

# **TRANSPORTATION**

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**PRESENTATION TO THE  
NUCLEAR WASTE TECHNICAL REVIEW BOARD  
MARCH 7-8, 1989**

# **NUCLEAR WASTE POLICY ACT**

- **DOE RESPONSIBLE FOR TRANSPORT OF SPENT FUEL AND HIGH-LEVEL WASTE**
- **DOE TAKES TITLE AT REACTOR (SHIPPER OF RECORD)**
- **PRIVATE SECTOR TO BE USED TO “FULLEST EXTENT POSSIBLE”**
- **NRC-CERTIFIED CASKS TO BE USED**
- **COSTS OF TRANSPORTATION TO BE COVERED BY WASTE FUND**

# **THE NUCLEAR WASTE POLICY AMENDMENTS ACT OF 1987 BROUGHT NEW REQUIREMENTS TO THE OCRWM TRANSPORTATION PROGRAM**

- **SECTION 180 (A) — USE NRC CERTIFIED TRANSPORTATION PACKAGE**
- **SECTION 180 (B) — PRENOTIFY STATES/LOCAL GOVERNMENTS UNDER NRC REGULATIONS**
- **SECTION 180 (C) — PROVIDE TECHNICAL ASSISTANCE AND FUNDING TO TRAIN LOCAL GOVERNMENTS & TRIBES ON ROUTINE TRANSPORTATION & EMERGENCY RESPONSE**

