

**U.S. DEPARTMENT OF ENERGY  
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT**

**NUCLEAR WASTE TECHNICAL REVIEW BOARD  
FULL BOARD MEETING**

**SUBJECT: CURRENT AND EMERGING  
TRANSFER TECHNOLOGIES**

**PRESENTER: ALAN H. WELLS**

**PRESENTER'S TITLE  
AND ORGANIZATION: CONSULTANT  
CRWMS M&O**

**PRESENTER'S  
TELEPHONE NUMBER: (704) 382-3119**

**DALLAS, TEXAS  
NOVEMBER 2, 1993**

# **Current & Emerging Transfer Technologies**

## **Current Spent Fuel Transfer Experience**

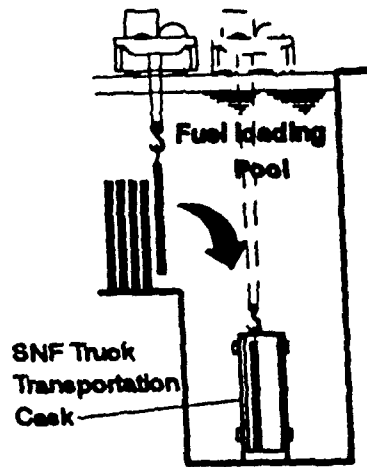
- **76 Pool Storage Sites**
- **5 Dry Storage Sites**

# **Current & Emerging Transfer Technologies**

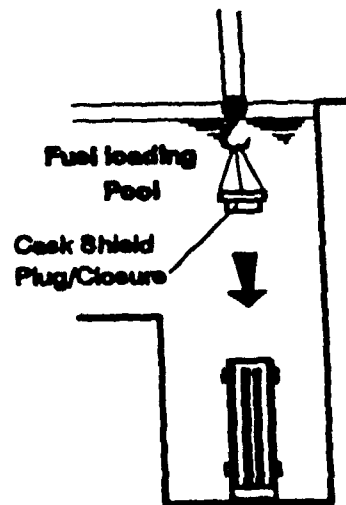
## **Current Spent Fuel Transfer Experience**

### **Direct Pool Transfer Technology**

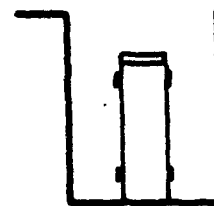
- **To transportation casks**
- **To metal storage casks**



- 1 FUEL LOADING POOL**  
 -Load Spent Fuel Assemblies into Truck Transportation Cask.

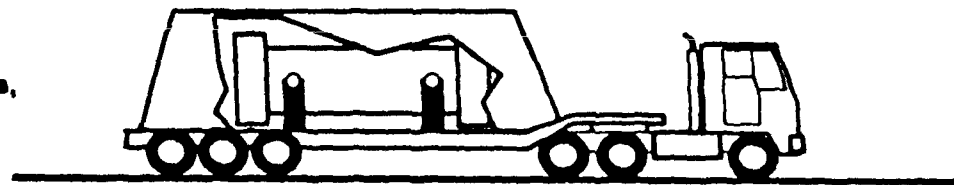


- 2 FUEL LOADING POOL**  
 -Place Cask Shield Plug/Closure.  
 -Move Cask to Prep/Decon Area.



- 3 PREP/DECON AREA**  
 -Install Cask Closure.  
 -Decon Cask.  
 -Drain, Dry, Inert Cask.

- 4 TRANSPORT PREP AREA**  
 -Place Cask on Transporter.  
 -Install Tie Downs, Impact Limiters,  
 Personnel Barrier.  
 -Dispatch to MRS or MGDS.

