SELECTED CHARTS:
NATIONAL WASTE TERMINAL STORAGE PROGRAM

March 1977

C. D. Zerby, Director
Office of Waste Isolation

Presented to:

The State of Louisiana
Webster and Bienville Parishes

**UNION
CARBIDE**

OFFICE OF WASTE ISOLATION
OAK RIDGE, TENNESSEE

*prepared for the U.S. ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
under U.S. GOVERNMENT Contract W-7405 eng 26*

MASTER

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency Thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

This report was prepared as an account of work sponsored by the United States Government. Neither the United States nor the Energy Research and Development Administration, nor any of their employees, nor any of their contractors, subcontractors, or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness or usefulness of any information, apparatus, product or process disclosed, or represents that its use would not infringe privately owned rights.

NUCLEAR POWER REACTORS IN THE UNITED STATES

NUCLEAR GENERATING UNIT CAPACITY

PUERTO RICO

■ OPERABLE		KILOWATTS
58 LICENSED BY NRC TO OPERATE	40,317,400	
2 OTHERS AUTHORIZED TO OPERATE (ERDA-OWNED)	940,000	
▲ BEING BUILT		
74 CONSTRUCTION PERMITS	76,931,200	
19 SITE WORK AUTHORIZED	20,490,000	
● PLANNED		
61 REACTORS ORDERED	69,394,000	
24 REACTORS NOT ORDERED*	28,900,000	
238	236,972,600	

*These units have not been ordered, and site information is incomplete.

There are no symbols for units planned but not sited.

Symbols do not reflect precise locations.

Ref.: TID 8200-R33, "Nuclear Reactors Being Built or Planned in the U.S. as of December 1, 1975". Updated June 30, 1976

NOTICE
This report was prepared as an account of work sponsored by the United States Government. Neither the United States nor the United States Energy Research and Development Administration, nor any of their employees, nor any of their contractors, subcontractors, or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness or usefulness of any information, apparatus, product or process disclosed, or represents that its use would not infringe privately owned rights.

MASTER

OWI-76-99 R1

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

**PROJECTED DOMESTIC POWER GROWTH
(OPA-MID CASE 1976)**

YEAR	GWe (TOTAL)	GWe (NUCLEAR)	NUCLEAR (% OF TOTAL)
1975	500	39	8
1985	725	145	20
2000	1,400	510	36

REF: E. J. HANRAHAN, ET AL, ERDA, OPA, "UNITED STATES URANIUM REQUIREMENTS," OCTOBER 19, 1976, GRAND JUNCTION, COLORADO.

OWI-76-103 R1

THE LIGHT WATER REACTOR NUCLEAR FUEL CYCLE

NWTS PROGRAM OBJECTIVE

TO PROVIDE FACILITIES IN VARIOUS DEEP GEOLOGIC FORMATIONS AT MULTIPLE LOCATIONS IN THE USA WHICH WILL SAFELY DISPOSE OF THE COMMERCIAL RADIOACTIVE WASTE WHICH MUST BE DELIVERED TO A FEDERAL REPOSITORY FOR TERMINAL STORAGE.

OWI-76-96

WASTE STORAGE HISTORY

- CONTINUING GEOLOGIC STUDIES FOR OVER 15 YEARS
- 1957 AND 1970 NAS-NRC COMMITTEE RECOMMENDED BURIAL OF SOLID RADIOACTIVE WASTE IN BEDDED SALT DEPOSITS.
- UNDERGROUND VAULT TEST AT LYONS, KANSAS, LATE IN 1960s.
- RETRIEVABLE SURFACE STORAGE FACILITY DESIGNED IN EARLY 1970s.
- WASTE ISOLATION PILOT PLANT IN BEDDED SALT FOR ERDA WASTE NOW UNDER DEVELOPMENT IN SOUTH-EAST NEW MEXICO.
- OFFICE OF WASTE ISOLATION ANNOUNCED - FEBRUARY 1976.

