

**U. S. Department of Energy
Office of Civilian Radioactive Waste Management**

Update of the Throughput Study

**William Bailey
Manager, Systems Analysis
M&O/TRW
Vienna, VA**

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Purpose and Objective

- **Establish the preferred rate at which to move SNF and HLW through the CRWMS**
- **Update previous throughput rate studies**
 - **Incorporate current cost data, SNF discharge projections, and transportation modal splits**
 - **Evaluate cost and non-cost measures of effectiveness**
- **Develop a methodology for rapid evaluation of alternative CRWMS scenarios**
- **Develop data to**
 - **Establish throughput rate design basis for CRWMS system elements**
 - **Provide sensitivities and trade-offs to guide design decisions**
 - **Provide performance criteria for inclusion in specifications**
- **Determine sensitivities to CRWMS design, operational, and/or policy changes**

Assumptions and Guidelines

Reference Case Assumptions:

- **Oldest Fuel First (OFF) for acceptance rights and selection**
- **EIA 1990 projections of SNF discharges (40 year lifetimes with no new orders)**
- **Generic eastern MRS; repository in southern Nevada**
- **63,000 MTU SNF; 7000 MTU (equivalent) HLW (from reprocessing)**
- **MRS startup on 1998; repository startup on 2010**
- **Costs presented for both the Total System (including excess at-reactor storage costs), and for CRWMS (excluding at-reactor costs)**

Methodology

- **Generate scenarios for reference and alternative strategies**
- **Generate waste stream data to determine shipments by source by cask type (using Waste Stream Analysis [WSA] computer program)**
- **Use interface programs to aggregate by year, compute cask purchase requirements, and add high level waste stream**
- **Conduct cost analyses (using System Engineering Cost Analysis Model developed by Pacific Northwest Laboratories)**
- **Evaluate multiple MOEs**
 - **Life Cycle Cost**
 - **Non-cost MOEs**

Non-Cost Measures of Effectiveness

Number of

- **Transportation casks**
- **Waste handlings**
- **Shipment miles**
- **Cask miles**
- **Waste packages**
- **Dry storage casks**

Principal Results to Date

- **Determined preferred range of system throughput rates (3000 - 5000 MTU/yr) for system reference case**
- **Identified corresponding MRS operational concept, consistent with MRS reference design concept**
- **Provided MRS expected annual SNF receipt rates and shipping rates (casks, assemblies, MTU) according to mode and PWR/BWR**
- **Analyzed impacts of selected alternatives**
- **Developed ramp-up cask requirements data to support Phase I transportation cask procurement**

