



***Spent Fuel Transports in the U.S. - What are
the Challenges Ahead?***

Ian Hunter, COGEMA, Inc.

INMM Spent Fuel Seminar, Washington DC, January 2004

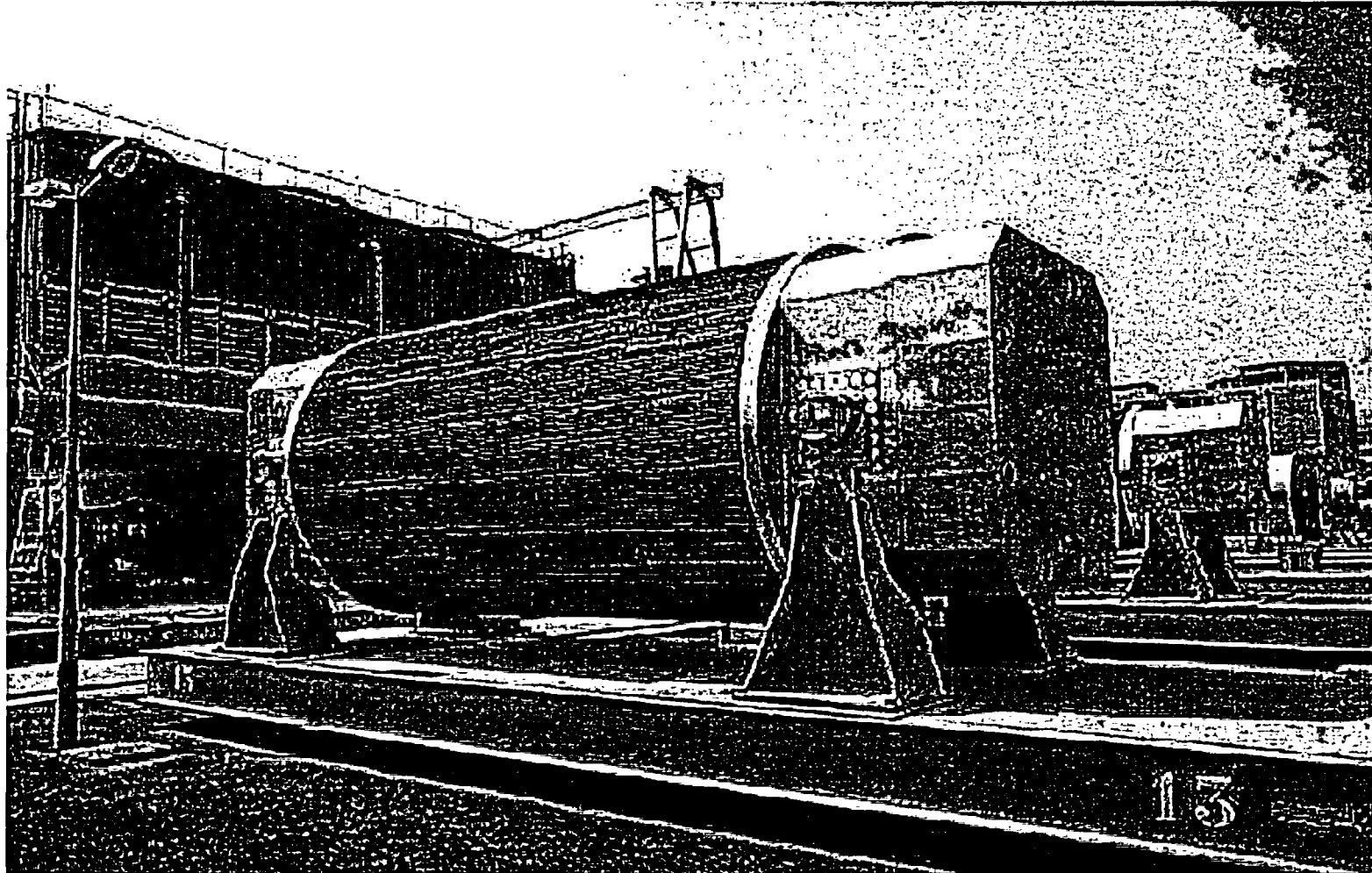
- ▶ Existing dry storage at Utilities sites
 - ◆ Hundreds of casks loaded
 - ◆ No universal cask solution
- ▶ Some casks are dual-purpose, ready for shipment
- ▶ There is no experience in the US in transporting thousands of MTHM per year of commercial spent fuel
- ▶ 50 states, many of them to cross from the Utilities sites to Yucca Mountain, with different regulations
- ▶ Homeland Security will make it even more complex

- ▶ **Two points of view and two players: the Utilities and the DOE.**
 - ◆ **Utilities need:**
 - Casks for storage (and pending authorizations),
 - No fuel pool perturbation.
 - ◆ **DOE needs:**
 - To take into account an existing dry storage casks fleet.
 - To acquire licensed casks for transport,
 - Management systems (logistics up to 3000 MTHM to transport per year),
- ▶ **One day, transporting 3,000 MTHM/y will be routine**

- ▶ **More than 3 decades of safe spent fuel transportation**
- ▶ **Comprehensive experience in all aspects of transportation**
- ▶ **A well established US presence**
 - ◆ **Transnuclear, Inc. was formed in 1965 specifically for spent fuel transport**

- ▶ **More than 50 heavy casks designed for spent fuel / HLW**
- ▶ **TN casks used worldwide**
 - ◆ **US**
 - ◆ **Europe**
 - ◆ **Japan**
- ▶ **Access to the best engineering resources**
- ▶ **A strong commitment to R&D**

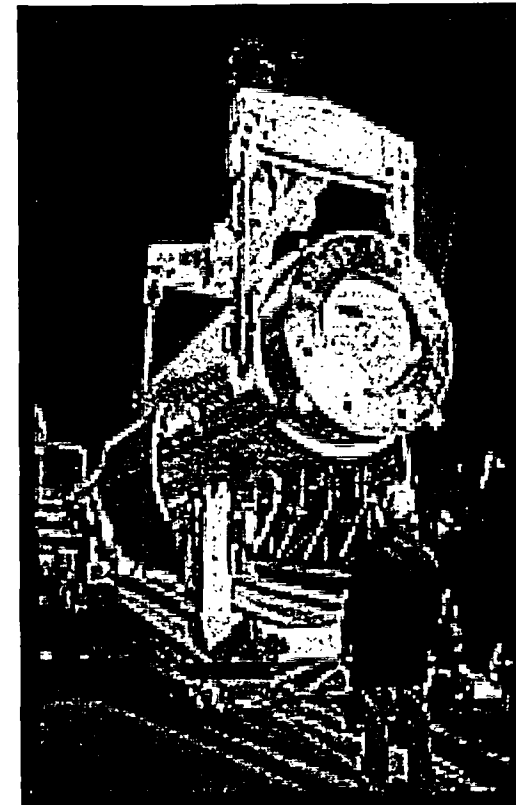
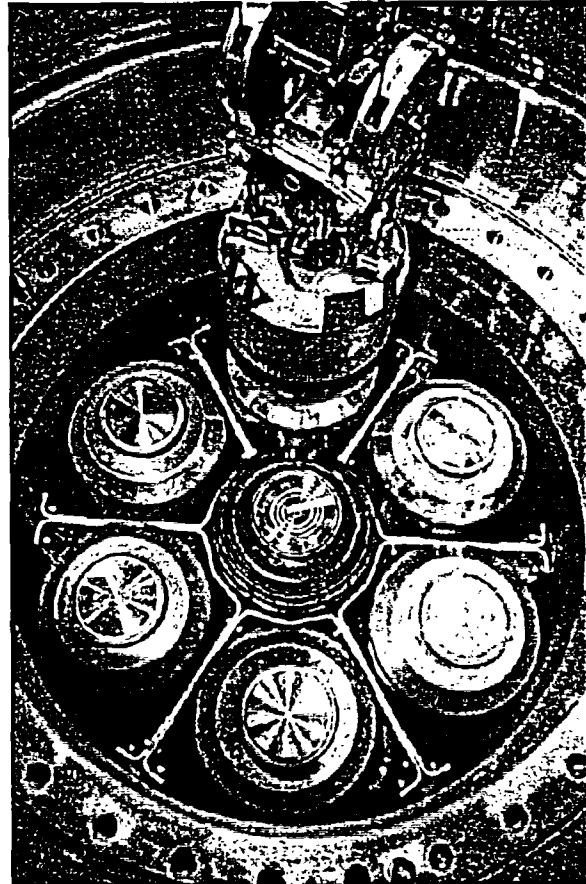
TN 12 SPENT FUEL CASK



