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SANDIA REPORT

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Printed August 1996

Waste Isolation Pilot Plant Shaft Sealing System Compliance Submittal Design Report

Volume 2 of 2: Appendix E

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Prepared by
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Albuquerque, New Mexico 87185 and Livermore, California 94550
for the United States Department of Energy
under Contract DE-AC04-94AL85000

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STE ISOLATION PILOT PLANT

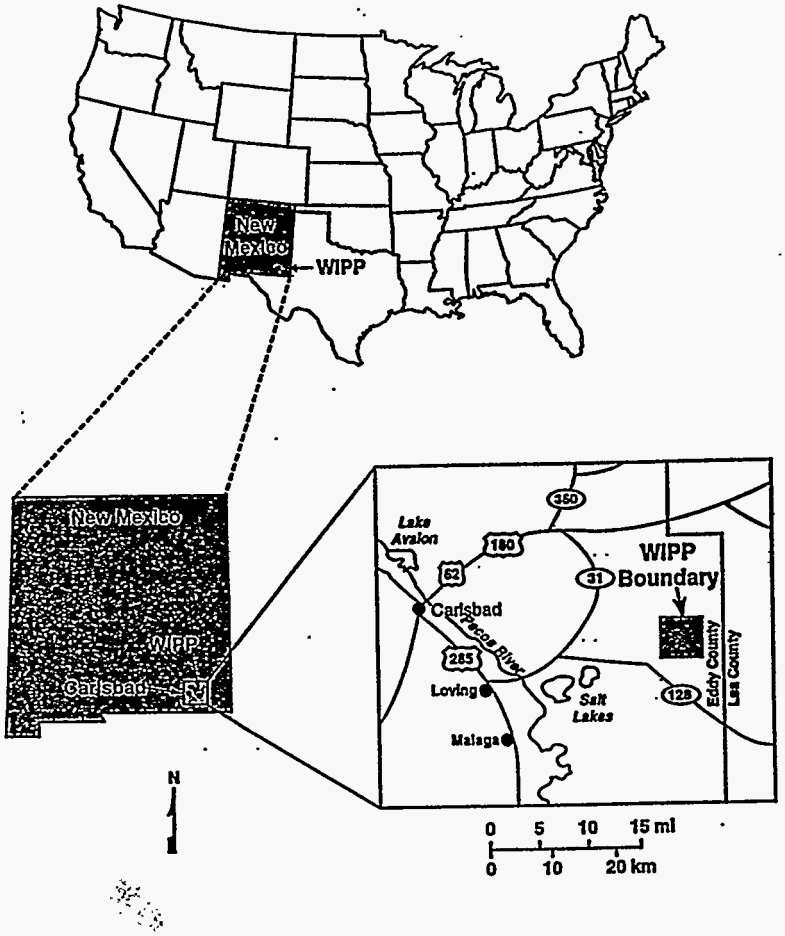
CARLSBAD, NM

AFT SEALING SYSTEM DESIGN

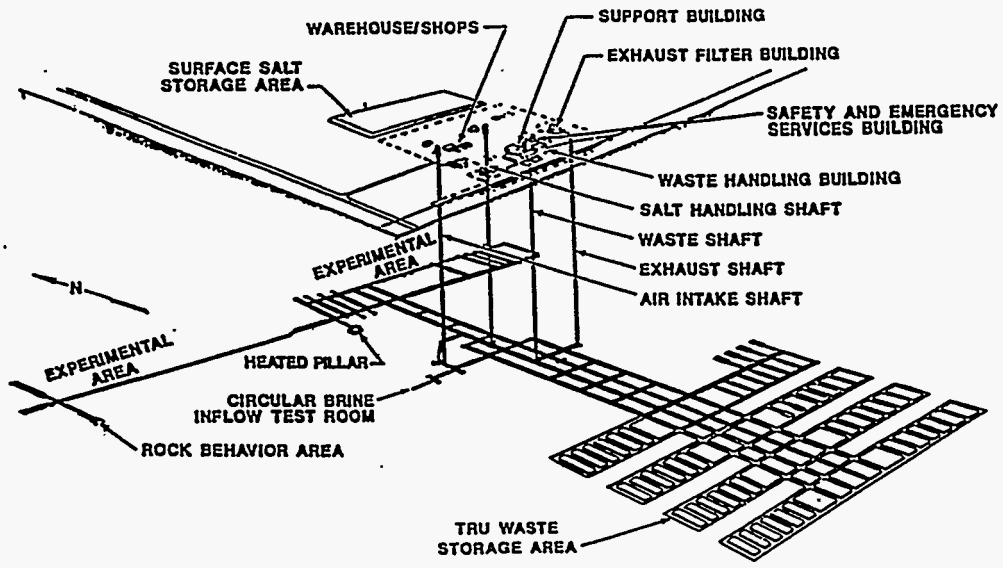
DESIGN DRAWINGS

	DRAWING NUMBER	TITLE
I	SNL-007 10 OF 28	WIPP SHAFT SEALING SYSTEM SALADO FORMATION AIR INTAKE SHAFT STRATIGRAPHY & SEALING SUBSYSTEM PROFILE
I IATIONS	SNL-007 11 OF 28	WIPP SHAFT SEALING SYSTEM AIR INTAKE SHAFT SHAFT STATION MONOLITH
I	SNL-007 12 OF 28	WIPP SHAFT SEALING SYSTEM NEAR-SURFACE/RUSTLER FORMATIONS EXHAUST SHAFT STRATIGRAPHY & AS-BUILT ELEMENTS
I IATIONS	SNL-007 13 OF 28	WIPP SHAFT SEALING SYSTEM SALADO FORMATION EXHAUST SHAFT STRATIGRAPHY & AS-BUILT ELEMENTS
H	SNL-007 14 OF 28	WIPP SHAFT SEALING SYSTEM NEAR-SURFACE/RUSTLER FORMATIONS EXHAUST SHAFT STRATIGRAPHY & SEALING SUBSYSTEM PROFILE
H	SNL-007 15 OF 28	WIPP SHAFT SEALING SYSTEM SALADO FORMATION EXHAUST SHAFT STRATIGRAPHY & SEALING SUBSYSTEM PROFILE
H HATIONS	SNL-007 16 OF 28	WIPP SHAFT SEALING SYSTEM EXHAUST SHAFT SHAFT STATION MONOLITH
H	SNL-007 17 OF 28	WIPP SHAFT SEALING SYSTEM NEAR-SURFACE/RUSTLER FORMATIONS SALT HANDLING SHAFT STRATIGRAPHY & AS-BUILT ELEMENTS
H HATIONS	SNL-007 18 OF 28	WIPP SHAFT SEALING SYSTEM SALADO FORMATION SALT HANDLING SHAFT STRATIGRAPHY & AS-BUILT ELEMENTS

