hill for entertainment as recreational purposes, thanks to another PHS solid waste demonstration grant designed to effectively join land reclamation and solid waste disposal.

Through the contract and demonstration grant mechanism the PHS Solid Wastes Program is supporting a study and demonstration to develop effective methods for controlling methane gas production in sanitary landfills and diminishing its adverse effects on land use.

The high cost of transporting solid waste to available land has limited use of land reclamation techniques especially in the eastern part of the United States where these distances can be substantial. A Public Health Service demonstration grant to the American Public Works Association is partially supporting a study and demonstration of the use of railroad facilities to haul solid waste from crowded urban centers to areas where land is available for disposal and reclamation. This appears to be an exceptionally economically method of joining available land with great volumes of solid waste and is potentially a new innovation in solid waste management of major proportions. This could open new avenues which would allow consideration of alternatives in this field heretofore considered unthinkable. We are working closely with the American Public Works Association to make certain the results of their investigation are made available to solid waste managers as soon as possible.

We are actively supporting the development, evaluation and demonstration of new devices and techniques to reduce the bulk or volume of solid waste and allow greater utilization of precious land for sanitary landfill operations. Crushing, baling, or grinding devices in New York City, New York; Madison, Wisconsin; Tacoma, Washington; and San Diego, California partially supported by Public Health Service solid waste demonstration grants are demonstrating techniques of volume reduction of solid waste to effectively increase the life of sanitary landfills. Similar grants support the demonstration of refuse disposal machines in Lockport, New York and Seattle, Washington to effectively compact and place solid waste into the ground in a manner designed to prolong the life of the sanitary landfill.

The cost of collection of solid waste at its source and transportation of this material to a disposal site is estimated to be about 75% of the current total cost of handling solid waste. It is evident that the development of methods which improve technology and lower the cost of collection will materially affect the overall solid waste management picture.

A solid waste demonstration grant awarded to Raleigh, North Carolina is demonstrating the systems analysis approach to this problem by the application of a mathematical model developed by a Public Health Service Research grant to Northweastern University. This organized approach designed to maximize economics involved in collection of solid waste could result in signficant savings to taxpayers across the Nation. Through the contract mechanism, we are obtaining an evaluation of the collection of solid waste using specially designed vehicles with one-man crews. The potential savings of such an approach is even more obvious when one considers that labor cost is the main factor in the overall cost of collection.

Innovation technology in the collection field is being investigated by the University of Pennsylvania supported by a Public Health Service solid waste research grant. This project is determining the feasibility of transporting solid waste in pipes as a liquid slurry. Recently developed in Sweden a vacuum system is transporting solid waste in highly urbanized areas short distances in pneumatic tubes. This method is being evaluated by the technical staff of our own Program and if justified will be applied to an appropriate system in the United States.

A demonstration grant was awarded to the town of Barrington, Rhode Island to demonstrate the feasibility of year-round solid waste storage and collection using paper bags and special holders provided by the municipality. The effect of this method on collection and disposal practices was also demonstrated.

Agricultural wastes including domestic animal wastes are included in the Nation's solid waste contribution to an extent not realistically considered by the average citizen. Reliable estimates of the magnitude are not now available but preliminary estimates indicate this contribution exceeds one billion tons per year.

Public Health Service solid waste research grants awarded to Purdue and Rutgers Universities are supporting study of new methods to dispose of dairy and poultry manure. A demonstration grant awarded to Washington State University is demonstrating facilities and techniques that will reduce the possibility of water pollution and increase the fertilizer values actually realized from dairy manure.