Civilian Radioactive Waste Management System

Management & Operating Contractor

TRW

TRW Environmental Safety Systems Inc.

GA-4/9 Legal Weight Truck Cask Systems Review and Status

Presented to the Nuclear Waste Technical Review Board
Arlington, VA

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Status of GA-4/9 LWT Cask Systems

- Background
- Significant milestones
- Future events
- Half-scale model fabrication
- Half-scale model testing

Background—Cask System Development Program (CSDP)

- Five contracts awarded in 1988
  - Two legal-weight truck (LWT) casks
  - Three rail/barge (R/B) casks
- As a result of program redirection (i.e., MPC system development), CSDP focused on GA-4/9 cask system
- GA-4/9 LWT cask proceeding to certification
- LWT casks needed for truck cask reactor sites

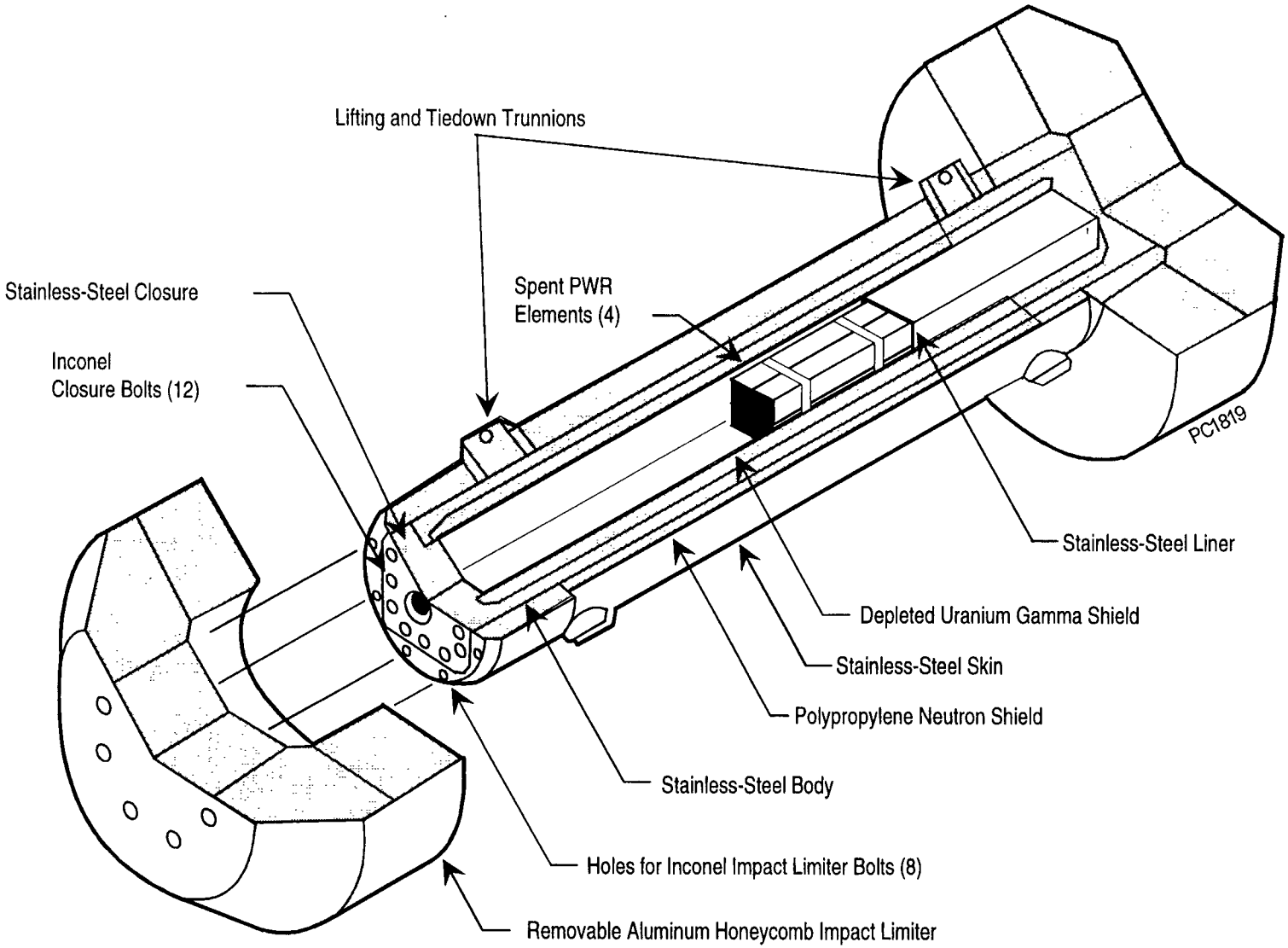
Significant Milestones—GA-4/9 LWT Cask Systems