DRAWING NUMBER	TITLE
SNL-007 19 OF 28	WIPP SHAFT SEALING SYSTEM NEAR-SURFACE/RUSTLER FORMATIONS SALT HANDLING SHAFT STRATIGRAPHY & SEALING SUBSYSTEM PROFILE
SNL-007 20 OF 28	WIPP SHAFT SEALING SYSTEM SALADO FORMATION SALT HANDLING SHAFT STRATIGRAPHY & SEALING SUBSYSTEM PROFILE
SNL-007 21 OF 28	WIPP SHAFT SEALING SYSTEM SALT HANDLING SHAFT SHAFT STATION MONOLITH
SNL-007 22 OF 28	WIPP SHAFT SEALING SYSTEM CONCRETE-ASPHALT WATERSTOP IN SALADO FORMATION
SNL-007 23 OF 28	WIPP SHAFT SEALING SYSTEM ASPHALT COLUMN
SNL-007 24 OF 28	WIPP SHAFT SEALING SYSTEM UPPER AND LOWER SALADO COMPACTED CLAY COLUMNS
SNL-007 25 OF 28	WIPP SHAFT SEALING SYSTEM COMPACTED SALT COLUMN
SNL-007 26 OF 28	WIPP SHAFT SEALING SYSTEM CONCRETE PLUG
SNL-007 27 OF 28	WIPP SHAFT SEALING SYSTEM RUSTLER COMPACTED CLAY COLUMN
SNL-007 28 OF 28	WIPP SHAFT SEALING SYSTEM COMPACTED EARTHEN FILL AND CONCRETE PLUG



WIPP LAYOUT



DRAWING NUMBER	TITLE
SNL-007 1 OF 28	WIPP SHAFT SEALING SYST SHAFT LOCATION PLAN, ABBREVIATIONS, GENERAL NOTES AND LEGEND
SNL-007 2 OF 28	WIPP SHAFT SEALING SYST NEAR-SURFACE/RUSTLER F WASTE SHAFT STRATIGRAPHY & AS-BUILT ELEMENTS
SNL-007 3 OF 28	WIPP SHAFT SEALING SYS SALADO FORMATION WASTE SHAFT STRATIGRAPHY & AS-BUILT ELEMENTS
SNL-007 4 OF 28	WIPP SHAFT SEALING SYS NEAR-SURFACE/RUSTLER F WASTE SHAFT STRATIGRAPHY & SEALING SUBSYSTEM PROFILE
SNL-007 5 OF 28	WIPP SHAFT SEALING SYS SALADO FORMATION WASTE SHAFT STRATIGRAPHY & SEALING SUBSYSTEM PROFILE
SNL-007 6 OF 28	WIPP SHAFT SEALING SYS WASTE SHAFT SHAFT STATION MONOLITH
SNL-007 7 OF 28	WIPP SHAFT SEALING SYS NEAR-SURFACE/RUSTLER F AIR INTAKE SHAFT STRATIGRAPHY & AS-BUILT ELEMENTS
SNL-007 8 OF 28	WIPP SHAFT SEALING SYS SALADO FORMATION AIR INTAKE SHAFT STRATIGRAPHY & AS-BUILT ELEMENTS
SNL-007 9 OF 28	WIPP SHAFT SEALING SYS NEAR-SURFACE/RUSTLER F AIR INTAKE SHAFT STRATIGRAPHY & SEALING SUBSYSTEM PROFILE

GENERAL NOTES:

1. THE DRIFT NUMBERING SYSTEM (E-300, S-400, ETC.) IS BASED ON THE DIRECTION AND NOMINAL DISTANCE IN FEET THE DRIFT IS FROM THE SALT HANDLING SHAFT'S DESIGNATED CENTERLINE LOCATION OF N-000, E-000. THE WIPP PLANT COORDINATE SYSTEM CENTERLINE LOCATION FOR THE SALT HANDLING SHAFT IS N9687.23, AND E6894.89. THE PLANT COORDINATE SYSTEM IS DESCRIBED IN WESTINGHOUSE DRAWING NO. 51-W-109-W, UNDERGROUND EXCAVATIONS, DATED 6/15/92.

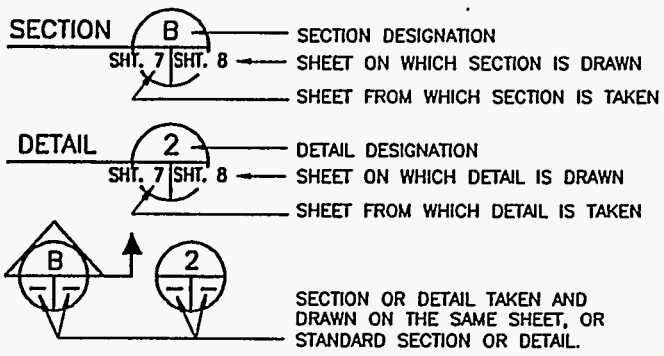
2. THE AS-BUILT DIMENSIONS AND DEPTHS AND/OR ELEVATIONS SHOWN IN THESE DRAWINGS ARE NOMINAL IN THAT DIMENSIONS MAY CHANGE DUE TO LOCAL VARIANCE OF THE STRATIFICATION, OPERATIONAL MODIFICATIONS MADE TO SUIT THE CREEP CLOSURE OF THE HALITE, AND OTHER OPERATIONAL REQUIREMENTS. THEREFORE THE AS-BUILT DIMENSIONS AND THE PERTINENT ELEVATIONS FOR SITING THE SEALING SYSTEM SHALL BE VERIFIED BY FIELD SURVEYING AND EXPLORATORY CORE DRILLING DURING SITE PREPARATION FOR THE FINAL CONSTRUCTION.

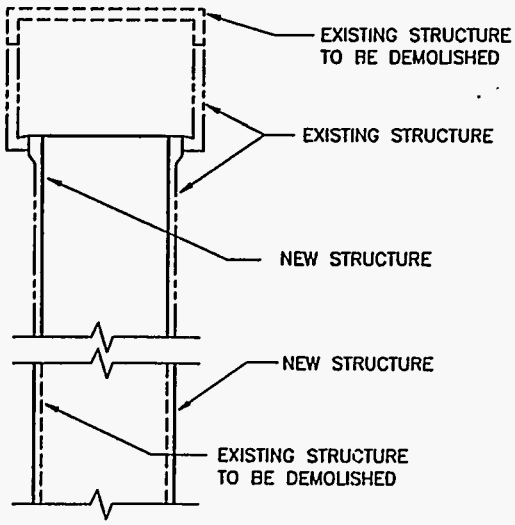
3. DRAWING NUMBERS:
   FOR CLARITY ON DETAIL AND SECTION DESIGNATIONS, AND NOTES, ONLY THE SHEET NUMBER IS SHOWN.

