MASTER

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SUPPLEMENTAL TECHNICAL INFORMATION
IN SUPPORT OF Y/OWI/TM-44*

Volume 13

DRAWINGS FOR REPOSITORY PRECONCEPTUAL
DESIGN STUDIES: SHALE

April 1978

Prepared By

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UNION
CARBIDE

OFFICE OF WASTE ISOLATION
OAK RIDGE, TENNESSEE

prepared for the U.S. DEPARTMENT OF ENERGY under
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WASTE ISOLATION FACILITY
IN
SHALE GEOLOGY

INDEX OF DRAWINGS

SHALE

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STANDBY GENERATION

CYCLE NO.	5 YR. RETRIEVABLE			25 YR. RETRIEVABLE
	I	II	III	II
K1	L1	M1		N1
K2	L2	M2		N2
K3	L3	M3		N3
K4	L4	M4		N4
K5	L5	M5		N5
K6	L6	M6		N6
K7	L7	M7		N7
K8	L8	M8		N8
K9	L9	M9		N9
K10	L10	M10		N10
K11	L11	M11		N11
K12	L12	M12		N12
K13	L13	M13		N13
K14	L14	M14		N14
K15	L15	M15		N15
K16	L16	M16		N16
K17	L17	M17		N17
K18	L18	M18		N18
K19	L19	M19		N19
K20	L20	M20		N20
K21	L21	M21		N21

GENERIC SHALE STRATIGRAPHY
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SHAFT CONSTRUCTION SCHEDULE
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MINE DRAINAGE PLAN
PARTIAL DRAINAGE PLAN AND SECTIONS

CYCLE NO.	5 YR. RETRIEVABLE			25 YR. RETRIEVABLE
	I	II	III	II
K22	L22	M22		N22
K23	L23	M23		N23
K24	L24	M24		N24
K25	L25	M25		N25
K26	L26	M26		N26
K27	L27	M27		N27
K28	L28	M28		N28
K29	L29	M29		N29
K30	L30	M30		N30
K31	L31	M31		N31
K32	L32	M32		N32
K33	L33	M33		N33
K34	L34	M34		N34
K35	L35	M35		N35
K36	L36	M36		N36
K37	L37	M37		N37
K38	L38	M38		N38
K39	L39	M39		N39
K40	L40	M40		N40
K41	L41	M41		N41
K42	L42	M42		N42
K43	L43	M43		N43

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OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS
NEW YORK, N.Y.

WASTE ISOLATION FACILITY
INDEX OF DRAWINGS

SCALE: NONE	CONTRACT NO. 62Y-45702C
DATE: FEBRUARY, 1978	DWG. NO. _____ REV. _____

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PLOT PLAN

- 1 LLWCW MINE AREA
- 2 LLW MINE AREA
- 3 HLW MINE AREA
- 4 MEN & MAT SHAFT
- 5 NOT REQ'D
- 6 SUPPLY AIR SHAFT
- 7 NOT REQ'D
- 8 EXHAUST AIR SHAFT
- 9 CANISTERED WASTE SHAFT
- 10 LOW LEVEL WASTE SHAFT

Site Plan

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY REPOSITORY - SITE AND PLOT PLAN SHALE - CYCLE I - 5 YR. RETRIEVABLE		
SCALE: AS NOTED	CONTRACT NO. 62Y - 45702C	
DATE: FEBRUARY, 1978	DWG. NO. K 1	REV.

Ground Floor Plan

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE 3		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY CANISTERED WASTE RECEIVING BUILDING GROUND FLOOR PLAN		
SCALE:	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. K 2	REV.

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY CANISTERED WASTE RECEIVING BUILDING BASEMENT PLAN		
SCALE:	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. K 3	REV.

OFFICE OF WASTE ISOLATION		
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WASTE ISOLATION FACILITY		
CANISTERED WASTE-RECEIVING BUILDING		
SECTIONS		
SCALE: 1/4" = 1'-0"	CONTRACT NO. 162Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. K 4	REV.

OFFICE OF WASTE ISOLATION		
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ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY		
SCHEMATIC FLOW DIAGRAM		
CANISTERED WASTE		
SHALE CYCLE 1 - 5 YR. RETRIEVABLE		
SCALE:	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. K 5	REV.

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY CANISTERED WASTE RECEIVING BUILDING VENTILATION-FLOW-DIAGRAM		
SCALE: NO SCALE	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. K 6	REV.

GROUND FLOOR PLAN

SECTION

CYCLE I FULL RECYCLE

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WASTE ISOLATION FACILITY LOW LEVEL WASTE RECEIVING BUILDING GROUND FLOOR PLAN AND SECTIONS SHALE - CYCLE I - 5 YR. RETRIEVABLE		
SCALE:	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. K7	REV.

NOTE: CYCLE II AND CYCLE III LAYOUT SHOWN
CYCLE I LAYOUT IS SIMILAR

CYCLE I: FULL RECYCLE

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PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY SCHEMATIC FLOW DIAGRAM LOW LEVEL WASTE (LLW) BUILDING		
SCALE: NONE	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. K 8	REV.

CARGO CARRIER UNLOADING
AND STORAGE AREA

NOTE: LAYOUT SHOWN IS FOR FUEL CYCLE II AND III FACILITY.
FUEL CYCLE I FACILITY IS SIMILAR.

CYCLE I: FULL RECYCLE

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WASTE ISOLATION FACILITY
LOW LEVEL WASTE RECEIVING BUILDING
VENTILATION-FLOW DIAGRAM

SCALE: NO SCALE
DATE: FEBRUARY, 1978
CONTRACT NO. 62Y-45/02C
DWG. NO. 89
REV.

Basement Plan

CYCLE I: FULL RECYCLE

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WASTE ISOLATION FACILITY		
EXHAUST VENT BUILDING		
BASEMENT PLAN		
SHALE - CYCLE - I - 5 YR. RETREIVABLE		
SCALE:	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. K 10	REV

Ground Floor Plan

CYCLE I: FULL RECYCLE

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WASTE ISOLATION FACILITY
EXHAUST VENT BUILDING
GROUND FLOOR PLAN
SHALE - CYCLE I - 5YR. RETRIEVABLE

SCALE:	CONTRACT NO. 62Y - 45702C
DATE: FEBRUARY, 1978	DWG. NO. K II REV.

Section

0 5 10 15 20 25

CYCLE I: FULL RECYCLE

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WASTE ISOLATION FACILITY
EXHAUST VENT BUILDING
SECTION
SHALE - CYCLE I - 5 YR. RETRIEVABLE

SCALE:	CONTRACT NO. 62Y-45702C
DATE: FEBRUARY, 1978	DWG. NO. K-12 REV.

CYCLE I: FULL RECYCLE

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WASTE ISOLATION FACILITY	
MINE VENTILATION FLOW DIAGRAM	
SHALE - CYCLE I - 5 YR. RETRIEVABLE	
SCALE: NO SCALE	CONTRACT NO. 671
DATE: FEBRUARY, 1978	DWG. NO. K13

FLOOR PLAN

10 5 0 25

CYCLE I: FULL RECYCLE

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WASTE ISOLATION FACILITY
SUPPLY VENTILATION BUILDING

SHALE-CYCLE I - 5 YR. RETRIEVABLE

SCALE: AS SHOWN

CONTRACT NO. 62Y-45702C

DATE: FEBRUARY, 1978

DWG. NO. K14

REV.

PLAN

SECTION B-B

SECTION A-A

CYCLE I: FULL RECYCLE

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PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY LIQUID RADWASTE TREATMENT BUILDING SHALE - CYCLE I - 5 YR. RETRIEVABLE		
SCALE: 1/16" = 1'-0"	CONTRACT NO. 62Y-40702C	
DATE: FEBRUARY, 1978	DWG. NO. K15	REV.

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY LIQUID RADWASTE TREATMENT FLOW DIAGRAM SHALE - CYCLE I - 5 YR. RETRIEVABLE		
SCALE: NOT TO SCALE DATE: FEBRUARY, 1978	CONTRACT NO. 62Y-45702C DWO NO. K 16	REV.

GROUND FLOOR PLAN

CYCLE I: FULL RECYCLE

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PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY CENTRAL SITE CONTROL & SWITCHGEAR BUILDING GROUND FLOOR PLAN		
SCALE	CONTRACT NO. 62Y-45702C	REV.
DATE: FEBRUARY, 1978	DWG. NO. K17

Excavated Material Handling Plan Scale 1" = 40'

Coal Handling System 1" = 20'

Section A-A 1" = 20'

Section B-B 1" = 20'

Section D-D 1" = 20'

Conveyor Schedule

Conveyor	Tph	width	fpm	HP
C1	500	48"	200	5
C2	"	36"	370	40
C3	"	"	"	50
C4	"	"	"	5
C5	"	"	"	5
Shuttle Drive				5
Vibrating Feeders	9 @ 5HP			45

Back filling system

Section C-C 1" = 20'

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WASTE ISOLATION FACILITY EXCAVATED MATERIAL & COAL HANDLING SHALE - CYCLE I - 5 YR. RETRIEVABLE		
SCALE:	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. K18	REV.

PARTIAL PLAN
MINING AND PLACEMENT VENTILATION
FUEL CYCLE I LAYOUT SHOWN - CYCLES II & III SIMILAR

MINING VENTILATION DETAIL
NO SCALE

LEGEND

- PLACEMENT EXHAUST AIR
- - - MINING EXHAUST AIR
- PLACEMENT & MINING SUPPLY AIR
- x — PLACEMENT IN PROGRESS
- — MINING IN PROGRESS
- + — ROOM OR CORRIDOR SEALED

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WASTE ISOLATION FACILITY
MINE VENTILATION PLAN

SHALE - CYCLE I - 5 YR. RETRIEVABLE

SCALE: 1" = 300'

CONTRACT NO. 82Y-45702C

DATE: FEBRUARY, 1978

DWG. NO. P-18

REV.

CYCLE I: FULL RECYCLE

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WASTE ISOLATION FACILITY
ELECTRICAL-ONE LINE DIAGRAM
SHALE-CYCLE I - 5 YEAR RETRIEVABLE

SCALE: NONE
DATE: FEBRUARY, 1978

CONTRACT NO. 62Y-4578
DWS NO. K20

CYCLE I - FULL RECYCLE

SUB-STATION PLAN

ITEM	QUANTITY	DESCRIPTION
1	8	AIR BREAK SWITCH, W TYPE V-3, 69KV, 600A, 3PST WITH MANUAL OPERATOR
2	6	LIGHTNING ARRESTER, W TYPE IVS
3	24	APPARATUS INSULATOR 69KV
4	30	STRAIN INSULATOR, 69 KV
5		1" IPS COPPER TUBING
6	3	1200A, 69KV, OIL C.B. 3P W TYPE GS
7		2/0 BARE COPPER CABLE
8	2	69KV/13.8KV. TRANSFORMER, 3P
9		4/0 COUNTERPOISE GROUND CABLE
10		3/4" x 10'-0" COPPERWELD GROUND ROD
11		1/0 GROUND CABLE
12		ANGLE IRON LATTICE COLUMN 33' HIGH
13		ANGLE IRON LATTICE BEAM
14		CHAIN LINK FENCE
15	4	CURRENT TRANSFORMER
16	4	POTENTIAL TRANSFORMER

STANDBY GENERATOR

SECTION A-A

SECTION B-B

SECTION C-C

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WASTE ISOLATION FACILITY
MAIN ELECTRICAL SUBSTATION
AND STANDBY GENERATOR

SCALE: CONTRACT NO. 62Y-45702C
DATE: FEBRUARY, 1978 DWG. NO. K21 REV.