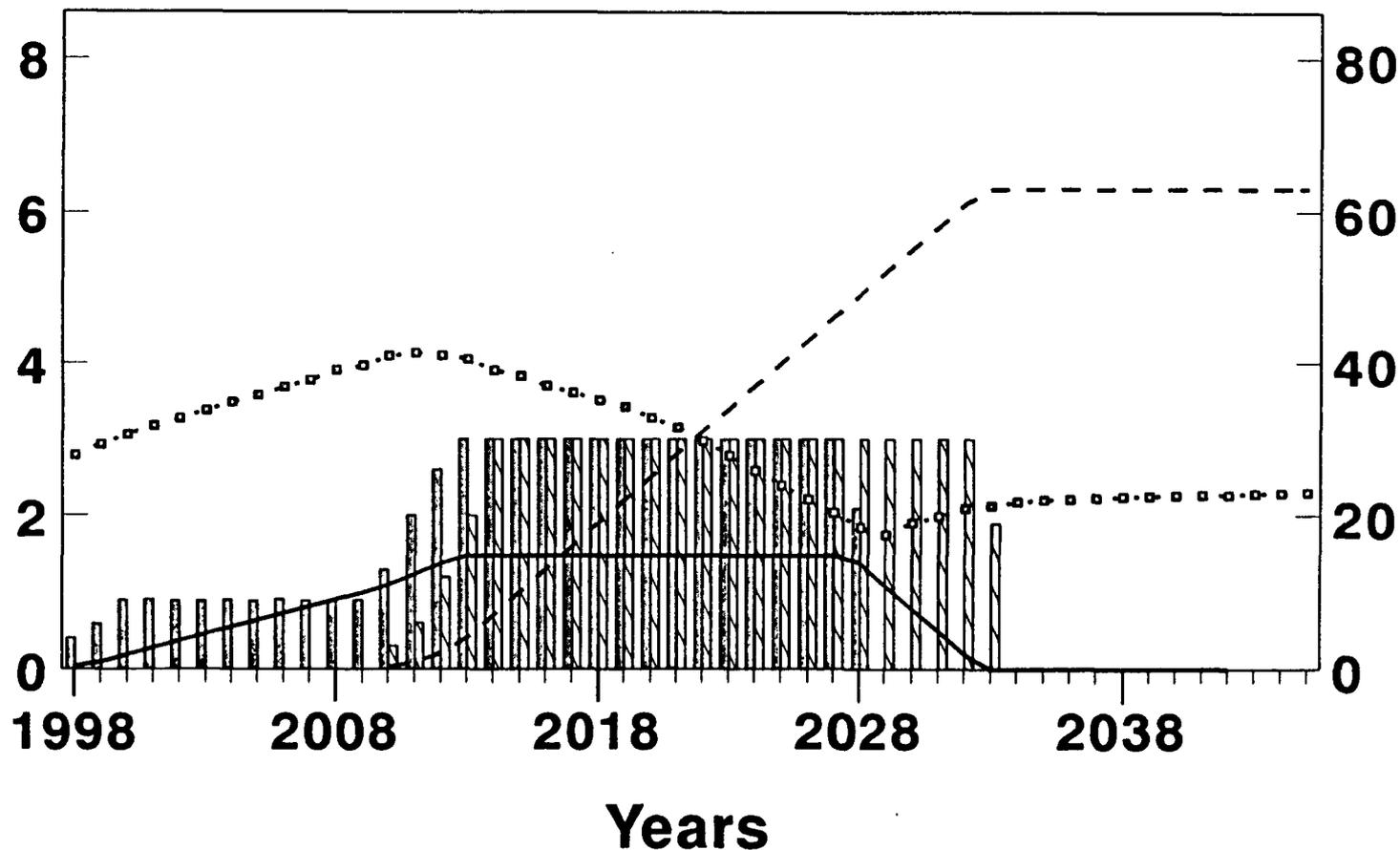
SNF Flows and Inventories

3000 MTU/yr Reference Scenario

Uses 1990 EIA