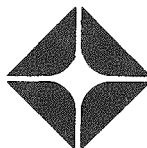


Atlantic Richfield Hanford Company  
Richland, Washington 99352

ARH-CD-767



DESIGN CRITERIA  
BURIAL CONTAINERS FOR NON-TRANSURANIC SOLID  
RADIOACTIVE WASTE

J. E. Hammond

August 11, 1976

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PREPARED FOR THE U.S. ENERGY RESEARCH AND DEVELOPMENT  
ADMINISTRATION UNDER CONTRACT E (45-1) 2130

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DESIGN CRITERIA  
BURIAL CONTAINERS FOR NON-TRANSURANIC SOLID  
RADIOACTIVE WASTE

J. E. Hammond

Instrument and Equipment Development  
Development Engineering Department  
Research and Engineering Division

August 11, 1976

Operated for the Energy Research and Development Administration  
by Atlantic Richfield Hanford Company under Contract E(45-1)-2130

DESIGN CRITERIA

J. E. Hammond

Instrument and Equipment Development  
Development Engineering Department  
Research and Engineering Division

August 11, 1976

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## DESIGN CRITERIA

BURIAL CONTAINERS FOR NON-TRANSURANIC SOLID  
RADIOACTIVE WASTE

## SCOPE

These criteria, which establish guidelines for the design, fabrication, inspection, and testing of burial containers for non-transuranic solid radioactive waste, replace reference 1 in its entirety. They apply to containers constructed specifically for the containment of beta-gamma radioactively-contaminated waste removed from an area controlled by radiation work procedures, transported across an uncontrolled area where there is risk of a radiation release to the environs, and buried in an approved radioactive waste burial ground. They do not apply to: containers intended for transuranic waste, references 2 through 5; containers used to transport smaller containers which have been sealed adequately to prevent the release of contamination; burial packages made by wrapping contaminated material and equipment in plastic sheeting or other impervious material for contamination control, and enclosures intended to provide protection and handling convenience for such packages; or to radioactive material waste cartons (drawing H-2-2478, not included).

## GENERAL

Regulations contained in reference 6 allowed burial of solid radioactive waste in burial grounds approved by the Energy Research and Development Administration (ERDA). The Atlantic Richfield Hanford Company (ARHCO) specifications and standards for the burial of solid radioactive waste are contained in reference 7. The criteria for the design, fabrication, inspection and testing of containers compatible with the requirements of references 6 and 7 are provided by this document.

## DESIGN

### MATERIALS

The choice of container materials, typically wood, steel and reinforced concrete, shall be made by the designer to provide adequate containment of contamination at lowest cost.

### DESIGN STANDARDS

Containers shall be designed in compliance with the requirements of construction standards appropriate for the materials of construction. The design drawings and specifications shall reference all such standards for the information of design review personnel.

Containment shall not be jeopardized by stresses due to the weight of the container and its contents, plus the loads associated with handling and transportation; however, there are no requirements that containment be maintained after the trench is backfilled or that the container be retrievable from the trench.

### CLOSURES

Container closures shall be gasketed to assure tightness under all loads imposed during handling. The closures shall be designed to prevent distortion of the joints by the imposed loads. Where personnel access to the container is restricted because of high radiation levels or other hazards, the closures shall be designed for remote operation.

### VENTS

Burial containers shall be provided with vents if there is a requirement that they be protected against variations in internal pressure until they have been placed in a trench and are ready for burial. Such vents, which shall be discharged through high efficiency particulate air (HEPA) filters, shall be closed or covered before backfilling the trench.



### PAINTING AND COATINGS

Sufficient area of the external surfaces of one side and the lid of the container shall be painted with a corrosion resistant white paint to serve as a background for identifying marks, signs (Hanford Standard AC-3-20), and weight information. The container design drawings and specifications shall specify all painting and coating requirements.

### WEIGHT INFORMATION

The container design drawings shall include the following weight information: weight of container; weight of lid; maximum allowable weight of contents; and gross total allowable weight. The gross total weight and the weight of the lid shall be painted on the lid and on one side of the container, in lettering no less than three inches high.

### SIZE AND WEIGHT LIMITS

Individual containers are limited in size and weight only by the capacity of the equipment and methods available to move them to the burial ground and into the burial trench.