CYCLE I: FULL RECYCLE

MINING AND PLACEMENT SCHEDULE

SHALE - CYCLE I - 5 YEARS RETRIEVABLE

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WASTE ISOLATION FACILITY HLW MINING AND PLACEMENT SCHEDULE SHALE-CYCLE I - 5 YR. RETRIEVABLE		
SCALE:	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. K23	REV.

MINING AND PLACEMENT SCHEDULE

SHALE - CYCLE I - 5 YEARS RETRIEVABLE

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WASTE ISOLATION FACILITY
ILW & CW MINING AND PLACEMENT SCHEDULE
SHALE-CYCLE I - 5 YR. RETRIEVABLE

SCALE:	CONTRACT NO. 62Y-45702C
DATE: FEBRUARY, 1978	DWG. NO. K 24 REV.

NOTES:

1. ALL LINES REPRESENT CENTER LINES OF ROOMS OR CORRIDORS.
2. FOR SHAFT AREA DETAIL, SEE DWG. NO. H10
3. HLW = HIGH LEVEL WASTE
ILW = INTERMEDIATE LEVEL WASTE
CW = CLADDING WASTE
LLW = LOW LEVEL WASTE
4. FOR ROOM CROSS SECTIONS, SEE DWG. NO. H11
5. ALL CORRIDORS ARE 26' WIDE x 20' HIGH.
6. NUMBER IN CIRCLE DENOTES PANEL NUMBER.
7. ELEVATIONS SHOWN AS ARE BASED ON GROUND LINE 0.00'

LEGEND:

PORTION OF REPOSITORY STORAGE AREA
THAT IS UTILIZED DURING FIRST FIVE
YEARS OF PLACEMENT OPERATION.

EXTRACTION RATIO

HLW : 23 %
ILW & CW : 30 %
LLW : 30 %

MINE MASTER PLAN

STORAGE CAPACITY (YEAR 2000)

HLW = 47,472 UNITS
ILW & CW = 191,268 UNITS
LLW = 278,208 UNITS

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WASTE ISOLATION FACILITY
MINE MASTER PLAN
SHALE CYCLE I - 5 YR. RETRIEVABLE

SCALE: 1" = 600'

DATE: FEBRUARY, 1978

CONTRACT NO. 62Y-45702C

DWG NO. K25

REV

CORRIDOR & ROOM LAYOUT - ILW & CW, LLW

SCALE: 1" = 60'

TYPICAL ROOM CROSS SECTION - ILW & CW

SCALE: 1" = 30'

ROOM PLAN - ILW & CW

SCALE: 1/16" = 1'

CORRIDOR & ROOM LAYOUT - HLW

SCALE: 1" = 60'

TYPICAL ROOM CROSS SECTION - HLW

SCALE: 1" = 30'

ROOM PLAN - HLW

SCALE: 1/16" = 1'

ROOM PLAN - LLW

SCALE: 1/16" = 1'

NOTE:

- 2% OF HOLES IN EACH ROOM IS TO BE RESERVED FOR OVERPACKED CANISTERS.

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WASTE ISOLATION FACILITY
CORRIDOR AND ROOM LAYOUT
SHALE - CYCLE I - 5 YR. RETRIEVABLE

SCALE: AS NOTED

CONTRACT NO. 62Y - 45702C

DATE: FEBRUARY, 1970

DWG. NO. K 27

REV.

SUBSURFACE RECEIVING STATIONS
N.T.S.

INTERMEDIATE LEVEL PLAN

LOWER LEVEL PLAN

TRANSPORTER LEVEL PLAN

CYCLE I: FULL RECYCLE

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WASTE ISOLATION FACILITY
CANISTERED WASTE SUBSURFACE
RECEIVING STATION - PLANS

SHIELD CYCLE I: 5 YR. WITH VARIABLE

SCALE: $\frac{3}{32}$ " = 1'-0"

DATE: FEBRUARY, 1978

CONTRACT NO. 62Y-45702C

DWG. NO. K28

REV.

SECTION A-A

SECTION B-B

SECTION C-C

CYCLE I: FULL RECYCLE

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WASTE ISOLATION FACILITY
CANISTERED WASTE SUBSURFACE
RECEIVING STATION - SECTIONS
SHALE CYCLE I 5YR. RETRIEVABLE

SCALE: $\frac{3}{32}'' = 1'-0''$

DATE: FEBRUARY, 1978

CONTRACT NO. 62Y-45702C

DWG. NO. K29

REV.

CANISTER DETAIL

CANISTER PLACEMENT PLAN

CANISTER PLACEMENT ELEVATION

DETAIL 1

SECTION A-A

DETAIL 2

SECTION B-B

DETAIL 3

SECTION C-C

NOTE:
DETAILS SHOWN FOR HLW.
ILW & CW ARE SIMILAR EXCEPT FOR ROOM SIZE
AND STORAGE PATTERN.

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WASTE ISOLATION FACILITY
CANISTERED WASTE STORAGE
SHALE CYCLE I - 5 YR. RETRIEVABLE

SCALE: NOT TO SCALE	CONTRACT NO. 62Y-45702C
DATE: FEBRUARY, 1978	DWG. NO. K 30 REV.

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS
NEW YORK, N.Y.

WASTE ISOLATION FACILITY
SHAFT CONSTRUCTION SCHEDULE
SHALE-CYCLE I-5YR. RETRIEVABLE

SCALE:	CONTRACT NO. 62Y-45702C
DATE: FEBRUARY, 1978	DWG. NO. K 31 REV.

PLAN OF SHAFT

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY
MINE AND MATERIAL SHAFT
SHALE-CYCLE I-5YR. RETRIEVABLE

CYCLE I: FULL RECYCLE

SCALE:	CONTRACT NO. 62Y-45702C
DATE: FEBRUARY, 1978	DWG. NO. K32
	REV.

G.A. LOADING POCKET & SHAFT BOTTOM

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY MEN AND MATERIAL SHAFT LOADING POCKET & SHAFT BOTTOM SHALE-CYCLE 1-5YR. RETRIEVABLE		
SCALE:	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. K 33	REV.

PLAN OF SHAFT

TYP. GUIDE RAIL CONNECT'N

TYP. BUNTON TO WALL CONNECT'N

SHAFT SECTION

PLAN

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY
CANISTERED WASTE SHAFT
SHALE-CYCLE I - 5 YR. RETRIEVABLE

CYCLE I: FULL RECYCLE

SCALE:	CONTRACT NO. 62Y-45702C
DATE: FEBRUARY, 1978	DWG. NO. K34 REV.

CYCLE I: FULL RECYCLE

ESTIMATED WEIGHT - 180K

OFFICE OF WASTE ISOLATION
 UNION CARBIDE CORPORATION
 NUCLEAR DIVISION
 OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
 ENGINEERS
 NEW YORK, N.Y.

WASTE ISOLATION FACILITY
 CANISTERED WASTE CAGE
 SHALE-CYCLE I - 5YR. RETRIEVABLE

SCALE:	CONTRACT NO. 62Y - 45702C	
DATE: FEBRUARY, 1978	DWG. NO. K35	REV.

TYPICAL GUIDE RAIL ASSEMBLY

TYPICAL GUIDE SHOE

GUIDE GENERAL ASSEMBLY

FLEXIBLE SAFETY DEVICE

SHAFT SAFETY GEAR ARRANGMENT

NOTES

BRAKING SEQUENCE

DURING AN OVERSPEED CONDITION, THE FLYBALL GOVERNOR (1) ENGAGE THE SHAFT SAFETY GEAR ARRANGMENT. AS THE GOVERNOR ROPE (2) IS PULLED DOWN, THE ACTIVATOR LEVER (3) IS PULLED DOWN INTO THE ENGAGING POSITION. THE JAMS ARE PULLED UP THE SIDE OF THE GUIDE RAIL 400-500 FEET. AS THE CONVEYANCE CONTINUES TO RISE, THE MOUNTED JAMS RISE UP AND ENGAGE THE GUIDE RAILS. THE CONVEYANCE BEGINS TO SPREAD DUE TO THE INCREASED A CONSTANT PRESSURE ON THE GUIDE RAILS. THE CONVEYANCE TO REST WITH A GIVEN DISTANCE. SHOULD THE GOVERNOR (6) AUTOMATICALLY ENGAGES THE BRAKING SEQUENCE.

CYCLE I: FULL RECYCLE

OFFICE OF WASTE ISOLATION
UNION CARBIDE
NUCLEAR
OAK RIDGE, TENN.

PARSONS, BRINCKERHOFF, SMITH & ASSOCIATES, INC.
ENGINEERS

WASTE ISOLATION FACILITY
CANISTERED WASTE CONVEYANCE
SAFETY MECHANISM
SHALE-CYCLE 1-5YR. RETRIEVABLE

SCALE:	CONTRACT NO. 62Y-45702C
DATE: FEBRUARY, 1978	DWG. NO. K 36
	REV.

PERMANENT SHAFT SETUP

LOW LEVEL WASTE SHAFT

PLAN OF HEADFRAME

TEMPORARY SETUP FOR INITIAL MINING

1450 STN.

1600

STEEL LININGS

CYCLE I: FULL RECYCLE

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY
LOW LEVEL WASTE SHAFT
SHALE-CYCLE I-5YR. RETRIEVABLE

SCALE:	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. K37	REV.

SECTION 'A-A'

SECTION THRU SHAFT BOTTOM

CYCLE I: FULL RECYCLE

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY
LOW LEVEL SHAFT DURING
PRELIMINARY MINE DEVELOPMENT
SHALE-CYCLE I-5YR. RETRIEVABLE

SCALE:	CONTRACT NO. 62Y-45702C
DATE: FEBRUARY, 1978	DWG. NO. K 38 REV.

PLAN OF SHAFT

SHAFT SECTION

CYCLE I: FULL RECYCLE

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY VENTILATION SUPPLY SHAFT SHALE-CYCLE I-5YR. RETRIEVABLE		
SCALE:	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. K 39	REV.

PLAN OF SHAFT

STATION 1450

SHAFT SECTION

SECTION 'A-A'

TWO STATIONS AT BOTTOM
AT 120° TO EACH OTHER
(30' x 20' x 26')

CYCLE I: FULL RECYCLE

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY VENTILATION EXHAUST SHAFT SHALE-CYCLE I-5YR. RETRIEVABLE		
SCALE:	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. K 40	REV.

