Multi-Purpose Canister System
Westinghouse Proposed Design

Presentation to the Nuclear Waste Technical Review Board
Arlington, VA

James R. Clark, Manager
MPC Project
June 14, 1995
MPC Contractor Workscope Phase 1

- Design large (125-ton) and small (75-ton) transportation casks with MPCs
- Design equipment to seal weld MPCs
- Design large and small storage modules for MPCs
- Design transfer system to transfer loaded MPCs
  - From reactor pool to storage modules
  - From storage modules to transportation casks
MPC Contractor Workscope Phase 1

• Prepare Preliminary Design Reports for above

• Conduct safety analysis and prepare reports for

  – Large and small transportation casks with MPC—10 CFR 71

  – Large and small storage modules and transfer systems with MPC—10 CFR 72
MPC Contractor Workscoope Phase 1

- Conduct alternative design studies and prepare reports
  - Enhanced fuel characteristics
  - Stainless steel clad SNF
  - Long fuel

- Perform scale model long lead activities
  - Prepare scale model fabrication and test plans
  - Buy scale model long lead materials
Proposal Evaluation

• Qualification criteria
  – Experience in design and fabrication of NRC certified systems or equipment
  – Five qualified offers received

• Evaluation factors per RFP
  – Business and management—corporate experience, personnel, management plans, facilities
  – Technical—design, certifiability under 10 CFR 71/72, system operability and fabricability
  – Price
Evaluation Process

- Note—restrictions on disclosure until GAO issues decisions on three protests
- Oral discussions with each offeror
- Best and final offers
- Best value evaluation and recommendation by Source Evaluation Board
- Review and determination by Source Selection Authority
Subcontractor and Team

- Westinghouse Government and Environmental Services Company
- Packaging Technology, Inc.
- Chem-Nuclear Systems, Inc.
Phase 1 MPC Subcontract

- Fixed price—$14.0 million
- One-year duration
  - Nine months to preliminary designs
  - Plus 3 months to prepare SARs
Westinghouse MPC Team Phase I Organization

Phase I
SAR Design

Quality Assurance
Carl Ross
Westinghouse

Deputy Program Mgr.
Ed Erikson
Westinghouse

Chief Design Eng.
Dick Haelsig
PAC TEC

Project Admin.
Bob Anderson
Westinghouse

Certification Lead
Bob Quinn
Pac Tec

Design Lead
Bob Lehnert
Pac Tec

Fabrication Mgr.
Terry Buterbaugh
Westinghouse

Program Manager
Pat Hopper
Westinghouse

• Management and Control
• System Integration

• Benz & Associates

• Westinghouse, CNSI

Concurrent Engineering
Westinghouse MPC

- Outer Closure LID
- Inner Closure LID
- Closure Shield Plug
- Inner End Plate
- End Shield Plug
- Outer End Plate
- Shell
- Drain/Vent Port
- Support Ring
- Lifting Lug

Civilian Radioactive Waste Management System
Management & Operating Contractor
MPC Assembly

• Large MPC
  – OD—66.0 inches
  – Thickness—0.75 inches
  – Length—192 and 180 inches

• Small MPC
  – OD—50.0 inches
  – Thickness—0.63 inches
  – Length—192 and 180 inches
MPC Assembly

- Six cavity lengths
- Shield plugs
  - Top and bottom
  - Depleted uranium or carbon steel sheathed in SS
MPC System Overview

- MPC capacity
  - Large PWR—21, large BWR—44
  - Small PWR—12, small BWR—24

- MPC basket configuration—support plate with guide tubes
# MPC Basket Designs

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<th>Basket Designation*</th>
<th>Large (125-ton)</th>
<th>Small (75-ton)</th>
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* Flux trap designs
MPC System Overview

- Storage mode—vertical pre-cast concrete
- Transfer—horizontal with optional vertical
Westinghouse Transfer Cask

- Neutron Shield and Secondary Lid
- Upper Lid
- Upper Trunnions
- MPC Guide Rails
- Supplementary Shield
- Liquid Neutron Shield
- Lead Gamma Shield
- Lower Trunnion
- Short MPC Spacer
- Lower Lid

Scanned Westinghouse Drawing

Civilian Radioactive Waste Management System
Management & Operating Contractor
Westinghouse Transfer System

Transfer Cask

Upender/Downender

Storage Unit

Hydraulic Ram

Lift/Tilt Fixture
Westinghouse Transportation Cask

Impact Limiter

Polyurethane Foam

MPC

Stainless Steel Shell

Transportation Cask

Removable Trunnions

Cask Lid

Scanned Westinghouse Drawing

PC2065

Civilian Radioactive Waste Management System
Management & Operating Contractor
MPC System Overview

- Transportation cask
  - Stainless steel containment
  - DU gamma shielding
  - NS3 neutron shielding
  - Polyurethane foam impact limiters

- Railcar—six-axle, 388,000-lb. GW, AAR approved
Certifiability—Analysis Versus Test

• Analysis
  – Reliance on previously accepted features
  – Fire and immersion events
  – Storage events

• Engineering development tests (phase 1)
  – Impact limiter attachment
  – Seal material performance
Certifiability—Analysis Versus Test

- Quarter-scale certification tests (phase 2)
  - Structural response to free drop and puncture events

- Confirmation tests
  - Thermal tests for storage (phase 2)
Package Design Drivers

- Heat loads—large MPC system
  - Aluminum heat removal panels installed between support plates
  - Large PWR and BWR only

- Weight constraints
  - Depleted uranium used in small transportation cask
  - Liquid neutron shield used in large transfer cask
Criticality Control Approach

- Westinghouse proposed flux trap design with capability of 4.3 w/o at zero burnup

- Design still must meet 1.8 w/o with collapsed flux trap for MGDS requirement

- BUC topical for PWR—Actinides only submitted to NRC May 31, 1995
Phase I Schedule
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