### DESIGN APPROVAL

Drawings, procedures and specifications for new containers shall be approved and certified for compliance with these criteria by the ARHCO Facilities Service Department, Engineering Department, Tank Farm Management Department, Environmental and Occupational Safety Department, and the Quality Assurance Department before construction.

### FABRICATION

Fabrication and welding of steel containers shall be in accordance with the requirements of reference 8. Burial containers are not pressure vessels and hence do not fall under the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section VIII, unless so specified.

## INSPECTION AND TESTING

Inspection during fabrication shall include normal verification of dimensions and visual inspection of materials and workmanship. All welds in steel containers shall be subject to visual inspection as specified in HPS-220-W, acceptance criterial type III or higher. All structural welds critical to the reaction of lifting the load and container shall be subject to nondestructive examination (magnetic particle, etc.); the designer shall provide a sampling schedule for nondestructive examination of other welds.

Specifications for leak testing shall include: the methods of performing the tests; the portions of the container to be tested; the degree of leak tightness required; and the methods of repairing defects.

Load testing, if specified, shall be performed by the manufacturer before the container is accepted. Closures designed for remote operation shall be tested for remotability.

The container design shall specify all inspection and testing requirements; all inspections and tests shall be documented.

## FILLED CONTAINERS RECEIVED FOR BURIAL

The following information shall be submitted for all containers proposed to be sent to ARHCO for burial: drawings and/or sketches showing the container design; gross total weight of the container and contents; proposed method of transportation; estimated radiation dose rates at the surface and at 10, 20, and 30 feet from the container; estimated delivery date. The ARHCO Facilities Services Department, Engineering Department, Tank Farm Management Department, Environmental and Occupational Safety Department, and the Quality Assurance Department shall perform design reviews of all such containers before they are sent for burial. The design review of each container shall be documented and may: (1) reject the container, (2) require modifications, (3) require testing, (4) require special burial procedures or segregation, or (5) find the container to be adequate for its intended purpose.

## QUALITY ASSURANCE

Quality Assurance (QA) programs for all contractors involved in the design, construction, inspection and testing of burial containers shall be formulated and executed to assure that they will perform as required for safe and reliable operation.

Burial containers shall be assigned QA level I as defined in reference 9. The materials of construction shall be marked by means of mill recognizable markings with identification codes as required by the material specification.

Fabrication and testing requirements are defined in previous sections of these criteria.

The Quality Assurance Department shall:

1. review and approve drawings, specifications and procurement packages for proper inclusion of all QA requirements prior to release for fabrication or procurement;
2. perform supplier evaluations in accordance with ARH-MA-150 (reference 9);
3. review the records for completeness of evidence of conformance to QA requirements for design, procurement, fabrication and testing of the container prior to storage in ARHCO files.

## REFERENCES

1. HW-83959 (unclassified), September 8, 1964, W. H. Koontz, "Criteria for Design of Equipment Burial Containers."
2. ARH-CD-353 REV 2 (unclassified), March 1, 1976, J. E. Hammond, "Design Criteria, Transuranic Dry Waste Burial Containers (Steel and Reinforced Concrete)."
3. ARH-3061 (unclassified), April 2, 1974, W. R. Heald, "Proposed Use of Fiberglass Reinforced Polyester (FRP) Plywood Containers for Transuranic Burial."
4. CE-0948-P1 REV 3, January 17, 1975, "Procurement Specification for Fiberglass Reinforced Plastic (FRP) Plywood Retrievable Container Modules."
5. HWS-8828 REV 3 (unclassified), January 3, 1975, "Specification for Procurement of 55-Gallon Drums for Storage of Radioactive Materials."
6. ERDA Manual Chapter 0511, September 19, 1973, "Radioactive Waste Management."
7. ARH-3032 (unclassified), April 29, 1974, J. D. Anderson, "Specifications and Standards for the Packaging, Storage and Disposal of Richland Operations Solid Wastes."
8. HPS-220-W (unclassified), latest revision, "Standard Specification for Welding Carbon Steels."
9. ARH-MA-150 (unclassified), January 10, 1975, "ARHCO Quality Assurance Policy Manual."