SECTION THRU SHAFT AT RING

DETAIL - 1

DETAIL - 2

CYCLE I: FULL RECYCLE

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY SHAFT DRAINAGE CONTROL SELF CLEANING WATER RING SHALE-CYCLE I - 5YR. RETRIEVABLE		
SCALE:	CONTRACT NO. 62Y - 45702C	
DATE: FEBRUARY, 1978	DWG. NO. K 41	REV.

MINE DRAINAGE PLAN

SCALE: 1" = 600'

NOTES

DRAINAGE PLAN FOR CYCLE II IS SHOWN.
DRAINAGE PLANS FOR CYCLE I & III ARE SIMILAR.

CYCLE I: FULL RECYCLE

OFFICE OF WASTE ISOLATION		
UNION CARBIDE CORPORATION		
NUCLEAR DIVISION		
OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.		
ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY		
MINE DRAINAGE PLAN		
SHALE - CYCLE II - 5 YR. RETRIEVABLE		
SCALE: 1" = 600'	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. K 42	REV.

NOTES:

DRAINAGE PLAN FOR CYCLE II IS SHOWN.
DRAINAGE PLANS FOR CYCLE I & III ARE SIMILAR.

CYCLE I: FULL RECYCLE

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY
PARTIAL DRAINAGE PLAN & SECTIONS
SHALE - CYCLE I - 5 YR. RETRIEVABLE

SCALE: 1" = 120'

CONTRACT NO. 62Y-45702C

DATE: FEBRUARY, 1978

DWG. NO. K 43

REV.

Site Plan

PLOT PLAN

- 1 BWR MINE AREA
- 2 LLW MINE AREA
- 3 PWR MINE AREA
- 4 MEN & MAT SHAFT
- 5 NOT REQ'D
- 6 SUPPLY AIR SHAFT
- 7 NOT REQ'D
- 8 EXHAUST AIR SHAFT
- 9 CANISTERED WASTE SHAFT
- 10 LOW LEVEL WASTE SHAFT

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY
REPOSITORY-SITE AND PLOT PLAN

SHALE - CYCLE II - 5 YR. RETRIEVABLE

SCALE: AS NOTED

CONTRACT NO. 62Y-45702C

DATE: FEBRUARY, 1978

DWG. NO. L1

REV.

OFFICE OF WASTE ISOLATION		
UNION CARBIDE CORPORATION		
NUCLEAR DIVISION		
OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.		
ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY		
CANISTERED WASTE RECEIVING BUILDING		
BASEMENT PLAN		
SHALE - CYCLE II - 5 YR. RETRIEVABLE		
SCALE:	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. L3	REV.

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS
NEW YORK, N.Y.

WASTE ISOLATION FACILITY
SCHEMATIC FLOW DIAGRAM
CANISTERED WASTE
SHALE-CYCLE II - 5 YR. RETRIEVABLE

SCALE:	CONTRACT NO. 62Y-45702C
DATE: FEBRUARY, 1978	DWG. NO. L 5 REV.

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY
VENTILATION FLOW DIAGRAM
SHALE - CYCLE II - 5 YR. RETRIEVABLE

SCALE: NO SCALE CONTRACT NO. 62Y-45702C
DATE: FEBRUARY, 1978 DWG. NO. L6 REV.

Ground Floor Plan

Section

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY LOW LEVEL WASTE RECEIVING BUILDING GROUND FLOOR PLAN AND SECTION SHALE - CYCLE II - 5 YR. RETRIEVABLE		
SCALE:	CONTRACT NO. 62Y-45T02C	
DATE: FEBRUARY, 1978	DWG. NO. L7	REV.

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY
SCHEMATIC FLOW DIAGRAM
LOW LEVEL WASTE (LLW) BUILDING
SHALE - CYCLE II - 5 YR. RETRIEVABLE

SCALE: NONE

CONTRACT NO. 62Y - 45702C

DATE: FEBRUARY, 1978

DWG. NO. L8

REV.

NOTE: LAYOUT SHOWN IS FOR FUEL CYCLE II AND III FACILITY.
FUEL CYCLE I FACILITY IS SIMILAR.

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY
LOW LEVEL WASTE RECEIVING BUILDING
VENTILATION FLOW DIAGRAM
SHALE - CYCLE II - 5 YR. RETRIEVABLE

SCALE: CONTRACT NO. 62Y-45702C
DATE: FEBRUARY, 1978 DWG. NO. L9 REV.

CYCLE II THROWAWAY FUEL CYCLE

Basement Plan

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY EXHAUST VENT BUILDING BASEMENT PLAN SHALE - CYCLE II - 5 YR. RETRIEVABLE		
SCALE:	CONTRACT NO. 62Y - 45702C	
DATE: FEBRUARY, 1978	DWG. NO. L 10	REV.

Ground Floor Plan

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY EXHAUST VENT BUILDING GROUND FLOOR PLAN SHALE - CYCLE II - 5 YR. RETRIEVABLE		
SCALE:	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. L II	REV.

Section

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION		
UNION CARBIDE CORPORATION		
NUCLEAR DIVISION		
OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.		
ENGINEERS		
NEW YORK, N.Y.		
WASTE ISOLATION FACILITY		
EXHAUST VENT BUILDING		
SECTION		
SHALE - CYCLE II - 5 YR. RETRIEVABLE		
SCALE:	CONTRACT NO. 62Y - 45702C	
DATE: FEBRUARY, 1978	DWG. NO. L 12	REV.

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY MINE VENTILATION FLOW DIAGRAM SHALE - CYCLE II - 5YR. RETRIEVABLE		
SCALE: NO SCALE	CONTRACT NO. 62Y - 45702C	
DATE: FEBRUARY, 1978	DWG. NO. L 13	REV.

FLOOR PLAN

OFFICE OF WASTE ISOLATION		
UNION CARBIDE CORPORATION		
NUCLEAR DIVISION		
OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.		
ENGINEERS		
NEW YORK, N.Y.		
WASTE ISOLATION FACILITY		
SUPPLY VENT. BLDG. - PLAN		
SHALE-CYCLE II - 5 YR. RETRIEVABLE		
DATE	CONTRACT NO.	REV
AS SHOWN	62Y-45702C	
FEBRUARY, 1978	L14

SECTION B-B

SECTION A-A

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY LIQUID RADWASTE TREATMENT BUILDING SHALE - CYCLE II - 5 YR. RETRIEVABLE		
SCALE: 1/16" = 1'-0"	CONTRACT NO. 62Y-46702C	
DATE: FEBRUARY, 1978	DWG. NO. L15	REV.

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY
SITE CONTROL BUILDING
SHALE-CYCLE II - 5 YR. RETRIEVABLE

SCALE: 1/8" = 1'-0"	CONTRACT NO. 62Y-45/020
DATE: FEBRUARY, 1978	DWG. NO. L 17 REV.

Excavated Material Handling
Plan Scale 1"=40'

700' ±
Coal Handling System 1"=20'

Section B-B
1"=20'

Conveyor Schedule

Con. No	Tph	width	fpm	HP
C1	500	48"	200	5
C2	"	36"	370	40
C3	"	"	"	50
C4	"	"	"	5
C5	"	"	"	5
Shuttle Drive				5
Vibrating Feeders	9 @ 5 HP			45

C6	500	36"	370	20
C7	"	"	"	75
Vibrating Feeders	2 @ 5 HP			10

for future reverse operation

Section C-C
1"=20'

Section D-D
1"=20'

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY
EXCAVATED MATERIAL & COAL HANDLING
SHALE - CYCLE II - 5YR. RETRIEVABLE

SCALE: AS NOTED	CONTRACT NO. 62Y-45702C
DATE: FEBRUARY, 1978	DWG. NO. L18 REV.

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS
NEW YORK, N.Y.

WASTE ISOLATION FACILITY
ELECTRICAL-ONE LINE DIAGRAM
SHALE-CYCLE II - 5 YEAR RETRIEVABLE

SCALE: NONE	CONTRACT NO. 62Y-45702C
DATE: FEBRUARY, 1978	DWG. NO. L20
	REV.

SUB-STATION PLAN

NO.	QTY.	DESCRIPTION
1	1	TYPE V-3 MANUAL OPERATOR
2	1	LIGHTNING ARRESTOR, W TYPE IVS
3	24	SPACER INSULATOR 69KV
4	30	STRAIN INSULATOR, 69KV
5		1" IPS COPPER TUBING
6	3	1800A, 69KV, OIL CB, 3P W TYPE 68
7		2/0 BARE COPPER CABLE
8	2	69KV/12.5KV. TRANSFORMER, 3P
9		4/0 COUNTERPOISE GROUND CABLE
10		3/4" 10-0 COPPERWELD GROUND ROD
11		1/0 GROUND CABLE
12		ANGLE IRON LATTICE COLUMN 33' HIGH
13		ANGLE IRON LATTICE BEAM
14		CHAIN LINK FENCE
15	4	CURRENT TRANSFORMER
16	4	POTENTIAL TRANSFORMER

STANDBY GENERATOR

SECTION A-A

SECTION B-B

SECTION C-C

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY
MAIN ELECTRICAL SUBSTATION
AND STANDBY GENERATOR

SCALE: CONTRACT NO. 62Y-45702C
DATE: FEBRUARY, 1978 DWG. NO. L 21 REV.

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE	
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.	
WASTE ISOLATION FACILITY GENERIC SHALE STRATIGRAPHY SHALE-CYCLE II- 5 YR. RETRIEVABLE	
SCALE: AS SHOWN	CONTRACT NO. 62Y-45702C
DATE: FEBRUARY, 1978	DWG. NO. C-22

MINING AND PLACEMENT SCHEDULE

SHALE-CYCLE II - 5 YEARS RETRIEVABLE

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY
PWR MINING AND PLACEMENT SCHEDULE
SHALE-CYCLE II-5 YR. RETRIEVABLE

SCALE:	CONTRACT NO. 62Y-45702C
DATE: FEBRUARY, 1978	DWG. NO. L23 REV.

MINING AND PLACEMENT SCHEDULE

SHALE-CYCLE II - 5 YEARS RETRIEVABLE

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS
NEW YORK, N.Y.

WASTE ISOLATION FACILITY
BWR MINING AND PLACEMENT SCHEDULE
SHALE - CYCLE II - 5 YR. RETRIEVABLE

SCALE:
DATE: FEBRUARY, 1978

CONTRACT NO. 62Y - 45702C
DWG. NO. L24
REV.