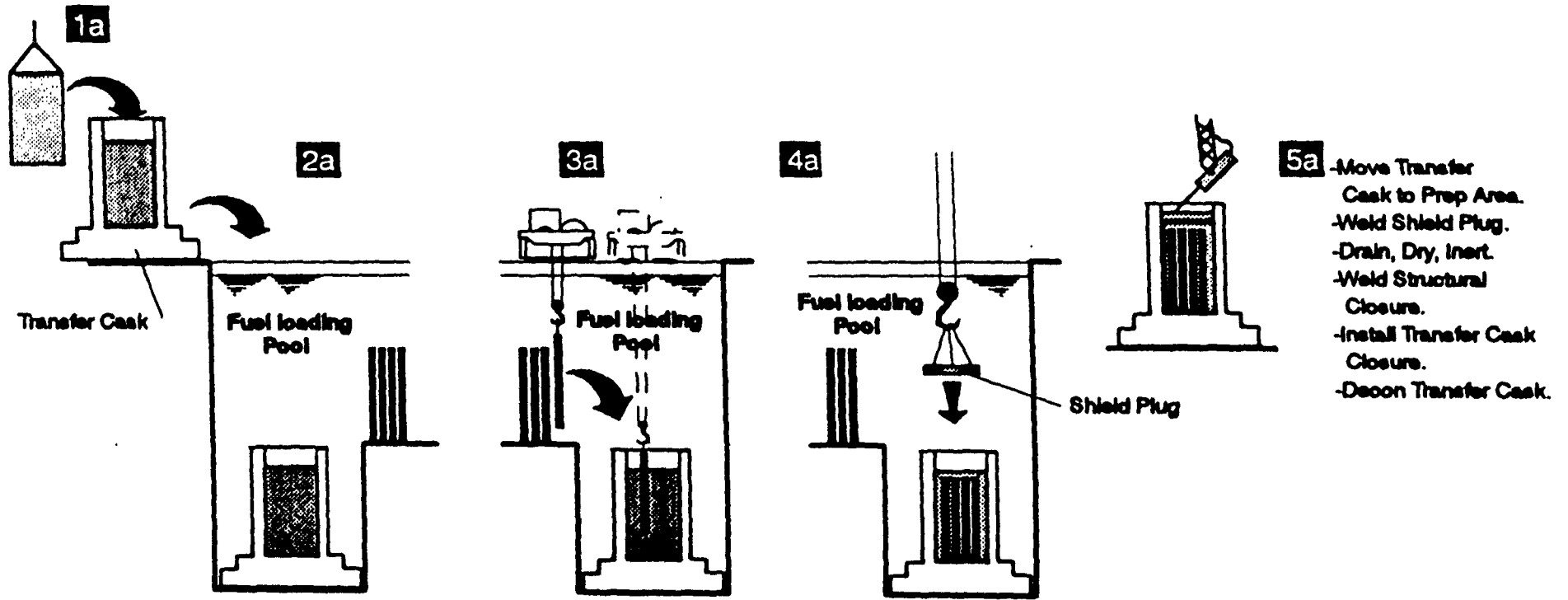


**DIRECT TRANSFER TO TRANSPORTATION CASK**

# **Current & Emerging Transfer Technologies**

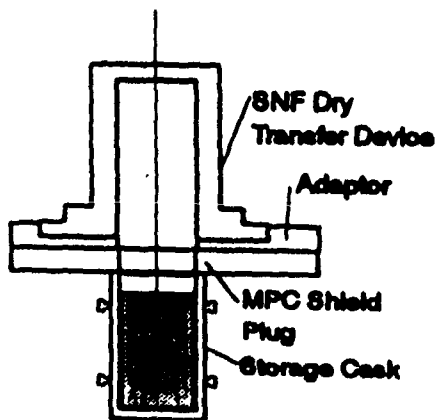
## **Current SNF Dry Storage (ISFSI) Experience**

<b>Surry</b>	<b>Direct In-Pool Transfer</b>
<b>H.B. Robinson</b>	<b>Horizontal Transfer Cask</b>
<b>Oconee</b>	<b>Horizontal Transfer Cask</b>
<b>Ft. St. Vrain</b>	<b>Vertical Transfer Cask</b>
<b>Palisades</b>	<b>Vertical Transfer Cask (HTGR Fuel)</b>
<b>Calvert Cliffs</b>	<b>Horizontal Transfer Cask</b>



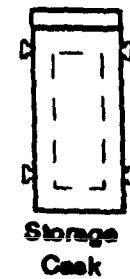
**6a**

- Locate Transfer Cask.
- Load into Storage Cask.