ABBREVIATIONS:

℄	CENTERLINE
ANH.	ANHYDRITE
CMP	CORRUGATED METAL PLATE
CONC.	CONCRETE
DOE	DEPARTMENT OF ENERGY
DWG.	DRAWING
E	EAST
EL.	ELEVATION
EXIST.	EXISTING
FT.	FOOT, FEET
HT.	HEIGHT
I.D.	INSIDE DIAMETER
IN.	INCHES
MB	MARKER BED
MIN.	MINIMUM
MSL	MEAN SEA LEVEL
N	NORTH
NO.	NUMBER
R	RADIUS
S	SOUTH
SHT.	SHEET NUMBER
SMC	SALADO MASS CONCRETE
TYP.	TYPICAL
USGS	UNITED STATES GEOLOGICAL SURVEY
W	WEST
WID	WESTINGHOUSE WASTE ISOLATION DIVISION
WIPP	WASTE ISOLATION PILOT PLANT

LEGEND FOR PROPOSED SHAFT SEALING SYSTEM:





ALBERT W. DENNIS
NEW MEXICO
5971
REGISTERED PROFESSIONAL ENGINEER

Albert W. Dennis
8-2-96

REV.	DATE	DESCRIPTION	BY	CK.	APP.
0	8/2/96	ISSUED FOR RECORDS PACKAGE			

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

CONTRACT NO: AG-4909

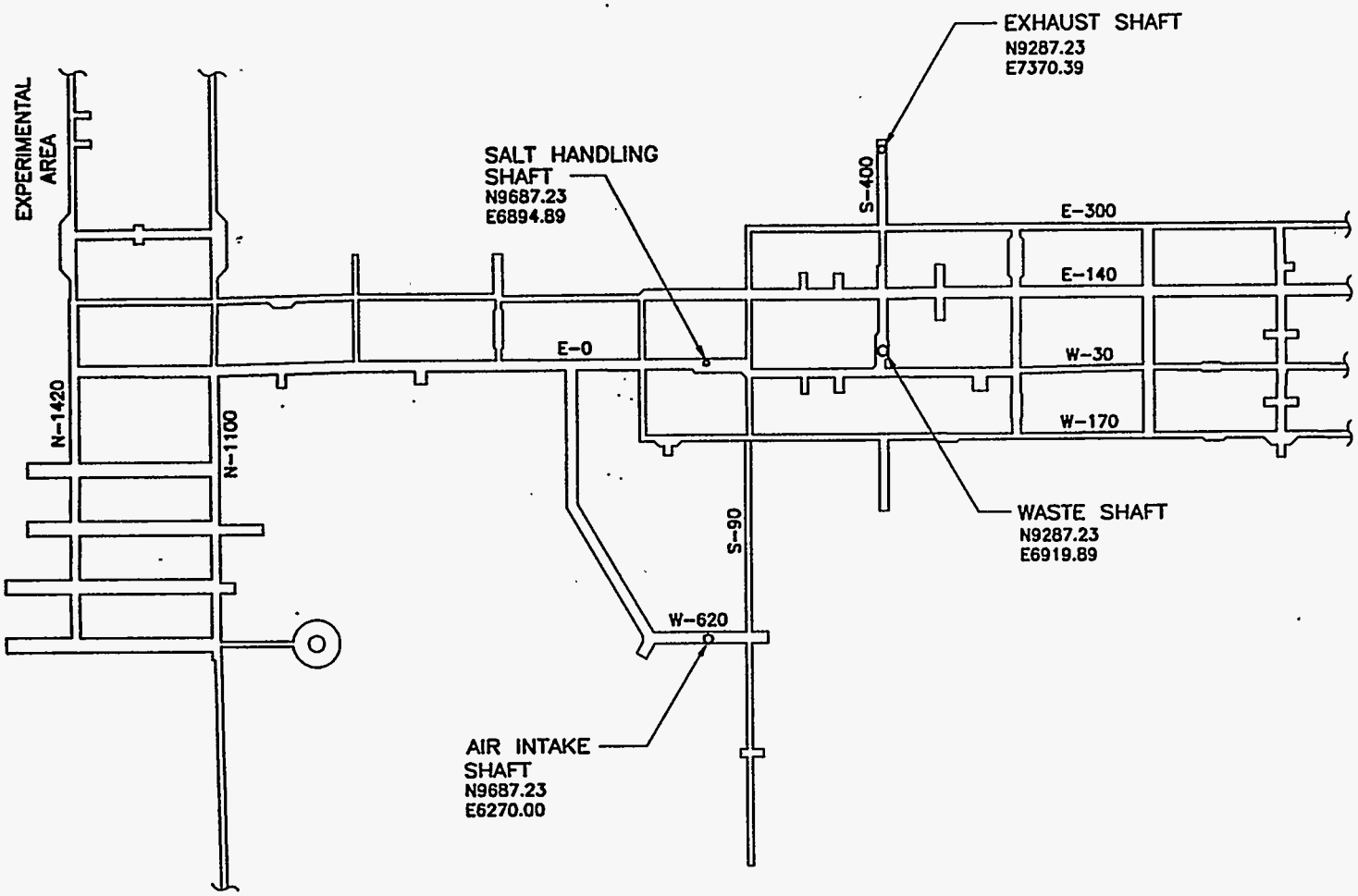
WIPP SHAFT SEALING SYSTEM

SHAFT LOCATION PLAN, ABBREVIATIONS, GENERAL NOTES AND LEGEND

	NAME	DATE
BY		8/2/96
CK.		8/2/96
APP.		8/2/96
APP.		8/2/96
APP.		8/2/96

PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO. SNL-007	SHEET NO. 1 OF 28