NOTES:

1. ALL LINES SHOWN REPRESENT THE CENTER LINES OF EITHER ROOMS OR CORRIDORS.
2. FOR SHAFT AREA DETAIL, SEE DWG. NO. L 10.
3. PWR = PRESSURIZED WATER REACTOR WASTE
BWR = BOILING WATER REACTOR WASTE
LLW = LOW LEVEL WASTE
4. FOR ROOM CROSS SECTION, SEE DWG. NO. L 11.
5. ALL CORRIDORS ARE 26' WIDE x 25' HIGH.
6. NUMBER IN CIRCLE DENOTES PANEL NUMBER.
7. ELEVATIONS SHOWN AS ARE BASED ON GROUND LINE 0.00'.

LEGEND:

PORTION OF REPOSITORY STORAGE AREA THAT IS UTILIZED DURING FIRST FIVE YEARS OF PLACEMENT OPERATIONS.

EXTRACTION RATIO

PWR: 23 %
BWR: 30 %
LLW: 30 %

MINE MASTER PLAN

SCALE: 1" = 600'

STORAGE CAPACITY (YEAR 2006)

PWR = 114,264 UNITS
BWR = 166,704 UNITS
LLW = 52,992 UNITS

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS
NEW YORK, N.Y.

WASTE ISOLATION FACILITY
MINE MASTER PLAN

SHALE - CYCLE II - 5 YR. RETRIEVABLE

SCALE: 1" = 600'

CONTRACT NO. 62Y-45702C

DATE: FEBRUARY, 1978

DWG. NO. L25

REV.

CYCLE II: THROWAWAY FUEL CYCLE

CORRIDOR & ROOM LAYOUT - BWR, LLW
SCALE: 1" = 60'

TYPICAL ROOM CROSS SECTION - BWR, LLW
SCALE: 1" = 30'

ROOM PLAN - BWR
SCALE: 1/16" = 1'

CORRIDOR & ROOM LAYOUT - PWR
SCALE: 1" = 60'

TYPICAL ROOM CROSS SECTION - PWR
SCALE: 1" = 30'

ROOM PLAN - PWR
SCALE: 1/16" = 1'

ROOM PLAN - LLW
SCALE: 1/16" = 1'

NOTE:

- 2% OF HOLES IN EACH ROOM IS TO BE RESERVED FOR OVERPACKED CANISTERS.

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS
NEW YORK, N. Y.

WASTE ISOLATION FACILITY
CORRIDOR AND ROOM LAYOUT
SHALE - CYCLE II - 5 YR. RETRIEVABLE

SCALE: AS NOTED

CONTRACT NO. 62Y-45702C

DATE: FEBRUARY, 1978

DWG. NO. L27

REV.

CYCLE II THROWAWAY FUEL CYCLE

SUBSURFACE RECEIVING STATIONS
N.T.S.

INTERMEDIATE LEVEL PLAN

LOWER LEVEL PLAN

TRANSPORTER LEVEL PLAN

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY
CANISTERED WASTE SUBSURFACE
RECEIVING STATION-PLANS
SHALE - CYCLE II - 5 YR. RETRIEVABLE

SCALE: $\frac{3}{32}$ " = 1'-0"

CONTRACT NO. 62Y-45702C

DATE: FEBRUARY, 1978

DWG. NO. L28

REV.

SECTION A-A

SECTION B-B

SECTION C-C

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY CANISTERED WASTE SUBSURFACE RECEIVING STATION - SECTIONS SHALE - CYCLE II - 5YR. RETRIEVABLE		
SCALE: $\frac{3}{8}$ " = 1'-0"	CONTRACT NO.	FEBRUARY, 1978
DATE: 62Y-45702C	DWG. NO. L29	REV.

CANISTER DETAIL

CANISTER PLACEMENT PLAN

CANISTER PLACEMENT ELEVATION

DETAIL 1

SECTION A-A

DETAIL 2

SECTION B-B

DETAIL 3

SECTION C-C

NOTE:
DETAILS SHOWN FOR PWR. BWR IS SIMILAR EXCEPT FOR ROOM SIZE AND STORAGE PATTERN.

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY
CANISTERED WASTE STORAGE
SHALE - CYCLE II - 5 YR. RETRIEVABLE

SCALE: NOT TO SCALE CONTRACT NO. 62Y-45702C
DATE: FEBRUARY, 1978 DWS. NO. L30 REV.

CYCLE II: THROWAWAY FUEL CYCLE

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY
SHAFT CONSTRUCTION SCHEDULE
SHALE - CYCLE II 5YR. RETRIEVABLE

SCALE:	CONTRACT NO. 62Y-45702C
DATE: FEBRUARY, 1978	DWG. NO. L 31 REV.

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS
NEW YORK, N.Y.

WASTE ISOLATION FACILITY
MEN AND MATERIAL SHAFT
SHALE-CYCLE II-5YR. RETRIEVABLE

SCALE:	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. L 32	REV.

DATE: FEBRUARY, 1978

DWG. NO. L 32

100

CYCLE II: THROWAWAY FUEL CYCLE

CYCLE II: THROWAWAY FUEL CYCLE

G.A. LOADING POCKET & SHAFT BOTTOM

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY MEN AND MATERIAL SHAFT LOADING POCKET & SHAFT BOTTOM SHALE - CYCLE II - 5YR. RETRIEVABLE		
SCALE:	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. L33	REV.

PLAN ON SHAFT

0 1 2 3
SCALE

TYP. GUIDE RAIL CONNECT'N

TYP. BUNTON TO WALL CONNECT'N

SHAFT SECTION

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE
UNION CARBIDE CORP.
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & ASSOCIATES
ENGINEERS

WASTE ISOLATION FACILITY
CANISTERED WASTE SHAFT
SHALE-CYCLE II- 5 YR. RETRIEVABLE

SCALE: CONTRACT NO. 621
DATE: FEBRUARY, 1978 DWG. NO. L 34

CYCLE II: THROWAWAY FUEL CYCLE

ESTIMATED WEIGHT - 200^k

OFFICE OF WASTE ISOLATION

UNION CARBIDE CORPORATION
 NUCLEAR DIVISION
 OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
 ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY

CANISTERED WASTE CAGE

SHALE-CYCLE II- 5YR. RETRIEVABLE

SCALE: CONTRACT NO. 62Y-45702C

DATE: FEBRUARY, 1978 DWG. NO. L'35 REV.

TYPICAL GUIDE RAIL ASSEMBLY

TYPICAL GUIDE SHOE

GUIDE GENERAL ASSEMBLY

FLEXIBLE SAFETY DEVICE

SHAFT SAFETY GEAR ARRANGMENT

NOTES

BRAKING SEQUENCE

DURING AN OVERSPEED CONDITION, THE BALL GOVERNOR (1) ENGAGES THE BRAKE ACTUATOR LEVER (3) AS THE GOVERNOR ROTATES. AS THE GOVERNOR ROTATES, THE ACTIVATOR LEVEL (4) IS IN THE ENGAGING POSITION. THE ACTIVATOR LEVEL (4) IS ON THE INSIDE OF THE GUIDE RAIL. AS THE CONVEYANCE COMES TO A STOP, THE MOUNTED JAWS RIDE UP THE GUIDE RAIL AGAINST THE GUIDE RAIL. THE CONVEYANCE BEGINS TO SPREAD DUE TO A CONSTANT PRESSURE ON THE CONVEYANCE TO REST WITHIN A GIVEN DISTANCE. SHOULD THE ACTIVATOR (6) AUTOMATICALLY ENGAGES THE

OFFICE OF UNION NUCLEAR ENGINEERS	
PARSONS, BRINCKERHOFF & COMPANY ENGINEERS	
WASTE ISOLATION CANISTERED WASTE CONVEYANCE SAFETY MECHANISM SHALE-CYCLE II-5YR RETRIEVABLE	
SCALE:	
DATE:	FEBRUARY, 1978

PERMANENT SHAFT SETUP

LOW LEVEL WASTE SHAFT

PLAN OF HEADFRAME

0 20 40

STEEL LININGS

1450 STN.

1600

TEMPORARY SETUP FOR INITIAL MINING

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS
NEW YORK, N.Y.

WASTE ISOLATION FACILITY
LOW LEVEL WASTE SHAFT
SHALE-CYCLE II: 5YR. RETRIEVABLE

SCALE:	CONTRACT NO. 62Y-45702C
DATE: FEBRUARY, 1978	DWG. NO. L 37

SECTION 'A-A'

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION		
UNION CARBIDE CORPORATION		
NUCLEAR DIVISION		
OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.		
ENGINEERS		
WASTE ISOLATION FACILITY		
LOW LEVEL SHAFT DURING		
PRELIMINARY MINE DEVELOPMENT		
SHALE-CYCLE II 5YR. RETRIEVABLE		
SCALE:	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. L 38	REV.

1500 LEVEL BOTTOM

PLAN OF SHAFT

SHAFT SECTION

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION		
UNION CARBIDE CORPORATION		
NUCLEAR DIVISION		
OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, ODE & DOUGLAS, INC.		
ENGINEERS		
WASTE ISOLATION FACILITY		
PARTIAL PLAN & SECTION		
VENTILATION SUPPLY SHAFT		
SHALE-CYCLE IF 5YR. RETRIEVABLE		
SCALE:	CONTRACT NO. 62Y-45702	
DATE: FEBRUARY, 1978	DWG. NO. L 39	REV.

PLAN OF SHAFT

STATION 1450

SHAFT SECTION

SECTION 'A-A'

TWO STATIONS AT BOTTOM
AT 120° TO EACH OTHER
(30' x 20' x 26')

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION		
UNION CARBIDE CORPORATION		
NUCLEAR DIVISION		
OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.		
ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY		
VENTILATION EXHAUST SHAFT		
SHALE-CYCLE 5YR. RETRIEVABLE		
SCALE:	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. L40	REV.

SECTION THRU SHAFT AT RING

DETAIL-2

DETAIL-1

DETAIL-2

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY SHAFT DRAINAGE CONTROL SELF CLEANING WATER RING SHALE - CYCLE II: 5YR. RETRIEVABLE		
SCALE:	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. L 41	REV.

MINE DRAINAGE PLAN

SCALE: 1" = 600'

NOTES:

DRAINAGE PLAN FOR CYCLE II IS SHOWN.
DRAINAGE PLANS FOR CYCLE I & III ARE SIMILAR.

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY

MINE DRAINAGE PLAN

SHALE - CYCLE II - 5 YR. RETRIEVABLE

SCALE: 1" = 600'

CONTRACT NO. 62Y-45702C

DATE: FEBRUARY, 1978

Draw. NO. L42

REV

CYCLE II: THROWAWAY FUEL CYCLE

PLAN

SECTION A - A

NOTES:

DRAINAGE PLAN FOR CYCLE II IS SHOWN.
DRAINAGE PLANS FOR CYCLE I & III ARE SIMILAR.

CYCLE II: THROWAWAY FUEL CYCLE

SECTION C-C

SECTION D-D

SECTION E-E

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY
PARTIAL DRAINAGE PLAN & SECTIONS
SHALE - CYCLE II - 5 YR. RETRIEVABLE

SCALE: 1" = 120'

CONTRACT NO. 62Y-45702C

DATE: FEBRUARY, 1978

DWG. NO. L43

REV.