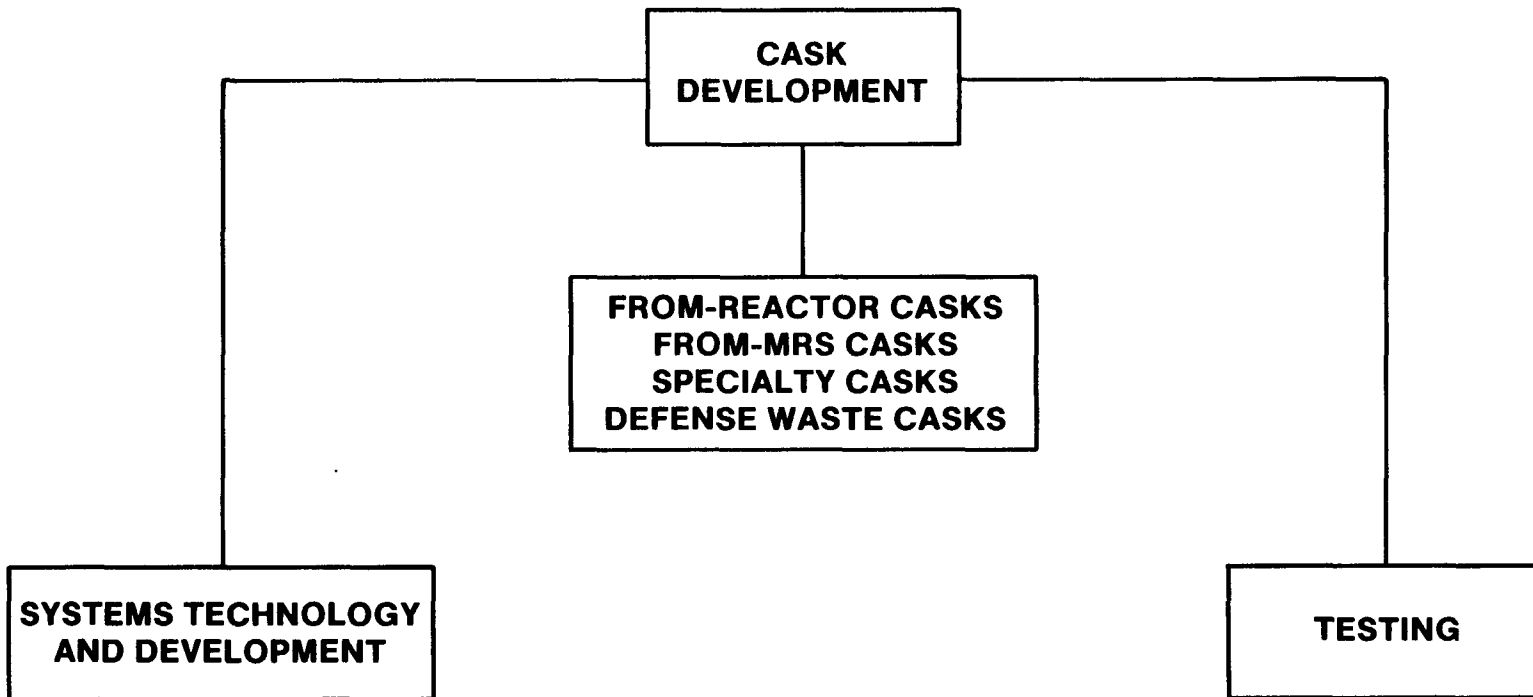
# FEDERAL REGULATION OF TRANSPORTATION

**NUCLEAR REGULATORY  
COMMISSION  
(10 CFR 71, 73)**

- **CASK DESIGN & TESTING**
- **PHYSICAL PROTECTION**
- **PRENOTIFICATION**

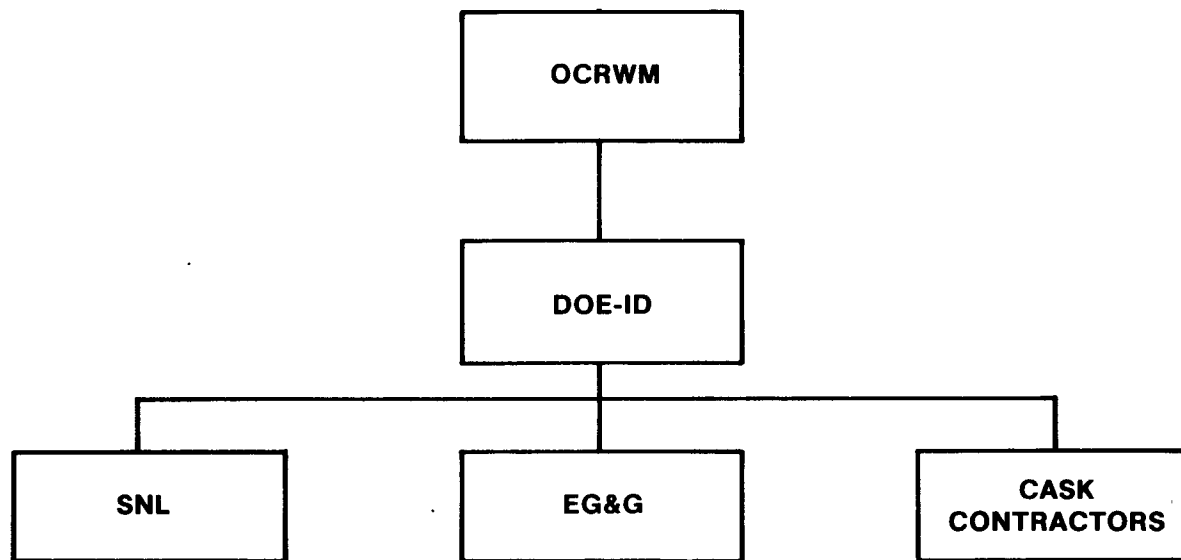
**DEPARTMENT OF  
TRANSPORTATION  
(49 CFR 106-399)**

- **OPERATIONAL PROCEDURES**
- **LABELING, MARKING**
- **PLACARDING**
- **ROUTING**
- **DRIVER TRAINING**



**CURRENT STATUS  
OF THE  
FROM-REACTOR CASK  
DEVELOPMENT INITIATIVE**

# CASK SYSTEMS DEVELOPMENT PROGRAM INTERFACES



# PRESENT GENERATION CASKS

| <u>CASK</u>    | <u>MODE</u> | <u>CAPACITY<br/>PWR/BWR</u> | <u>ESTIMATED<br/>SHIPMENTS/YR.<br/>FOR 3000 MTU</u> |
|----------------|-------------|-----------------------------|---|
| NLI - 1/2      | LWT         | 1/2                         | 6711  |
| TN - 8L/TN - 9 | OWT         | 3/7                         | 2119  |
| IF - 300       | RAIL        | 7/18                        | 880   |
| NLI - 10/24    | RAIL        | 10/24                       | 631   |