HIGH LEVEL WASTE CASKS

- ▶ Vitrified residues (HLW) are transported in heavy casks
- ▶ Up to 28 HLW canisters per cask

HLW Cask
Loading
Operations



TN 28 V HLW
CASK

- ▶ **Foreign research reactor fuel to Savannah River and Idaho, more than 250 shipments**
- ▶ **TN 9 shipments (1980's)**
 - ◆ **Dresden fuel to West Valley**
 - ◆ **Oyster Creek fuel to West Valley**
- ▶ **TN 8 shipments**

PWR fuel shipped from Oconee to McGuire
- ▶ **Numerous PIE shipments**

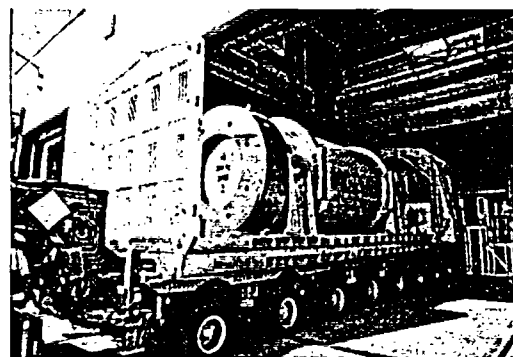
US TRANSPORT EXPERIENCE



- ▶ Arranges worldwide transportation of nuclear material
 - ◆ Obtain Export Licenses, Package Validations, permits
 - ◆ Interface with origin/destination facilities
 - Assist/prepare paper paperwork as required
 - Assist in package selection and
 - Proper Labeling/Placarding/Marking
 - ◆ Schedule deliveries
 - ◆ Act as shipper from seaport or airport
 - ◆ Interface with carriers (Motor freight, Railroads, Airlines, Steamship lines)
 - ◆ Interface with Regulatory Authorities

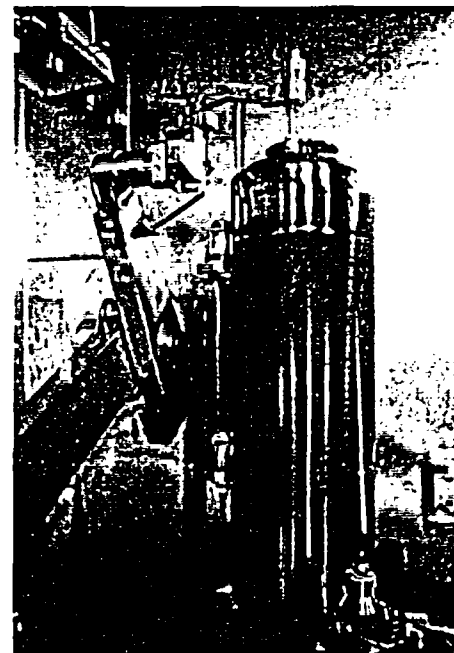
▶ The COGEMA group has safely transported LWR Spent Fuel from world-wide customers:

◆ 30 000 MTHM over 30 years



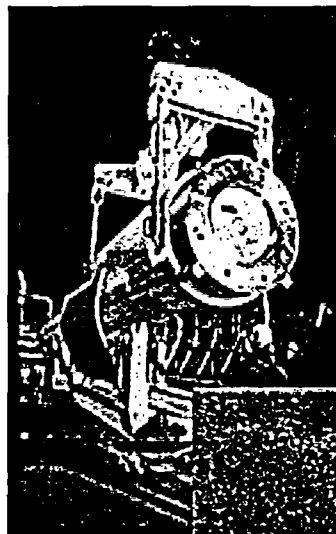
▶ Transportation of Vitrified Residues Canisters (HLW):

◆ 900 tons of HLW (1800 canisters)

