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MASTER

ENGINEERING STUDY FOR AN EQUIPMENT SYSTEM FOR RETRIEVAL/ HANDLING OF BURIED TRANSURANIC WASTE

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The study's objective is to develop a preliminary concept design of an equipment system for retrieval and handling of buried transuranic (TRU) waste. The TRU waste addressed is 2,300,000 ft^3 buried at the Radioactive Waste Management Complex (RWMC) located at the Idaho National Engineering Laboratory (INEL). The retrieval rate design criteria used in the study is 300,000 ft^3 of waste per year plus an equivalent amount of soil.

The retrieval concept places the operator in a totally enclosed cab which provides protection from radiological and industrial hazards associated with retrieval. The mechanized equipment is based upon modification of existing equipment, a large selection of which is available from coal mining and hard-rock mining industries.

The primary concern is safety to personnel and the environment. Contamination control is practiced throughout the design. The retrieval equipment is designed to operate within a double containment building. Waste and soil material exiting the retrieval building will be in sealed containers, externally decontaminated, and conveyed in enclosed transport vehicle.

Retrieval operations begin with the installation of the retrieval complex as illustrated in Figure 1. Waste and soil retrieval will require various methods and equipment. The normal method of retrieval is with the mobile waste retriever shown in Figure 2. The retriever will combine two standard components from the materials handling and mining industries. The first component, a walking/support structure, is a mobile crane gantry modified so that two of the four legs will telescope and rest in the deeper pit bottom as extraction progresses. The second component, a digging tool, is a 2,000-lb-capacity soil and rock mucker used in mine shaft development.

Larger items of waste will be handled by a heavy duty backhoe or will be reduced in size through the combined use of the backhoe, the waste-sizing vehicle, and the waste-sizing saw.

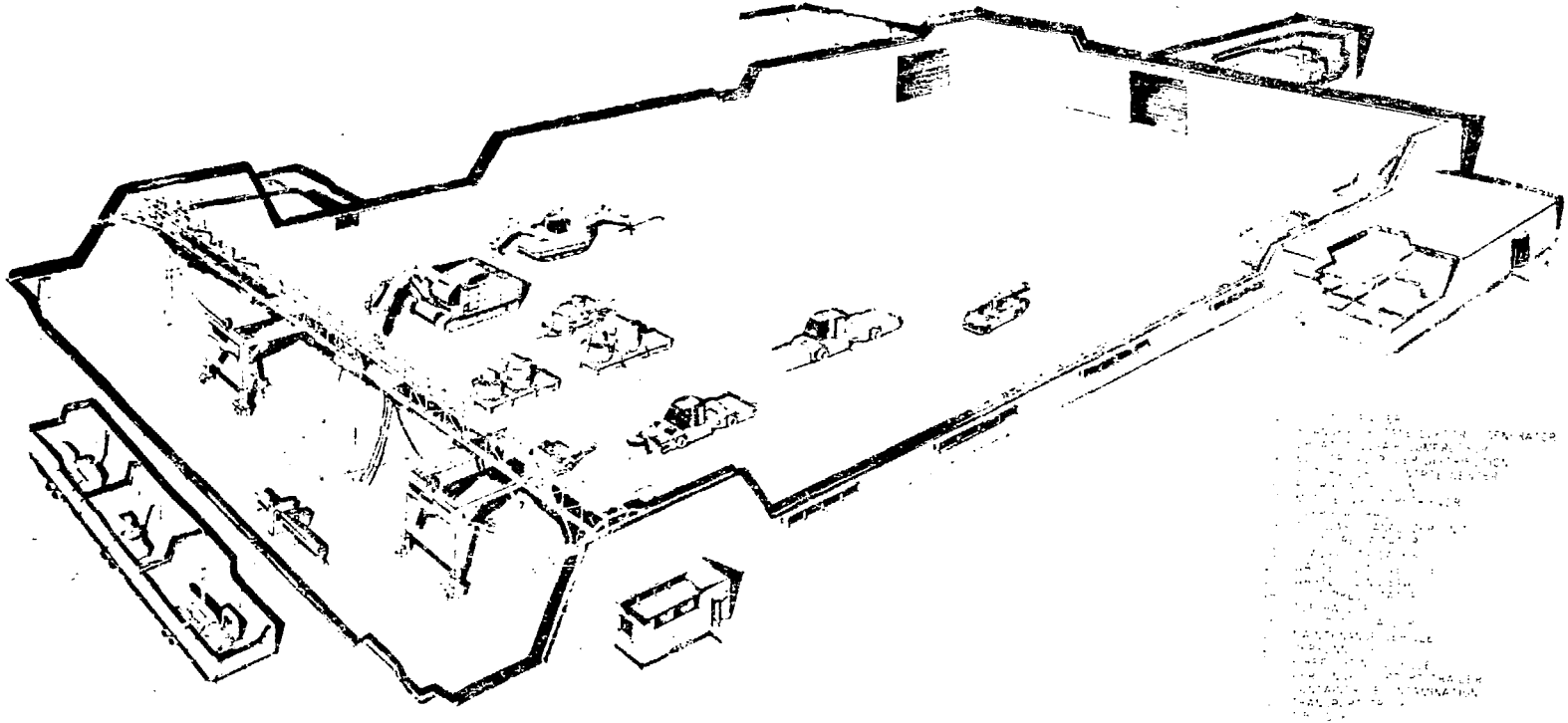
All retrieved waste and soil will be containerized in tubs and covered to control contamination. Radiation levels will be measured, and material with contamination measuring greater than 200 mrad/h will be placed in radiation-shielding containers. Containerized waste and soil will be transferred within the retrieval building by a tub hauler or a combination cleanup scoop/tub hauler.