E-4



SHAFT SEALS LOCATION PLAN

N

SCALE IN FEET

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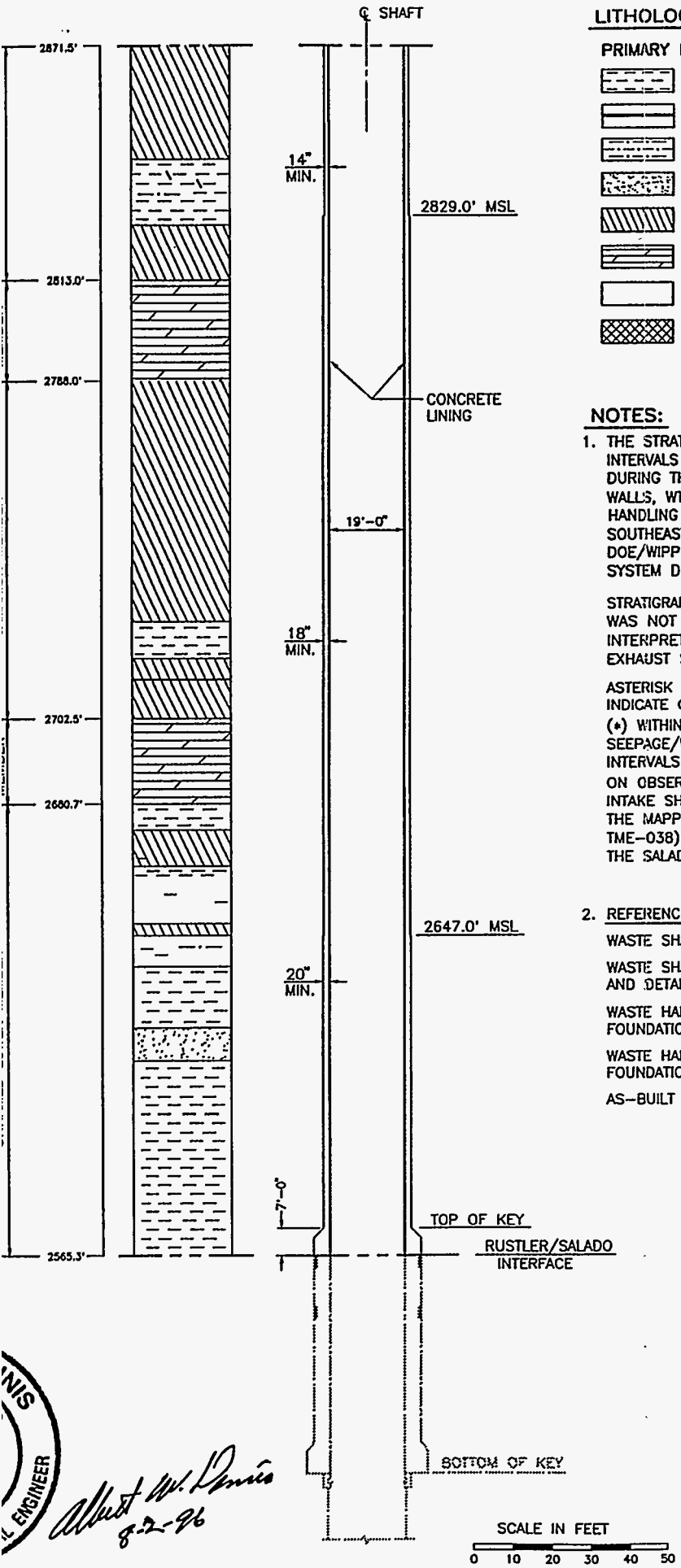


LITHOLOGY:

PRIMARY ROCK/SEDIMENT TYPES	SECONDARY CONSTITUENTS
MUDSTONE/CLAYSTONE	ARGILLACEOUS
CLAYSTONE BED	SILTY
SILTSTONE	SANDY
SANDSTONE	SULFATIC
ANHYDRITE/GYPSUM	DOLOMITIC
DOLOMITE	CALCAREOUS
HALITE	HALITIC
POLYHALITE	POLYHALITIC

NOTES:

1. THE STRATIGRAPHY AND GROUNDWATER BRINE SEEPAGE/WEEP INTERVALS ARE BASED ON THE LITHOLOGIC INFORMATION COMPILED DURING THE GEOLOGIC MAPPING OF THE WASTE HANDLING SHAFT WALLS, WTSD-TME 038, "GEOTECHNICAL ACTIVITIES IN THE WASTE HANDLING SHAFT WASTE ISOLATION PILOT PLANT (WIPP) PROJECT SOUTHEASTERN NEW MEXICO," 1984, AND APPENDIX A OF REPORT DOE/WIPP-95-3117, "WASTE ISOLATION PILOT PLANT SEALING SYSTEM DESIGN REPORT," 1995.

   STRATIGRAPHIC CONTACT AT THE TOP OF THE DEWEY LAKE REDBEDS WAS NOT RECORDED DURING MAPPING. ELEVATION SHOWN IS INTERPRETED FROM RECORDINGS OF THE SALT HANDLING AND EXHAUST SHAFTS.

   ASTERISK (*) WITHIN THE RUSTLER AND SUPRA RUSTLER FORMATIONS INDICATE GROUNDWATER OBSERVED DURING SHAFT MAPPING. ASTERISK (*) WITHIN THE SALADO FORMATION INDICATES A POTENTIAL BRINE SEEPAGE/WEEP INTERVAL. THESE POTENTIAL BRINE SEEPAGE/WEEP INTERVALS, LOCATED ABOVE THE SHAFT STATION LEVEL, ARE BASED ON OBSERVED INTERVALS OF BRINE SEEPAGE/WEEPS IN THE AIR INTAKE SHAFT THAT HAVE BEEN PROJECTED TO THE WASTE SHAFT. THE MAPPING OF THE WASTE SHAFT (HOLT & POWERS, 1984/WTSD-TME-038) DID NOT INDICATE OBSERVED SEEPAGE INTERVALS WITHIN THE SALADO FORMATION.

2. REFERENCE AS-BUILT DRAWINGS FROM WID:

WASTE SHAFT 311 SHAFT DEVELOPMENT SECTIONS	31-R-001-01D
WASTE SHAFT 311 SHAFT LINING & KEY SECTIONS AND DETAILS	31-R-002-01D
WASTE HANDLING BUILDING 411 HOIST TOWER FOUNDATION PLANS, ELEVATIONS, 76'-0" & 89'-0"	41-D-016-014
WASTE HANDLING BUILDING 411 HOIST TOWER FOUNDATION SECTIONS	41-D-018-014
AS-BUILT FOR WASTE SHAFT COLLAR	OGL A-001