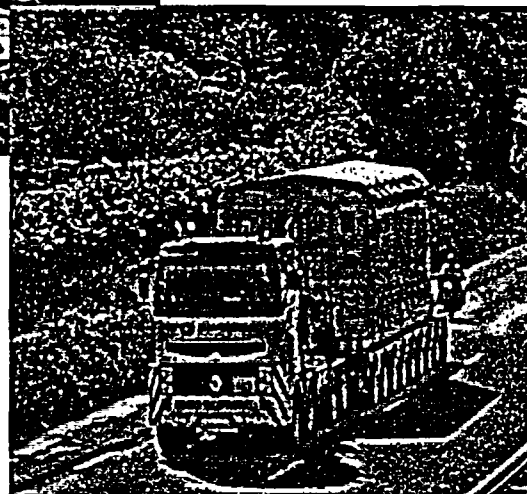


CASK FLEET MANAGEMENT

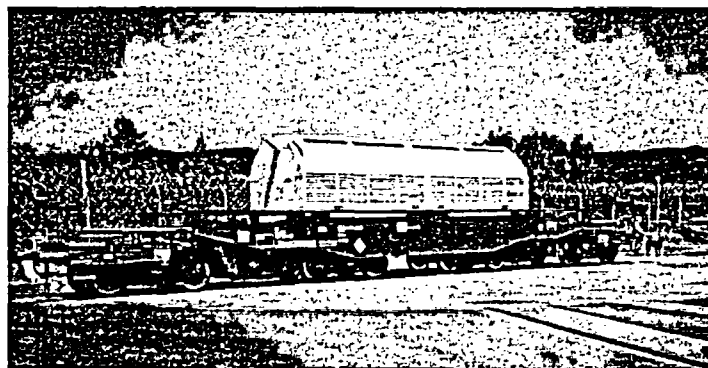
▶ 50 Heavy Transport Casks

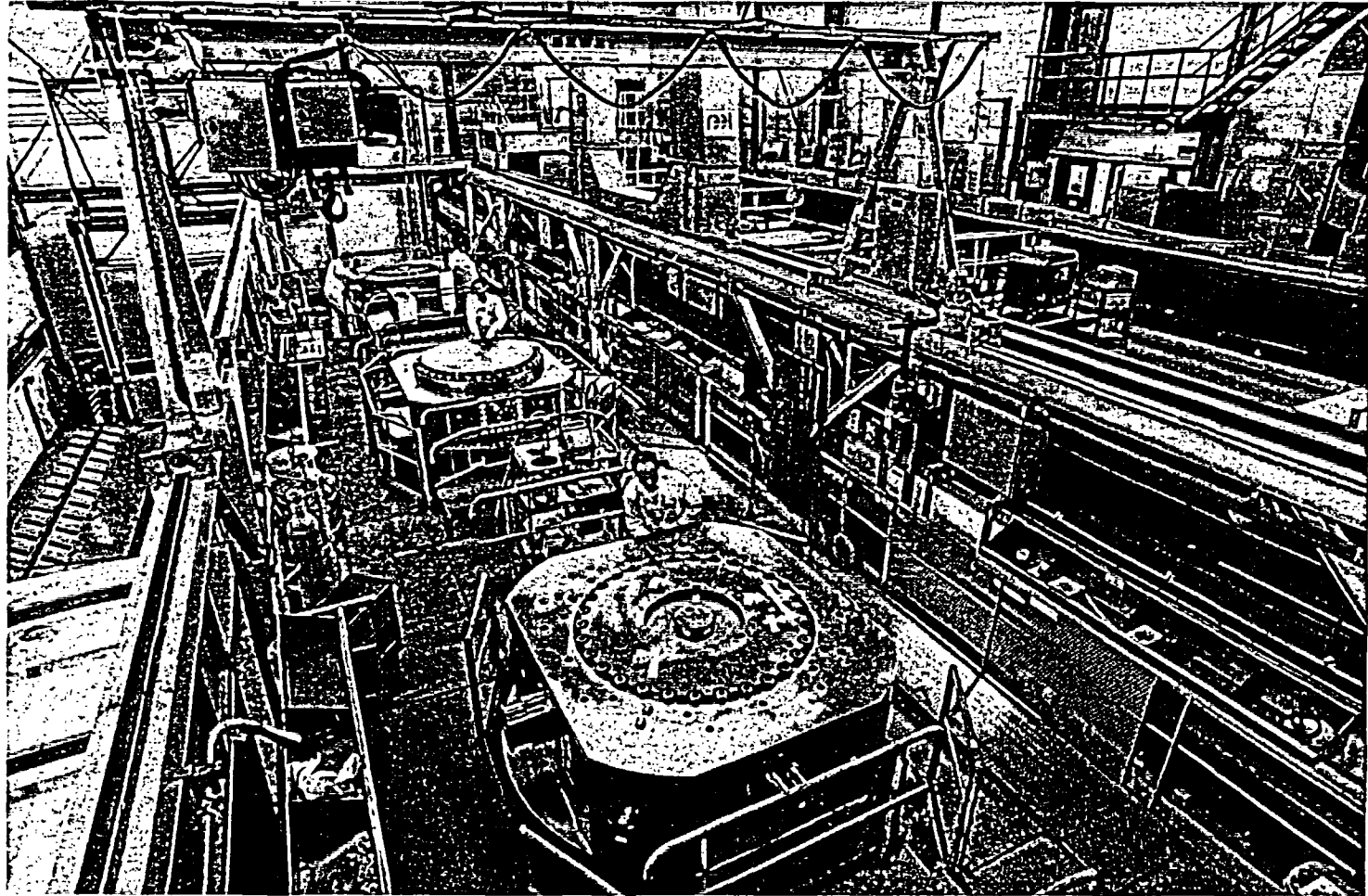


▶ 10 Special Heavy Haul Trailers



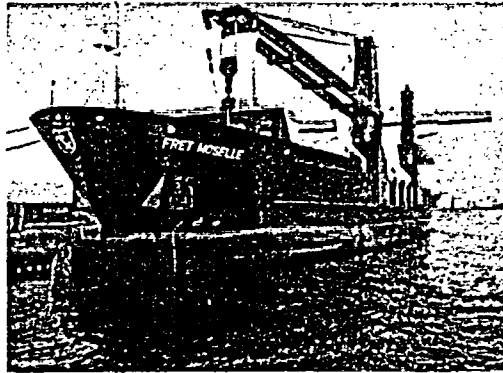
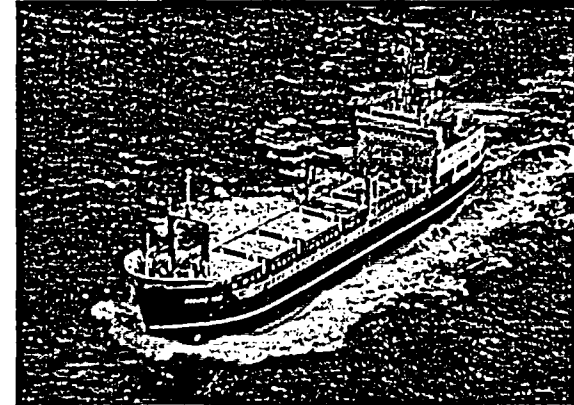
▶ 30 Dedicated Railcars





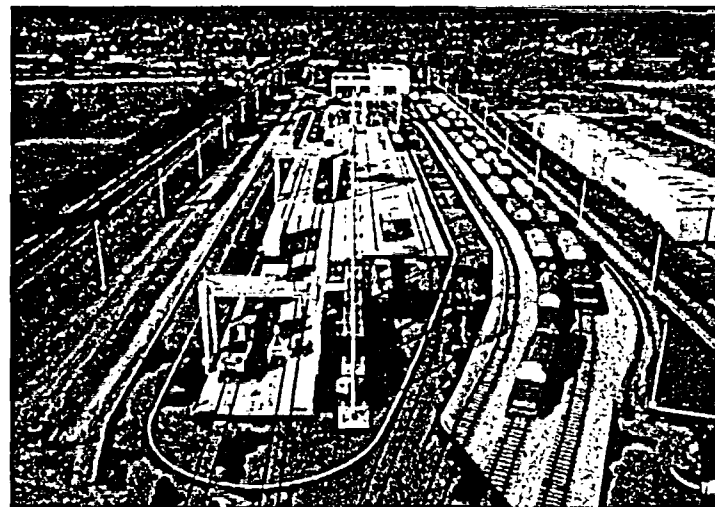
- ▶ **Planning of multiple shipments**
- ▶ **Regular and dedicated trains**
- ▶ **Convoy arrangements**
- ▶ **Multimodal transports**

MULTI MODAL TRANSPORTS

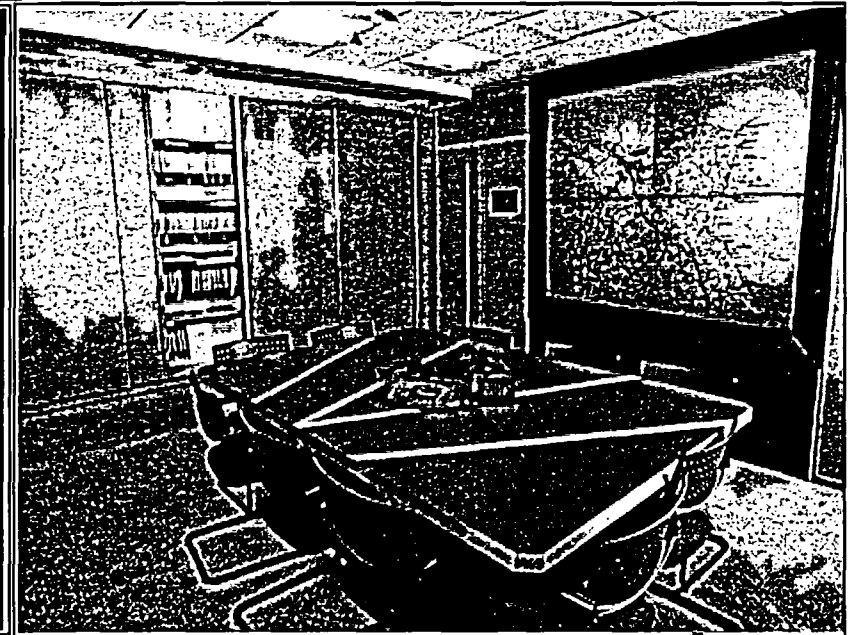
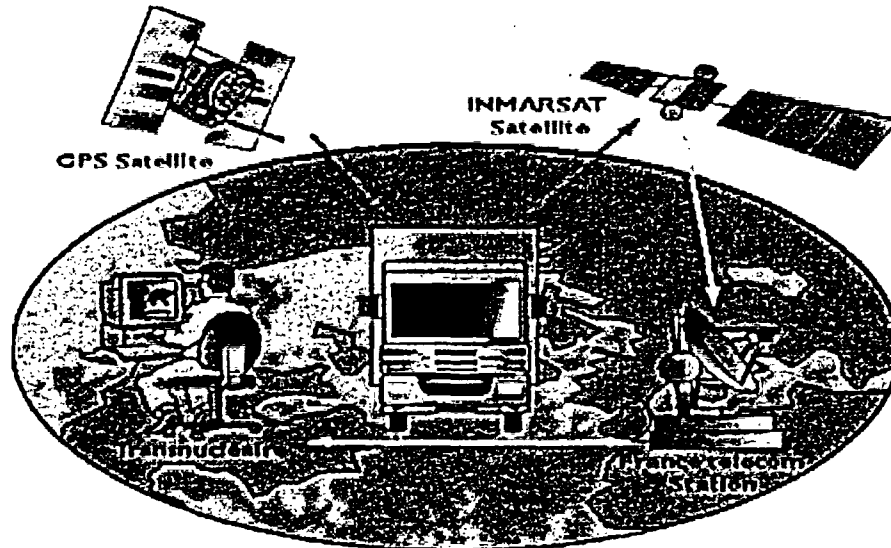


