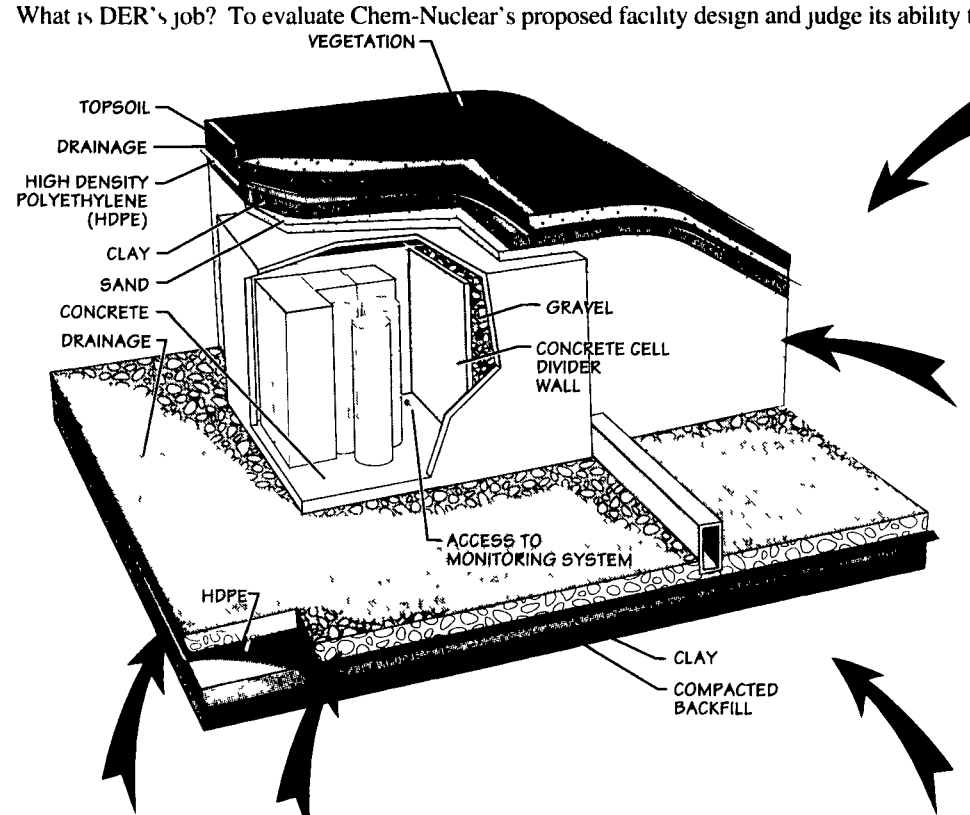
FACILITY DESIGN AND MONITORING: HOW IT WORKS

THE GOAL: ZERO RELEASE OF RADIOACTIVITY

Pennsylvania law requires an engineered disposal facility be constructed on the ground surface. The regulatory goal is zero release of radioactivity. The applicant, Chem-Nuclear, plans to design and build waste disposal units that rely on four levels of protection:

- **Waste in solid form, securely packaged**
- **Sealed concrete containers containing several waste packages**
- **Sealed abovegrade concrete disposal units**
- **Layered earthen cover over sealed disposal units**

What is DER's job? To evaluate Chem-Nuclear's proposed facility design and judge its ability to isolate the waste.



DISPOSAL UNIT

The disposal unit is a thick-walled concrete structure with concrete floor, walls, and ceiling. This unit is built abovegrade. The concrete provides both structural stability and radiation shielding. Concrete overpacks (described below) are placed in the disposal units. After the disposal unit is filled, the spaces between overpacks will be filled and the unit will be sealed with concrete and covered with a multilayer earthen cover.

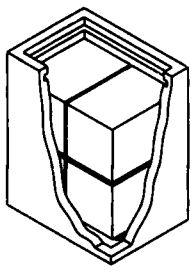
EARTHEN COVER

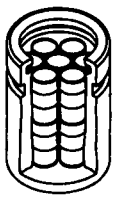
Keeping rain and snow off the completed disposal unit is important to maintaining the strength of the concrete. Chem-Nuclear must cover each completed disposal unit. Alternating layers of fast-draining materials and low-permeability soil will keep water from coming in contact with the concrete roofs of the disposal units. Grass or other vegetation will be planted on the top to help deflect rainfall and to prevent erosion of the final soil cover.

MONITORING GALLERY

An important part of the overall facility monitoring program will be built right into the disposal facility. A monitoring gallery will be installed beneath each disposal unit to detect any release of radioactive material. Each waste disposal unit will have a port that drains any outside water entering the unit into the monitoring gallery. Because of the multiple barriers, it is expected that the monitoring gallery will be dry. If there is any water passing through the disposal unit, it will be collected in the gallery and promptly tested. Corrective action, if necessary, will be taken immediately. Chem-Nuclear will be required to regularly inspect the gallery for any releases. DER and local inspectors also will have access to the monitoring gallery for inspection.

OVERPACK





Low-level wastes will arrive at the facility in drums, boxes, or casks. Before disposal, DER will require Chem-Nuclear to place the incoming waste packages into concrete "overpack" containers. Each overpack will hold several waste packages and will be sealed with concrete.

Source: Chem-Nuclear Systems, Inc

RECEIVING WASTE

The licensee will be required to schedule incoming waste shipments in advance. As trucks enter the facility, they will be inspected and monitored. Inspection by DER on-site inspectors, local inspectors, and the licensee will confirm the waste volumes and types listed on the manifest. Inspectors will monitor all areas of the truck and shipment for radiation levels, as shown here, using sensitive monitoring instruments. Waste packaging will be inspected to enforce the requirement that the waste be dry and secure before it is loaded into the concrete overpacks.

Source: Chem-Nuclear Systems, Inc.

Fast Fact

The level of traffic to and from the low-level radioactive waste disposal facility will be low compared to truck traffic for a solid waste landfill. An average of two to three truckloads of low-level waste per day will arrive at the disposal facility. This contrasts with the dozens of truckloads of solid waste that arrive at a typical solid waste landfill each day.