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LWT = LEGAL WEIGHT TRUCK  
OWT = OVERWEIGHT TRUCK



# OCRWM CASK EXPECTATIONS

| <u>CASK TYPE</u> | <u>CAPACITY<br/>PWR/BWR</u> | <u>ESTIMATED<br/>SHIPMENTS/YR.<br/>FOR 3000 MTU</u> |
|------------------|-----------------------------|---|
| LWT (MIN. CAP)   | 2/6                         | 2940  |
| LWT (MAX. CAP)   | 4/9                         | 1609  |
| OWT (MIN. CAP.)  | 4/14                        | 1411  |
| OWT (MAX. CAP.)  | 6/14                        | 1060  |
| R/B (MIN. CAP.)  | 16/40                       | 389   |
| R/B (MAX. CAP)   | 26/52                       | 259   |

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**R/B = RAIL/BARGE**

# SELECTED CONTRACTORS

## LEGAL WEIGHT TRUCK CASKS

GA TECHNOLOGIES (\$8.5 MILLION)

WESTINGHOUSE ELECTRIC CORPORATION (\$7 MILLION)

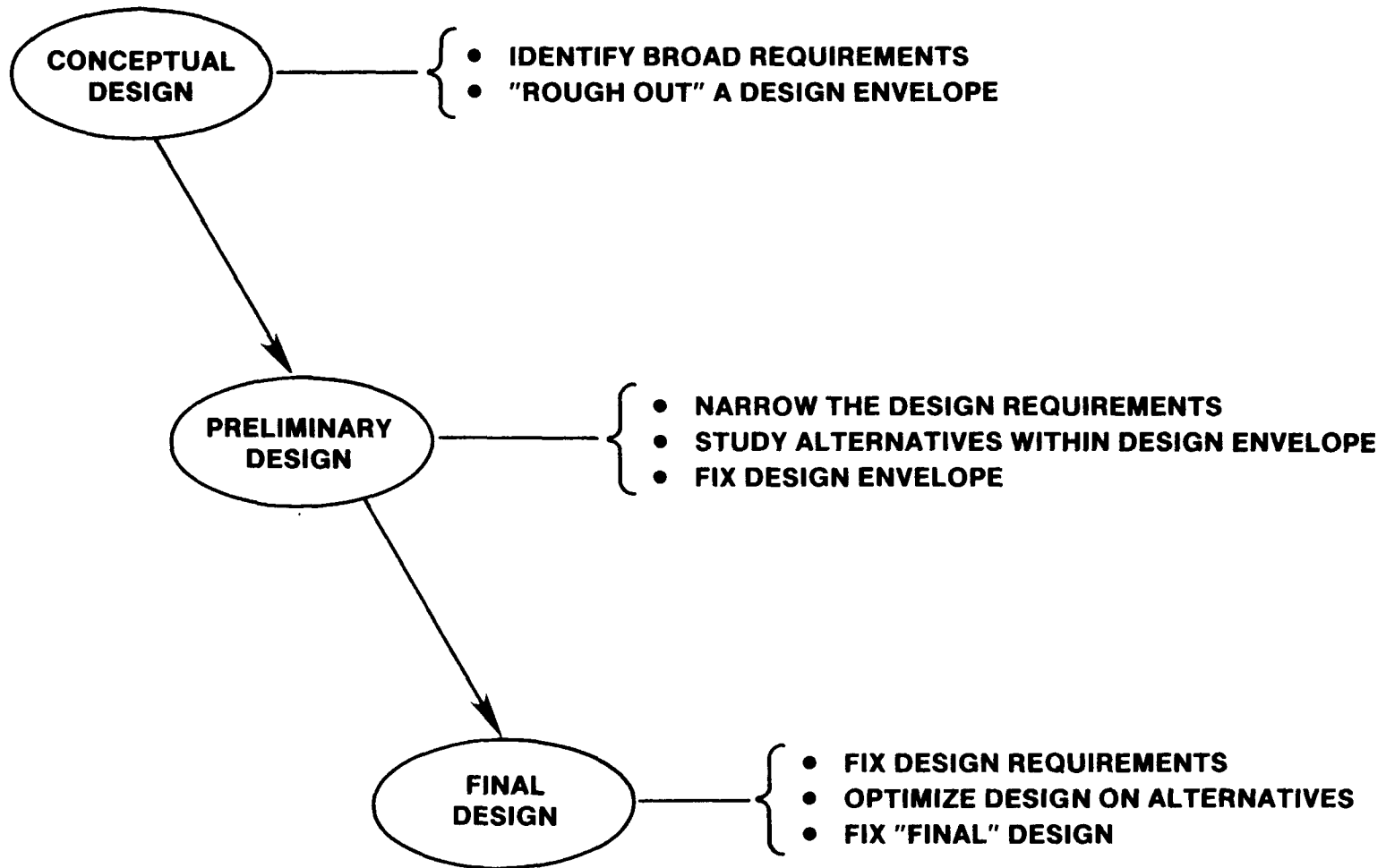
## RAIL/BARGE CASKS

BABCOCK & WILCOX (\$14.9 MILLION)

NUCLEAR ASSURANCE CORPORATION (\$9 MILLION)

NUCLEAR PACKAGING, INCORPORATED (\$13.6 MILLION)

# THE DESIGN PROCESS



# LEGAL WEIGHT TRUCK CASKS

|                                 | GA  | W                                   |
|---------------------------------|---|-------------------------------------|
| <b>CAPACITY/<br/>ASSEMBLIES</b> | 4PWR<br>9BWR  | 3PWR<br>7BWR                        |
| <b>SHAPE</b>                    | SQUARE<br>CAVITY  | CYLINDRICAL                         |
| <b>MATERIALS</b>                | STAINLESS<br>STEEL/DEPLETED<br>URANIUM                                  | TITANIUM ALLOY/<br>DEPLETED URANIUM |