RAIL/TRUCK TRANSFER STATION

- ▶ The Valognes terminal. The world's biggest facility dedicated to the transfer of casks from rail to truck.



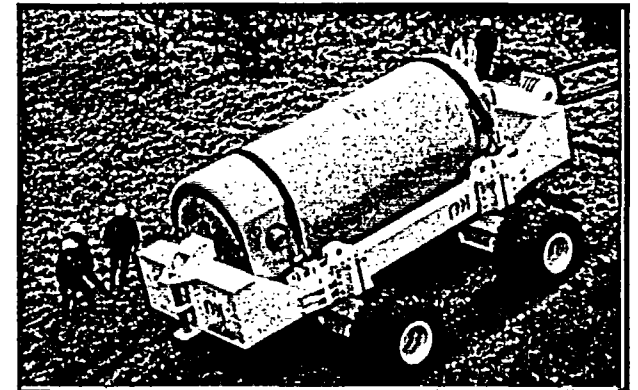
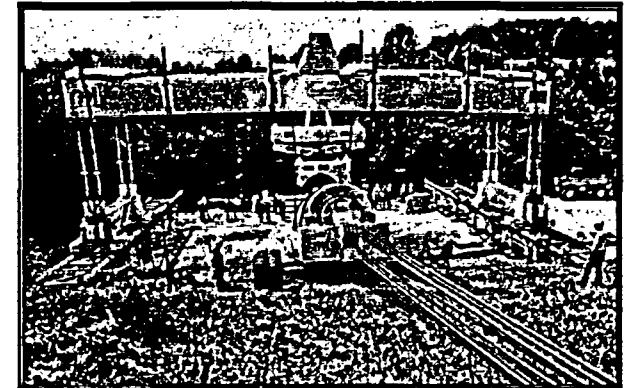
REAL TIME TRACKING, CONTINGENCY PLANS



BEING PREPARED FOR EMERGENCIES

- ▶ **Expertise in emergency response plan**
 - ◆ Provide requirements and guidelines in the event on off-normal event or emergency
 - ◆ Heavy load recovery system
 - ◆ Address co-ordination with on-scene response personal, notifications with authorities (local, central, international jurisdictions), media communication.

- ▶ **Expertise in security measures**
 - ◆ Provide guidelines and requirements for establishing, acquiring, maintaining and integrating physical security
 - (organisation, threat assessment, staffing, security procedures, security communication, training)

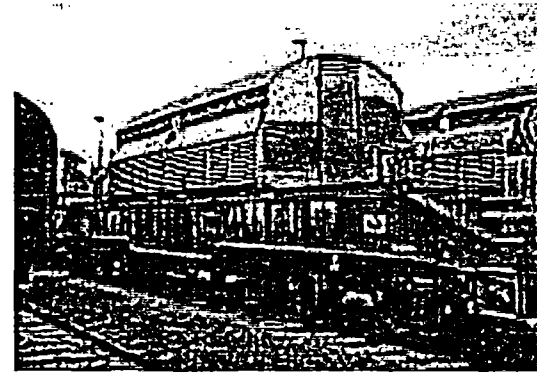
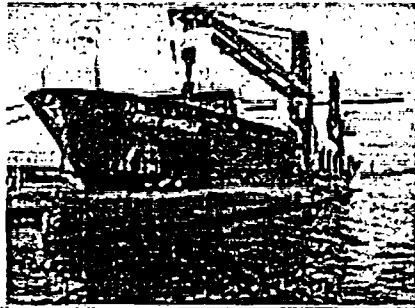


- ▶ **International experience in dealing with opposition groups**
- ▶ **A database of Q&A**
- ▶ **Experienced lobbyists**
- ▶ **Trained media staff**

ON THE MOVE: OVER 1000 TRANSPORTS/YEAR

► Expertise in multi-modal transportation

◆ (Sea, air, road, rail)

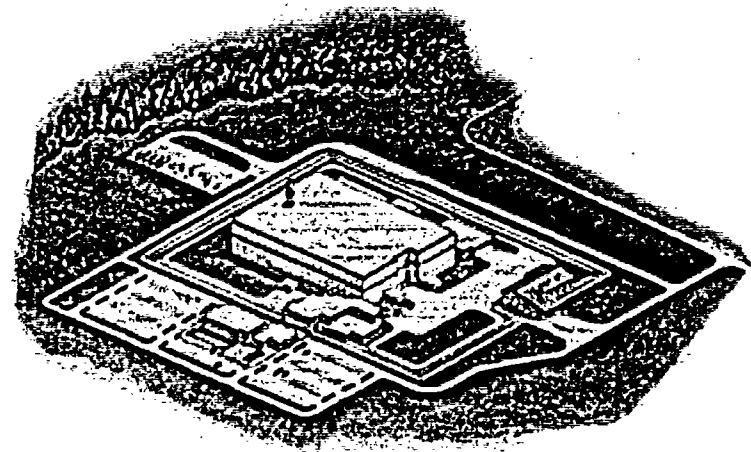


Nb of annual transports	1999	2000	2001	2002
French spent fuel	157	191	145	185
European spent fuel	9	12	44	61
Vitrified waste (incl. Japan)	6	11	20	22
PuO2 and MOX (incl. Japan)	150	149	187	175
Low Level Waste	643	684	757	700
Total	965	1047	1153	1143

- ▶ Working with DOE on the MOX Project
- ▶ Working with DOE and BSC on Surface facilities at Yucca Mountain
- ▶ Premier supplier of dry storage solutions to commercial sector