• Released fabrication of half-scale model	Mar 93
• SARs submitted to NRC	Jul/Aug 94
• LWT trailer durability test completed	Feb 95
• DOE accepted LWT trailer	Apr 95
• Received SAR Round 1 questions	May 95

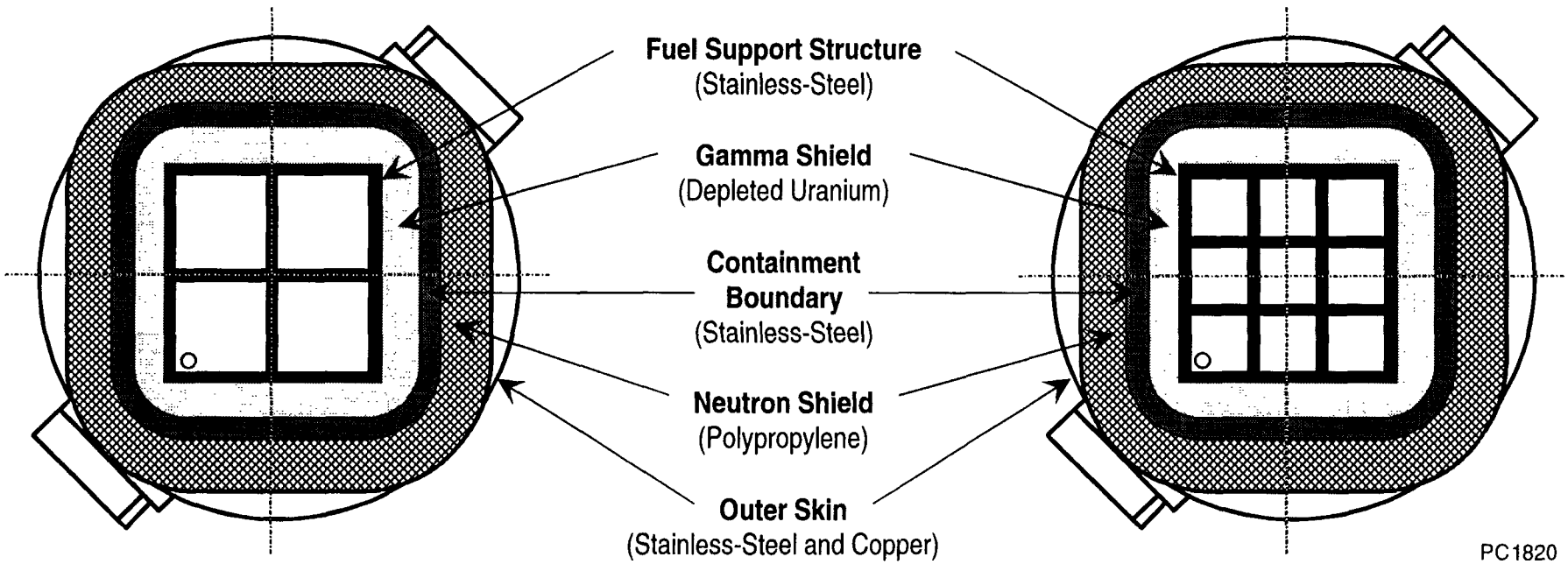
Future Events—GA-4/9 LWT Cask Systems

• LWT performance & operational testing	May 95 - Jun 96
• Fabrication of half-scale model	Aug 95
• Perform regulatory tests on cask model	Sep 95
• Submit test report to NRC	Nov 95
• Receive NRC certification of compliance	Jul/Aug 96
• Deliver GA LWT prototype cask per Program Plan	Sep 97