OWI-76-10 R2

NWTS PROGRAM LINE OF RESPONSIBILITY (ERDA-HQ)

OWI-76-11 R1

NWTS PROGRAM LINE OF RESPONSIBILITY (ERDA-ORO)

OWI-76-12 R1

NWTS PROGRAM LINE OF RESPONSIBILITY (UCC-ND)

WASTE ISOLATION FACILITY - PERSPECTIVE

CWI 76-272

ESTIMATED FEDERAL REPOSITORY LAND AREAS

OWI-76-118 R1

WASTE TRANSPORTER

OWI-76-141

Dry Opening in Bedded Salt

OWI-76-160

10 CFR 50

LICENSING OF PRODUCTION AND UTILIZATION FACILITIES

APPENDIX F

SITING REPROCESSING PLANTS AND RELATED WASTE MANAGEMENT FACILITIES

- **HIGH-LEVEL LIQUID RADIOACTIVE WASTE (HLLRW) IS
COMPOSITE OF ALL REPROCESSING LIQUID WASTE
STREAMS**
- **HLLRW CAN BE STORED FOR MAXIMUM OF FIVE YEARS**
- **HLLRW SHALL BE CONVERTED TO DRY SOLID
PLACED IN SEALED CONTAINER PRIOR TO
TRANSFER TO FEDERAL REPOSITORY**
- **H.L. WASTE SHALL BE STORED NO LONGER THAN
10 YEARS**

OWI-76-21 R1

DESCRIPTIONS OF WASTE FORMS SENT TO FEDERAL REPOSITORY

HIGH-LEVEL WASTE—COMPOSITE OF ALL REPROCESSING PLANT LIQUID WASTE STREAMS - CONTAINING 99.9% OF NONVOLATILE FISSION PRODUCTS - 0.5% Pu AND U

CLADDING WASTE—SOLID FRAGMENTS OF CLADDING AND STRUCTURAL COMPONENTS OF FUEL ASSEMBLIES - CONTAINING 0.05% OF NONVOLATILE FISSION PRODUCTS

INTERMEDIATE-LEVEL TRANSURANIUM WASTE—SOLID MATERIALS CONTAINING PLUTONIUM OR OTHER LONG-LIVED ALPHA EMITTERS IN CONCENTRATIONS GREATER THAN 10 nCi/g - CONTAINING FISSION PRODUCT CONTAMINATION - REQUIRES SOME SHIELDING

LOW-LEVEL TRANSURANIC WASTE—SOLID MATERIALS CONTAINING PLUTONIUM OR OTHER LONG-LIVED ALPHA EMITTERS IN CONCENTRATIONS GREATER THAN 10 nCi/g - NO SHIELDING REQUIRED

**REFERENCE: BLOMEKE AND KEE
JULY 1976**

OWI-76-128

**ACCUMULATIVE VOLUME OF WASTE TO BE DELIVERED
TO FEDERAL REPOSITORIES
(1,000 CU. FT.)**

THROUGH YEAR	HIGH LEVEL	CLADDING	INTERMEDIATE LEVEL	LOW LEVEL
1985	0.0	0.0	0.0	0.0
1990	0.0	18.0	124	355
1995	21.2	66.0	325	885
2000	78.4	161	710	2,050
2005	190	300	1,340	3,920

REF: BLOMEKE, CROFF, AND KEE, ORNL/TM-5427, DECEMBER 1976.

OWI-77-5

**WASTE TO BE DELIVERED TO A
FEDERAL REPOSITORY**

TOTAL DELIVERED VOLUME THROUGH THE YEAR 2006	
WASTE TYPE	(1,000 CU. FT.)
HIGH LEVEL	220
CLADDING	330
INTERMEDIATE LEVEL	1,475
LOW LEVEL	4,345

REF: BLOMEKE, CROFF, AND KEE, ORNL/TM-5427, DECEMBER 1976.

OWI-77-30

NWTS MULTIPLE SITE APPROACH

- **FEASIBILITY OF A TIMELY OPERATION OF A TERMINAL STORAGE FACILITY IMPROVED BECAUSE OF SIMULTANEOUS AND PARALLEL ACTIVITIES**
- **PERMITS RETRIEVABILITY CONCEPT**
- **WILL MAKE IT POSSIBLE FOR MORE THAN ONE SITE TO SERVE THE COUNTRY AS A TERMINAL STORAGE FACILITY**
- **REDUCES TRANSPORTATION COST IF MORE THAN ONE IS USED**
- **ELIMINATES CONCERN REGARDING POSSIBLE FEDERAL GOVERNMENT RELUCTANCE TO ABANDON POSSIBLE SITE AFTER SIGNIFICANT EXPENDITURE**