REV.	DATE	DESCRIPTION	BY	CK.	APP
0	8/2/96	ISSUED FOR RECORDS PACKAGE			

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

CONTRACT NO: AG-4909

WIPP SHAFT SEALING SYSTEM
NEAR-SURFACE/RUSTLER FORMATIONS

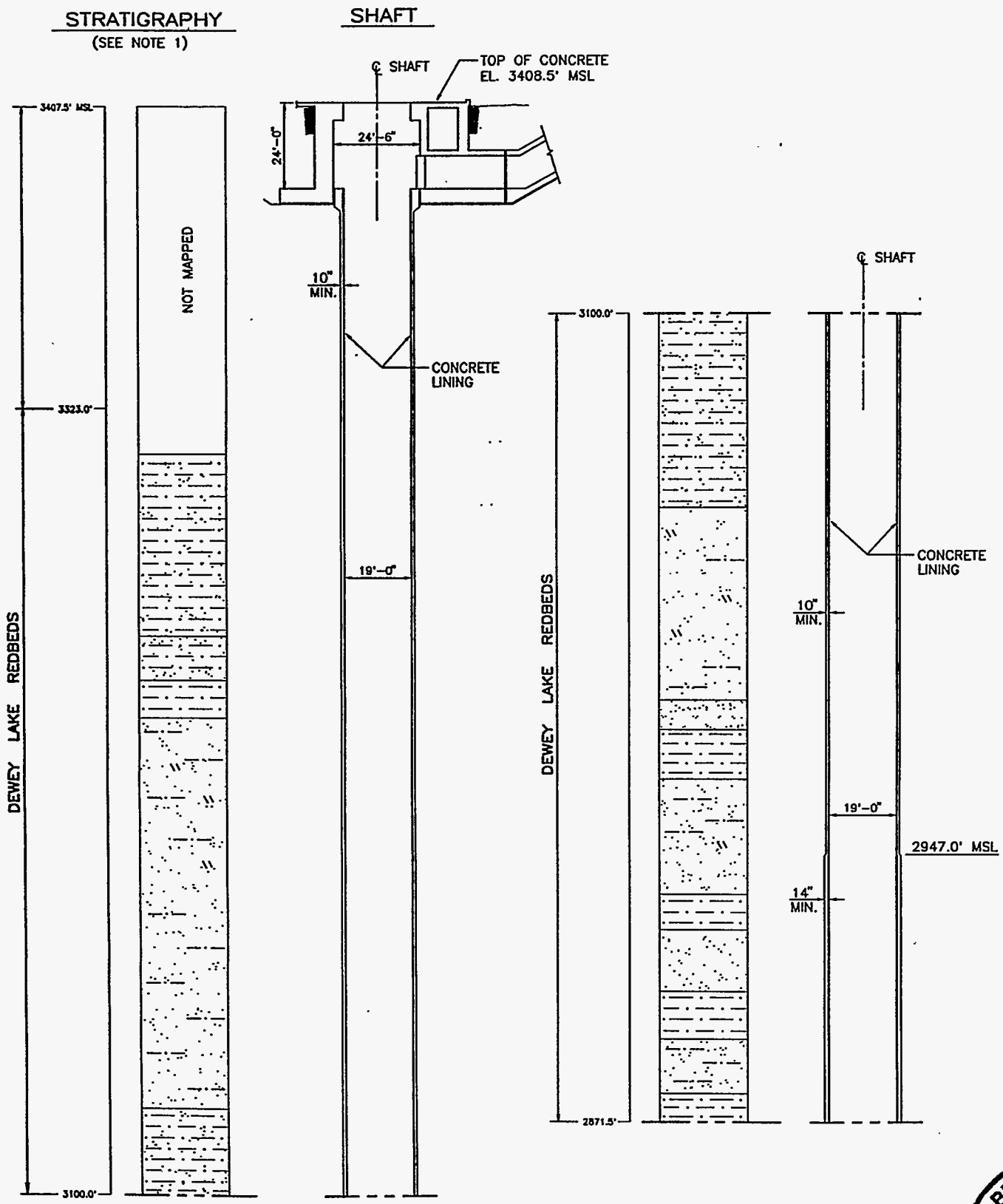
WASTE SHAFT
STRATIGRAPHY &
AS-BUILT ELEMENTS

	NAME	DATE
BY		8/2/96
CK.		8/2/96
APP.		8/2/96
APP		8/2/96
APP		8/2/96

PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO. SNL-007	SHEET NO. 2 OF 28