GA-4 Legal Weight Truck Cask



GA-4/9 Cask Cross Sections



GA-4 Cask

GA-9 Cask

Key Design Features

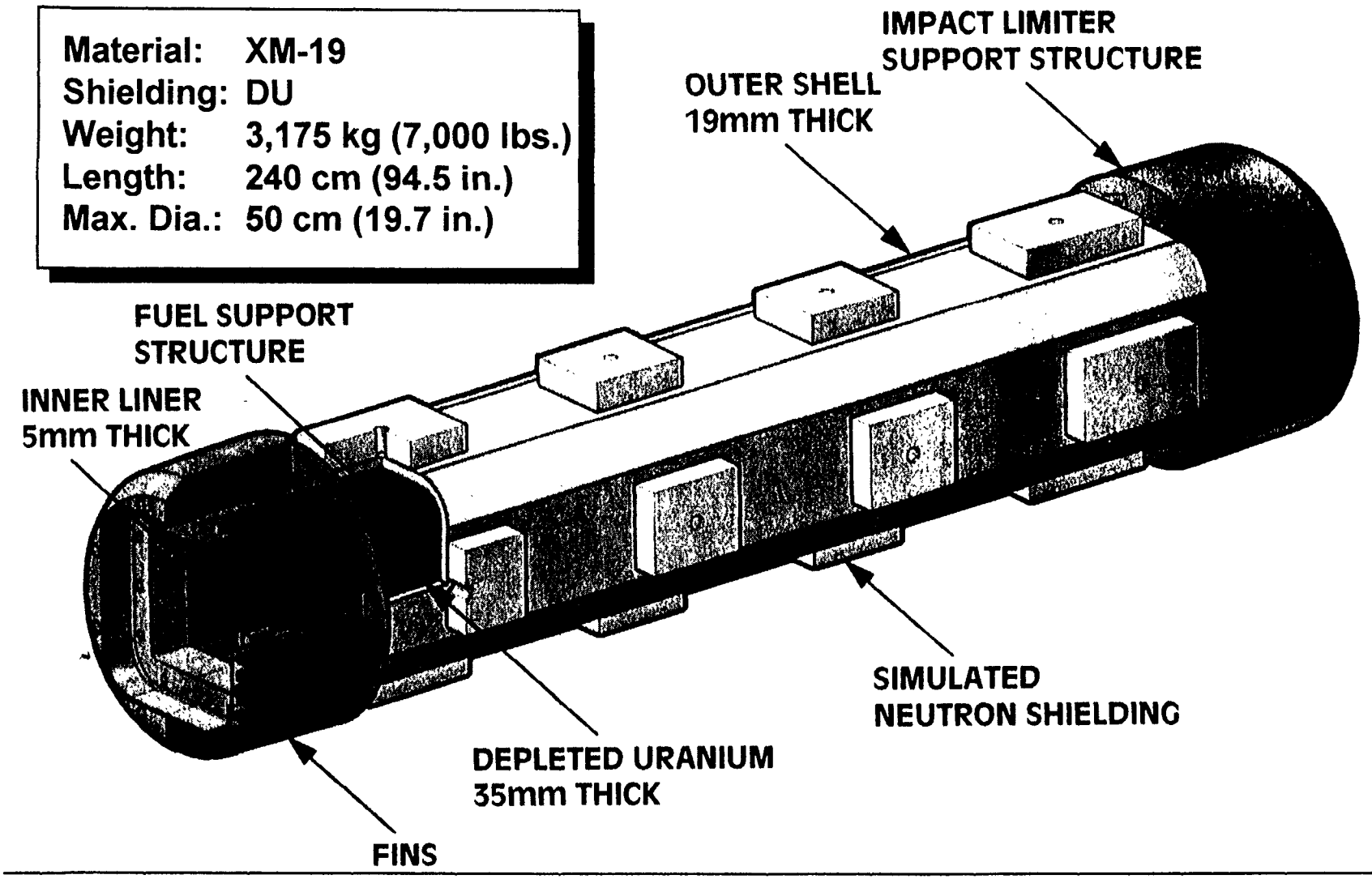
- Four PWR or nine BWR spent fuel assemblies
- Stainless steel cruciform spent fuel support structure
- Stainless steel liner
- Depleted uranium (DU) gamma shield
- Stainless steel outer shell