No-New-Orders Projection

1000 MTU rates (bars)

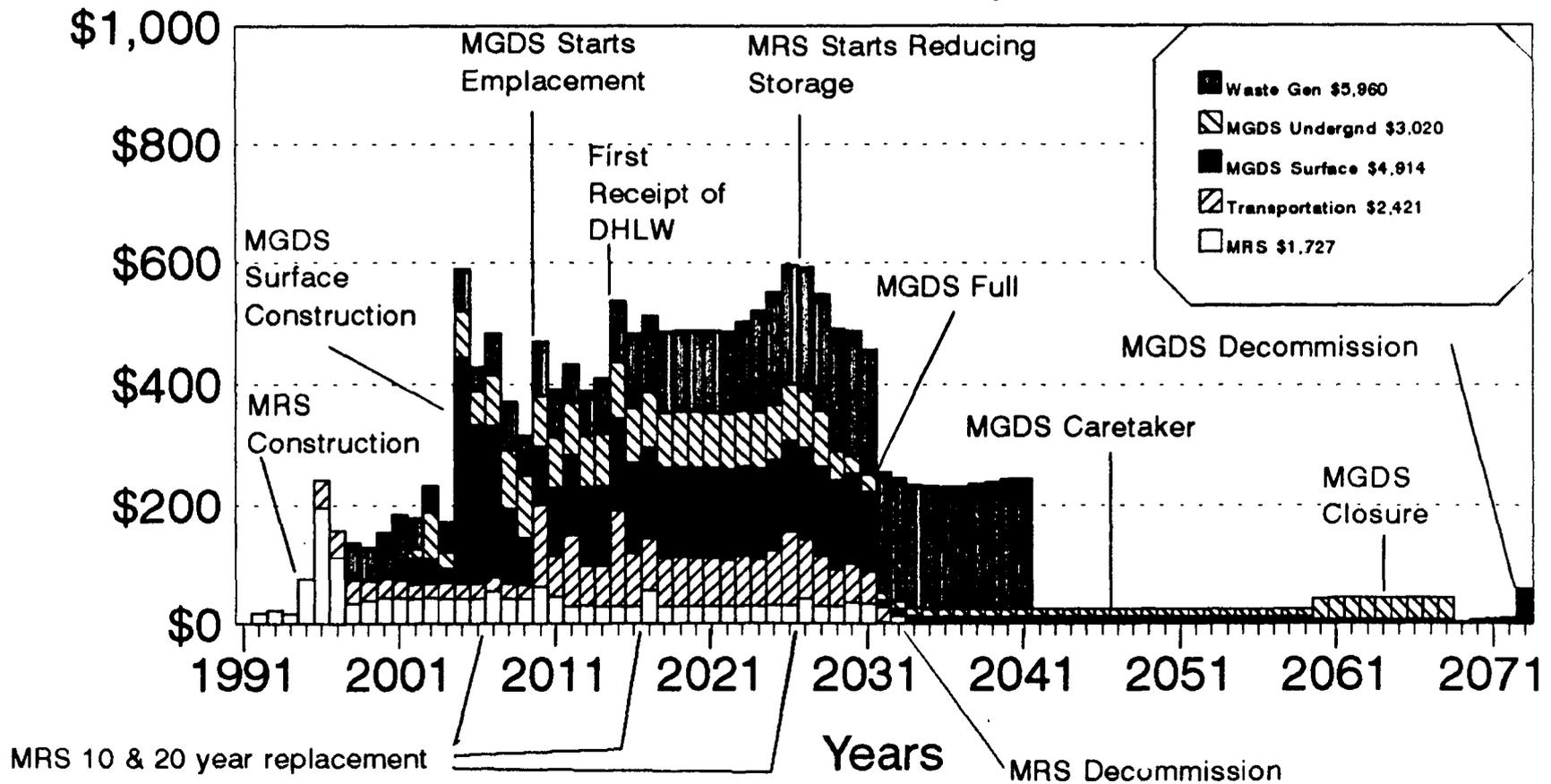
1000 MTU inventories (lines)