Site Plan

PLOT PLAN

- 1 LLW/MINE AREA
- 2 LLW/MINE AREA
- 3 LLW/MINE AREA
- 4 MEN & MAT. SHAFT
- 5 NOT REQ'D
- 6 SUPPLY AIR SHAFT
- 7 NOT REQ'D
- 8 EXHAUST AIR SHAFT
- 9 CANISTERED WASTE SHAFT
- 10 LOW LEVEL WASTE SHAFT

OFFICE OF WASTE ISOLATION
 UNION CARBIDE CORPORATION
 NUCLEAR DIVISION
 OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
 ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY
REPOSITORY-SITE AND PLOT PLAN
 SHALE - CYCLE III - 5 YR. RETRIEVABLE

SCALE: AS NOTED	CONTRACT NO. 62Y-45702C
DATE: FEBRUARY, 1978	DWG. NO. M1
	REV.

CYCLE III: URANIUM RECYCLE WITH PU IN HLW

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY CANISTERED WASTE RECEIVING BUILDING BASEMENT PLAN		
SCALE:	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. M 3	REV.

OFFICE OF WASTE ISOLATION
 UNION CARBIDE CORPORATION
 NUCLEAR DIVISION
 OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
 ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY
 SCHEMATIC FLOW DIAGRAM
 CANISTERED WASTE
 SHALE-CYCLE III - 5 YR. RETRIEVABLE

SCALE: CONTRACT NO. 62Y-45702C
 DATE: FEBRUARY, 1978 DWG. NO. M 5 REV.

- LEGEND**
- HEPA FILTER
 - 90% NBS FILTER
 - 30% NBS FILTER
 - COOLING COIL
 - HEATING COIL
 - DIRECTION OF FLOW
 - FAN
 - FAN/COIL UNIT
 - DAMPER
 - CONTROL DAMPER
 - BACK FLOW PREVENTER
 - REGISTER

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY CANISTERED WASTE RECEIVING BUILDING SCHEMATIC VENTILATION AIR FLOW DIAGRAM		
SCALE: NO SCALE	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. M 6	REV.

CYCLE III: URANIUM RECYCLE WITH PU IN HLW

Ground Floor Plan

Section

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY LOW LEVEL WASTE RECEIVING BUILDING GROUND FLOOR PLAN AND SECTION SHALE - CYCLE III - 5 YR. RETRIEVABLE		
SCALE:	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. M. 7	REV.

CYCLE III: URANIUM RECYCLE WITH PU IN HLW

CYCLE III: URANIUM RECYCLE WITH PU IN HLW

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY
SCHEMATIC FLOW DIAGRAM
LOW LEVEL WASTE (LLW) BUILDING
SHALE-CYCLE III-5YR. RETRIEVABLE

SCALE: NONE	CONTRACT NO. 62Y-45702C
DATE: FEBRUARY, 1978	DWG. NO. M 8
	REV.

NOTE: LAYOUT SHOWN IS FOR FUEL CYCLE II AND III FACILITY.
FUEL CYCLE I FACILITY IS SIMILAR.

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY
LOW LEVEL WASTE RECEIVING BUILDING
VENTILATION FLOW DIAGRAM

SCALE: NO SCALE CONTRACT NO. 62Y-45702C
DATE: FEBRUARY, 1978 DWG. NO. M9 REV.

CYCLE III: URANIUM RECYCLE WITH PU IN HLW

Basement Plan

CYCLE III: URANIUM RECYCLE WITH PU IN HLW

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY EXHAUST VENT BUILDING BASEMENT PLAN SHALE - CYCLE III - 5 YR. RETRIEVABLE		
SCALE:	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. NL 10	REV

Ground Floor Plan

CYCLE III: URANIUM FUEL ELEMENTS WITH PU IN HLW

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY EXHAUST VENT BUILDING GROUND FLOOR PLAN SHALE - CYCLE III - 5 YR RETRIEVABLE		
SCALE:	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	OWG. NO. 1111	REV.

Section

OFFICE OF WASTE ISOLATION		
UNION CARBIDE CORPORATION		
NUCLEAR DIVISION		
OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.		
ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY		
EXHAUST VENT BUILDING		
SECTION		
SHALE - CYCLE III - 5 YR. RETRIEVABLE		
SCALE:	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. M 12	REV.

CYCLE III: URANIUM RECYCLE WITH PU IN HLW

OFFICE OF WASTE ISOLATION	
UNION CARBIDE CORPORATION	
NUCLEAR DIVISION	
OAK RIDGE, TENNESSEE	
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS	
ENGINEERS	
WASTE ISOLATION FACILITY	
MINE VENTILATION FLOW DIAGRAM	
SCALE: NO SCALE	CONTRACT NO. 62Y-1870
DATE: FEBRUARY, 1978	DWG. NO. M13

CYCLE III: URANIUM RECYCLE WITH PU IN HLW

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY SUPPLY VENTILATION BUILDING		
SCALE: AS SHOWN	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. M14	REV.

SECTION B-B

SECTION A-A

CYCLE III: URANIUM RECYCLE WITH PU IN HLW

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS
NEW YORK, N.Y.

WASTE ISOLATION FACILITY
LIQUID RADWASTE TREATMENT BUILDING
SHALE - CYCLE III - 5 YR. RETRIEVABLE

SCALE: 1/16" = 1'-0"

CONTRACT NO. 62Y-45702C

DATE: FEBRUARY, 1978

DWG. NO. M15

REV.

CYCLE III: URANIUM RECYCLE WITH PU IN HLW

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY CENTRAL SITE CONTROL & SWITCHGEAR BLDG. GROUND FLOOR PLAN		
SCALE: 1/8" = 1'-0"	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. M17	REV.

Excavated Material Handling
Plan Scale 1"=40'

Conveyor Schedule

Conk No	Tph	width	from	to
C1	500	48"	200	5
C2	"	36"	370	40
C3	"	"	"	50
C4	"	"	"	5
C5	"	"	"	5
Shuttle Drive				5
Vibrating Feeders	9@5HP			45
C6	500	36"	370	20
C7	"	"	"	75
Vibrating Feeders	2@5HP			10

Back-filling system

for future reverse operation

CYCLE III: URANIUM RECYCLE WITH PU IN HLW

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY EXCAVATED MATERIAL AND COAL HANDLING		
SCALE:	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. M18	REV.

MINING VENTILATION DETAIL
NO SCALE

LEGEND

- PLACEMENT EXHAUST AIR
- MINING EXHAUST AIR
- PLACEMENT & MINING SUPPLY AIR
- x PLACEMENT IN PROGRESS
- MINING IN PROGRESS
- + ROOM OR CORRIDOR SEALED

PARTIAL PLAN
MINING AND PLACEMENT VENTILATION
FUEL CYCLE I LAYOUT SHOWN- CYCLES II & III SIMILAR

CYCLE III: URANIUM RECYCLE WITH PU IN HLW

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY MINE VENTILATION PLAN		
SCALE: 1"=300'	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1970	DWG. NO. M10	REV.

TOTAL FACILITY LOAD

LOAD - KVA
CONN. 30305
ACTIVE 23041
EMERG. 2741

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS
NEW YORK, N.Y.

WASTE ISOLATION FACILITY
ELECTRICAL-ONE LINE DIAGRAM
SHALF-CYCLE III-5 YEAR RETRIEVABLE

SCALE: NONE
DATE: FEBRUARY, 1978

CONTRACT NO. 62Y-45702C
DWO. NO. M20

REV.

CYCLE III: URANIUM RECYCLE WITH PU IN HLW

SUB-STATION PLAN

ITEM	QUANTITY	DESCRIPTION
1	8	AIR BREAK SWITCH, W TYPE V-3, 69KV, 600A, 3PST WITH MANUAL OPERATOR
2	6	LIGHTNING ARRESTER, W TYPE IVS
3	24	APPARATUS INSULATOR 69KV.
4	30	STRAIN INSULATOR, 69 KV.
5		1" IPS COPPER TUBING
6	3	1200A, 69KV, OIL C.B. 3P, W TYPE GS
7		2/O BARE COPPER CABLE
8	2	69KV/13.8KV. TRANSFORMER, 3Ø
9		4/O COUNTERPOISE GROUND CABLE
10		3/4" 10'0" COPPERWELD GROUND ROD
11		1/O GROUND CABLE
12		ANGLE IRON LATTICE COLUMN 33' HIGH
13		ANGLE IRON LATTICE BEAM
14		CHAIN LINK FENCE
15	4	CURRENT TRANSFORMER
16	4	POTENTIAL TRANSFORMER

STANDBY GENERATOR

SECTION A-A

SECTION B-B

SECTION C-C

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY
MAIN ELECTRICAL SUBSTATION
AND STANDBY GENERATOR

SCALE:

CONTRACT NO. 62Y-45702C

DATE: FEBRUARY, 1978

DWG. NO. M21

REV.

CYCLE III: URANIUM RECYCLE WITH PU IN HLW

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY GENERIC SHALE STRATIGRAPHY SHALE-CYCLE III- 5 YR. RETRIEVABLE		
SCALE: AS SHOWN	CONTRACT NO. 62Y-45702C	REV.
DATE: FEBRUARY, 1978	DWG. NO. M 22	

MINING AND PLACEMENT SCHEDULE

SHALE - CYCLE III - 5 YEARS RETRIEVABLE

CYCLE III: URANIUM RECYCLE WITH PU IN HLW

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY
HLW MINING AND PLACEMENT SCHEDULE
SHALE-CYCLE III - 5 YR. RETRIEVABLE

SCALE:	CONTRACT NO. 62Y-45702C
DATE: FEBRUARY, 1978	DWG. NO. M23 REV.

MINING AND PLACEMENT SCHEDULE

SHALE - CYCLE III - 5 YEARS RETRIEVABLE

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS
NEW YORK, N.Y.

WASTE ISOLATION FACILITY
ILW & CW MINING AND PLACEMENT SCHEDULE
SHALE-CYCLE III - 5 YR. RETRIEVABLE

SCALE:	CONTRACT NO. 62Y-45702C
DATE: FEBRUARY, 1978	DWG. NO. M24 REV.

CYCLE III: URANIUM RECYCLE WITH PU IN HLW

PLAN

SECTION B - B

SECTION A - A

OFFICE OF WASTE ISOLATION	
UNION CARBIDE CORPORATION	
NUCLEAR DIVISION	
OAK RIDGE, TENNESSEE	
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.	
ENGINEERS	
NEW YORK, N.Y.	
WASTE ISOLATION FACILITY	
MINE PARTIAL PLAN & SECTIONS	
SHALE - CYCLE III - 5 YR. RETRIEVABLE	
SCALE: 1" = 120'	CONTRACT NO. 62Y-48702C
DATE: FEBRUARY, 1978	DWG. NO. M26
	REV.

