

Intermediate-level wastes.—These wastes are generally composed of:

1. Second-cycle wastes derived from the solvent extraction process.
2. First cycle waste condensates.
3. Coating wastes derived from the chemical decladding of nuclear fuel elements.
4. Aqueous wastes accumulated from washing and purifying the organic extractant.

These wastes, either singly or pooled, are concentrated by evaporation. The distillate is routed to the low-level waste treatment system. The concentrated waste (still bottoms) is stored in underground tanks. The volume of intermediate-level waste generated per ton of uranium processed is several fold larger than that for the high-level waste.

Low-level wastes.—Low-level wastes are made up of water rejected from the distillation of intermediate-level wastes, process cooling water which has the potential of becoming contaminated, and other related process streams. This very large volume waste stream is treated by various methods to reduce the fission product content to acceptable levels and is then discharged to the environment. The fission products which were removed or "scavenged" from this solution are retained by tank storage on the plant site.

Gaseous wastes.—Gaseous wastes contain volatile fission products (for example, krypton and xenon) and other fission products that escape the chemical separations operations with process and ventilation air (for example, radio-iodine, tritium, and so forth). The gaseous wastes are treated chemically and filtered extensively to meet discharge limits for the disposal of gaseous wastes to the atmosphere.

CHARACTERISTICS OF WASTE STORAGE PRACTICE

From the foregoing, it is immediately evident that:

1. The fission product wastes are retained at the separation plant in a liquid and mobile form. Thus, these wastes are stored, not disposed of.
2. The only material disposed of, in the strictest sense and excluding the gaseous wastes, is water.
3. The integrity of the storage vessel is all important. Successive generations of storage tanks must be available as the original vessels fail from corrosion or other causes.
4. The storage system must be monitored continually to detect failure of the containment system resulting in the unwanted dispersal of fission products in a mobile form to the environs.

ACTIVITIES IN THE WASTE MANAGEMENT FIELD

The U.S. Atomic Energy Commission is currently supporting a multimillion-dollar program within the AEC complex to develop and demonstrate practical and economic means of converting high-level aqueous wastes, typical of those assumed to be produced by the commercial fuel reprocessing industry, to immobile solids. These fission product-containing solids, either as calcines or after conversion to "glasses," are to be packaged in high integrity metal containers suitable for permanent storage in special geological formations, that is, salt mines, and so forth. It is to be noted that the conversion of the liquid