Annual Costs for Reference Case with Western Strategy

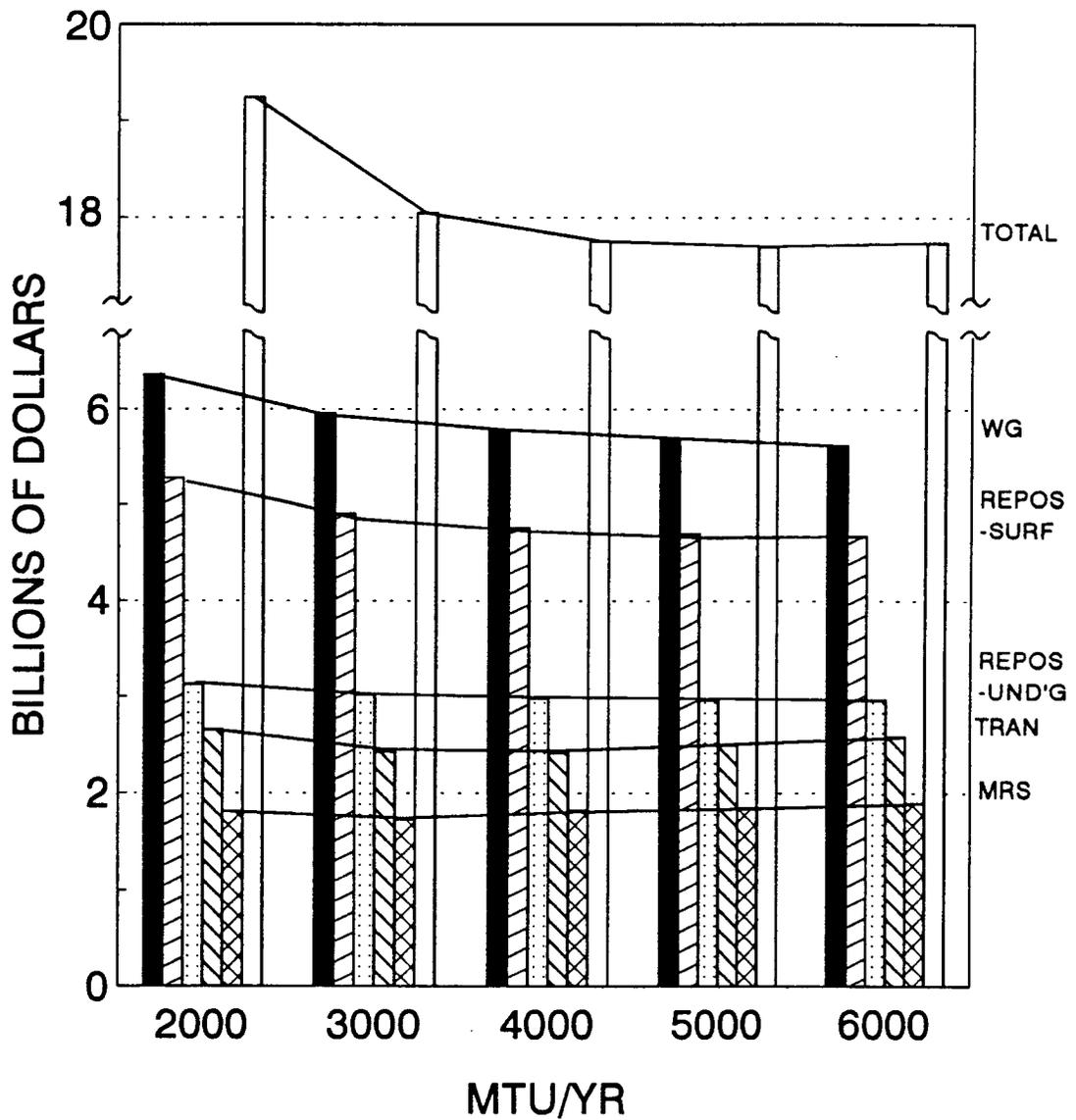
Steady State Throughput = 3000 MTU/yr

Millions of constant 1991 dollars (Total \$18,042)



