

'Blue Goose' lives on diet of dioxin

The Environmental Protection Agency (EPA) announced last week that it has developed a prototype mobile incinerator that can destroy dioxin.

"We are completely satisfied with the technology's performance," Bernard D. Goldstein, the agency's assistant administrator for research and development, announced at a news conference in Washington, D.C. Recent test results, he said, "represent a major breakthrough" in dealing with hazardous wastes.

In four trial burns conducted at a contaminated farm in southwest Missouri, the incinerator—nicknamed the "Blue Goose"—destroyed 99.9999 percent of both liquid and solid wastes contaminated with 357 parts per million of 2,3,7,8-TCDD, the most toxic form of dioxin, agency officials said.

"The residues of dioxin left over in the ash were below the lowest amounts our analytical equipment can detect, which is two tenths of a part per billion," Frank Freestone, the EPA's project manager at the Missouri test site, said in a telephone interview this week.

Goldstein said that because the incinerator had burned the dioxin "so com-

pletely," the agency plans to designate the residues from future burns in the incinerator as "nonhazardous." The incinerator also meets federal air pollution standards, he said.

But the new technology, agency officials caution, may not be suitable for cleaning up all sites contaminated with dioxin. It costs from \$200 to \$1,200 for the Blue Goose to burn a ton of dioxin-contaminated soil, the agency said, and every ton takes an hour to burn. Thus, said Freestone, it would not make sense to use the small, mobile incinerator for a hazardous waste site like Times Beach, Mo., where 400,000 tons of soil are now contaminated (SN: 1/22/83, p. 60). "We're in the process of evaluating where we think it would be appropriate to use this type of mobile incinerator," Goldstein said.

Goldstein also said that the Blue Goose was only a model from which he hoped commercial waste disposal companies could learn. But some environmentalists have questioned whether the private sector can be trusted to do incineration. "Unfortunately in the waste business there seems to be a preponderance of dubious companies involved," said environmentalist Peter Montague, co-editor of the *NEW JERSEY HAZARDOUS WASTE NEWS*. "It's a high consequence business, and I'm concerned that the EPA won't adequately monitor them," he said. —*J. Mathewson*

Metastatic talents of toxic shock germ

The highly invasive bacterium *Staphylococcus aureus*, responsible for such diverse maladies as pimples, food poisoning, blood poisoning, cystitis, endocarditis, pneumonia, severe infections and toxic shock syndrome, may spread through the body in the same way that metastasizing cancer cells do. *S. aureus*'s capacity to bind to a molecule found in the matrix between cells may allow the bacterium to move in and out of the bloodstream by slipping through vascular walls and into tissues, report J.D. Lopes of the Ludwig Institute for Cancer Research in São Paulo, Brazil, and colleagues in the July 19 *SCIENCE*.

The molecule, laminin, is a protein that helps make up the basal laminae—ultra thin membranes that separate the body's epithelial, or lining, cells from connective tissue. In order for cells to metastasize, they must be able to stick to the surface over which they are to migrate. *S. aureus* has surface receptors for laminin, which seem to allow the bacteria to stick, or bind, to the basal laminae.

S. aureus's ability to cross vascular basal laminae, and so invade the bloodstream, is "critical for the organism's pathogenicity," says Lopes. And therefore, the scientists suggest, the bacterium's laminin receptors may be responsible for *S. aureus*'s virulence. To support this argument, the researchers also showed that *Staphylococcus epidermis*, a non-invasive, non-pathogenic cousin germ, has no receptors for laminin; implying that *S. epidermis*' lack of virulence is due to a lack of laminin receptors.

In addition, the researchers demonstrated that, like *S. aureus*, certain mouse cancer cells have laminin receptors, which suggests a common mechanism for invasion by two very different pathogens. Laminin receptors have been correlated with invasiveness in tumor cells.

The new findings are important because they shed light on the biochemistry of virulence, says Bruce Hannah, director of clinical microbiology at Bellevue Hospital at New York University Medical Center, in New York City. Hannah says *S. aureus* is a "sophisticated" organism, "replete with pathogenic potential." If the virulence of *S. aureus* really depends on its laminin receptors, he says, then agents that block those receptors or a vaccine that prevents adherence could be developed as alternatives to antibiotics. (Antibiotics are becoming less reliable, as pathogens develop resistance to them.)

However, Hannah cautions that Lopes and colleagues have yet to demonstrate that laminin receptors are "the true virulence mechanism." And, he adds, "very rarely does pathogenicity rest on a single trait." —*J. Dusheck*

NIE to be abolished... well, sort of

Education Secretary William Bennett has announced that on October 1 the National Institute of Education—the Department of Education's primary research arm—will be abolished. Functions of the comparatively tiny institute—budgeted at \$51.6 million—will be absorbed by its parent structure within the Education Department, the Office of Educational Research and Improvement. Few funding changes or layoffs are expected to result from the move, according to Bennett.

Bennett said the reorganization "will achieve greater efficiency and responsiveness and eliminate duplication and needless bureaucratic layering." Among the changes will be elimination of two presidentially appointed positions—NIE's director and deputy director—and the downgrading of the National Council on Educational Research from a policy-setting body to a purely advisory one. A new oversight committee will coordinate research. Most of the agency's research will be consolidated into a new Office of Research.

Penny Early, director of Federal and State Relations for the Washington, D.C.-based American Association of Colleges for Teacher Education, says that "other than moving some functions from one block on an organizational chart to

another—and essentially getting rid of the director of NIE—I don't see anything that's fundamentally different."

But Laurie Garduque, director of governmental and professional liaison for the American Educational Research Association (AERA) in Washington, D.C., sees an important difference. Representing roughly 14,000 individuals involved in educational research, she expressed AERA's past concern that "NIE hasn't made any new awards to individual researchers in four years." The agency's accounting procedures tended to mask that, she says, since there were no budgetary line-items on how NIE spent its research money. But with the new Office of Research, she says, "if they zero out cognitive science research in education it will be clearly evident to everyone." As a result, now the agency can be held up to greater scrutiny and accountability, she believes.

Ironically, in a postscript to the statement on NIE's abolition, Bennett added that the Education Department also intends to seek legislative authority to rename the Office of Educational Research and Improvement. His choice? The National Institute of Education. This name change is the only aspect of the entire reorganization requiring congressional approval. —*J. Raloff*