| <b>SPECIAL</b>                  | ALUMINUM<br>HONEYCOMB<br>IMPACT<br>LIMITERS<br>2 CASKS:<br>1 PWR, 1 BWR | TOROIDAL<br>IMPACT<br>LIMITERS      |

**PWR = PRESSURIZED WATER REACTOR**  
**BWR = BOILING WATER REACTOR**

# RAIL/BARGE CASKS

|                  | <b>NUPACK</b>                   | <b>B &amp; W</b>                                   | <b>NAC</b>                                |
|------------------|---------------------------------|--|---|
| <b>CAPACITY</b>  | <b>21/48</b>                    | <b>24/49</b>                                       | <b>26/52</b>                              |
| <b>SHAPE</b>     | <b>CYLINDRICAL</b>              | <b>CYLINDRICAL</b>                                 | <b>CYLINDRICAL</b>                        |
| <b>MATERIALS</b> | <b>STAINLESS<br/>STEEL/LEAD</b> | <b>STAINLESS<br/>STEEL/LEAD</b>                    | <b>CARBON STEEL/<br/>DEPLETED URANIUM</b> |
| <b>SPECIAL</b>   | <b>THERMAL<br/>DIODE</b>        | <b>BORATED<br/>CONCRETE<br/>NEUTRON<br/>SHIELD</b> | <b>WEDGE<br/>LOCK<br/>CLOSURE</b>         |

## **1988 CASK SYSTEM DEVELOPMENT PROGRAM**

- **FOCUS HAS BEEN ON "FROM-REACTOR" CASK DEVELOPMENT**
- **FIVE CONTRACTS HAVE BEEN SIGNED WITH WESTINGHOUSE, B&W, GA, NUPAC, AND NAC**
- **ALL KICKOFF MEETINGS HELD**
- **ALL START-WORK BRIEFINGS COMPLETED**
- **ALL CONTRACTORS AUTHORIZED TO BEGIN DESIGN**
- **ALL CONTRACTORS QA SURVEYS COMPLETED**
- **ALL CONTRACTORS HAD INITIAL MEETING WITH NRC**

