost its education budget.

Erich Bloch was the director during most of the period the forecast was circulated. He was not called to the hearing of the House subcommittee on Investigations and Oversight. But a poster board was set up in clear sight of attendees with quotes from Bloch telling Congress about "shortages" of people—even though his employee, House, maintained that his report was not a labor-market analysis but simply a prediction that the number of engineering degrees would drop in the next decade.

The hearing uncovered evidence that the NSF itself was split over House's paper. Repeatedly, conflicts arose within and outside NSF over how House arrived at his forecast. At one point, NSF's own people refused to publish the paper as an official document. The 1986 paper went through 10 revisions and permutations in the next five years in an increasingly frantic attempt to prop up its findings.

Most important to Wolpe, however, was the fact that Congress based legislation, in part, on the forecast. The 1990 Immigration Reform Law, the Excellence in Mathematics, Science and Engineering Act of 1990, and the NASA authorization bill all cited "shortages" as a reason for federal action.

"The credibility of the Foundation is seriously damaged when it is so careless about its own work product," said Wolpe.

Methodology

The subcommittee called 10 witnesses during the April 8 hearing. Besides House, two were from NSF: the new director, Walter E. Massey, and Kenneth Brown, director of the NSF's Science Resources Studies Division. The division clashed frequently with House's Policy Research and Analysis (PRA) division over the forecast's methodology.

That methodology was the focus of questioning of the first seven witnesses, an assortment of statistical experts from other governmental agencies, academia and from the Engineering Manpower Commission of the American Association of Engineering Societies, an umbrella group that IEEE belongs to.

The basic message from those witnesses was that the paper's methodology was flawed. Its emphasis on supply did not take into account job-market demand. It

extrapolated data on the basis of the peak year of engineering graduates. And it did not undergo vigorous peer review.

Facing Wolpe, the persistent chairman of the I&O committee, the gaunt, visibly nervous Peter House defended his work. He said he never meant to have the paper



Rep. Howard Wolpe: 'This was not good science.'

used as a labor-market analysis.

In his written statement, House noted that "PRA found that demographics, specifically the size of the college-age population group, had been the dominant factor explaining the growth in numbers of new NS&E (natural science and engineering) bachelors degrees over the past 25 years."

With a declining population of 22-year-olds on the horizon, House tracked how the number of degrees would likely decline if a "conservative" estimate of 4 percent of graduates took NS&E course work over the next few years. PRA then took one of the peak engineering graduation years and drew a line straight across the chart to past the year 2011. The difference between the likely number of engineering degrees and that line became the "shortfall," a number that one congressional staffer called "meaningless."

House defined demand as "if you pick a period, and suppose a zero growth rate, it's the number of degrees we need."

"We're not comprehending," said Wolpe, shaking his head.

"All we did," House said, "was project the number of degrees in the natural sciences and engineering that was going to fall from 1986 on." And, he said, they have. "We did not do a market analysis related to jobs."

Study use

House was then asked why the study was called "Future Scarcities of Scientists and Engineers." The "scarcities" title, he said, "was for

those who felt there should be more degrees in NS&Es."

Wolpe then pressed the bow-tied analyst about how his study was used. Wolpe noted that House's boss, Erich Bloch, talked about a "cumulative shortfall" in engineers and scientists in arguing for higher NSF funds in 1986-87. "He frequently mentioned your numbers. Did you ever remind Bloch you were addressing only one point? Did you ever go to him?"

"No." Then, in an unintentionally funny moment, House added, "I didn't pay attention to Erich's speeches."

House repeated his assertion that "my input was one of many." He later added that if Bloch received other numbers from elsewhere, "it was within his purview to translate them into a shortage." But, House added, "he could not make that kind of statement from my numbers."

The hearing revealed that while one division of NSF was warning of shortfalls, another dismissed that contention.

Wolpe presented a statement from Joel L. Barries, a former study director for the utilization studies group of the Science Resources Studies division of NSF. In it, he said, "in 1989, I supervised the preparation of a report . . . which had a new section on projec-

tions based on the SRS model."

The SRS concluded that the labor market "would adjust to any spot shortages in personnel."

Barries said the model prepared by its sister division at NSF, House's PRA unit, befuddled them. "Even the SRS staff . . . could not always follow



Erich Bloch: Predicted shortages of personnel.

the reasoning and methodology."

The PRA model tracks engineering degrees. The SRS forecast model "breaks out supply into four components: new degree holders, re-entrants, immigrants and up-grades," Barries pointed out. Witnesses at the hearing confirmed that any study of labor-market shortages must take those factors into consideration and look into demand and market forces.

The SRS attempted to publish its findings. But the report was held up for a year. The SRS director met with House to find out why. "At that meeting," Barries said, "Dr. House said the problem was that the report did not support the director's position that there would be serious personnel shortages in the 1990s."

At the hearing, House said, "I can't say if I said that."

Asked by Wolpe whether the "pipeline study" had an impact, House replied, "I can't say." Wolpe cited the numerous occasions in which it was quoted, and asked incredulously, "And you're not sure what impact it had on policy?" "I just don't know."

House conceded that by mid-1990, the NSF itself backed away from the shortage conclusions. In 1991, the word "scarcities" was removed from the title, as was the prediction there would a shortfall of 675,000 engineers and scientists.

The Michigan congressman, who was the only representative on the panel (except staff) for most of the hearing, conceded that when Democrats and Republicans present data, people recognized the potential of a built-in bias.

"No one expects the NSF to play that game," said Wolpe. "This was not good science."

Bloch has since retired as director of NSF.

NSF study under fire on the Hill

BY ROBERT BELLINGER

Washington — A congressional hearing last week fiercely criticized the controversial prediction made five years ago by the National Science Foundation that the United States faced a massive shortage of scientists and engineers.

"That prediction . . . was the equivalent to shouting 'fire' in a crowded theater," said Rep. Sherwood Boehlert, R-N.Y.

The NSF paper predicted a shortfall of 400,000 to 692,000 engineers and scientists. It became one of the most widely quoted papers the NSF ever produced—and one of the most controversial.

Last week, the man behind the prediction, Peter W. House, the director of the Policy Research and Analysis division of NSF, was grilled for more than two hours on methodology, squabbles within NSF over the report, and why he remained silent for five years while the media, executives and Congress spread the news of an impending shortage.

"An overall shortage has never materialized," said Howard Wolpe, D-Mich. "There may even be an oversupply." Wolpe is the chairman of the Investigations and Oversight subcommittee of the House Committee on Science and Technology, the subcommittee looking into the NSF "pipeline paper."

Questions also arose whether NSF used the predictions to "project a sense of crisis" and further

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