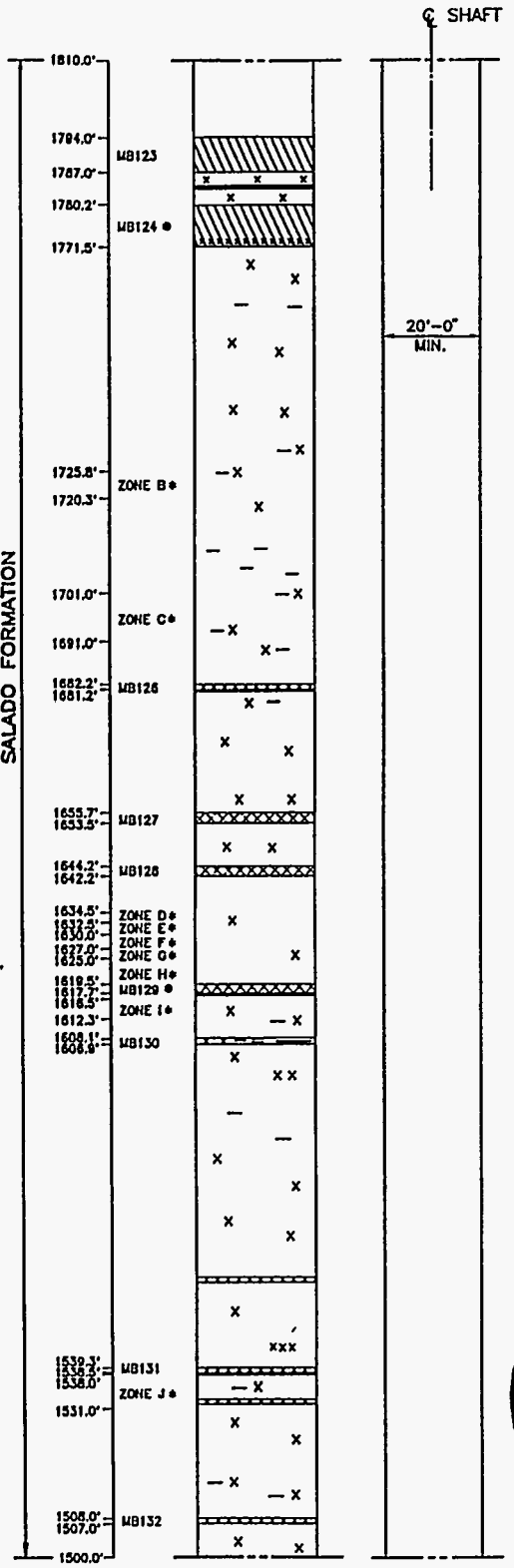
Albert W. Davis 8-2-96

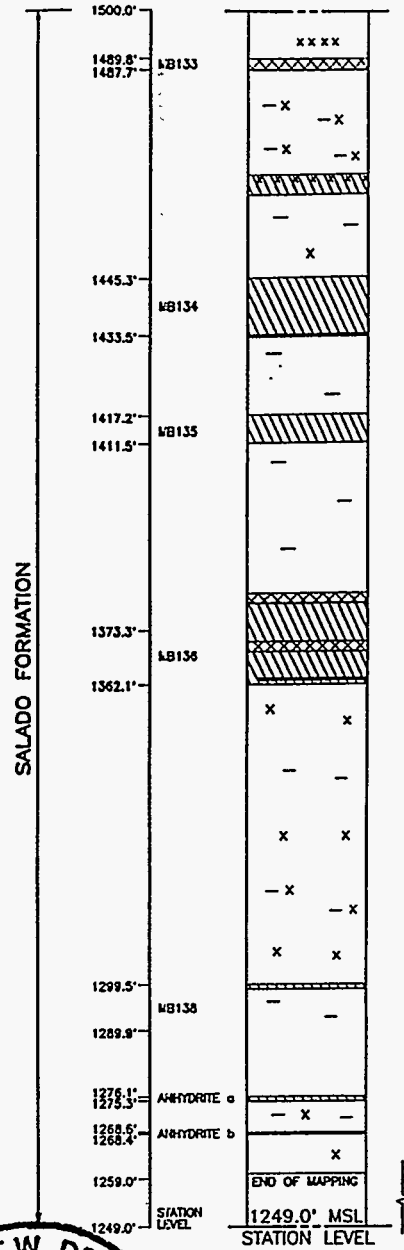
E-5

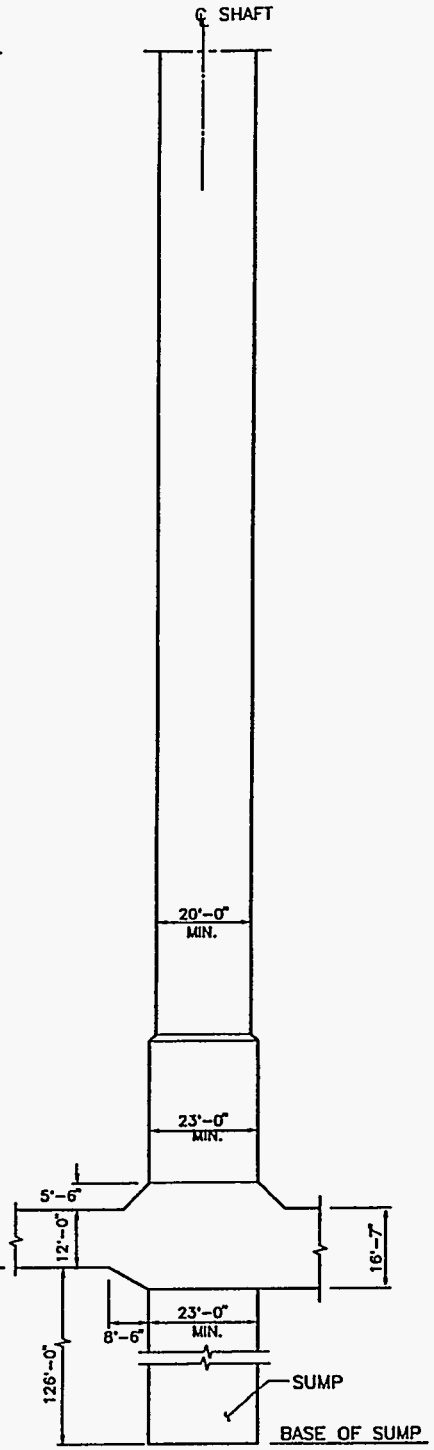


ALBERT W. DE
NEW MEXI
5971
REGISTERED PROFESSIO

NAME: C:\1\WIPP\9\CS\CS31-G01.DWG DATE: JULY 02, 1996 TIME: 9:04 AM







ALBERT W. DENNIS
NEW MEXICO
5971
REGISTERED PROFESSIONAL ENGINEER

Albert W. Dennis
8-2-96

REV.	DATE	DESCRIPTION	BY	CK.	APP.
0	8/2/96	ISSUED FOR RECORDS PACKAGE			

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

CONTRACT NO: AG-4909

WIPP SHAFT SEALING SYSTEM
SALADO FORMATION

WASTE SHAFT
STRATIGRAPHY &
AS-BUILT ELEMENTS

	NAME	DATE
BY		8/2/96
CK.		8/2/96
APP.		8/2/96
APP		8/2/96
APP		8/2/96

PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO. SNL-007	SHEET NO. 3 OF 28

NOTES:

1. SEE SHT. 1 FOR GENERAL NOTES AND ABBREVIATIONS.
2. SEE SHT. 2 FOR LITHOLOGY AND NOTES.

SCALE IN FEET
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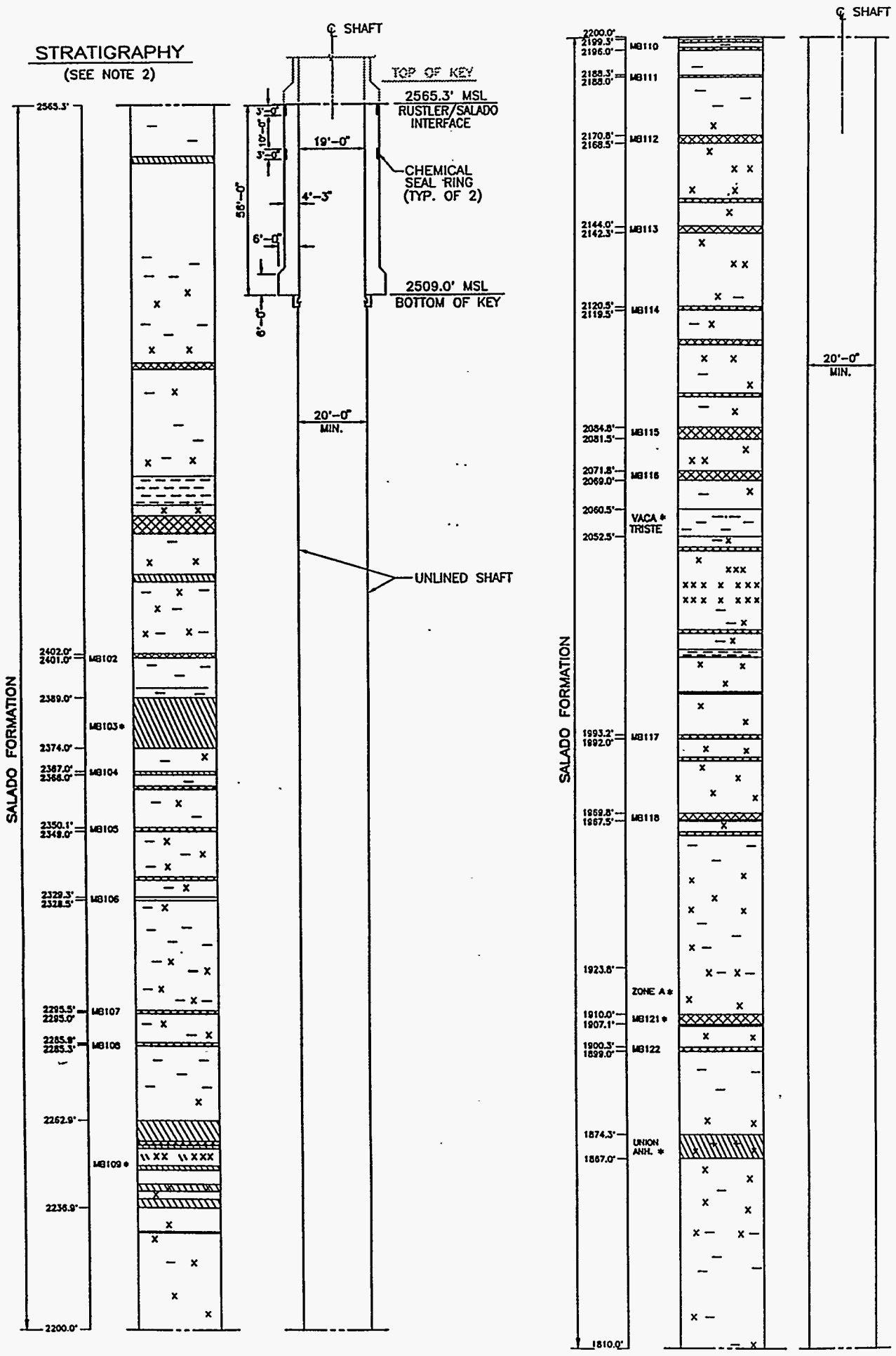
E-9