OWI-76-20R2

GEOLOGIC TERMINAL STORAGE

GENERAL PLAN

OWI-76-31 R5

GEOLOGIC TERMINAL STORAGE

REPOSITORY NO. 1 DESIGN AND CONSTRUCTION SCHEDULE

OWI-76-92 R4

GENERAL NWTS DEVELOPMENT SEQUENCE

- 1. IDENTIFICATION OF FORMATIONS OF INTEREST**
- 2. RECONNAISSANCE TO PROVIDE GEOLOGIC DATA**
- 3. AREA STUDIES**
- 4. DETAILED CONFIRMATION STUDIES**
- 5. IN SITU TESTS**
- 6. REPOSITORY OPERATIONS**

OWI-76-98 R2

SITE SELECTION PROCESS

SCREENING PROCESS

• BETWEEN STATES

• WITHIN STATES

MULTIPLE
GEOLOGIC
FORMATIONS

GEOLOGIC
STUDY
AREAS

DETAILED
CONFIRMATION
STUDY
LOCATIONS

SITES

OWI-76-119

ROCK SALT DEPOSITS IN THE UNITED STATES
(AFTER PIERCE AND RICH, U.S.G.S. BULL. 1148)

OWI-76-25

ARGILLACEOUS FORMATIONS IN THE UNITED STATES

OWI-76-26 R1

CRYSTALLINE FORMATIONS IN UNITED STATES

OWI-76-27

NATIONAL WASTE TERMINAL STORAGE PROGRAM

CURRENT BUDGET PROJECTIONS (THOUSANDS OF DOLLARS)

	<u>FY 1977</u>
GEOLOGICAL PROJECTS	\$22,705
TECHNICAL SUPPORT PROJECTS	2,970
ENGINEERING STUDIES	2,525
FACILITY PROJECTS	2,350
SYSTEMS PROJECTS	2,375
REGULATORY AFFAIRS	1,375
PROGRAM MANAGEMENT	<u>3,900</u>
TOTAL	<u>\$38,200</u>

OWI-76-312 R2

CATEGORIES OF STATES BY PLANNED NWTS ACTIVITIES DURING FY 77

PLANNED ACTIVITIES IN FY 1977	NUMBER OF STATES	STATES		
I. PLANNED LITERATURE STUDIES AND FIELD WORK	13	*COLORADO *INDIANA *LOUISIANA *MICHIGAN *MISSISSIPPI	*NEVADA *NEW YORK *OHIO *SOUTH DAKOTA *TENNESSEE	*TEXAS *UTAH *WASHINGTON
II. PLANNED LITERATURE STUDIES AND POSSIBLE FIELD WORK	6	*ILLINOIS *MINNESOTA *NORTH DAKOTA	*OKLAHOMA SOUTH CAROLINA *WISCONSIN	
III. LITERATURE STUDIES ONLY	17	*ALABAMA ARIZONA CONNECTICUT FLORIDA GEORGIA MAINE	MARYLAND MASSACHUSETTS *MISSOURI *MONTANA *NEBRASKA NEW HAMPSHIRE	*NORTH CAROLINA *PENNSYLVANIA VERMONT VIRGINIA *WYOMING

* STATES IN WHICH STUDIES HAVE BEEN PERFORMED IN THE PAST

OWI-76-311

INTERIOR GULF COAST SALT DOME BASINS

OWI-77-12-R1

OWI-77-13-R1

PLANNED ACTIVITIES IN LOUISIANA - 1977

PRINCIPAL AREAS OF INTEREST

SALT DOMES

PAST ACTIVITIES

LITERATURE SURVEYS OF THE REGIONAL GEOLOGICAL CHARACTERISTICS OF THE SALT DOMES WERE MADE IN 1975 AND 1976. SOME FIELD INVESTIGATIONS OF THE SALT DOMES WERE ALSO CONDUCTED IN 1975 AND 1976.

SCOPE OF 1977 ACTIVITIES

- SELECT A PROJECT MANAGEMENT FIRM TO CONDUCT ALL STUDIES.
- EXTENSIVE SEISMIC GEOPHYSICAL SURVEYS.
- HYDROLOGY INVESTIGATION WITH A FAIRLY LARGE NUMBER OF SHALLOW DRILL HOLES.
- SOIL BORINGS.
- INSTALLATION OF INSTRUMENTS FOR DETERMINING RATE OF SALT MOVEMENT.
- DEEP CORE DRILLING TO TEST INTERNAL STRUCTURE OF SALT DOME AND TO PROVIDE SAMPLES FOR LABORATORY TESTING.
- HEATER EXPERIMENT—USING ELECTRICAL ELEMENTS ONLY—WILL BE INSTALLED AT THE AVERY ISLAND MINE.

OWI-76-574
12/3/76