Pollution: Military's Cleanup Stresses Plumbing, Not R & D

The Department of Defense, (DOD) is the wealthiest agency of government. It has the most personnel, buildings, vehicles, and other gear. It is also the government's biggest polluter. Now that federal agencies are working toward controlling their own contributions to pollution, a dose of environment funds proportional to its size has been pumped into DOD.

In fiscal 1972, DOD will spend about $182 million for pollution control. But although DOD faces some sophisticated environmental problems, a comparatively small fraction of the money will go to advanced R & D. The money will create jobs in the blue-collar part of the labor market, rather than in the white-coated sector that is the province of scientists and engineers.

Under the administrative rules implementing the sweeping National Environmental Policy Act of 1969 (NEPA), DOD and all federal agencies must bring their own facilities into compliance with existing pollution regulations by 31 December 1972, or show by that date that they are trying to do so. In addition, under NEPA, federal agencies must file impact statements before taking any action which might affect the quality of the human environment. DOD considers such actions to include developing a new weapons system, construction and land purchase, disposal of chemical or biological munitions, and even changes in the number of military personnel assigned to an area. DOD directives also say that the departments should file statements on any action that will become controversial once the public finds out about it. So far, DOD has filed roughly 30 impact statements.

But the filing of impact statements is a small task for the bureaucracy at DOD compared with that of cleaning up its bases, installations, and ships.

The armed forces' biggest pollution problem is simply that they employ and house hundreds of thousands of people—hence they must treat a lot of sewage. Doing this is expensive, and comprises the greatest proportion of DOD environmental efforts to date.

The Navy, for example, has a $65.3-million budget for pollution this year, of which $40 million will go to build sewage treatment plants. The related problem of shipboard sewage treatment now consumes $5 million in R & D contracts. Technologically it is the Navy's biggest environment problem. The implementation of NEPA defines a vessel as a federal facility. Although no specific standards have yet been promulgated by EPA, the Navy expects that all ships will be required in the near future to retain all sewage and wastes on board until they can be disgorged into shoreside treatment plants. Present practice permits dumping at sea and the Navy's thousands of ships are not equipped to store all wastes. An aircraft carrier, for example, carries up to 5,000 men for several months at sea. Estimates of the cost of cleaning up all naval vessels vary, but go as high as $500 million.

Other environment expenditures, says commander Joseph D'Emidio, who heads the Navy's new Environmental Protection Division, include $7.3 million to buy additional emission control devices for aircraft and jet engine test cells, and $4 million of regular operation and maintenance funds, to add piping or plumbing to installations.

Lately, DOD has been criticized for classifying piles of documents. One related problem, however, is how to dis-

Environmental Impact—on Whom?

One of the ironies of the National Environmental Policy Act (NEPA) and its administration within the government is that the Department of Defense (DOD) is required to file environmental impact statements on all its activities which might affect the environment—including its weapons systems.

This means that DOD is legally obligated to tell the public how many sea otters, blue whales, bald eagles, and potential avalanches will be affected by the procurement of a new plane or the building up of a new installation; but, according to the rules, combat-related activities need not be discussed.

DOD spokesmen say that they interpret the NEPA impact statement requirement as a means of making commanders at the local level aware of environmental considerations while making key decisions. DOD has set up a chain of environmental offices—one in each service—to communicate with them.

The only trouble is that the business of the military is waging wars or preparing to wage them—not cleansing the environment. What if DOD had to file an impact statement on Vietnam? To date, DOD has filed about 30 impact statements, including ones on the Navy's F-14 fighter, the Air Force's F-15 fighter and B-1 bomber—all of which will, like the SST, travel at supersonic speeds—and on the Sanguine submarine communications project in Wisconsin (*Science*, 14 November 1969) and the Air Force high-energy laser program. Despite the fact that the public might recognize many of these as tools of destruction, the statements manage to conclude that none of the projects will significantly affect the quality of the human environment.

There is even an impact statement on the newest doomsday machine, the Safeguard antiballistic missile system. The statement talks about the effect of starting up a base to maintain the system out in the country. There is discussion of the need for more school buses for the base staff's children, but not a word about what happens when Safeguard is actually used against another country. Asked whether it would be feasible to include this in the impact statement, one military spokesman replied "Sure. That would be easy. Just two words: total destruction."—D.S.

pose of them. "We can't burn them in incinerators any more," said a spokesman as he showed pictures of piles of brown paper bags—presumably containing dead top-secret material—being fed into a shredder.