CYCLE III: URANIUM RECYCLE WITH PU IN HLW

CORRIDOR & ROOM LAYOUT - ILW & CW, LLW

SCALE: 1" = 60'

TYPICAL ROOM CROSS SECTION - ILW & CW, LLW

SCALE: 1" = 30'

ROOM PLAN - ILW & CW

SCALE: 1/16" = 1'

CORRIDOR & ROOM LAYOUT - HLW

SCALE: 1" = 60'

TYPICAL ROOM CROSS SECTION - HLW

SCALE: 1" = 30'

ROOM PLAN - HLW

SCALE: 1/16" = 1' CYCLE III: URANIUM RECYCLE WITH PU IN HLW

ROOM PLAN - LLW

SCALE: 1/16" = 1'

NOTE:

1. 2% OF HOLES IN EACH ROOM IS TO BE RESERVED FOR OVERPACKED CANISTERS.

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS
NEW YORK, N.Y.

WASTE ISOLATION FACILITY
CORRIDOR AND ROOM LAYOUT
SHALE-CYCLE III - 5 YR. RETRIEVABLE

SCALE: AS NOTED

CONTRACT NO. 62Y-45702C

DATE: FEBRUARY, 1978

DWG. NO. M27

REV.

SUBSURFACE RECEIVING STATIONS
N.T.S.

INTERMEDIATE LEVEL PLAN

LOWER LEVEL PLAN

TRANSPORTER LEVEL PLAN

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY CANISTERED WASTE SUBSURFACE RECEIVING STATION - PLANS SHALE - CYCLE III - 5 YR. RETRIEVAL		
SCALE: $\frac{3}{8}$ " = 1'-0"	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. M28	REV.

CYCLE III: URANIUM RECYCLE WITH PU IN HLW

SECTION A-A

SECTION B-B

SECTION C-C

CYCLE III: URANIUM RECYCLE WITH PU IN HLW

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY
CANISTERED WASTE SUBSURFACE
RECEIVING STATION - SECTIONS
SHALE - CYCLE III - 5 YR. RETRIEVABLE

SCALE: $\frac{3}{32}$ " = 1'-0"

CONTRACT NO. 62Y-45702C

DATE: FEBRUARY, 1978

DWG. NO. M29

REV.

CANISTER DETAIL

CANISTER PLACEMENT PLAN

CANISTER PLACEMENT ELEVATION

DETAIL 1

SECTION A-A

DETAIL 2

SECTION B-B

DETAIL 3

SECTION C-C

NOTE:
DETAILS SHOWN FOR HLW.
ILW & CW ARE SIMILAR EXCEPT FOR ROOM SIZE
AND STORAGE PATTERN.

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY
CANISTERED WASTE STORAGE
SHALE - CYCLE III - 5 YR. RETRIEVABLE

SCALE: NOT TO SCALE	CONTRACT NO. 82Y-43702C
DATE: FEBRUARY, 1978	DWG. NO. M30 REV.

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS
NEW YORK, N.Y.

WASTE ISOLATION FACILITY
SHAFT CONSTRUCTION SCHEDULE
SHALE-CYCLE-5YR. RETRIEVABLE

CYCLE III: URANIUM RECYCLE WITH PU IN HLW

SCALE: 1" = 10 WEEKS
DATE: FEBRUARY, 1978

CONTRACT NO. 62Y-467020
DWS. NO. M 31

PLAN OF SHAFT

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY
MEN AND MATERIAL SHAFT
SHALE-CYCLE III-5YR. RETRIEVABLE

SCALE:	CONTRACT NO. 62Y-45702C
DATE: FEBRUARY, 1978	DWG. NO. M 32 REV.

CYCLE III: URANIUM RECYCLE WITH PU IN HLW

G.A. LOADING POCKET & SHAFT BOTTOM

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY MEN AND MATERIAL SHAFT LOADING POCKET & SHAFT BOTTOM SHALE - CYCLE III - 5 YR. RETRIEVABLE		
SCALE:	CONTRACT NO. 62Y - 45702C	
DATE: FEBRUARY, 1978	DWG. NO. M 33	REV.

CYCLE III: URANIUM RECYCLE WITH PU IN HLW

PLAN OF SHAFT

TYP. GUIDE RAIL CONNECT'N

TYP. BUNTION TO WALL CONNECT'N

SHAFT SECTION

PLAN

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DONALDSON
ENGINEERS

WASTE ISOLATION FACILITY
CANISTERED WASTE SHAFT
SHALE-CYCLE III - 5 YR. RETRIEVABLE

SCALE:
DATE: FEBRUARY, 1978

CONTRACT NO. 52Y-107
DWS. NO. M-34

CYCLE III: URANIUM RECYCLE WITH PU IN HLW

CYCLE III: URANIUM RECYCLE WITH PU IN HLW
 ESTIMATED WEIGHT - 120k

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY CANISTERED WASTE CAGE SHALE CYCLE III 5YR. RETRIEVABLE		
SCALE:	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. M 35	REV.

TYPICAL GUIDE RAIL ASSEMBLY

TYPICAL GUIDE SHOE

GUIDE GENERAL ASSEMBLY

FLEXIBLE SAFETY DEVICE

SHAFT SAFETY GEAR ARRANGMENT

NOTES

BRAKING SEQUENCE

DURING AN OVERSPEED CONDITION, THE BALL GOVERNOR (1) ENGAGES THE GOVERNOR ROPE (2) AS THE GOVERNOR ROTATES. AS THE GOVERNOR ROTATES, THE ACTIVATOR LEVER (3) IS IN THE ENGAGING POSITION. THE ACTIVATOR LEVER (3) IS MOUNTED JAW SIDE UP AGAINST THE GOVERNOR HOUSING UNIT. AS THE GOVERNOR ROTATES, THE ACTIVATOR LEVER (3) BEGINS TO SPREAD THE GOVERNOR HOUSING UNIT. A CONSTANT PRESSURE IS APPLIED TO THE GOVERNOR HOUSING UNIT. SHOULD THE GOVERNOR ROTATE A GIVEN DISTANCE, SHOULD THE GOVERNOR ROTATE (6) AUTOMATICALLY ENGAGES THE

OFFICE
UNION

PARSONS ENGINEERS

WASTE ISOLATION
CANISTERED WASTE CONVEYANCE
SAFETY MECHANISM
SHALE-CYCLE III-5YR. RETRIEVABLE

SCALE:

DATE: FEBRUARY, 1978

CYCLE III: URANIUM RECYCLE WITH PII IN HLW

DATE

PERMANENT SHAFT SETUP

LOW LEVEL WASTE SHAFT

PLAN OF HEADFRAME

STEEL LININGS

1450 SIN.

1600

TEMPORARY SETUP FOR INITIAL MINING

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARDONS, BRINCKERHOFF, QUINN & ASSOCIATES
ENGINEERS

WASTE ISOLATION FACILITY
LOW LEVEL WASTE SHAFT
SHALE-CYCLE III-5YR. RETRIEVABLE

SCALE: 1" = 10' 1" = 20' 1" = 40'
DATE: FEBRUARY 1978

CYCLE III: URANIUM RECYCLE WITH PU IN HLW

SECTION 'A-A'

CYCLE III: URANIUM RECYCLE WITH PU IN HLW

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY LOW LEVEL SHAFT DURING PRELIMINARY MINE DEVELOPMENT SHALE-CYCLE III - 5YR. RETRIEVABLE		
SCALE:	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. M 38	REV.

PLAN OF SHAFT

SHAFT SECTION

CYCLE III: URANIUM RECYCLE WITH PU IN HLW

OFFICE OF WASTE ISOLATION	
UNION CARBIDE CORPORATION	
NUCLEAR DIVISION	
OAK RIDGE, TENNESSEE	
PARSONS, BRINCKERHOFF & COMPANY	
ENGINEERS	
WASTE ISOLATION FACILITY	
VENTILATION SUPPLY SHAFT	
SHALE-CYCLE III- 5YR. RETRIEVABLE	
SCALE:	
DATE:	FEBRUARY, 1978

PLAN OF SHAFT

STATION 1450

SHAFT SECTION

TWO STATIONS AT BOTTOM
AT 120° TO EACH OTHER
(30' x 20' x 26')

CYCLE III: URANIUM RECYCLE WITH PU IN HLW

OFFICE OF WASTE ISOLATION	
UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE	
PARSONS, BRINCKERHOFF, SMITH & CO. ENGINEERS	
WASTE ISOLATION FACILITY	
VENTILATION EXHAUST SHAFT SHALE-CYCLE III-5YR. RETRIEVABLE	
SCALE:	CUSTOMER'S NO.
DATE: FEBRUARY, 1978	DWG. NO. W-40

SECTION THRU SHAFT AT RING

DETAIL - 1

DETAIL - 2

CYCLE III: URANIUM RECYCLE WITH PU IN HLW

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS
NEW YORK, N.Y.

WASTE ISOLATION FACILITY
SHAFT DRAINAGE CONTROL
SELF CLEANING WATER RING
SHALE-CYCLE III 5YR. RETRIEVABLE

SCALE:

CONTRACT NO. 62Y-45702C

DATE: FEBRUARY, 1978

DWG. NO. M-41

MINE DRAINAGE PLAN

SCALE: 1" = 600'

NOTES:

DRAINAGE PLAN FOR CYCLE II IS SHOWN.
DRAINAGE PLANS FOR CYCLE I & III ARE SIMILAR.

CYCLE III: URANIUM RECYCLE WITH PU IN HLW

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS
NEW YORK, N.Y.

WASTE ISOLATION FACILITY

MINE DRAINAGE PLAN

SHALE - CYCLE III - 5 YR. RETRIEVABLE

SCALE: 1" = 600'

CONTRACT NO. 62Y-45702C

DATE: FEBRUARY, 1978

DWG. NO. M42

REV

PLAN

SECTION A - A

NOTES:
DRAINAGE PLAN FOR CYCLE II IS SHOWN.
DRAINAGE PLANS FOR CYCLE I & III ARE SIMILAR.

CYCLE III: URANIUM RECYCLE WITH PU IN HLW

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY PARTIAL DRAINAGE PLAN & SECTIONS SHALE - CYCLE III - 5 YR. RETRIEVABLE		
SCALE: 1" = 120'	CONTRACT NO. 62Y-45702C	REV.
DATE: FEBRUARY, 1978	DWG. NO. 143

Site Plan

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS
NEW YORK, N.Y.

WASTE ISOLATION FACILITY
REPOSITORY-SITE AND PLOT PLAN

SHALE - CYCLE II - 25 YR. RETRIEVABLE

SCALE: AS NOTED

CONTRACT NO. 62Y-46708C

DATE: FEBRUARY, 1978

DWG. NO. N 1

REV.

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE 37831

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS
NEW YORK, N.Y.