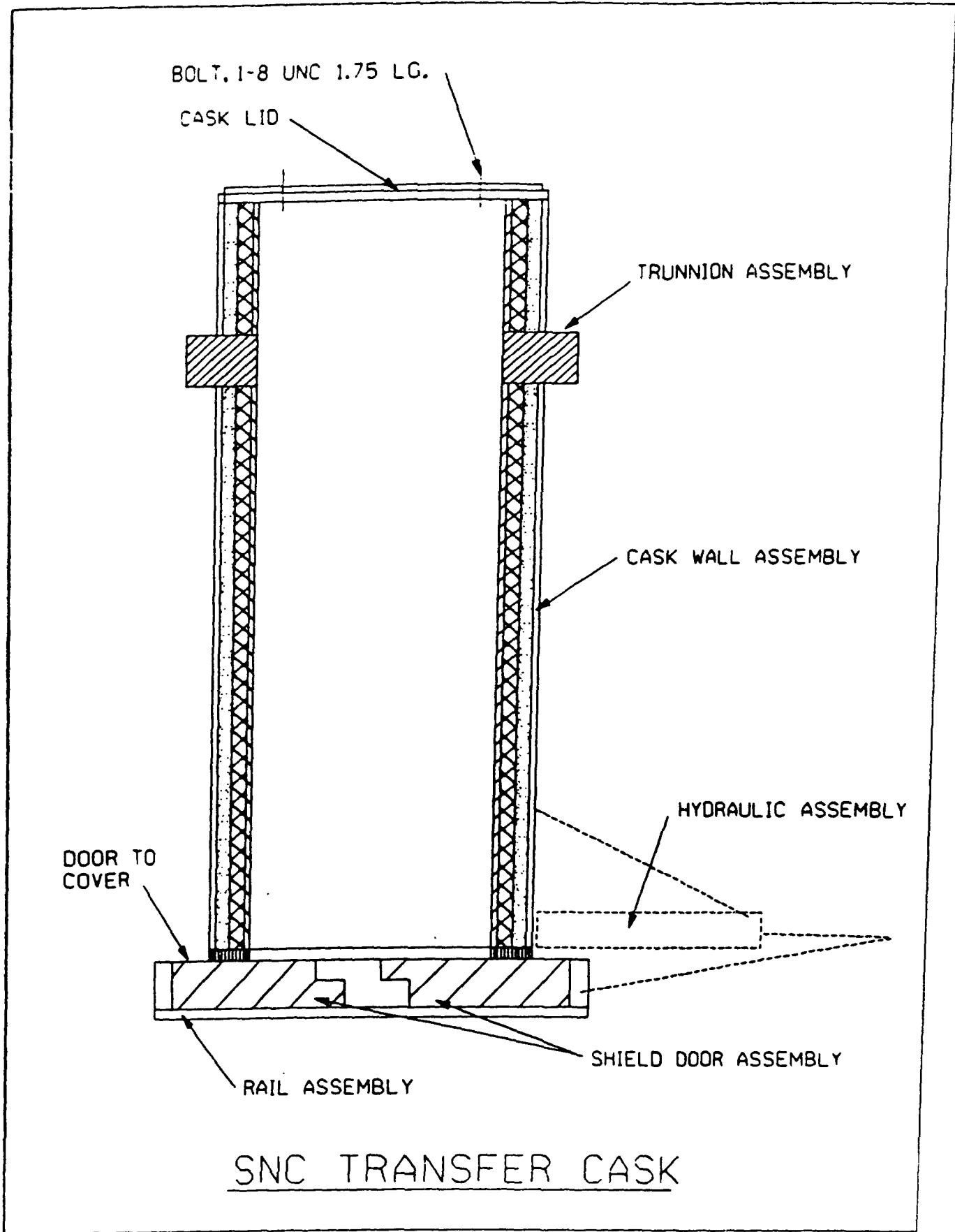


**7a**

- Install Cask Closure.
- Inert Cask.



### VERTICAL TRANSFER SYSTEM



**LOAD (STEPS 1a - 5a SAME AS VERTICAL TRANSFER SYSTEM)**



Loaded On-Site Transfer Cask

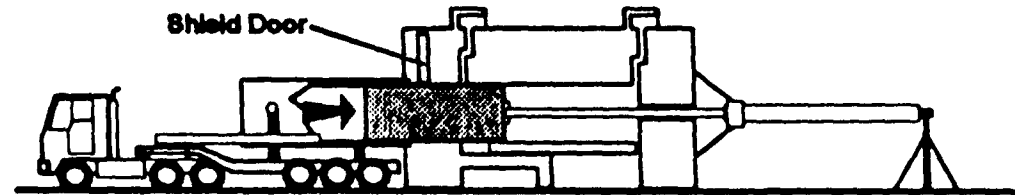
**1**

- Loaded at Fuel Storage Pool
- Move Loaded On-Site Transfer Cask to ISFSI.

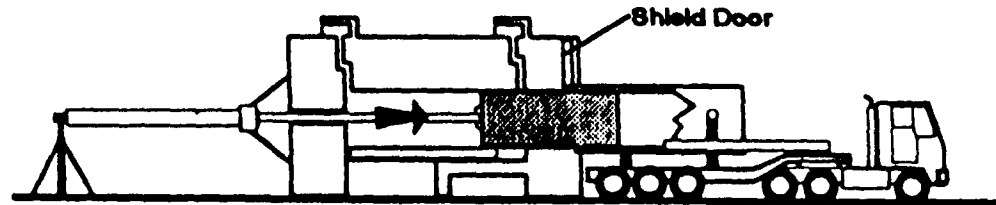
**2**

**HORIZONTAL STORAGE**

- Transfer MESC into Storage Unit.
- Secure Storage Closure.