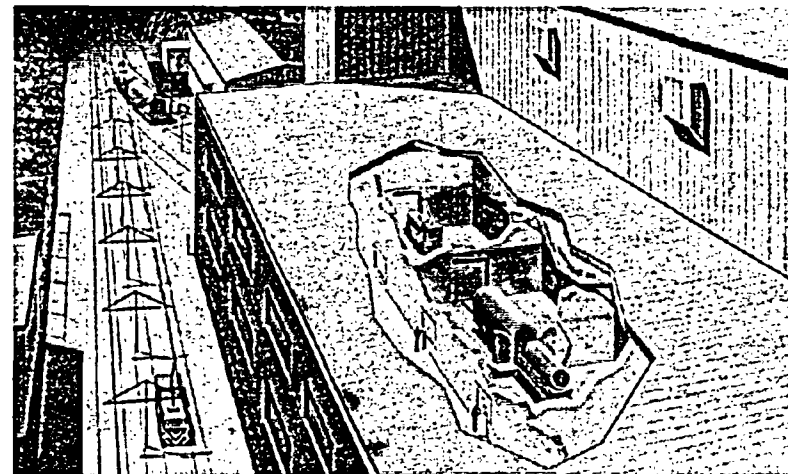
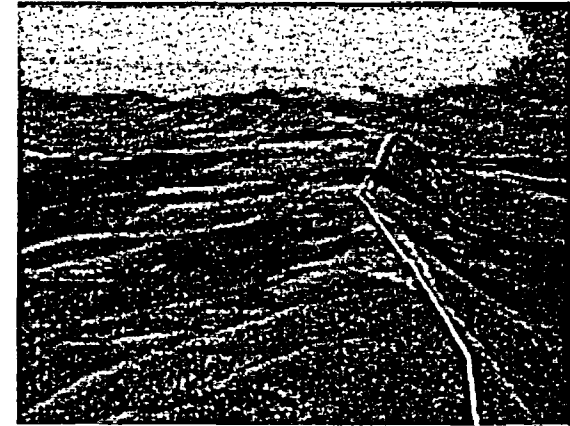
MOX FUEL FABRICATION FACILITY

- ▶ **COGEMA is a partner with Duke Energy and Stone & Webster in the DOE MOX project**
- ▶ **COGEMA is designing packaging for the MOX assemblies and assisting DOE with the transport.**



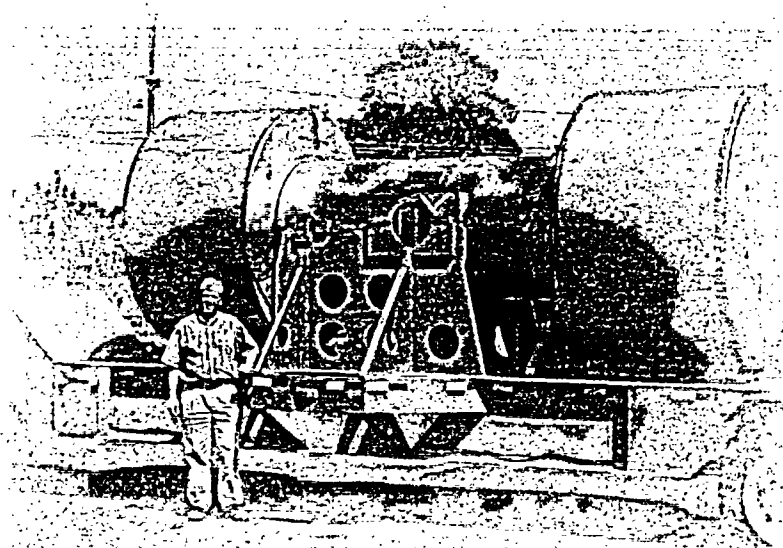
MOX Fuel Fabrication Facility

- ▶ **COGEMA, Inc. is under contract to BSC to design mechanical equipment for the Yucca Mountain receipt facilities.**



DOE- WIPP Package for Remote Handled TRU

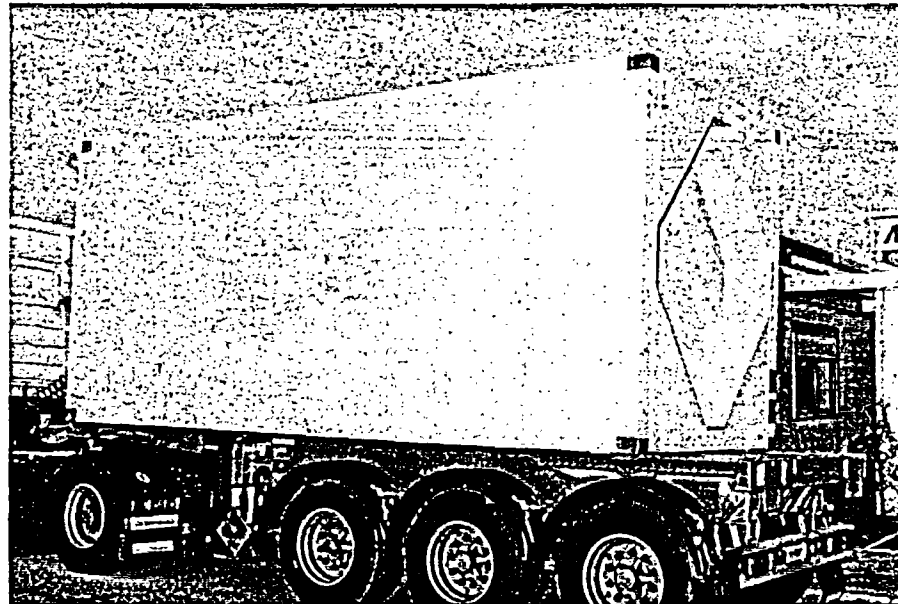
- ▶ PacTec, has taken the RH 72B Transportation Cask from initial conceptual design and licensing, initiated in '97, through production of the first six packages



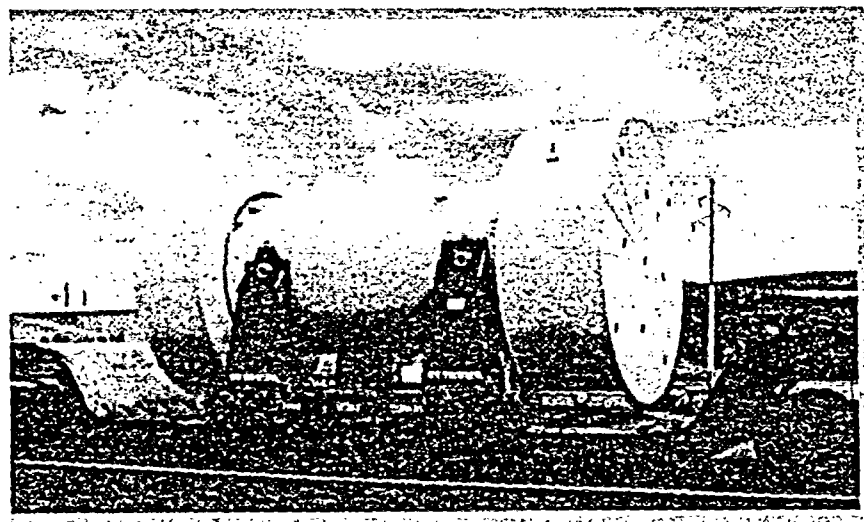
We deliver solutions to some of DOE's biggest problems