D'Emidio estimates that only $8.4 million of the Navy's $65.3 million goes to research. Research activities include solving the ship sewage problem, controlling oil spills, and cleansing bilge and ballast water. The only project in which electronics are extensively used is a $2-million comprehensive pollution data bank system "so we know where we're polluting and how much."

In the present fiscal year, the Army will be able to spend $32.7 million for "water pollution abatement" and $35.5 million for "air pollution abatement." The $32.7 will be distributed in lots of about $100,000 to small companies for building sewage treatment plants on a contract basis. George C. Cunney, chief of the Environment Office, and a one-time builder of sewage treatment plants himself, says, "In the 1940's, all the money in sewage treatment was in design and engineering. The process itself was invented in the 1920's or 1930's." Is the DOD researching more modern methods? "We would not now sponsor research in domestic requirements. We only would do research on problems which are peculiar to DOD, such as portable things to carry with the troops. After all, every city in the country has got a domestic sewage problem.

"We are doing research on helicopters to eliminate noise signature, so the enemy won't be able to hear a helicopter coming and shoot at it. But we've been doing that for years. The helicopter we buy today is quieter than the one we bought several years ago."

Other Army R & D is working on the problem of disposing of toxic substances and explosives. One research project on this problem for fiscal 1971 was $200,000.

The Air Force has 13,646 aircraft or 60 percent of the country's aircraft engines. But most of the Air Force's cleanup money will go to purchase already-existing, already-marketed products, rather than to R & D on new ones.

Colonel Clifford Whitehead, director of the Air Force's Environmental Protection Group and a nuclear engineer by training, estimates that the Air Force has spent $90 million on pollution control since 1968. For fiscal 1972, it will have a budget of $48.2 million of which $35.9 million will be for facilities cleanup—chiefly sewage treatment plants—and $4.8 million will buy sound suppressors for jet engine test cells and stands. Only $7.5 million will be for research and development, including studies of the upper atmosphere, noise, solar flares, and jet engine test cell development.

The Environmental Protection Group itself has hired nine professional scientists or engineers (there is still one post unfilled), but otherwise, the Air Force's environmental spending isn't creating very many new scientific jobs. One effort, for example, is work toward developing a quiet and smokeless engine. Although aspects of this work are now billed under the pollution heading, the strategic goal of a quiet, trailless airplane has been a military project for about 5 years.

DOD spending to comply with the NEPA seems to be constructive. By cleaning up bases, installations, and ships, the armed forces will probably put themselves far ahead of the average U.S. city in terms of environmental purification.

However the pattern of big spending on here-and-now technology is but one side of a debate on who are the proper consumers of environmental funds. One view commonly held in the technical community is that R & D efforts are vital to environmental protection. This view is based principally on that article of faith among some scientists that given national problem *X*, more and better R & D will solve it.

The other school of thought, however, holds that a lot of new technology and research in the environment is neither urgent nor even necessary. New sewage treatment processes, for example, are said to be costlier and less efficient than the present ones. In this view, what is needed is construction of more of same—not embarkation on lengthy R & D programs.

Whether more or less R & D is justified, however, the fact remains that the amounts of environmental dollars now flowing to scientists and engineers are far lower than the sums lavished on them during the space effort. It seems that the expectation that the environment cause would produce work for the technical community was inflated.

An official at the Office of Management and Budget who looks at the environment budgets of many agencies commented, "There seems to be quite a lot of misconceptions of the possibilities of things that will happen in terms of new technology. We've had lots of proposals from aerospace companies to work in the environmental area. But it doesn't work out that way. There are jobs, but they are different kinds of jobs."—DEBORAH SHAPLEY

RESEARCH TOPICS

Ecosystem Analysis: Biome Approach to Environmental Research

In *Silent Spring*, Rachel Carson warned of the dangers of accumulating pesticides in the food chain, and others have called attention to similar gradual and possibly irreversible changes in the environment. To determine the long-range effects of man-made changes in the environment, however, requires a better understanding of ecological systems than is now available; both basic theory and quantitative measurements of ecological changes are lacking.

A major attempt to understand how entire ecosystems function and, by modeling the behavior of these systems, to predict how they will respond to man-made stresses is under way as part of the United States participation in the International Biological Program (IBP). The ecosystem analysis program is having a major impact on the way that many scientists perceive ecological problems, and it appears likely to produce some practical results that will aid in the management of natural resources. It is less certain that the effort will, by itself, lead to major improvements in the scientific understanding of ecosystems. In order to cope with the diversity and tremendous complexity of ecological relationships, the research is focused on empirical analysis and greatly simplified models, and there is concern