# **CASK SYSTEM TECHNOLOGY DEVELOPMENT**

- **BURN-UP CREDIT**
- **SOURCE TERM**
- **COMPUTER CODE BENCHMARKING**
- **MATERIALS AND COMPONENT DEVELOPMENT**
- **CASK WEEPING**

# BURNUP CREDIT

- **SPENT FUEL IS REMOVED FROM REACTORS BECAUSE OF REDUCED REACTIVITY**
  - **NET DECREASE IN FISSILE MATERIAL**
  - **NET INCREASE IN "POISONS"**
- **CURRENT PRACTICE IN U.S. IS TO BASE CRITICALITY DESIGN ON A FRESH FUEL ASSUMPTION**
- **BURNUP CREDIT IS THE TERM DESCRIBING CRITICALITY DESIGN BASED ON REDUCED REACTIVITY**
- **BURNUP CREDIT COULD RESULT IN INCREASED CASK CAPACITIES**

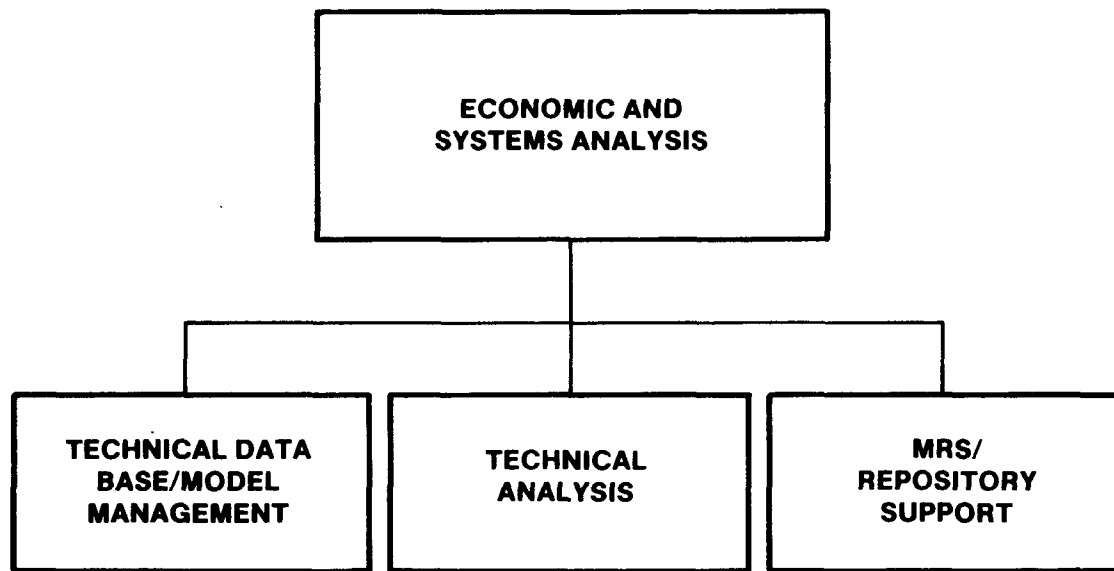


# **OBJECTIVE OF SOURCE TERM PROGRAM**

- **TO DEVELOP A TECHNICALLY DEFENSIBLE STANDARDIZED METHODOLOGY FOR DEMONSTRATING THAT SPENT FUEL TYPE B PACKAGES SATISFY MAXIMUM PERMISSIBLE RELEASE RATES OF 10 CFR 71, I.E., THE A<sub>2</sub>- CRITERION**
- **DEVELOP A CONSISTENT APPROACH FOR DETERMINING THE RELEASIBLE "SOURCE TERM" ASSOCIATED WITH CASK CONTENTS**

# **CASK TESTING TO ULTIMATELY LEAD TO CASK CERTIFICATION**

- **DOE-APPROVED ENGINEERING TESTS**
- **DESIGN VERIFICATION TESTS**
- **ACCEPTANCE TESTS**
- **PERFORMANCE EVALUATION TESTING**
- **FULL-SCALE TESTING (IF DECIDED)**