Key Design Features

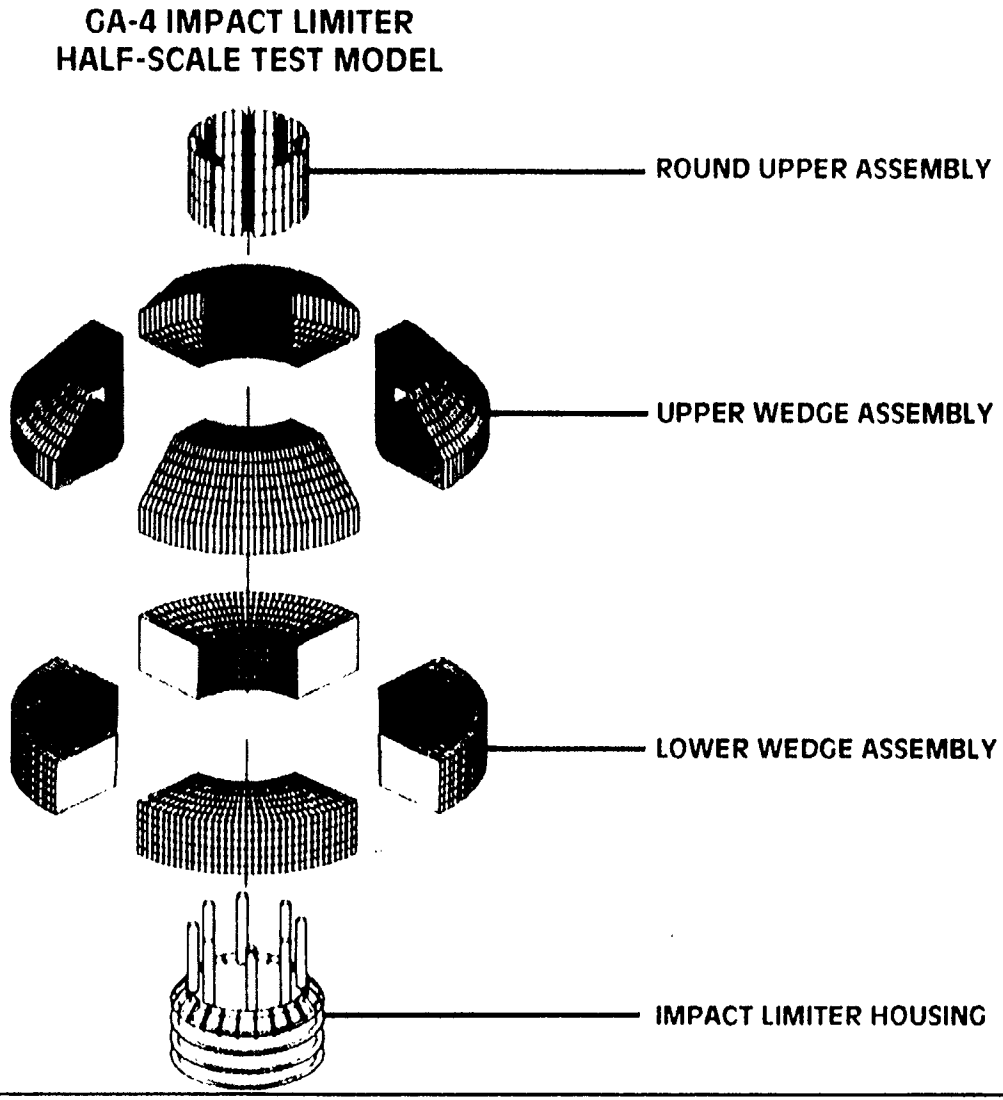
- Polypropylene neutron shield
- Forged bottom head
- Bolted lid closure
- Aluminum honeycomb impact limiters
- Access ports for draining, drying, and venting for in-plant operations

GA-4 Half-Scale Cask Model Body

Material:	XM-19
Shielding:	DU
Weight:	3,175 kg (7,000 lbs.)
Length:	240 cm (94.5 in.)
Max. Dia.:	50 cm (19.7 in.)



GA-4 Impact Limiter Half-Scale Test Model



Half-Scale Model Fabrication

- Outer shell
- Shell (XM-19) cold forming
- Hot forming of shell
  - Heated to 2000°F
  - Vertical press bending shell
  - Plate reoriented for second bend
  - Final shape after bending

Fuel Support Structure

- Four wings welded to center piece
- Dimensions 4.5 x 83 x 5/16 inches
- Drilled holes for B_4C pellets
- Approximately 300 holes per wing

Insertion of Fuel Support Structure

- Inner liner fixtured for alignment
- Fuel support structure slides into keyways
- Lateral guides and vertical supports

Depleted Uranium (DU) Assembly

- First ring placed over inner liner
- Inflatable bladder used to guide rings
- DU ring tapered
- Last ring being lowered over inner liner
- Completed assembly of DU rings

Placement of Outer Shell

- Lifted by impact limiter bolt attachment lugs
- Start to slide outer shell over DU rings
- Impact limiter bolt attachment lugs
- Weld preparations on outer shell and bottom head

Impact Limiter Support Structure Ribs

- Thirty-six ribs welded to both ends
- Different length to transition from square to round
- Fixture used hold and rotate model for welding on ribs
- Fixture to keep alignment of ribs during welding

Enclosure Shell for Impact Limiter Support Structure

- Ten slots per rib
- Plug welds attach shell to ribs
- Tapered at edge to match impact limiters

Impact Limiter Housing

- Inner structure for attaching honeycomb
- Tubes for impact limiter attachment bolts
- Gussets to reinforce during impact

Neutron Shield (Not Part of Model)

- Outer shell
- Neutron shield blocks
- Neutron closure shell
- Aluminum tubes (not shown) transfer heat through neutron shield

GA-4 Half-Scale Cask Model Regulatory (Drop) Testing

• Awarded contract to Maxwell Laboratories	Mar 95
• Construct drop pad	May 95
• Review GA test procedures	Jul 95
• Perform benchmark tests with dummy cask	Aug 95
• Perform drop tests	Sep 95
• Complete test report	Oct 95
• Submit test report to NRC	Nov 95

Drop tests (in Accordance with 10CFR 71.73)

- Three 30-foot drops
  - Side horizontal
  - Side slapdown
  - Corner over center of gravity
- Three puncture drops
  - Into damaged impact limiter at lid
  - Into center of model horizontal
  - Into damaged impact limiter at lid closure seals