impossibility of adequate cleansing of cabin air became evident.

"The coup de grace to smoking in airlines was the realization that diminished ventilation with outside air and increased recirculation of air, a characteristic of almost all new airliner models, will increase previous levels of toxic products of cigarette smoking in nonsmoking sections of the cabin."

In recommending the ban, the committee cites four aims: to lessen irritation and discomfort to passengers and crew, to reduce potential health hazards to cabin crew, to eliminate the possibility of fires caused by cigarettes, and to bring the cabin air quality into line with established standards for other closed environments.

Besides the smoking issue, the report, "The Airliner Cabin Environment," takes a comprehensive look at cabin air quality and safety issues including contamination and pollution from ozone, cosmic radiation, ground fumes, biologic aerosols, humidity, carbon dioxide, and dangers from onboard fires and depressurization.

Sponsor of the study was the Department of Transportation, parent agency of the Federal Aviation Administration, which regulates the airlines. Chalmers says the panel found the FAA system for dealing with air safety "phenomenal," but its concern for health issues less focused. Because of the scarcity of monitoring studies on air quality in airliner cabins, the panel decided to make comparisons of conditions in aircraft with other types of environments. Chalmers says that after looking at air-exchange rates in plane cabins, the panel concluded that conditions on airliners were inferior to those in other environments. For example, the panel says that measured values for environmental tobacco smoke in airline cabins were found to exceed a Japanese standard for indoor air quality. And ventilation standards set in the United States to avoid irritation by tobacco smoke in buildings are not met by prevailing aircraft practices.

It is unusual although not unprecedented for an academy report not to cite decisive scientific evidence to support a major recommendation. In such cases, academy panels not infrequently wind up calling for more research. In this instance, the panel succeeded in convincing those manning the academy's formidable report review mechanism that the weight of evidence, incomplete as it is, justified the ban. Chalmers says that the process was a rigorous one, recalling that the review document ended up "bigger than our report." He acknowledges that "There was trepidation throughout the building. They wanted to be absolutely sure we could stand up to the criticism." ■

JOHN WALSH

OTA Enters Inflamed Debate on Ocean Incineration

Of all the ways to get rid of hazardous waste, none has engendered as much controversy as burning toxic substances at sea. Now the Office of Technology Assessment (OTA) has entered the fray with a lengthy report that has already been used by proponents and opponents of the technology to bolster their own arguments.

The report, "Ocean Incineration: Its Role in Managing Hazardous Waste," released on 15 August, comes at an opportune time because the Environmental Protection Agency is struggling to develop regulations on ocean incineration. In May, EPA rejected

Waste Management, Inc.

Vulcanus II. *Plans to use the ship to burn wastes off New Jersey drew strong protests.*

an application submitted by Chemical Waste Management, Inc., to conduct experiments on its ocean incineration ship, the Vulcanus II, off Cape May, New Jersey. The agency announced at the same time that it would not issue a permit until it had developed regulations to cover both research and commercial use of the technology. The company proposal generated enormous local opposition; nearly 3000 people attended public hearings held this spring on the proposal.

The OTA report says that burning hazardous waste at sea could be used as a stopgap measure to treat toxic liquids. It states that ocean incineration "could be a useful option, but is clearly not a panacea." Ultimately, better methods to reduce or recycle waste must be developed. Ocean incineration would only be suitable to treat 5 to 8% of all hazardous waste, but the chemicals that could be destroyed by the technology are among the most toxic. The report also notes that incineration at sea is one of the few methods available to detoxify hazardous waste that is highly chlorinated.

The report says that there are many unresolved scientific questions concerning the technology's potential risks to health and the environment. Many of these same concerns were raised last year by an EPA scientific advisory board. For example, the board recommended that EPA develop better ways to measure whether compounds have been destroyed by burning and that it should improve methods to identify what compounds are being emitted into the atmosphere after incineration.

Representative Roy Dyson (D–MD), a member of the House Committee on Merchant Marine and Fisheries, which has jurisdiction over ocean incineration, said in a statement that, based on the findings of the OTA report, "the need for ocean incineration has not been proven." But James Banks, director of environmental affairs at Waste Management, Inc., the parent company of Chemical Waste Management, repeated the report's statement that ocean incineration could be considered an interim method of treating hazardous waste. Banks said, "We're not saying that ocean incineration is the end-all and be-all. But let's go ahead and get the regulations moving. The technology is ready." ■ MARJORIE SUN

Nuclear Waste Program Hits Senate Roadblock

The effort to find a suitable place to bury highly radioactive wastes from nuclear reactors has run into serious trouble in the U.S. Senate. On 13 August, the Senate Appropriations Committee voted unanimously to gut the Department of Energy's civilian nuclear waste budget, stripping some $400 million from the $780 million requested by the Administration.

The move, spearheaded by Senator Mark Hatfield (R–OR), is designed to block exploration of three candidate sites in the western United States for at least a year. The three sites, in Washington, Nevada, and Texas, were recently selected by DOE for intensive study with a view to choosing one of them as the nation's first nuclear waste repository.

The selection process was part of a carefully crafted national plan put together by Congress 4 years ago. It involved the selection of one site in the West, followed several years later by a second site in the East. However, the plan started to unravel on 28 May when DOE announced that it is suspending the search for an eastern site, claiming that one repository will be enough for the time being. The announcement angered people in the West, and the Senate Appropriations Committee action was a direct result (*Science*, 22 August, p. 835).