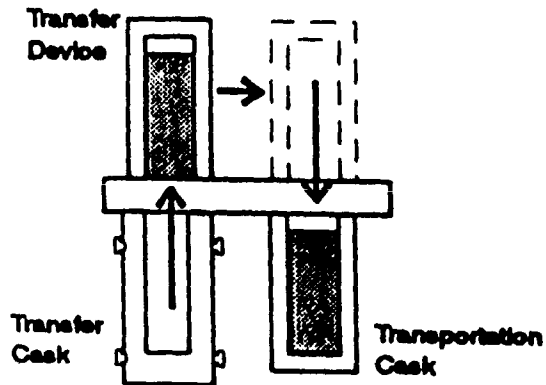
**RETREIVE**



**3**

**HORIZONTAL STORAGE**

- Transfer MESC into On-Site Transfer Cask.
- Move to Transfer Area.

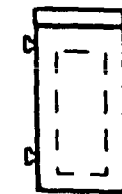


**4**

**TRANSFER AREA**

**5**

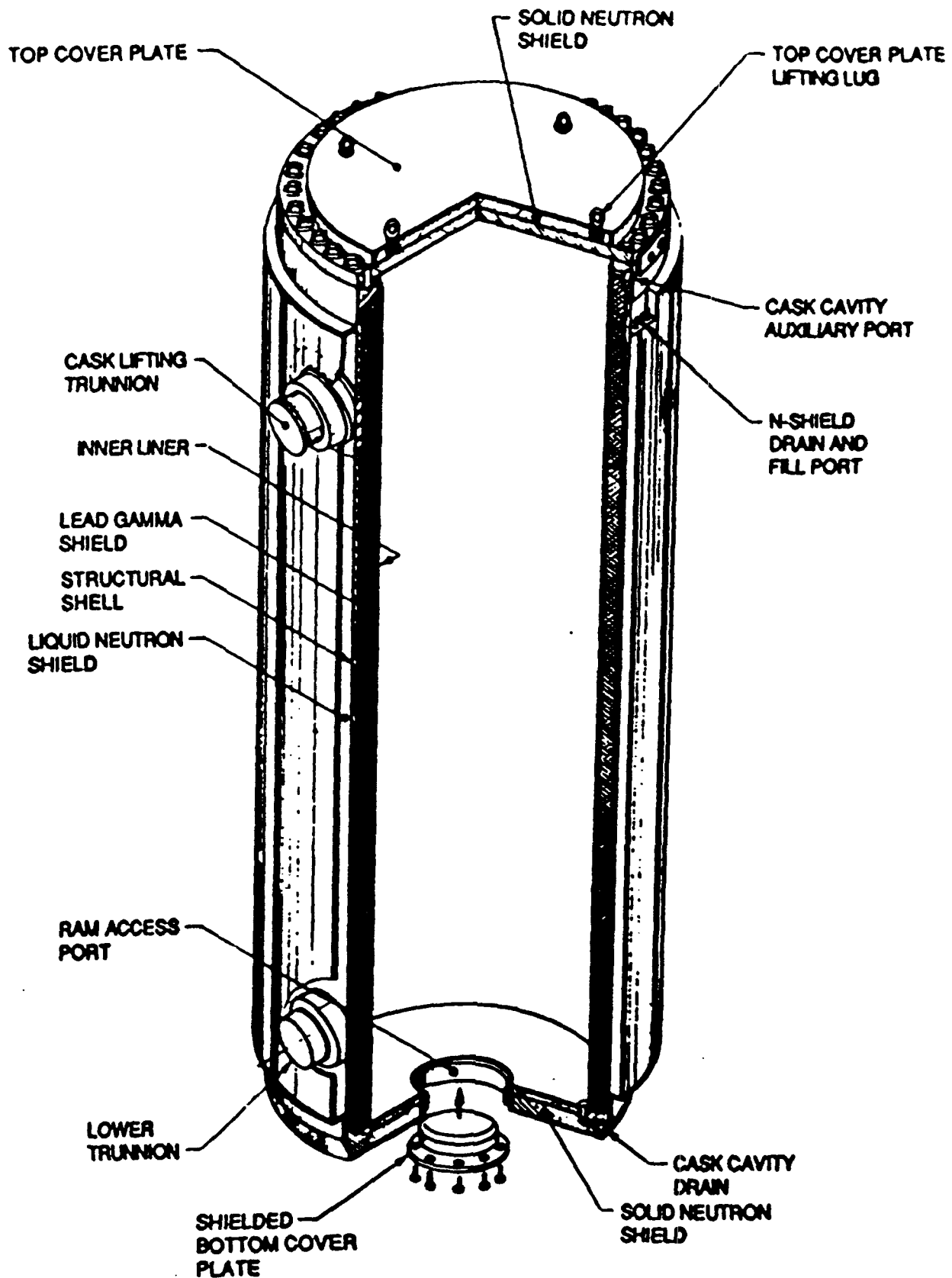
- Install Cask Closure.
- Inert Cask.