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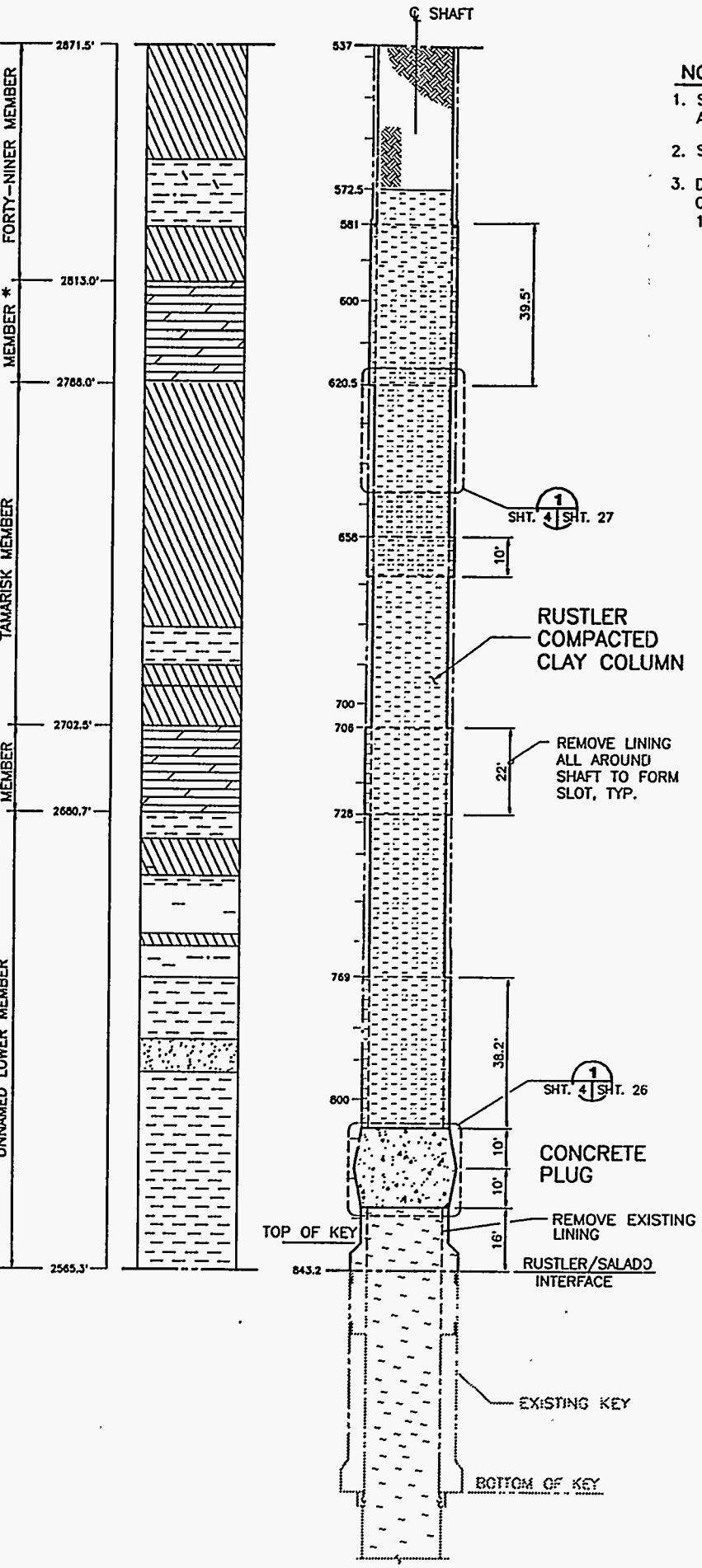


NOTES:

1. SEE SHT. 1 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS.
2. SEE SHT. 2 FOR LITHOLOGY AND NOTES.
3. DEPTHS SHOWN ARE DISTANCES BELOW THE TOP OF CONCRETE, LOCATED AT EL. 3408.5' ABOVE MSL USGS 1927 NORTH AMERICAN DATUM.