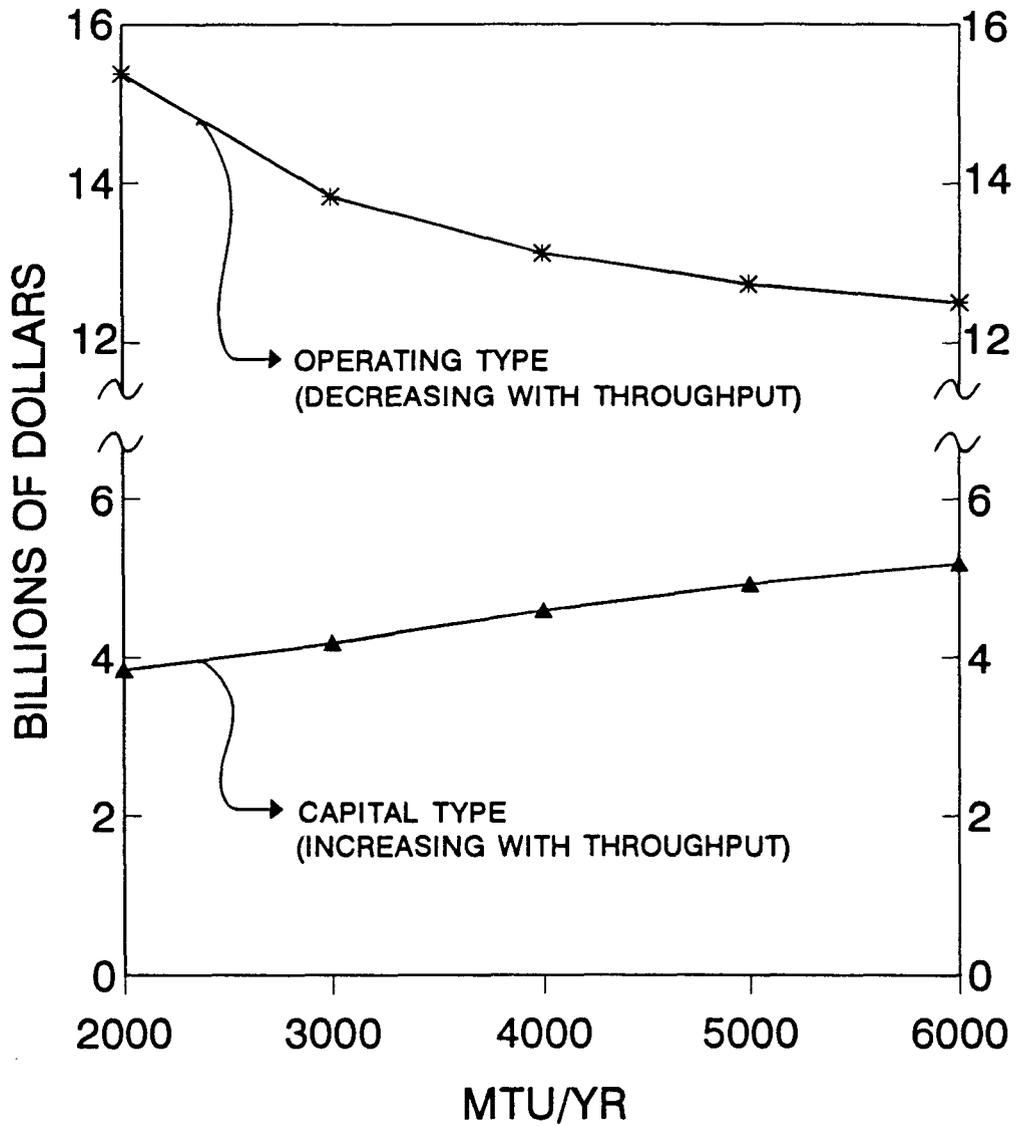
Excluding D&E, Benefits & 2nd Repository