Containerized waste will exit the building through a decontamination facility. In this facility, the tub exteriors will be checked and decontaminated. Contamination-free containers will be loaded into a transport vehicle for removal from the retrieval complex.

Additional retrieval equipment will provide support to the retrieval operations. A personnel bus and rescue vehicle will transport operators to the retrieval equipment. The maintenance vehicle will support both unscheduled real-time maintenance and scheduled maintenance during the nonproduction third shift. A firefighting vehicle will be used to control fires within the retrieval building.

The transport vehicle, which will be used to move waste and soil from the retrieval facility to the processing facility, will be equipped with a negative-pressure and filter system for contamination containment.

This equipment system concept represents a workable approach to the retrieval and handling of large volumes of buried TRU waste. It also features protection both for operating personnel and for the environment.



RETRIEVAL COMPLEX

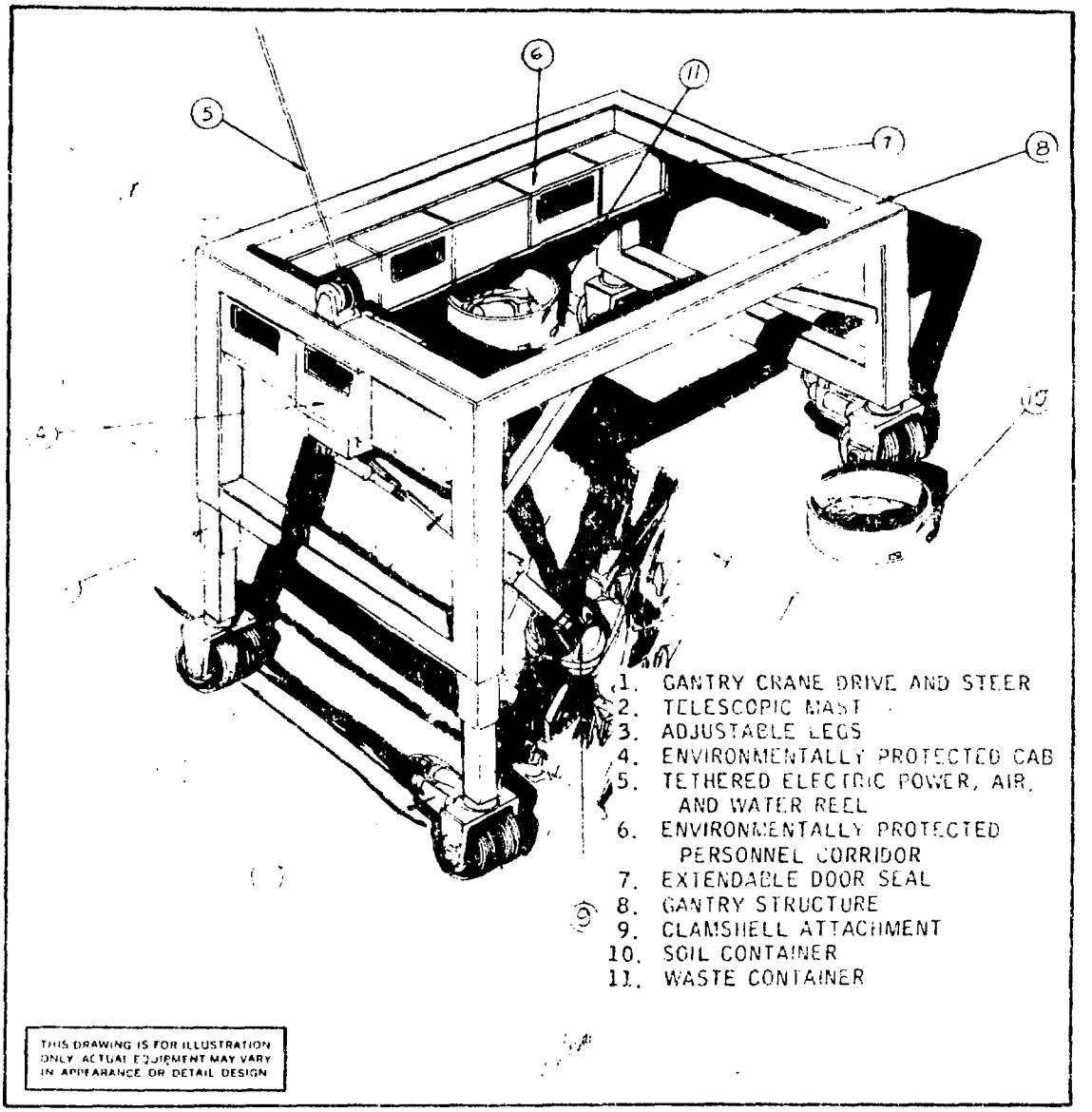


FIGURE 2 MOBILE WASTE RETRIEVER