# **TECHNICAL DATA BASE/MODEL MANAGEMENT**

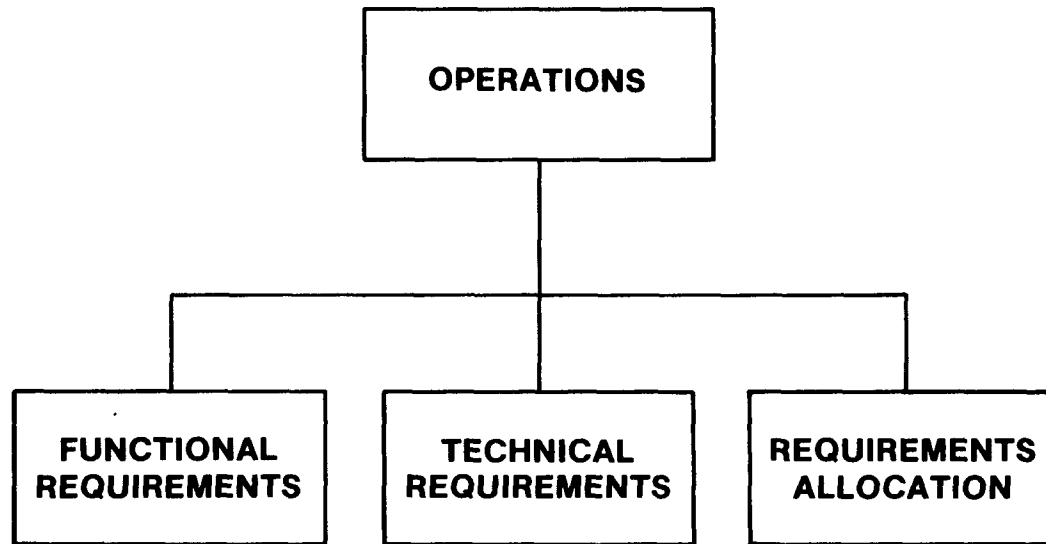
**EXPANDED AND MORE DETAILED DATA ARE BEING COLLECTED TO ENHANCE TRANSPORTATION ANALYSES USING CURRENT, MODIFIED OR NEWLY EMERGING MODELS**

- **DEVELOP DATA BASES**
  - **COLLECTED ACCIDENT RATES FOR RAIL AND ROAD TYPE**
  - **DEVELOPED UNIT COST AND RISK FACTORS FOR NATIONAL TRANSPORTATION NETWORK ANALYSES**
  
- **DEVELOP MODELS**
  - **TRICAM DEVELOPED FOR OPTIMIZATION ANALYSES**
  - **TRANSMAP USED FOR DISPLAY OF SHIPPING ROUTES**
  - **CASKCOM APPLIED TO LIFE CYCLE COSTS ANALYSES**
  - **MODIFYING RADTRAN FOR MORE SPECIFIC ROUTE ANALYSES**
  - **UPDATING AND EXPANDING HIGHWAY AND INTERLINE FOR MODAL ANALYSES**
  
- **UNCERTAINTY ANALYSIS**
  - **PREPARED DRAFT REPORT ON TRANSPORTATION LIFE CYCLE COST UNCERTAINTY BASED ON CASKCOM MODEL**

# TECHNICAL ANALYSIS

**COSTS AND RISKS OF VARIOUS TRANSPORTATION ALTERNATIVES/OPTIONS ARE EVALUATED IN TECHNICAL STUDIES**

- **COST/RISK STUDIES**
  - **PREPARED DRAFT REPORTS ON DEDICATED TRAINS AND TRUCK CONVOYS**
  - **EVALUATED COST/RISK OF DRY STORAGE CASKS AT REACTORS**
  - **PREPARED DRAFT REPORT ON RAIL ACCIDENTS/TRACK CLASS RELATIONSHIP**
  