TN Gemini US is TRUPACT-III

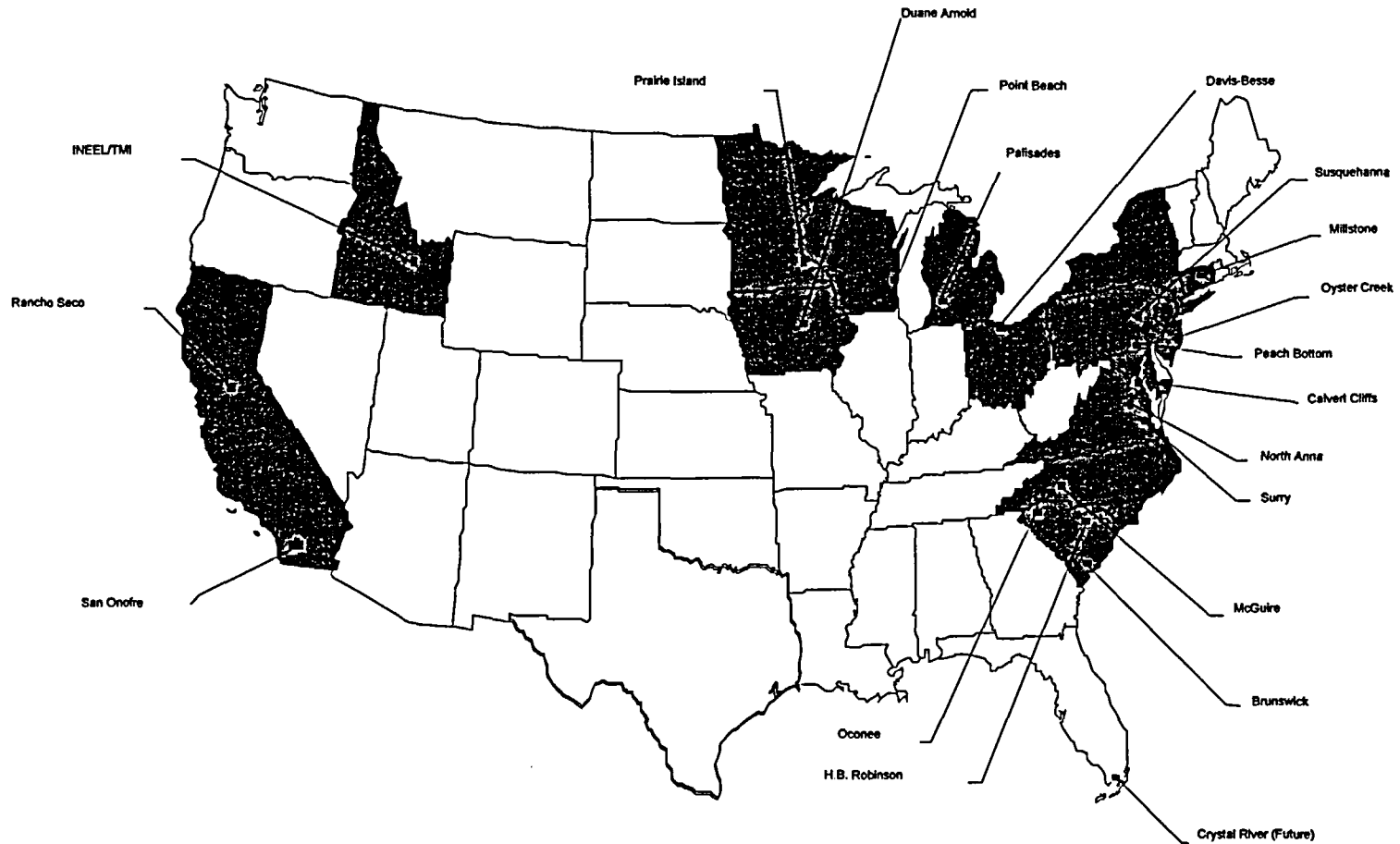
- ▶ **PacTec is developing TRUPACT-III for DOE/WTS, based on the TN Gemini.**



- ▶ TN supplied DOE casks for West Valley shipments



TN DRY STORAGE SERVING TWENTY ISFSI LOCATIONS

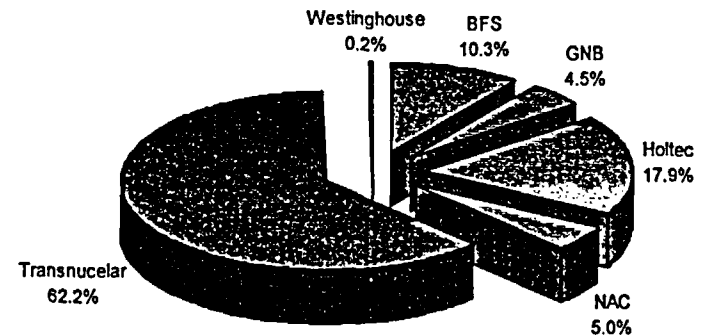


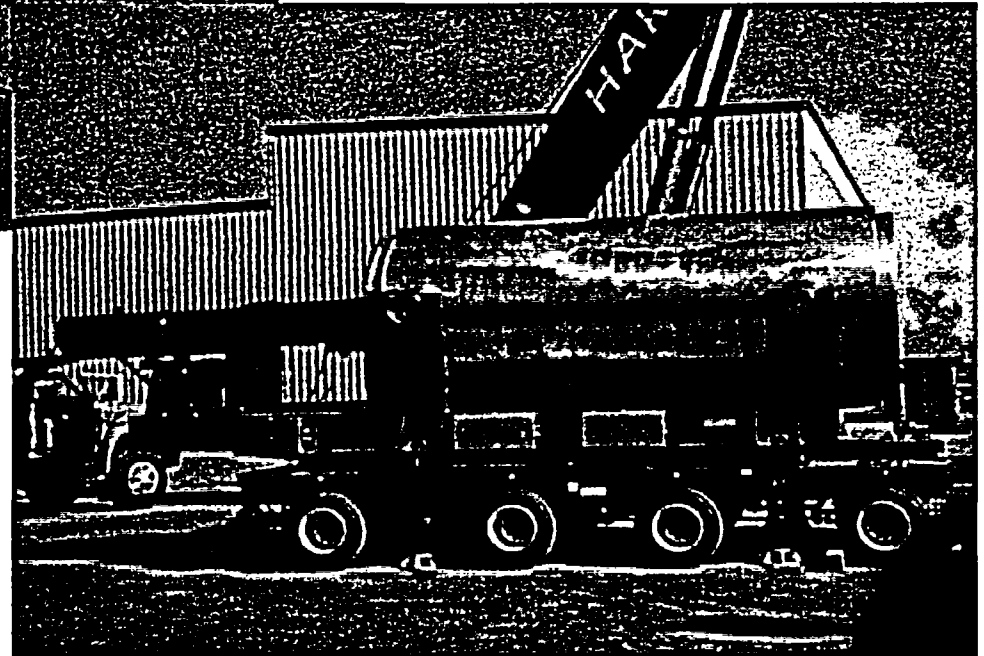
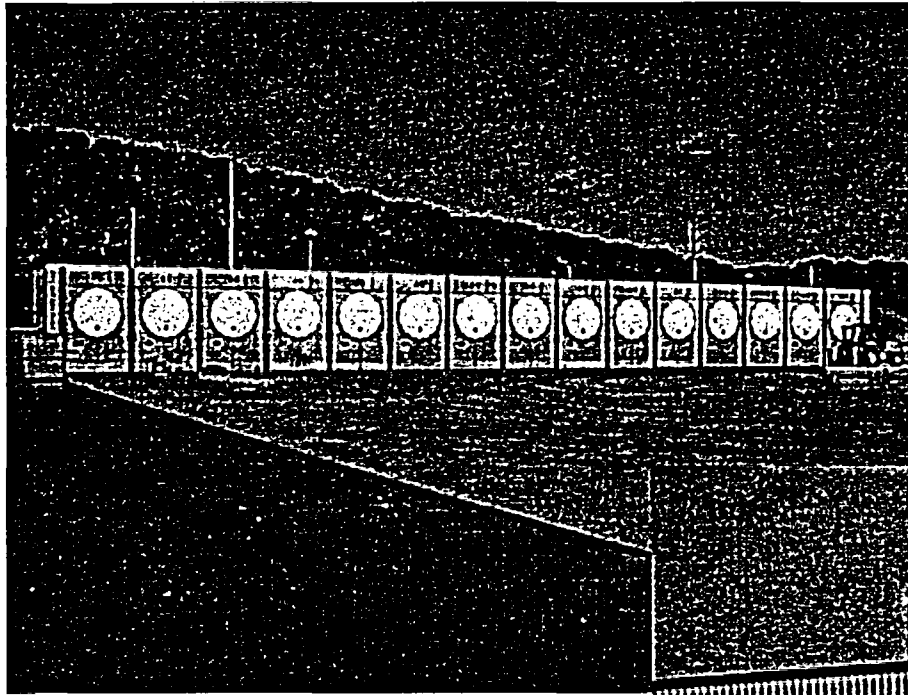
US DRY STORAGE CUSTOMERS

