

has been financial inability either to buy new equipment or to risk public funds on facilities not yet wholly proven.

A national picture of the current status of solid waste management problems and practices is patently needed at this time. And steps are being taken systematically to develop such a picture. Some of the work will be accomplished, of course, in the Statewide planning surveys. But several weeks ago, to obtain an across-the-country view of the problem, the Office of Solid Wastes awarded a research contract to an experienced engineering firm for a technical economic survey of solid waste disposal needs and practices covering 450 cities and 90 industries. We are optimistic that this project, which will involve the collection and analysis of data from a very large sample of industrial and municipal sources, will be a valuable index of the total national solid waste picture.

Another research contract recently signed with the private sector calls for the development of a series of state-of-the-art reports on unit processes of solid waste disposal which could have broad applicability toward better management of the national solid waste problem.

Mention has already been made of the growing physical burden of solid wastes. The best way to lower this burden is to reduce waste generation at the source. One approach would be to design products so that the principal materials of which they are made may be recycled, or sent back, for reuse in manufacturing new products. Paper producing processes, of course, readily use wastes. And this industry could recycle considerably more wastes if solutions were found to problems of economic separation of clean and otherwise usable waste. Recycling of iron and steel scrap is a basic part of steelmaking which should, similarly, be susceptible to expansion.

The design of products for recycling materials of manufacture is a more difficult challenge. It will, of course, be rewarding in terms of solid waste pollution control. And authorities who have carefully studied the problem are optimistic that substantial recycling technology can be developed if given sufficient research attention.

In some instances, industry is now applying sophisticated technology to recover and reuse process waste materials that would otherwise find their way into the air, water, or land reservoirs as pollutants. Chemical solvents are being recovered and gases and vapors are being recycled by certain petroleum refinery and distribution facilities. And in the area of solid wastes, the lumber industry is now making marketable products out of wood scrap that would otherwise pose a very serious disposal problem.

But industry's cost consciousness cannot always be counted on to help reduce the process waste burden. Experience has shown that substantial progress frequently results from the pressure of public opinion or action by government, rather than from purely economic forces.

Perhaps voluntary action on the part of industry might occur more often if concern for potential operating economies were fortified by recognition of the fact that improper and unsanitary solid waste management costs the Nation far more than the \$3 billion annually spent for collection and disposal. Industry shares in this cost burden just as surely as each citizen does. It would seem that industry, in its own interest, would recognize a much greater responsibility to develop and apply improved technology for solid waste handling in order to reduce this form of environmental contamination to the minimum.

To reduce waste production at the source, it also seems clear that research resources ought to be devoted to the design of products which generate less waste. Making some of them more durable would be a step in this direction. On the other hand, however, longevity in packaging increases the waste burden. The substitution of aluminum for steel in cans, for instance, has given us a waste item which can remain indefinitely in the environment. Many plastic containers are nearly nondegradable. We greatly need the development of paper and other packaging materials which, if they are not to be reused, are soluble or quickly degrade and can be harmlessly returned to the environment. The packaging industry has an opportunity to make a dramatic contribution to solution of the waste management problem.

In this connection, incidentally, anyone concerned about solid wastes cannot help being concerned about the apparent trend toward increased use of the non-returnable container. Disposable bottles doubtless are a consumer convenience, but they also compound the solid waste management problem. Nonreturnable