- **SPECIAL STUDIES**
  - **HUMAN FACTORS EFFECTS ON OPERATIONAL SAFETY**
  - **NEAR-SITE INFRASTRUCTURE STUDY COMPLETED (PHASE I)**
  - **INITIATED PHASE II INFRASTRUCTURE STUDY**



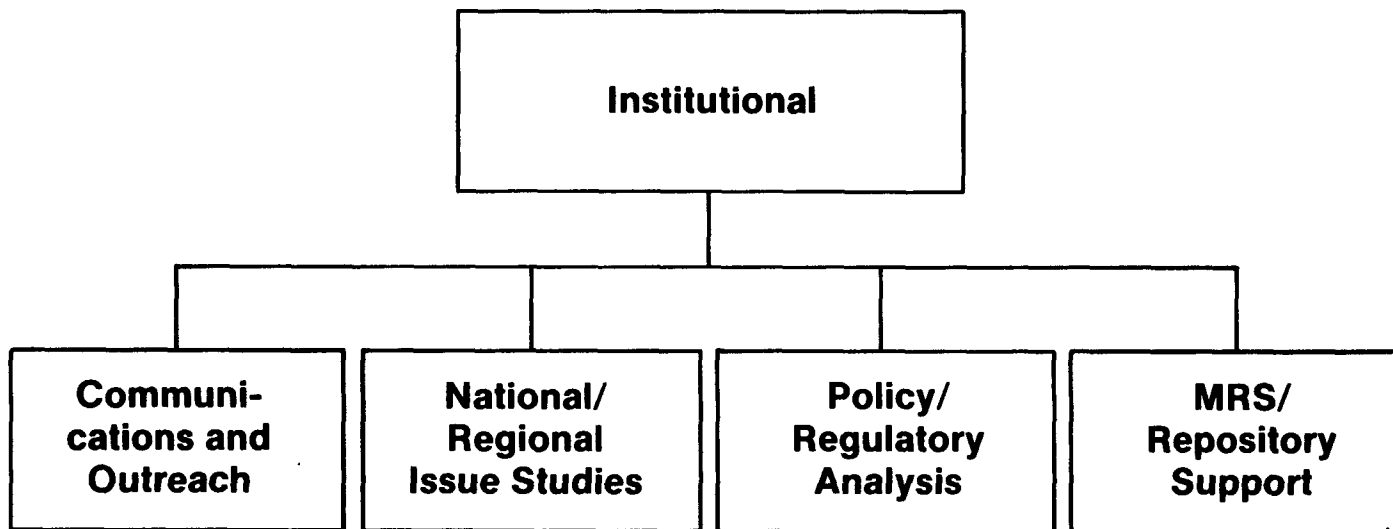
# **OPERATIONS**

## **IN FY 1988, PROVIDED**

- DRAFT OPERATION PLANS FOR BOTH TRUCK AND RAIL SHIPMENTS**
- DRAFT OPERATIONS READINESS REVIEW PLAN FOR WEST VALLEY DEMONSTRATION PROJECT SHIPMENT CAMPAIGN**
- DRAFT OPERATIONS SECTION OF TRANSPORTATION PLAN**

## **IN FY 1989, IN GENERAL, EFFORTS WILL BE LIMITED**

- SUPPORTING DEVELOPMENT OF TRANSPORTATION PLAN AS NEEDED**
- LIMITED SYSTEMS INTEGRATION ACTIVITIES**
- SUPPORT OF OCRWM SHIPMENTS AS FUNDED**





# **OCRWM TRANSPORTATION INSTITUTIONAL ACTIVITIES POLICY AND REGULATORY ANALYSIS**

- **PREPARE SPECIAL STUDIES:**
  - **SPENT FUEL SHIPPING CAMPAIGN STUDY**
  - **INSPECTION PROCEDURES AND PILOT STUDY WITH CVSA**
  