WASTE ISOLATION FACILITY
CANISTERED WASTE RECEIVING BUILDING
GROUND FLOOR PLAN

SCALE: CONTRACT NO. 62Y-45702C
DATE: FEBRUARY, 1978 DWG. NO. N2 REV.

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE	
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.	
WASTE ISOLATION FACILITY CANISTERED WASTE RECEIVING BUILDING BASEMENT PLAN	
SCALE:	CONTRACT NO. 52V-457020
DATE: FEBRUARY, 1978	DWG. NO. N-3 REV.

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY CANISTERED WASTE RECEIVING BUILDING SECTIONS SHALE - CYCLE II - NON-RETRIEVABLE		
SCALE: 1/4" = 1'-0"	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. N 4	REV.

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY
SCHEMATIC FLOW DIAGRAM
CANISTERED WASTE
SHALE - CYCLE II - 25 YR. RETRIEVABLE

SCALE:	CONTRACT NO. 62Y-46702C
DATE: FEBRUARY, 1978	DWG. NO. N 5
	REV.

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY
CANISTERED WASTE RECEIVING BUILDING

VENTILATION FLOW DIAGRAM

SCALE: NO SCALE

CONTRACT NO. 62Y-45702C

DATE: FEBRUARY, 1978

DWG. NO. N 6

REV.

CYCLE II: THROWAWAY FUEL CYCLE

Ground Floor Plan

Section

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE	
PARSONS, BRINCKERHOFF, QUADE & DONALDSON ENGINEERS	
WASTE ISOLATION FACILITY LOW LEVEL WASTE RECEIVING BUILDING GROUND FLOOR PLAN AND SECTION SHALE - CYCLE II 25 YR. RETRIEVABLE	
SCALE:	CONTRACT NO. 62Y - 45702C
DATE: FEBRUARY, 1978	DWG. NO. N 7

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION	
UNION CARBIDE CORPORATION	
NUCLEAR DIVISION	
OAK RIDGE, TENNESSEE	
PARSONS, BRINCKERHOFF, OLIVE & DODGE	
ENGINEERS	
WASTE ISOLATION FACILITY	
SCHEMATIC FLOW DIAGRAM	
LOW LEVEL WASTE (LLW) BUILDING	
SHALE - CYCLE II 25 YR RETRIEVABLE	
SCALE: NONE	CONTRACT NO. 62Y-457
DATE: FEBRUARY, 1978	DR. NO. N.E.

NOTE: LAYOUT SHOWN IS FOR FUEL CYCLE II AND III FACILITY. FUEL CYCLE I FACILITY IS SIMILAR.

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS
NEW YORK, N.Y.

WASTE ISOLATION FACILITY
LOW LEVEL WASTE RECEIVING BUILDING
VENTILATION FLOW DIAGRAM

SCALE: NO SCALE
DATE: FEBRUARY, 1978
CONTRACT NO. 62Y-45702C
DWG. NO. N 9
REV.

CYCLE II: THROWAWAY FUEL CYCLE

Basement Plan

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY EXHAUST VENT BUILDING BASEMENT PLAN SHALE - CYCLE II - 25 YR. RETRIEVABLE		
SCALE:	CONTRACT NO. 62Y - 45702C	
DATE: FEBRUARY, 1978	DWG. NO. N 10	REV.

Ground Floor Plan

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION UNION CARBID CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY EXHAUST VENT BUILDING GROUND FLOOR PLAN SHALE - CYCLE II - 25 YR RETRIEVABLE		
SCALE:	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. N II	REV.

Section

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS
NEW YORK, N.Y.

WASTE ISOLATION FACILITY
EXHAUST VENT BUILDING
SECTION
SHALE - CYCLE II - 25 YR. RETRIEVABLE

SCALE:	CONTRACT NO. 62Y - 45702C
DATE: FEBRUARY, 1978	DWG. NO. N 12 REV.

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION	
UNION CARBIDE CORPORATION	
NUCLEAR DIVISION	
OAK RIDGE, TENNESSEE	
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.	
ENGINEERS	
NEW YORK, N.Y.	
WASTE ISOLATION FACILITY	
MINE VENTILATION FLOW DIAGRAM	
SHALE - CYCLE II 25 YR. RETRIEVABLE	
SCALE: NO SCALE	CONTRACT NO. 62Y-457021
DATE: FEBRUARY, 1978	DWG. NO. N13

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS
NEW YORK, N.Y.

WASTE ISOLATION FACILITY
SUPPLY VENTILATION BUILDING

SHALE - CYCLE II - 25 YR. RETRIEVABLE

SCALE: AS SHOWN

CONTRACT NO. 62Y-45702C

DATE: FEBRUARY, 1978

DWG. NO. N14

REV.

SECTION B-B

SECTION A-A

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY LIQUID RADWASTE TREATMENT BUILDING SHALE-CYCLE II - 25 YR. RETRIEVABLE		
SCALE: 1/8" = 1'-0"	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. N15	REV.

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY CENTRAL SITE CONTROL & SWITCHGEAR BUILDING GROUND FLOOR PLAN SHALE-CYCLE II - 25 YR. RETRIEVABLE		
SCALE: 1/8" = 1'-0"	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. N17	REV.

CON. NO	Top	width	fpm
C1	500	48"	600
C2	"	36"	370
C3	"	"	"
C4	"	"	"
C5	"	"	"
Shuttle Drive			
Vibrating Feeders 9@5HP 45			
C6	500	36	370
C7	"	"	"
C8	"	"	"
Vibrating Feeders 2@5HP 10

OFFICE OF WASTE ISOLATION		UNION CARBIDE CORPORATION		NUCLEAR DIVISION		OAK RIDGE, TENNESSEE	
PARSONS BRINCKERHOFF, QUADE & DOUGLAS, INC.		NEW YORK, N.Y.		ENGINEERS			
WASTE ISOLATION FACILITY							
EXCAVATED MATERIAL AND COAL HANDLING							
SHALE - CYCLE II - 25 YR. RETENTIONABLE							
SCALE: AS NOTED		CONTRACT NO. 62Y - 45702C		DRG. NO. N18		REV	
DATE: FEBRUARY, 1978

PARTIAL PLAN
MINING AND PLACEMENT VENTILATION
FUEL CYCLE I LAYOUT SHOWN - CYCLES II & III SIMILAR

MINING VENTILATION DETAIL
NO SCALE

- LEGEND**
- PLACEMENT EXHAUST AIR
 - - - MINING EXHAUST AIR
 - PLACEMENT & MINING SUPPLY AIR
 - x — PLACEMENT IN PROGRESS
 - — MINING IN PROGRESS
 - + — ROOM OR CORRIDOR SEALED

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY
MINE VENTILATION PLAN

SHALE - CYCLE II - 25 YR. RETRIEVABLE

SCALE: 1" = 300'	CONTRACT NO. 62Y-45702C
DATE: FEBRUARY, 1978	DWG. NO. N19 REV.

SUB-STATION PLAN

ITEM	QUANTITY	DESCRIPTION
1	8	AIR BREAK SWITCH, W-TYPE V-3, 69KV, 600A, 3PST WITH MANUAL OPERATOR
2	6	LIGHTNING ARRESTER, W-TYPE IVS
3	24	APPARATUS INSULATOR 69KV
4	30	STRAIN INSULATOR, 69KV
5		1" IPS COPPER TUBING
6	3	1200A, 69KV, OIL C.B. 3P, W-TYPE GS
7		2" O BARE COPPER CABLE
8	2	69KV/13.8KV. TRANSFORMER, 3P
9		4/0 COUNTERPOISE GROUND CABLE
10		3/4" x 10'-0" COPPERWELD GROUND ROD
11		1/0 GROUND CABLE
12		ANGLE IRON LATTICE COLUMN 33' HIGH
13		ANGLE IRON LATTICE BEAM
14		CHAIN LINK FENCE
15	4	CURRENT TRANSFORMER
16	4	POTENTIAL TRANSFORMER

STANDBY GENERATOR

SECTION A-A

SECTION B-B

SECTION C-C

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS
NEW YORK, N.Y.

WASTE ISOLATION FACILITY
MAIN ELECTRICAL SUBSTATION
AND STANDBY GENERATOR

SCALE: CONTRACT NO. 62Y-45702C
DATE: FEBRUARY, 1978 DWG. NO. N 21 REV.

CYCLE II: THROWAWAY FUEL CYCLE

MINING AND PLACEMENT SCHEDULE

SHALE-CYCLE II - 25 YEARS RETRIEVABLE

LEGEND

MINING

DRILLING & SLEEVE PLACEMENT

CANISTER PLACEMENT

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY
PWR MINING AND PLACEMENT SCHEDULE
SHALE-CYCLE II - 25 YR. RETRIEVABLE

SCALE:	CONTRACT NO. 62Y - 45702C
DATE: FEBRUARY, 1978	DWG. NO. N23 REV.

CYCLE II: THROWAWAY FUEL CYCLE

MINING AND PLACEMENT SCHEDULE

SHALE - CYCLE II - 25 YEARS RETRIEVABLE

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS
NEW YORK, N.Y.

WASTE ISOLATION FACILITY
BWR MINING AND PLACEMENT SCHEDULE
SHALE - CYCLE II - 25 YR. RETRIEVABLE

SCALE:	CONTRACT NO. 62Y - 45702C
DATE: FEBRUARY, 1978	DWG. NO. N24 REV.

CYCLE II: THROWAWAY FUEL CYCLE

NOTES:

1. ALL LINES REPRESENT CENTER LINES OF ROOMS OR CORRIDORS.
2. FOR SHAFT AREA DETAIL, SEE DWG. NO. P10
3. PWR = PRESSURIZED WATER REACTOR WASTE
BWR = BOILING WATER REACTOR WASTE
LLW = LOW LEVEL WASTE
4. FOR ROOM CROSS SECTIONS, SEE DWG. NO. P11
5. ALL CORRIDORS ARE 26' WIDE x 25' HIGH
6. NUMBER IN CIRCLE DENOTES PANEL NUMBER.
7. ELEVATIONS SHOWN ARE BASED ON GROUND LINE 0.00'.

LEGEND:

PORTION OF REPOSITORY STORAGE AREA THAT IS UTILIZED DURING FIRST FIVE YEARS OF PLACEMENT OPERATION.

EXTRACTION RATIO

PWR: 23 %
 BWR: 30 %
 LLW: 30 %

STORAGE CAPACITY (YEAR 2003)

PWR = 79,120 UNITS
 BWR = 122,268 UNITS
 LLW = 46,368 UNITS

MINE MASTER PLAN

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY MINE MASTER PLAN SHALE - CYCLE II - 25 YR. RETRIEVABLE		
SCALE: 1" = 120'	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. N25	REV.

PLAN

SECTION A - A

SECTION B - B

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION		
UNION CARBIDE CORPORATION		
NUCLEAR DIVISION		
OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.		
ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY		
MINE PARTIAL PLAN & SECTIONS		
SHALE - CYCLE II 25 YR. RETRIEVABLE		
SCALE: 1" = 120'	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. N26	REV.