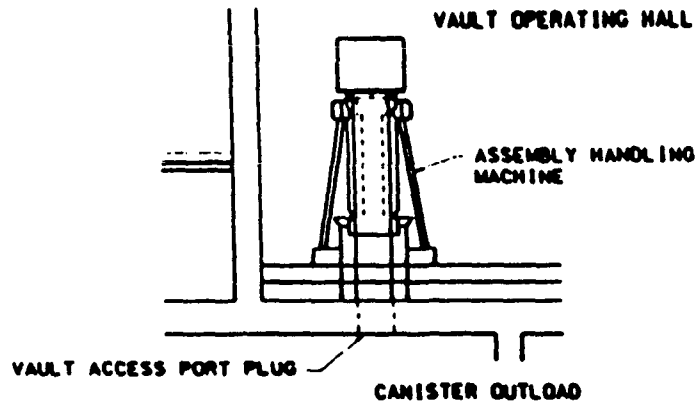
Transportation Cask

**HORIZONTAL TRANSFER SYSTEM**

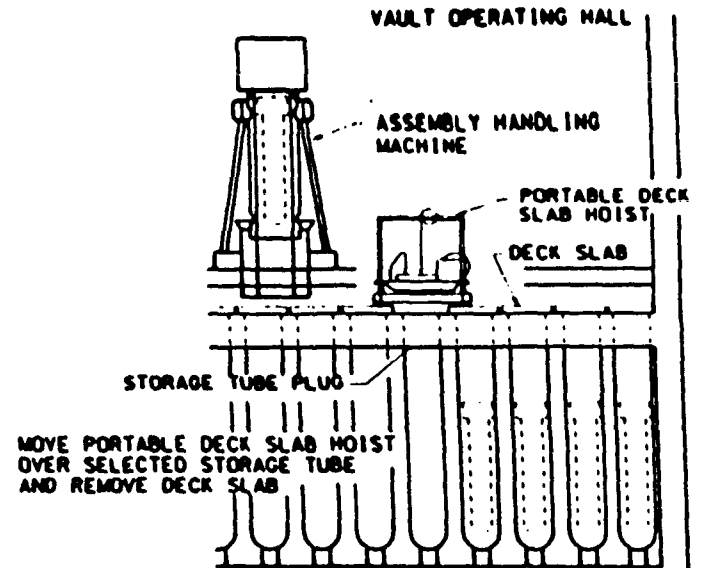




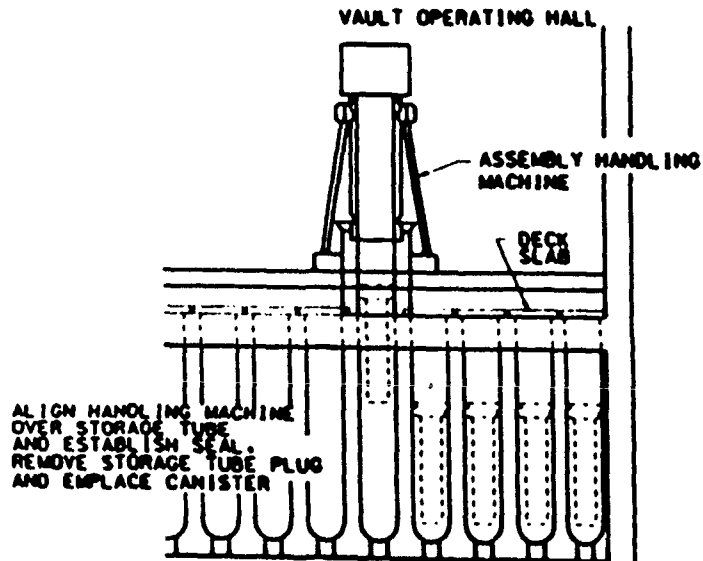
**NUHOMS ON-SITE TRANSFER CASK**



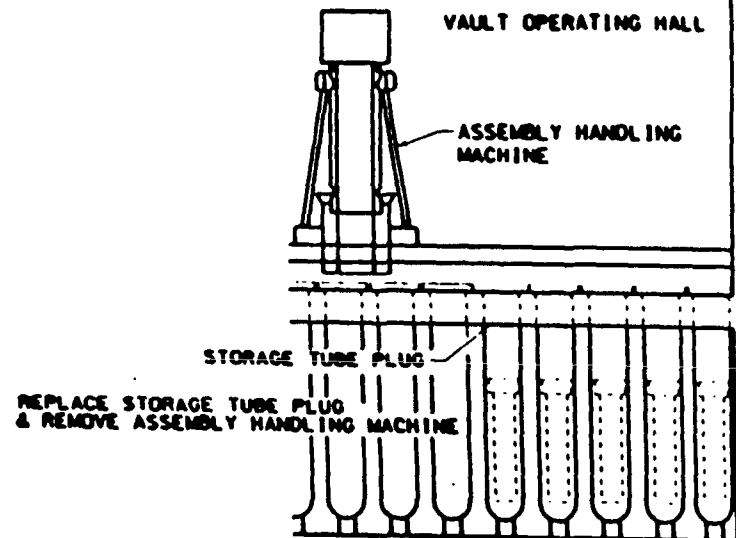
LIFT CANISTER INTO  
ASSEMBLY HANDLING MACHINE  
AND REPLACE VAULT ACCESS PLUG



MOVE PORTABLE DECK SLAB HOIST  
OVER SELECTED STORAGE TUBE  
AND REMOVE DECK SLAB



ALIGN HANDLING MACHINE  
OVER STORAGE TUBE  
AND ESTABLISH SEAL.  
REMOVE STORAGE TUBE PLUG  
AND EMPLACE CANISTER



REPLACE STORAGE TUBE PLUG  
& REMOVE ASSEMBLY HANDLING MACHINE