	ISFSI	Model	Loaded	
			Casks	SFA
NUHOMS®	Brunswick	61BT	—	—
	Calvert Cliffs	24P	40	960
	Crystal River	32PT	—	—
	Davis-Besse	24P	3	72
	Duane Arnold	61BT	10	610
	INEEL/TMI-2	12T	29	177
	Millstone	32PT	—	—
	North Anna	32PTH	—	—
		24PTH	—	—
	Oconee	24P	78	1872
	Oyster Creek	61BT	8	488
	Palisades	32PT	—	—
	Point Beach	32PT	—	—
	Rancho Seco	MP187	21	493
		24PTH	—	—
	Robinson	7P	8	56
		24PT1	5	120
	SONGS	24PT4	—	—
	Surry	32PTH	—	—
		52B	25	1300
	61BT	—	—	
TN Cask	McGuire	TN-32	10	320
	North Anna	TN-32	19	608
	Peach Bottom	TN68	20	1360
	Prairie Island	TN-40	17	680
	Surry	TN32	20	640
	Total		313	9756

9700 of the approximately 13,000 SFAs in dry storage are stored in TN systems

Total Fuel Stored By Vendor

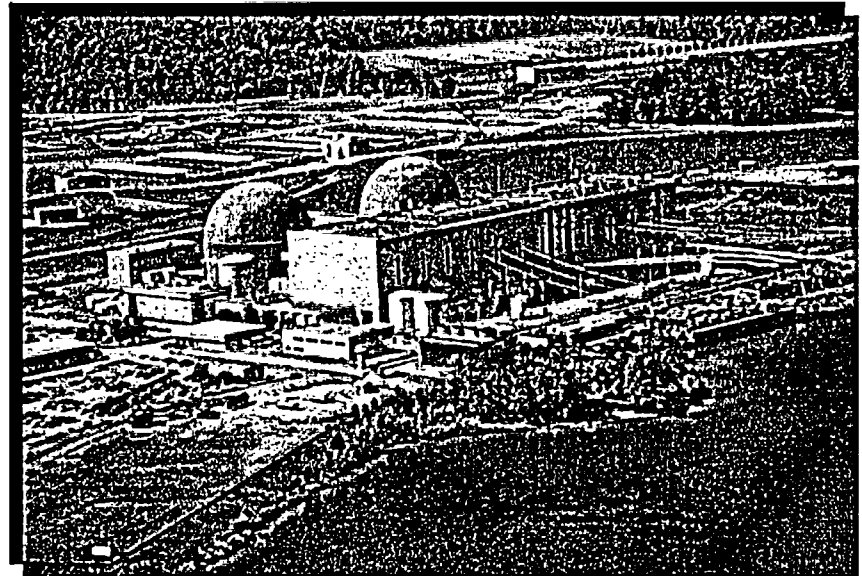
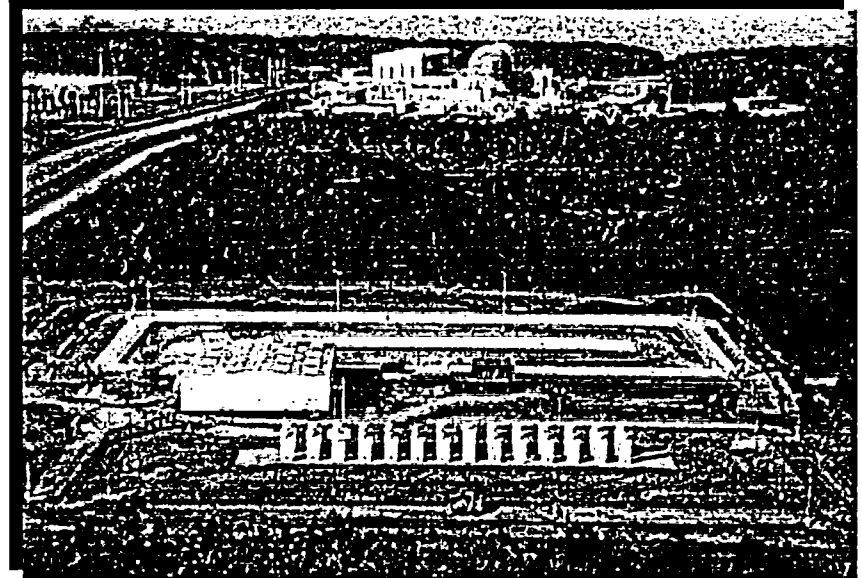




SURRY AND NORTH ANNA TN 32 CASKS

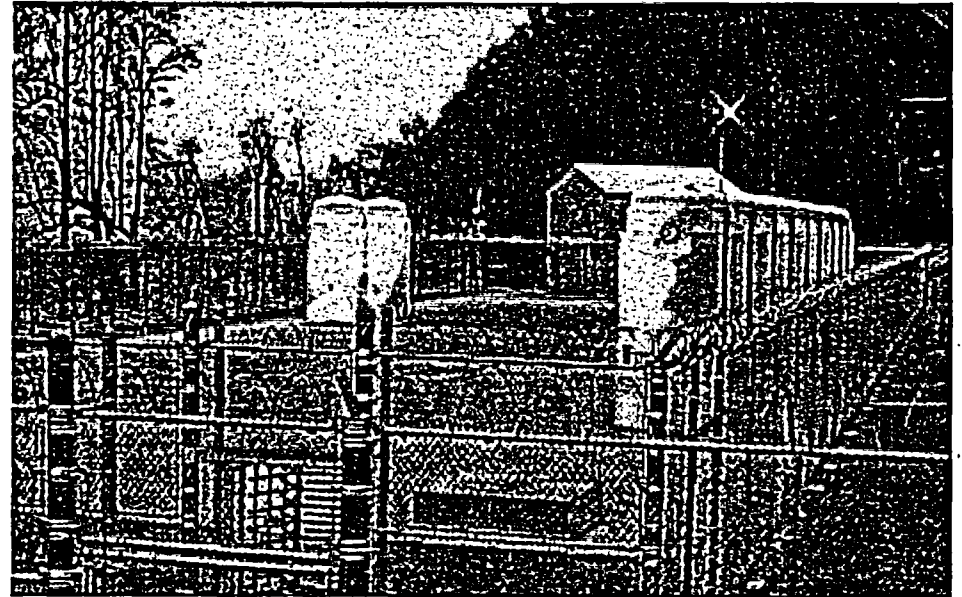
▶ **Site Specific license**

- ◆ **First TN 32 loaded in 1996**
- ◆ **16 casks loaded at Surry**
- ◆ **15 casks loaded at North Anna**
- ◆ **53 casks ordered**