CORRIDOR & ROOM LAYOUT - BWR, LLW
SCALE: 1" = 60'

TYPICAL ROOM CROSS SECTION - BWR, LLW
SCALE: 1" = 30'

ROOM PLAN - BWR
SCALE: 1/16" = 1'-0"

CORRIDOR & ROOM LAYOUT - PWR
SCALE: 1" = 60'

TYPICAL ROOM CROSS SECTION - PWR
SCALE: 1" = 30'

ROOM PLAN - PWR
SCALE: 1/16" = 1'-0"

CYCLE II: THROWAWAY FUEL CYCLE

ROOM PLAN - LLW
SCALE: 1/16" = 1'-0"

NOTE:

1.2% OF HOLES IN EACH ROOM IS TO BE RESERVED FOR OVERPACKED CANISTERS.

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PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS
NEW YORK, N.Y.

WASTE ISOLATION FACILITY
CORRIDOR AND ROOM LAYOUT
SHALE-CYCLE II-25YR. RETRIEVABLE

SCALE: AS NOTED

CONTRACT NO. 62Y-45702C

DATE: FEBRUARY, 1978

DWG. NO. N27

REV.

SUBSURFACE RECEIVING STATIONS
N.T.S.

INTERMEDIATE LEVEL PLAN

LOWER LEVEL PLAN

TRANSPORTER LEVEL PLAN

CYCLE II: THROWAWAY FUEL CYCLE

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ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY
CANISTERED WASTE SUBSURFACE
RECEIVING STATION - PLANS
SHALE - CYCLE II - 25 YR. RETRIEVABLE

SCALE: $\frac{3}{32}$ " = 1'-0"

CONTRACT NO. 62Y-45702C

DATE: FEBRUARY, 1978

DWG. NO. N28

REV.

SECTION A-A

SECTION B-B

SECTION C-C

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION
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PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY
CANISTERED WASTE SUBSURFACE
RECEIVING STATION - SECTIONS
SHALE - CYCLE II - 25 YR. RETRIEVABLE

SCALE: $\frac{3}{32}$ " = 1'-0"

CONTRACT NO. 62Y-45702C

DATE: FEBRUARY, 1978

DWG. NO. N29

REV.

CANISTER DETAIL

CANISTER PLACEMENT PLAN

CANISTER PLACEMENT ELEVATION

DETAIL 1

SECTION A-A

DETAIL 2

SECTION B-B

DETAIL 3

SECTION C-C

NOTE:
DETAILS SHOWN FOR PWR.
BWR IS SIMILAR EXCEPT FOR ROOM SIZE
AND STORAGE PATTERN.

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WASTE ISOLATION FACILITY
CANISTERED WASTE STORAGE
SHALE - CYCLE II - 25 YR. RETRIEVABLE

SCALE: NOT TO SCALE	CONTRACT NO. 62Y - 45702C
DATE: FEBRUARY, 1978	DWG. NO. N30 REV.

WASTE ISOLATION FACILITY

PLAN ON SHAFT

OFFICE OF WASTE ISOLATION
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY
MINE AND MATERIAL SHAFT
SHALE-CYCLE 25YR. RETRIEVABLE

SCALE:	CONTRACT NO. 62Y-45702C
DATE: FEBRUARY, 1978	DWG. NO. N32 REV.

CYCLE II: THROWAWAY FUEL CYCLE

G.A. LOADING POCKET & SHAFT BOTTOM

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY MEN AND MATERIAL SHAFT LOADING POCKET & SHAFT BOTTOM SHALE - CYCLE II: 5 YR. RETRIEVABLE		
SCALE:	CONTRACT NO. 62Y - 45702C	
DATE: FEBRUARY, 1978	DWG. NO. N33	REV.

CYCLE II: THROWAWAY FUEL CYCLE

PLAN ON SHAFT

TYP. GUIDE RAIL CONNECT'N

TYP. BUNTON TO WALL CONNECT'N

SHAFT SECTION

PLAN

OFFICE OF WASTE ISOLATION	
UNION CARBIDE CORPORATION	
NUCLEAR DIVISION	
OAK RIDGE, TENNESSEE	
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.	
ENGINEERS	
WASTE ISOLATION FACILITY	
CANISTERED WASTE SHAFT	
SHALE-CYCLE II- 25 YR. RETRIEVABLE	
SCALE:	CONTRACT NO. 62Y-4570
DATE: FEBRUARY, 1978	DWG. NO. N34

CYCLE II: THROWAWAY FUEL CYCLE

CYCLE II: THROWAWAY FUEL CYCLE
 ESTIMATED WEIGHT - 200^k

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE	
PARSONS, BRINCKERHOFF, QUADE & DOUGLASS ENGINEERS <small>NEW YORK, N.Y.</small>	
WASTE ISOLATION FACILITY CANISTERED WASTE CAGE SHALE-CYCLE II-25YR. RETRIEVABLE	
SCALE:	CONTRACT NO. 62Y-45702
DATE: FEBRUARY, 1978	DWG. NO. N35

TYPICAL GUIDE RAIL ASSEMBLY

TYPICAL GUIDE SHOE

GUIDE GENERAL ASSEMBLY

FLEXIBLE SAFETY DEVICE

SHAFT SAFETY GEAR ARRANGMENT

NOTES

BRKING SEQUENCE

DURING AN OVERSPEED CONDITION, BALL GOVERNOR (1) ENGAGES THE ACTUATOR LEVER (3) AS THE CAGE MOVES DOWN. THE ACTUATOR LEVER (3) ENGAGES THE BRAKE HOUSING UNIT (2) AS THE CAGE MOVES DOWN. THE BRAKE HOUSING UNIT (2) ENGAGES THE BRAKE SHOES (4) AS THE CAGE MOVES DOWN. THE BRAKE SHOES (4) ENGAGE THE RAILS AS THE CAGE MOVES DOWN. THE CAGE IS STOPPED AT A CONSTANT DISTANCE FROM THE RAILS. THE CAGE IS STOPPED AT A CONSTANT DISTANCE FROM THE RAILS. (5) AUTOMATICALLY ENGAGES THE BRAKE SHOES (4) AS THE CAGE MOVES DOWN.

OFFICE

WASTE CONVEYANCE
CANISTERED WASTE CONVEYANCE
SAFETY MECHANISM
SHALE-CYCLE II-25YR. RETRIEVABLE

SCALE:

DATE: FEBRUARY 1977

CYCLE II: THROWAWAY FUEL CYCLE

PERMANENT SHAFT SETUP

LOW LEVEL WASTE SHAFT

PLAN OF HEADFRAME

0 20 40

TEMPORARY SETUP FOR INITIAL MINING

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION	
UNION CARBIDE CORPORATION	
NUCLEAR DIVISION	
OAK RIDGE, TENNESSEE	
PARSONS, BRINCKERHOFF, QUADRE & ASSOCIATES	
ENGINEERS	
WASTE ISOLATION FACILITY	
LOW LEVEL WASTE SHAFT	
SHALE-CYCLE II: 25YR. RETRIEVABLE	
SCALE:	CONTRACT NO. 6EY-4570CC
DATE: FEBRUARY, 1978	DRG. NO. 37

SECTION 'A-A'

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION UNION CARBIDE CORPORATION NUCLEAR DIVISION OAK RIDGE, TENNESSEE		
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC. ENGINEERS NEW YORK, N.Y.		
WASTE ISOLATION FACILITY LOW LEVEL SHAFT DURING PRELIMINARY MINE DEVELOPMENT SHALE-CYCLE II-25YR. RETRIEVABLE		
SCALE:	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. N38	REV.

PLAN ON SHAFT

1375 LEVEL

SHAFT SECTION

TWO STATIONS AT BTM.
AT 90° TO EACH OTHER
(30'x20'x26')

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION
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NUCLEAR DIVISION
OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF & COMPANY
ENGINEERS

WASTE ISOLATION FACILITY
MINE PARTIAL PLAN & SECTIONS
VENTILATION SUPPLY SHAFT
SHALE-CYCLE II-25YR. RETRIEVABLE

SCALE:

DATE: FEBRUARY, 1978

PLAN ON SHAFT

STATION 1450

SHAFT SECTION

SECTION 'A-A'

TWO STATIONS AT BOTTOM
AT 120° TO EACH OTHER
(30'x 20'x 26')

CYCLE II: THROWAWAY FUEL CYCLE

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OAK RIDGE, TENNESSEE

PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS NEW YORK, N.Y.

WASTE ISOLATION FACILITY

VENTILATION EXHAUST SHAFT
SHALE-CYCLE 125YR. RETRIEVABLE

SCALE:	CONTRACT NO. 62Y-45702C	
DATE: FEBRUARY, 1978	DWG. NO. N40	REV.

SECTION THRU SHAFT AT RING

DETAIL -1

DETAIL -2

CYCLE II: THROWAWAY FUEL CYCLE

OFFICE OF WASTE ISOLATION	
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NUCLEAR DIVISION	
OAK RIDGE, TENNESSEE	
PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.	
ENGINEERS	
NEW YORK, N.Y.	
WASTE ISOLATION FACILITY	
SHAFT DRAINAGE CONTROL	
SELF CLEANING WATER RING	
SHALE-CYCLE 125YR. RETRIEVABLE	
SCALE:	CONTRACT NO. 62Y-457020
DATE: FEBRUARY, 1978	DWG. NO. N41

MINE DRAINAGE PLAN

SCALE: 1" = 600'

NOTES:

DRAINAGE PLAN FOR CYCLE II IS SHOWN.
DRAINAGE PLANS FOR CYCLE I & III ARE SIMILAR.

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NEW YORK, N.Y.

WASTE ISOLATION FACILITY
MINE DRAINAGE PLAN
SHALE - CYCLE II - 25 YR. RETRIEVABLE

SCALE: 1" = 600'

CONTRACT NO. 62Y-45702C

DATE: FEBRUARY, 1978

DES. NO. N42

REV.

CYCLE II: THROWAWAY FUEL CYCLE

PLAN

SECTION A - A

NOTES:

DRAINAGE PLAN FOR CYCLE II IS SHOWN.
DRAINAGE PLANS FOR CYCLE I & III ARE SIMILAR.

CYCLE II: THROWAWAY FUEL CYCLE

SECTION C-C

SECTION D-D

SECTION E-E

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NUCLEAR DIVISION
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PARSONS, BRINCKERHOFF, QUADE & DOUGLAS, INC.
ENGINEERS
NEW YORK, N.Y.

WASTE ISOLATION FACILITY
PARTIAL DRAINAGE PLAN & SECTIONS
SHALE-CYCLE II - 25 (R. RETRIEVABLE)

SCALE: 1" = 120'
DATE: FEBRUARY, 1978

CONTRACT NO. 62Y-45702C
DWG. NO. N43