# **Current & Emerging Transfer Technologies**

## **Emerging Technologies**

### **SNF Cask-to-Cask Transfer Systems**

#### **EPRI/DOE Cooperative Agreement**

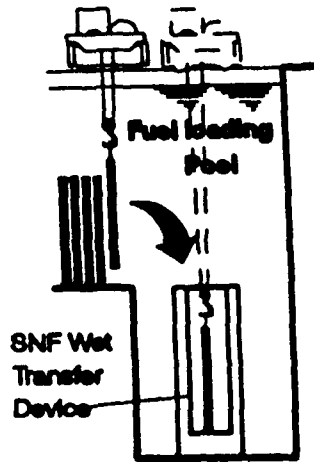
- **Conceptual Design EPRI NP-7495**
- **Transnuclear**

#### **Newport News Transfer System**

- **Response to the MPC CBD Notice**
- **Navy Nuclear Experience**

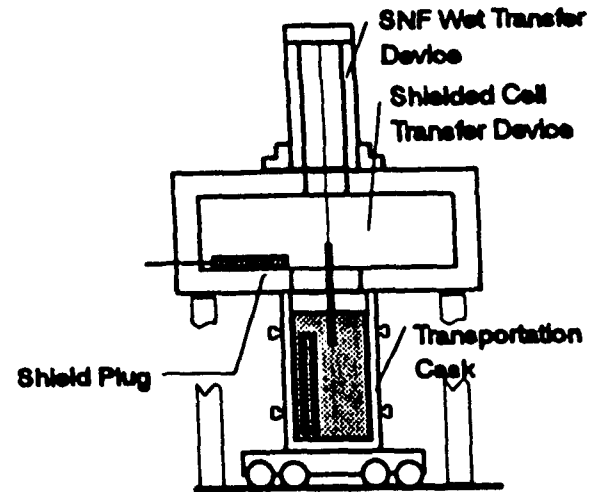
# 1 UTILITY FUEL POOL

- Load SNF into Transfer Device.
- Place Shield/Closure.
- Move Device to Prep Area.
- Install Closure.
- Drain & Dry Transfer Device.
- Move Device to Cask to Cask Prep Area.

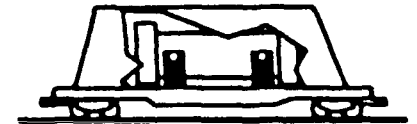


- 3**
- Move MPC to Prep Area.
  - Weld MPC Shield Plug.
  - Inert MPC.
  - Weld MPC Structural Closure.