- **MONITORING AND SUMMARIZE LEGAL AND REGULATORY DEVELOPMENTS**
  
- **MANAGE THE TRANSPORTATION LEGISLATIVE DATABASE (TLDB)**

## **1989 COOPERATIVE AGREEMENTS BETWEEN OCRWM TRANSPORTATION BRANCH AND SEVERAL NATIONAL AND REGIONAL GROUPS**

- **SOUTHERN STATES' ENERGY BOARD (SSEB)**
- **WESTERN INTERSTATE ENERGY BOARD (WIEB)**
- **MID-WEST OFFICE OF THE COUNCIL OF STATE GOVERNMENTS (COSG)**
- **NATIONAL CONGRESS OF AMERICAN INDIANS (NCAI)**
- **NATIONAL CONFERENCE OF STATE LEGISLATURES (NCSL)**
- **COMMERCIAL VEHICLE SAFETY ALLIANCE (CVSA)**
- **COUNCIL OF RADIATION CONTROL PROGRAM DIRECTORS (CRCPD)**
- **AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)**

## **NATIONAL AND REGIONAL GROUPS WORK WITH OCRWM TO RESOLVE MAJOR TRANSPORTATION INSTITUTIONAL ISSUES**

- **EMERGENCY RESPONSE  
(SSEB, WIEB, COSG)**
- **INSPECTION AND ENFORCEMENT  
(CVSA, CRCPD)**
- **OVERWEIGHT TRUCK SHIPMENTS  
(AASHTO)**
- **HIGHWAY ROUTING (WIEB, SSEB)**
- **RAIL AND BARGE ROUTING (SSEB)**
- **MIX OF TRANSPORTATION MODES  
(WIEB)**
- **INFRASTRUCTURE IMPROVEMENTS  
(SSEB, AASHTO)**
- **STATE, TRIBAL, AND LOCAL  
REGULATIONS (NCAI, NCSL)**

# **OCRWM TRANSPORTATION INSTITUTIONAL ACTIVITIES POLICY AND REGULATORY ANALYSIS**

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# GENERAL SCHEDULE FOR TRANSPORTATION ACTIVITIES

## 1989

- **COMPLETION OF PRELIMINARY "FROM-REACTOR" CASK DESIGNS**
- **STUDY OF TECHNICAL CASK-DESIGN ISSUES**
- **ISSUANCE OF TRANSPORTATION DOCUMENTS**
- **CONDUCT SYSTEM STUDIES**
- **REVIEW MODIFICATIONS TO RISK METHODOLOGIES**

## 1990

- **REVIEW PROGRESS ON OWT UNIFORM PERMIT**
- **DECISION ON USE OF OWT**
- **COMPLETE FINAL DESIGN OF "FROM REACTOR" CASKS**
- **DEVELOP & RELEASE STRATEGY FOR ASSESSING TRAINING-ASSISTANCE REQUIREMENTS**

# **GENERAL SCHEDULE FOR TRANSPORTATION ACTIVITIES (CONT.)**

## **1991-1997**

- **COMPLETE TRANSPORTATION STUDIES FOR EIS**
- **SUBMIT SAFETY ANALYSIS REPORTS TO NRC FOR CASK DESIGNS (FROM-REACTOR)**
- **DETERMINE NEEDS FOR MRS CASKS, SPECIALTY CASKS, DEFENSE-WASTE CASKS AND INITIATE DEVELOPMENT, IF APPROPRIATE**
- **DETERMINE PREFERRED OPTION FOR MANAGING TRANSPORT OPERATIONS**
- **FINALIZE PLANS FOR TRAINING ASSISTANCE**
- **INITIATE EQUIPMENT ACQUISITION**

# **GENERAL SCHEDULE FOR TRANSPORTATION ACTIVITIES (CONT.)**

## **1998-2002**

- **DRAFT OPERATIONAL PROCEDURES**
- **DEVELOP LIMITED SHIPPING CAPABILITY, IF NEEDED**
- **IDENTIFY MODAL MIX**
- **IDENTIFY POTENTIAL ROUTES FOR EMERGENCY PREPAREDNESS PURPOSES**
- **BEGIN PROVIDING TRAINING ASSISTANCE**
- **ISSUE CASK-FLEET CONTRACT**

## **2003**

- **INITIATE OPERATIONS**