

## RADIOACTIVE WASTE MANAGEMENT IN TAIWAN, ROC.

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## RADIOACTIVE WASTE MANAGEMENT POLICY

Taiwan's first step into the atomic age was an education reactor installed at Tsing Hua University in 1961. The Taiwan Research Reactor (TRR) of the Institute of Nuclear Energy Research (INER) was installed and started its operation in 1973. Meanwhile, Taiwan Power Company (TPC) decided to develop nuclear power to furnish a share of the future electricity supply. To this end, four BWR nuclear power units, at the northern tip of Taiwan with the total output of 3240 MW(e), are in operation. Two PWR units of total 1900 MW(e) at the southern tip will be connected to grid in May 1984 and May 1985 respectively.

Early in 1970, the Atomic Energy Council (AEC), Republic of China decided to invite experts from Taiwan Power Company, Universities and INER to organize a committee to study the waste management policy. One of their conclusions is "Ocean dumping is the most feasible alternative for the ultimate disposal of low level solid radioactive waste in this country. Before it is implemented, radioactive waste to be disposed of will be stored on some islets temporarily".

Since 1973, a joint task group by AEC, INER and TPC has undertaken a feasibility study on shallow land storage. Their preliminary siting criteria are:

- (1) will not contaminate drinking water supply.
- (2) is sparsely populated.
- (3) is fairly easy for transportation.

A few mountain areas and many islets around Taiwan were investigated. Lan-Yu (Orchid Island) was finally chosen as temporary shallow land storage site for low level solidified radwaste.

## REGULATORY ORGANIZATION

In order to protect public health and safety to this country, the Radwaste administration of AEC was instituted in January 1, 1981. The administration comprises three section and the Lan-Yu storage facility. Their authorities are:

- (1) The development of radwaste management policy.
- (2) The establishment and implementation of rules and regulations.
- (3) A comprehensive inspection and enforcement program covering radwaste treatment, handling, transportation and storage to ensure compliance with the regulations.
- (4) A confirmatory research program to develop the information required to support regulatory functions.
- (5) The operation of National Lan-Yu Radwaste Storage Facility.

## TRANSPORTATION AND STORAGE

## Transportation

Pursuant to Radwaste Management Rules, 5.1, 1981, a radwaste generator should submit Transportation Plan (TP) and Emergency Response Plan (ERP) to Radwaste Administration for review and approval. Once these plans are approved, a shipment request form should be submitted for approval each time. Radwaste Administration will send out inspectors to verify that every phase of the transportation is being implemented safely and in compliance with regulatory requirements. Since May, 1982, vessels and tug barge transport have been used by contractors to ship radwaste package in containers from northern tip of Taiwan to Lan-Yu. The operation is illustrated in Figure 1 and 2.