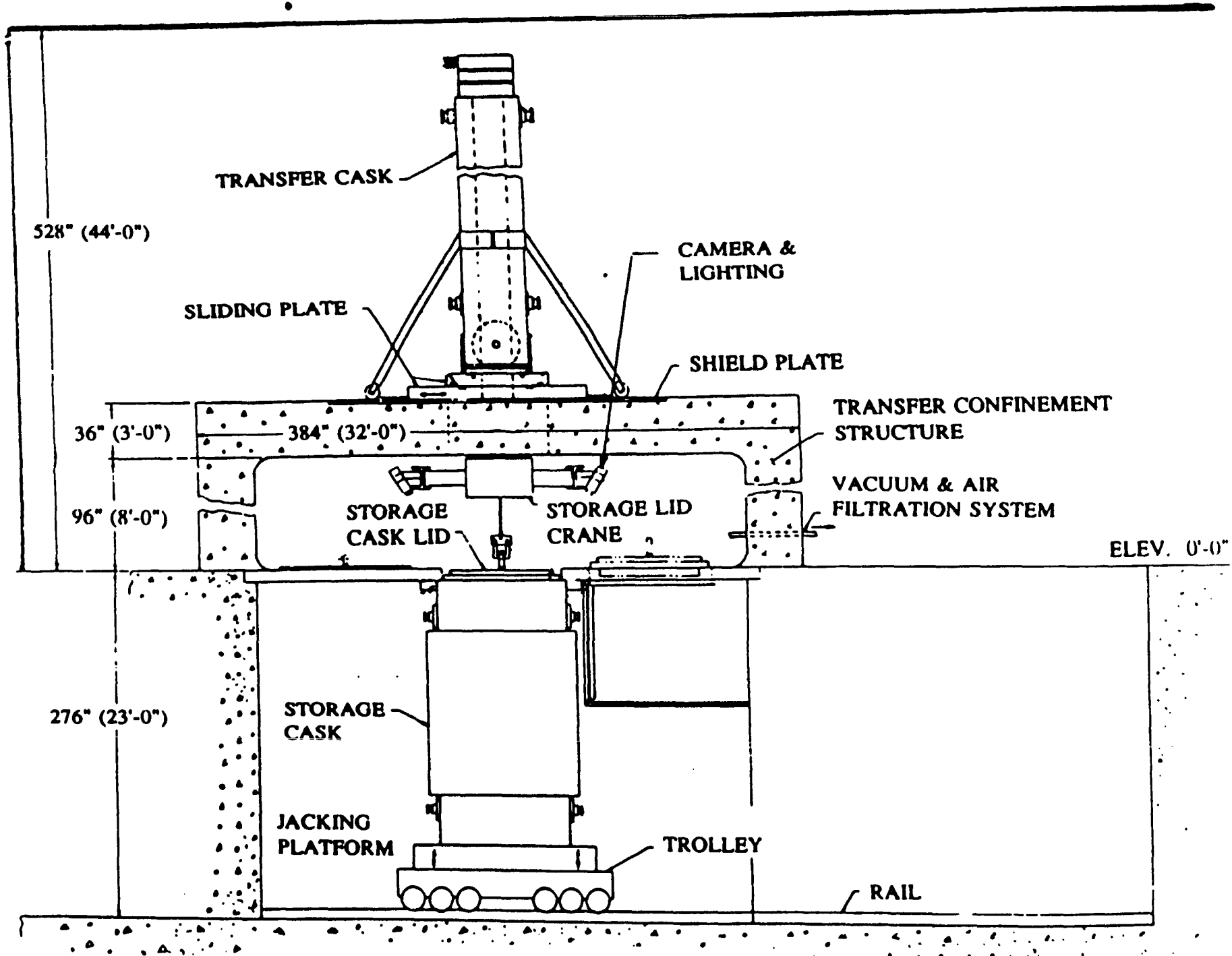
- 2**
- Move SNF/On-Site Transfer Cask into Transfer Area.
  - Locate SNF Transfer Device.
  - Load SNF into Transfer Cask
  - Place Shield Plug.



- 4**
- Install Cask Closure.
  - Inert Cask.

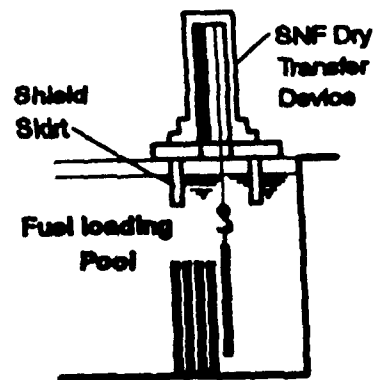


- 5**
- Place Cask on Transporter.
  - Install Tie Downs, Impact Limiters, and Personnel Barrier.
  - Dispatch to MRS or MGDS.



# 1 UTILITY FUEL POOL

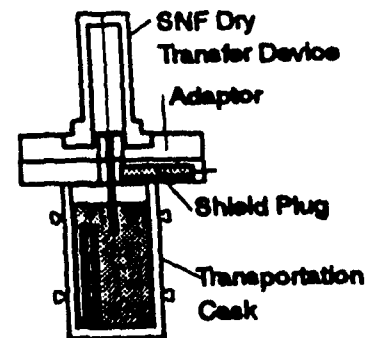
- Load SNF into Transfer Device.
- Place Shield/Closure.
- Move Device to Prep Area.
- Load SNF into Dry Transfer Device.
- Close Shield Closure.
- Move to Cask to Cask Prep Area.



# 2

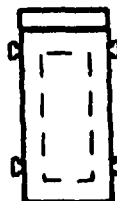
- Move SNF/On-Site Transfer Cask into Transfer Area.
- Locate SNF Transfer Device on Adaptor.
- Load SNF into Transfer Cask
- Place Shield Plug.