SYSTEM COSTS



TOTAL SYSTEM COSTS

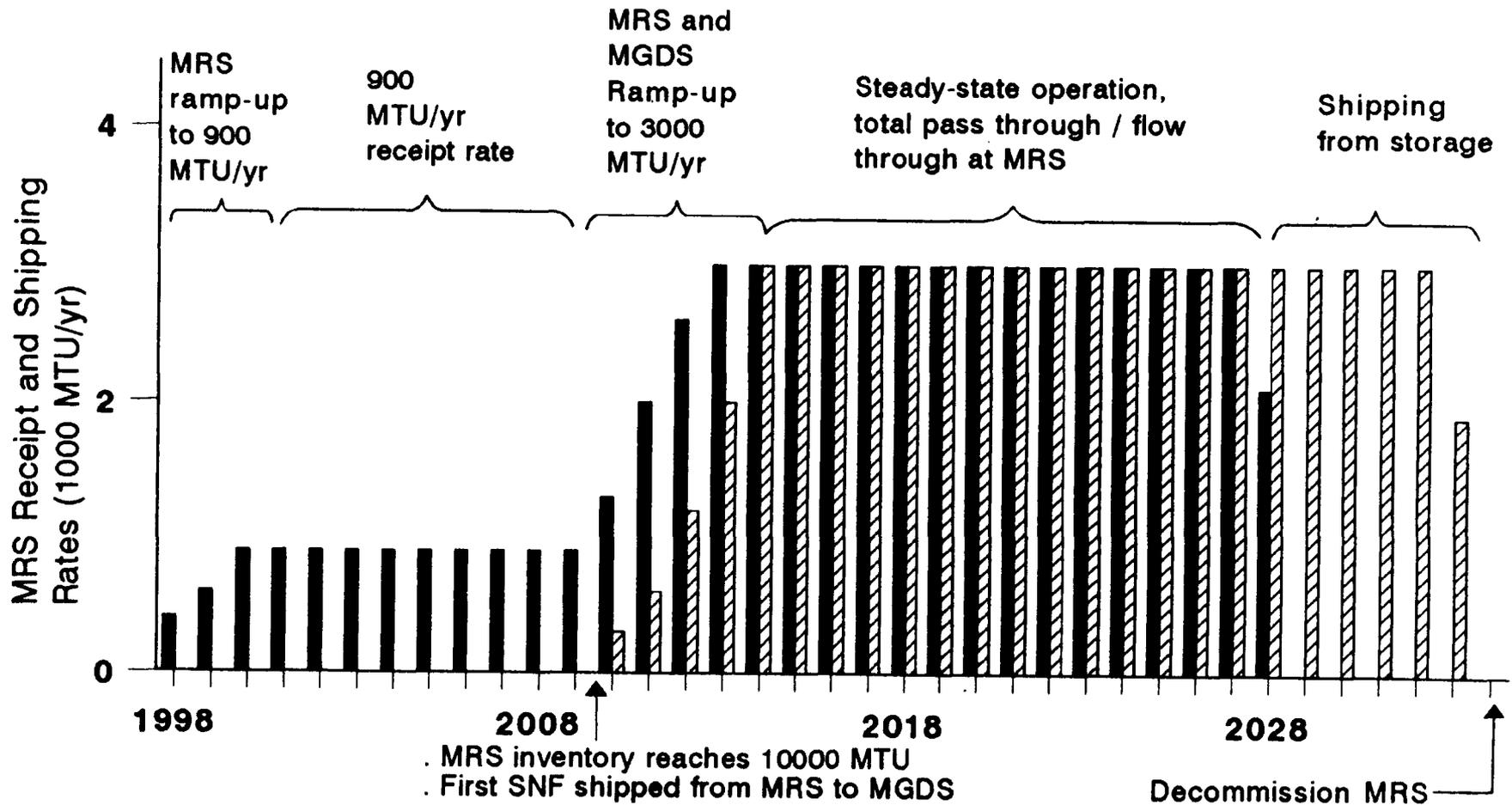
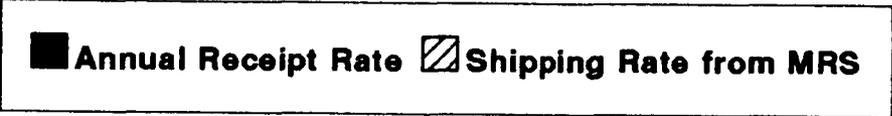
DIVIDED INTO INCREASING AND DECREASING