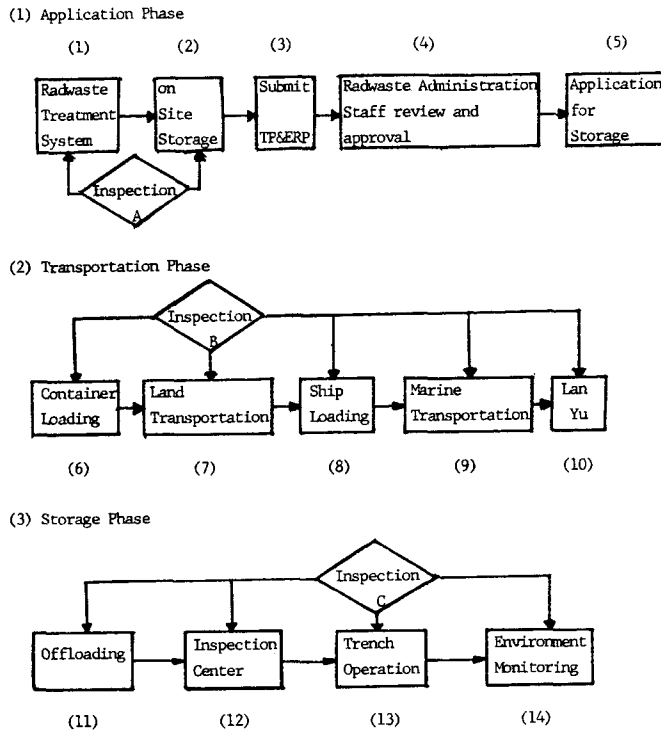


Fig. 1 Transportation Flow Diagram

## Storage

Lan-Yu is located at  $22^{\circ}04'N$  and  $121^{\circ}32'E$ , and is about 75Km from Taiwan with a size of 46Km. Total of 170 hectares at the southern part of Lan-Yu is designed to accept solidified low level waste for over fifty years. The construction was completed in April 1982. 12,000 drums have been stored since May, 1982. The design of storage facility is shown in Fig. 3 and 4. This method can be classified as shallow land storage. Solidified radwaste encapsulated in steel drums will be stored in near-surface reinforced concrete trenches which are retrievable. These trenches are 5.4m wide, 4.5m deep and 0.35m thick, 3m underground and 1.5m above. Each trench is designed to store three layers of radwaste drums. After the trench is filled, it will be covered with concrete slabs of 0.35m thick and sealed with asphalt for water proof. In this manner, concrete trenches will provide a high degree of isolation and prevent migration. The radiation level of a full trench without any back-filling is very close to background. Any water flowing out from the trenches will be collected in sumps equipped with a decontamination unit for emergency use. Before release to the ocean, samples will be analysed to ensure that the concentration is below one tenth of the maximum permissible concentration prescribed in the National Safety Standard on Ionizing Radiation Protection of AEC. 18 Thermo-Luminescence dosimeter stations were installed in the storage site and all around the islet. Samples of air, soil, plant and marine life have been taken on a regular basis for radioactivity analysis.

## RESEARCH AND DEVELOPMENT PROGRAMS

The main projects being carried on or to be set forth in the near future are:

- (1) The ultimate disposal study of low level radwaste.
- (2) Container Assessment-Corrosion study of low level waste container materials.
- (3) The volume reduction study of low level waste.
- (4) Environmental and Safety Assessment of National Lan-Yu Storage Facility.
- (5) The feasibility study of safe storage of high level waste in Taiwan.



Fig. 2  
Offloading at  
Lan-Yu Pier

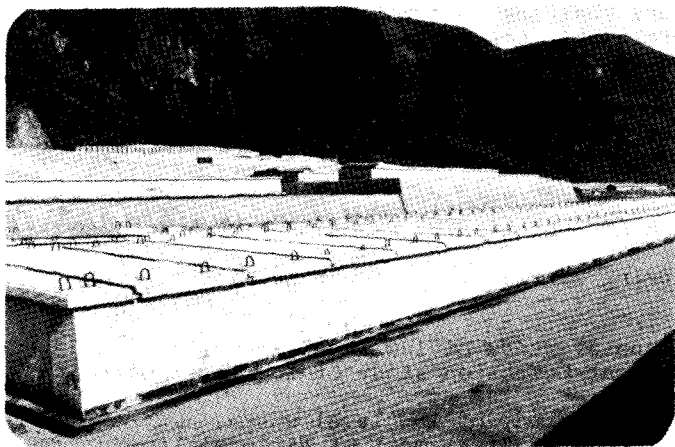


Fig. 3  
Outside View of  
Concrete Trench

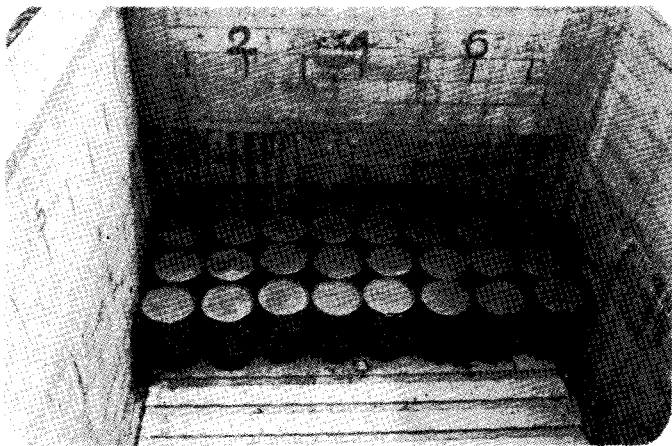


Fig. 4  
Inside View of  
Concrete Trench