# THROUGH ADAPTOR



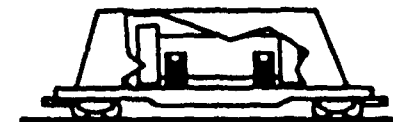
# 3

- Move to Prep Area.
- Weld Shield Plug.
- Inert.
- Weld Structural Closure.



# 4

- Install Cask Closure.
- Inert Cask.



# 5

- Place Cask on Transporter.
- Install Tie Downs, Impact Limiters, and Personnel Barrier.
- Dispatch to MRS or MGDS.

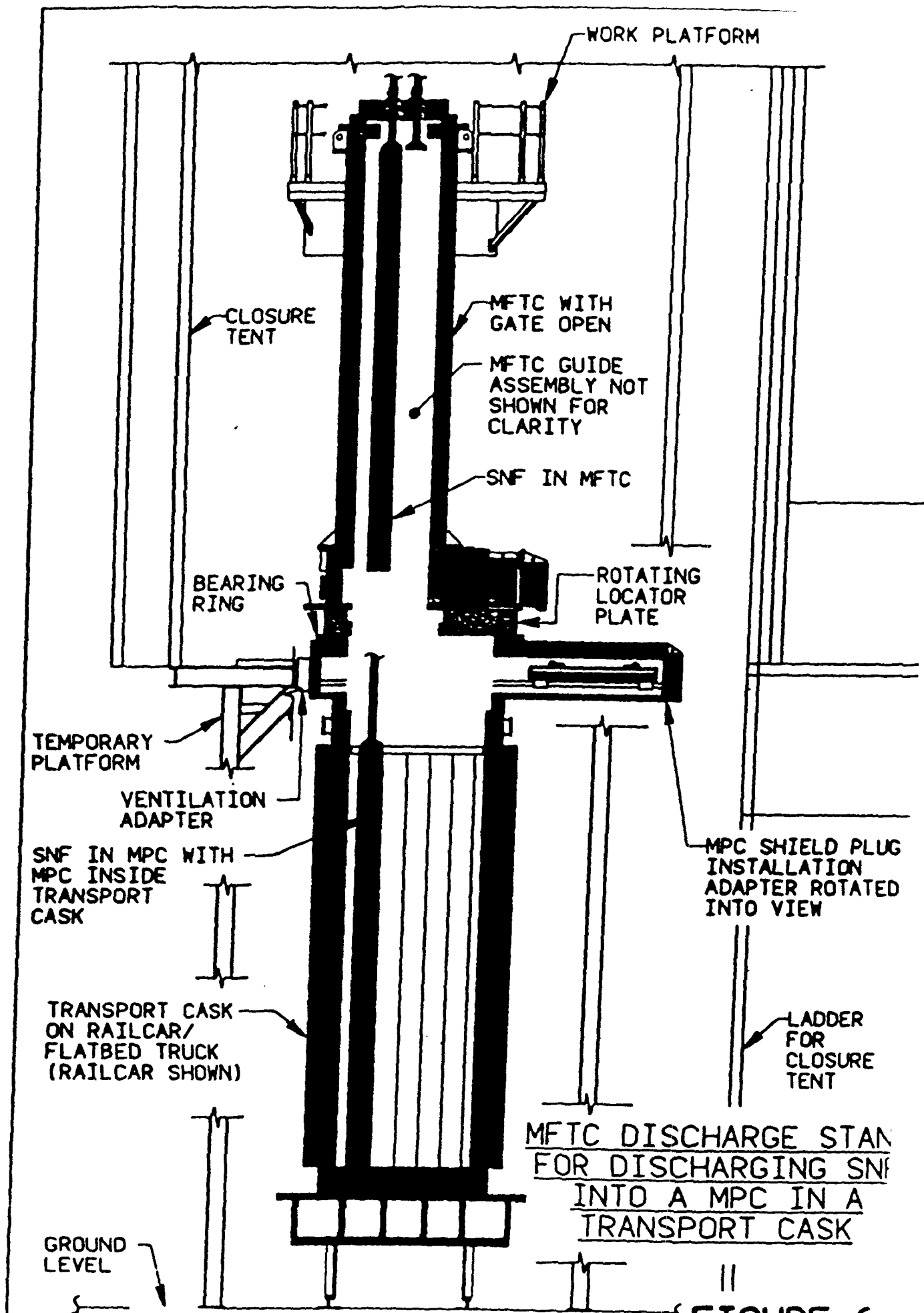


FIGURE 6

# Summary

- **MPC UTS system utilizes existing technology**
- **CDR UTS transfer systems**
  - **Direct transfer**
  - **Enhanced transfer**
  - **Cask-to-cask**
  - **UTS storage and transfer**