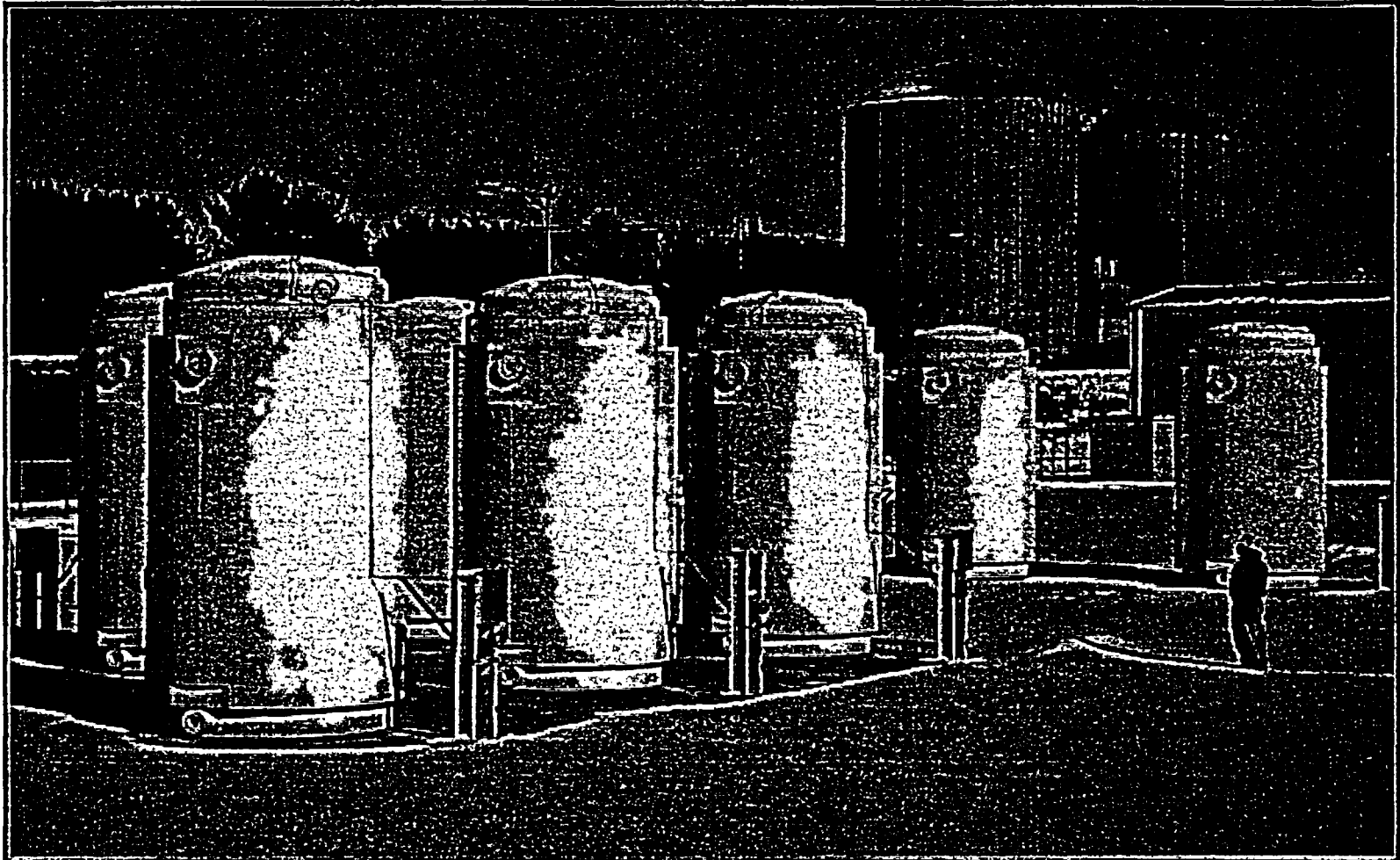


TN 68 CASKS - PEACH BOTTOM

- ▶ **Dual Purpose BWR casks
(Part 71 & Part 72 licensed)**
- ▶ **40 on order**
- ▶ **20 delivered and loaded**
- ▶ **Ready to ship to Yucca
Mountain**



TN 40 CASKS AT PRAIRIE ISLAND

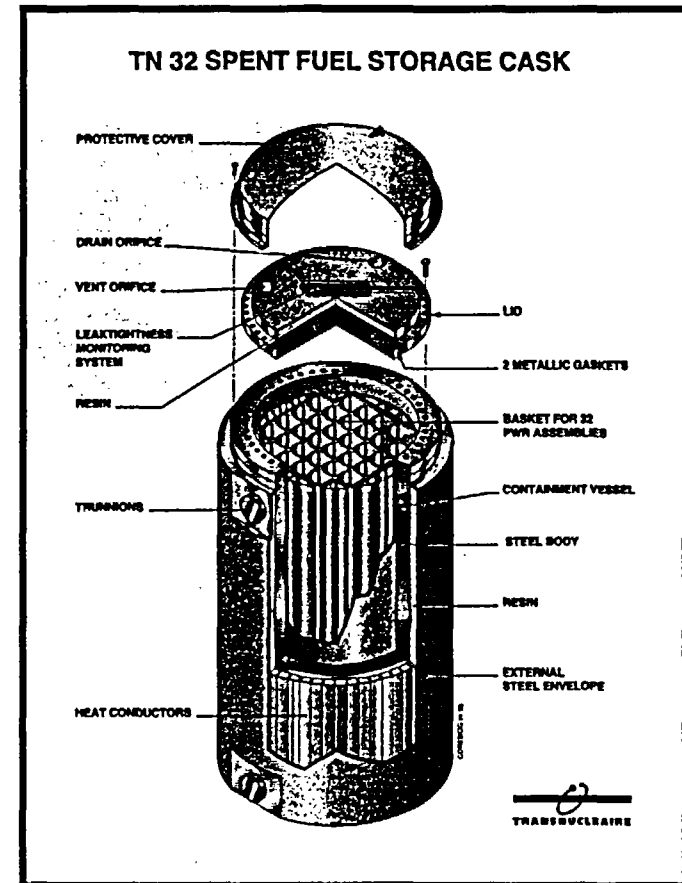


TN R&D PROGRAM

- ▶ **Uprate the TN 68 for Higher Burnup**
- ▶ **A high Burn up, dual purpose TN 32 cask**
- ▶ **A modern LWT cask**

TN 32 HIGH BURN UP CASK

- ▶ Dual purpose, 32 PWR
- ▶ Improved performance
 - ◆ Burn up 60,000 MWd/t(U)
 - ◆ Enrichment 5.0%
 - ◆ 7 years minimum cooling
 - ◆ Up to 45 KW loadings
 - ◆ Uses standard TN 32 equipment
- ▶ SAR in preparation
- ▶ First cask could be ready for use in 2006



What Can We Offer to the US Market?

- ▶ **Licensed Dual Purpose Casks**
- ▶ **A commitment to continually develop casks to meet market needs**
- ▶ **Detailed knowledge of the US commercial reactors**
 - ◆ **Site interfaces**
 - ◆ **Fuel data**
 - ◆ **Local licensing issues**

- ▶ **We have the technology and the experience**
- ▶ **Although conditions in Europe and Asia are not equal to the US, we've had to deal with all types of issues that the US will have to address**

Path Forward to Meet the Needs of the Industry

- ▶ **Develop a safe Transportation System which:**
 - ◆ Meets regulatory requirements
 - ◆ Meets interfaces well with the Utilities
 - ◆ Meets operational needs (low exposure dose to workers, ...)
 - ◆ Meets interfaces with the receipt facilities at Yucca Mountain
 - ◆ Respects the acceptance criteria of DOE

- ▶ **Access to 30 years experience in transportation methods developed in the US and worldwide is available in:**
 - ◆ Cask Design and Manufacturing
 - ◆ Cask Fleet Maintenance
 - ◆ Planning, Logistics
 - ◆ Emergency Response

- ▶ **This is going to be new to the Public**
 - ◆ Public Outreach