▲ INCREASING * DECREASING

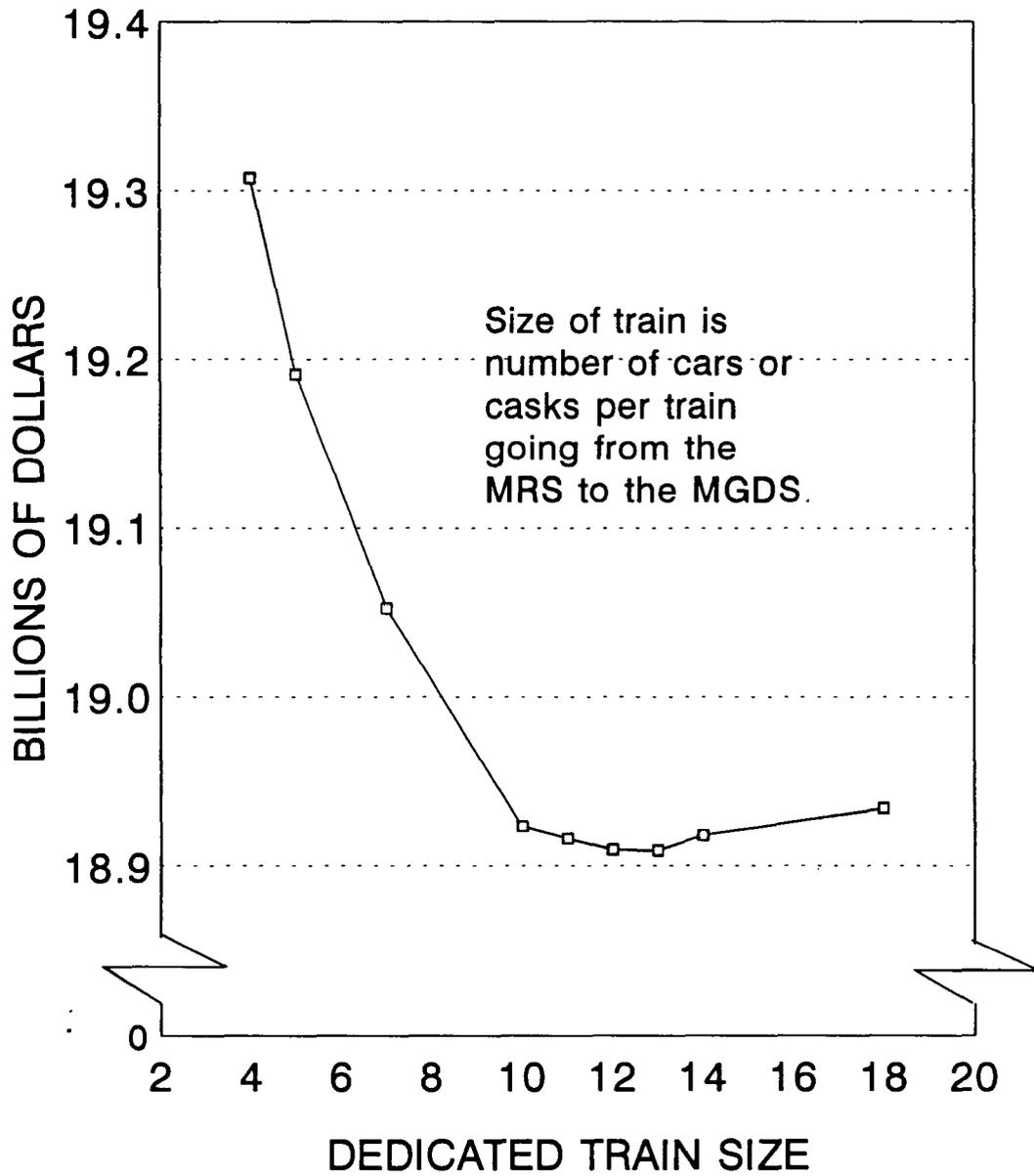
Reference Strategy

Steady State Throughput Rate: 3000 MTU/yr



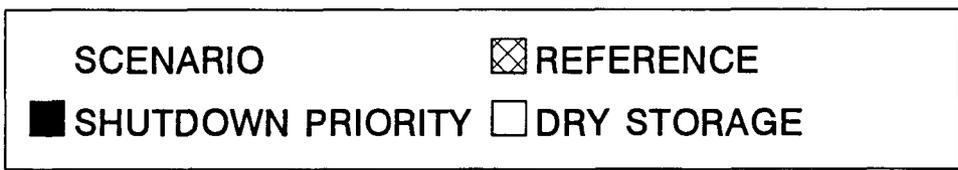
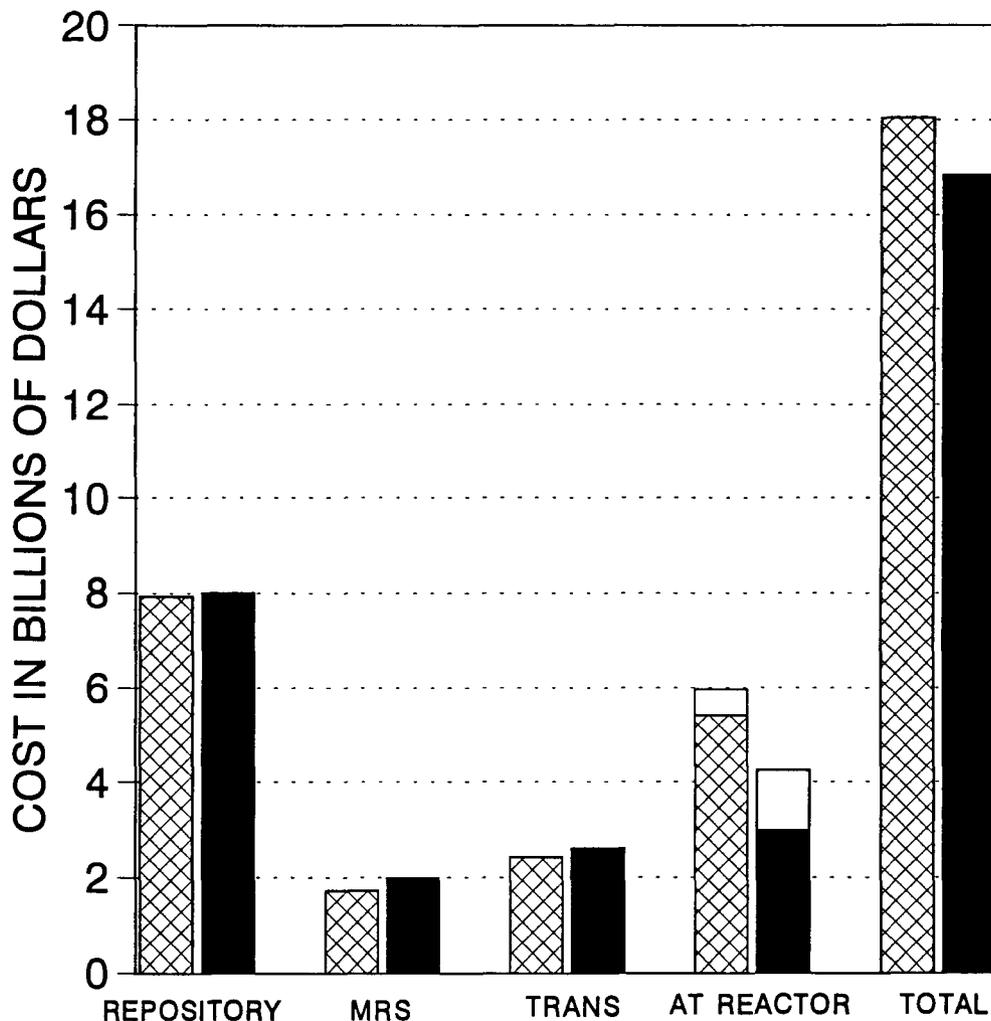
Cost Optimization of Dedicated Train Size

REFERENCE STRATEGY, 3000 MTU/yr THROUGHPUT RATE



TOTAL SYSTEM COSTS

COMPARING PRIORITY FOR SHUTDOWN REACTORS



FY '92 Throughput Rate Study

- **Draft final report due September 30, 1992**
- **Strategies/Issues to be analyzed in remainder of Throughput Study are:**
 - **Transportation cask and mode scenarios**
 - **Alternative acceptance strategies**
 - **Analysis of alternative MRS operation concepts**
 - **Unconstrained MRS storage**
 - **Effect of reactor life extensions**
 - **No extensions**
 - **Delayed MGDS (2020)**
 - **Updated cost data for MRS and determination of sensitivity of results to uncertain ties in cost data**
 - **Incorporation of Development and Evaluation cost**