

The sanitary land fill system which has long been a part of military as well as municipal waste disposal methods is in itself a reclamation activity in that the fundamental philosophy is of using wastes to fill what would be normally unusable land. Unfortunately, both misuse of the system by failing to operate it properly or to combine it with the so called burn and cover method, and the lack of available suitable land sites in the vicinity of metropolitan and large military complexes has tended to bring this system into disfavor.

In a consumption economy it may be easier to dispose of waste materials even though having some utility or reuse value, rather than to experience the costs of collection, transportation, assembly and processing. In some instances, military departments have found it difficult to dispose of certain waste materials in spite of our classification, reclamation and salvage operations. Materials having relatively immediate usefulness may not find a ready market. An example is the case of waste red fuming nitric acid, utilized in the early stages of the missile propellant program. This material might be of use in fertilizer manufacturing, in metal processing, and in a number of other industrial operations. Unfortunately, the cost of removal of such hazardous materials and the additional precautions necessary in its transportation and handling are such that not only could the material not be sold, but it could not be given away. As a result, procedures for disposal in a safe and satisfactory manner had to be developed. It is anticipated that similar problems may result during the phase-out of missile systems utilizing the storable propellants such as unsymmetrical dimethyl hydrazine.

There have been some notable achievements in the development of reusable packages and containers for military material and equipment. The so-called Conex packages for shipment of large items have already found an adaptation to civilian use as containerized packages which are placed on trucks, railroad cars, ships and aircraft. These reusable packages have produced reduction in formerly generated packing and crating waste material.

The improved handling methods have also resulted in better efficiency of operation. The problems of solid waste in the military establishment are of major concern and will be given increasing attention. As has been observed by some, increasing demand for petro chemicals makes petroleum of increasing importance as a raw material rather than as a source of energy. The possible use of the thermal potential in solid waste has been under investigation by some authorities. The interest in the Department of Defense in this is somewhat incidental (since we feel that the primary responsibility rests in the civilian sector). These are obvious implications as to conservation of propulsion fuels and the interrelationship of the industrial economy with the mobilization base. The President's Science Advisory Committee recommended that the military departments give consideration to possible pilot studies in this area. It is contemplated that this matter will be given increasing attention as we achieve success in our current high priority endeavors to comply with various directives and legislation relating to development of programs and plans for water pollution and air pollution.

Determination of costs of disposal in initial planning

There is some discussion later in this report regarding the systems analysis and systems engineering techniques which have been used to provide for environmental pollution controls in military system development. This approach has resulted in an early determination of pollution control requirements and an assessment of research needed to develop new procedures where existing state-of-the-art technology was not adequate. In the case of the Titan II system, it became evident quite early that there was a need for investigation as to the proper means of disposal of waste unsymmetrical dimethyl hydrazine. Concurrent with the propellant testing program, studies were conducted by the U.S. Air Force regional environmental health laboratory at Kelly AFB, Texas to determine based on the then available information what possible means of handling this problem were available, and what practical designs could be evolved. After the classic bench top and pilot plant investigation, a number of alternatives were proposed and a suitable design selected.

Because the military departments do operate within strict budgetary and personnel allocations, most careful attention is being given and has been given to ensure that control measures or proposals for modification or improvement of the environment are consistent with the requirements of economy and necessity. The approaches which are taken on this are in general the same in the