ALBERT W. DENNIS
NEW MEXICO
5971
REGISTERED PROFESSIONAL ENGINEER

Albert W. Dennis
8-2-96

SCALE IN FEET
0 10 20 30 40 50

REV.	DATE	DESCRIPTION	BY	CK.	APP
0	8/2/96	ISSUED FOR RECORDS PACKAGE			

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

CONTRACT NO: AG-4909

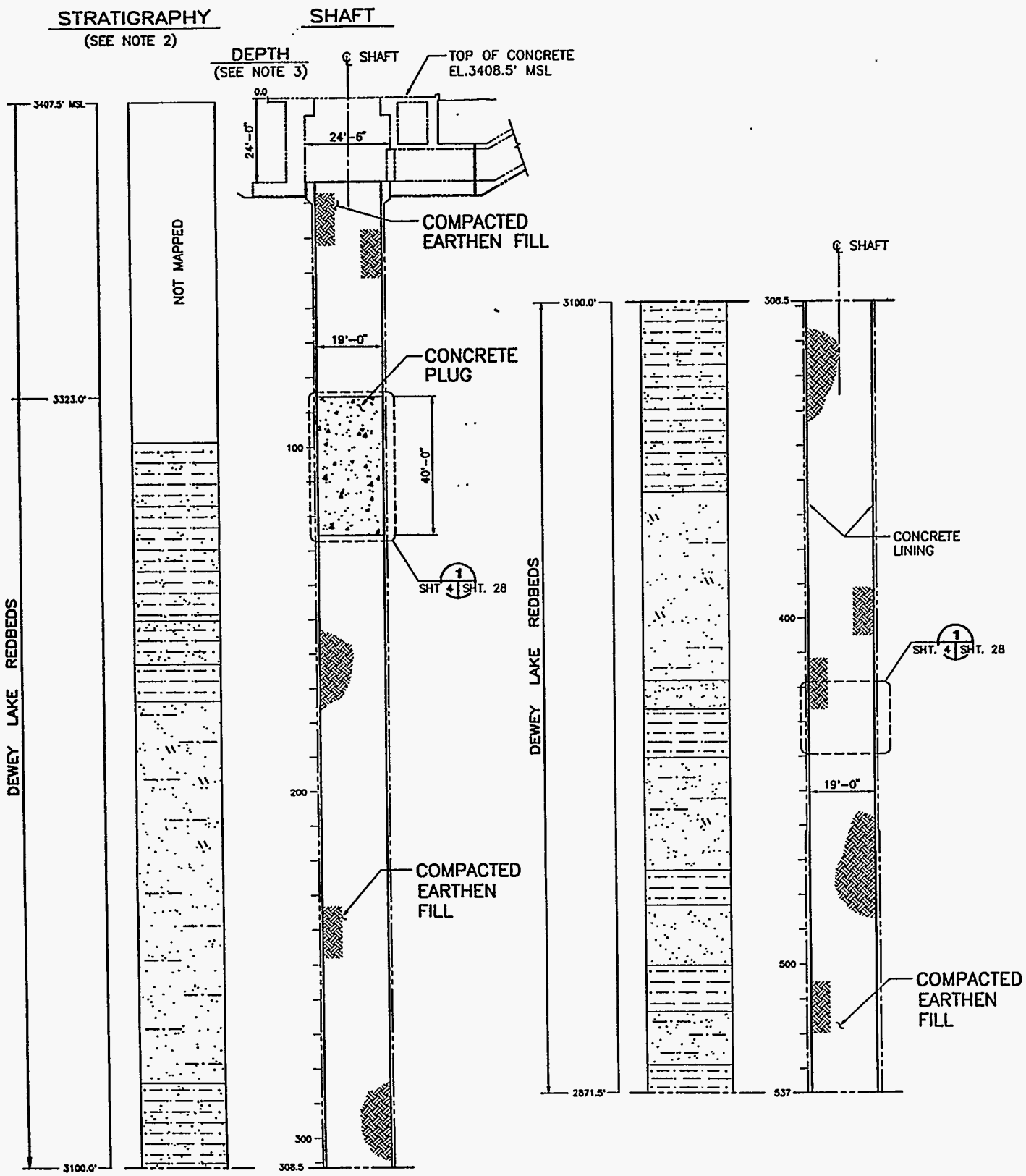
WIPP SHAFT SEALING SYSTEM
NEAR-SURFACE/RUSTLER FORMATIONS

WASTE SHAFT
STRATIGRAPHY & SEALING
SUBSYSTEM PROFILE

	NAME	DATE
BY		8/2/96
CK.		8/2/96
APP.		8/2/96
APP		8/2/96
APP		8/2/96

PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO. SNL-007	SHEET NO. 4 OF 28

E-7



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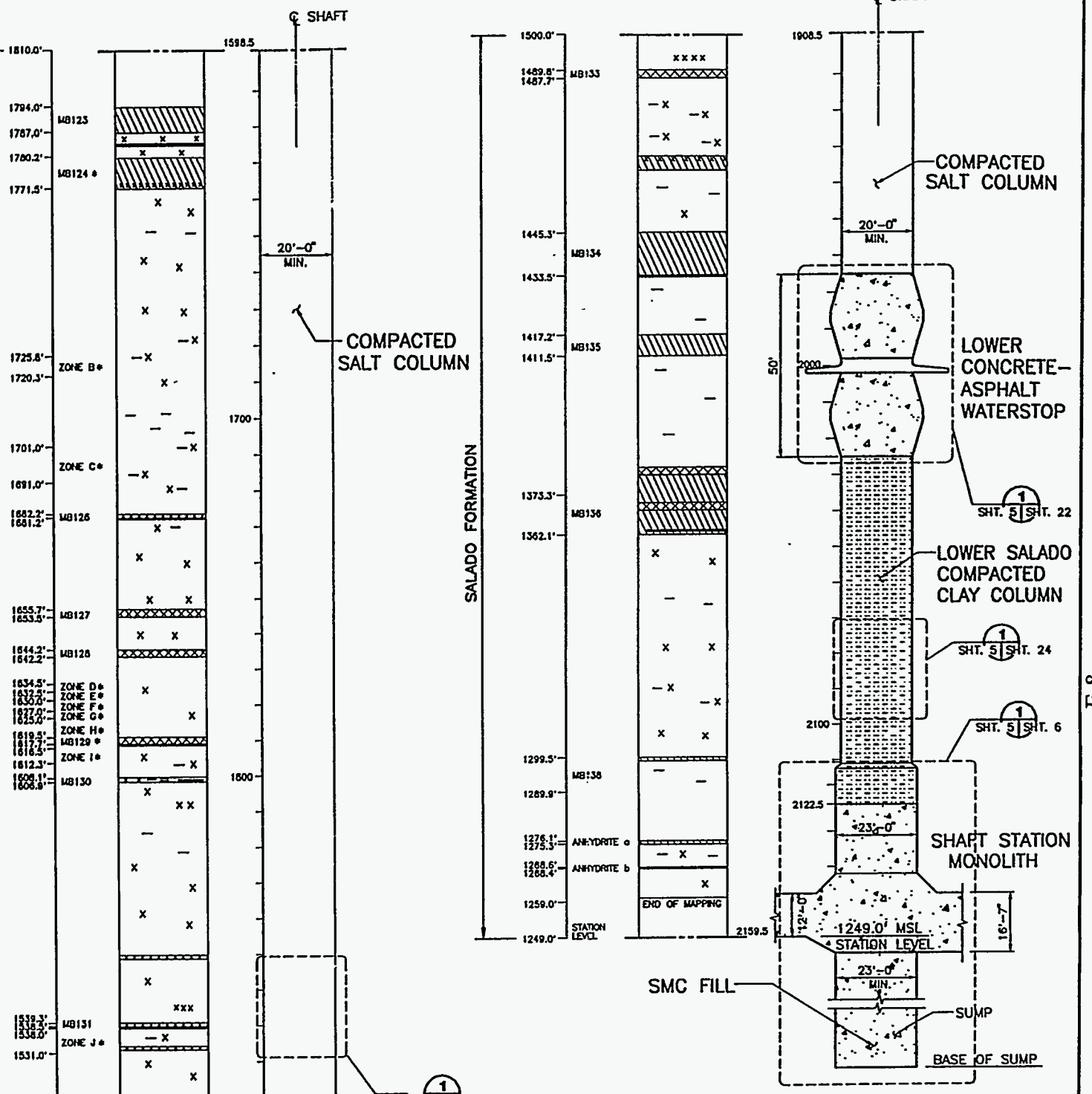

E-8

NOTES:

1. SEE SHT. 1 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS.
2. SEE SHT. 2 FOR LITHOLOGY AND NOTES.
3. SEE NOTE 3 OF SHT. 4.

ALBERT W. DENNIS
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Albert W. Dennis
5-2-96

SCALE IN FEET
0 10 20 30 40 50

REV.	DATE	DESCRIPTION	BY	CK.	APP
0	8/2/96	ISSUED FOR RECORDS PACKAGE			

SANDIA NATIONAL LABORATORIES

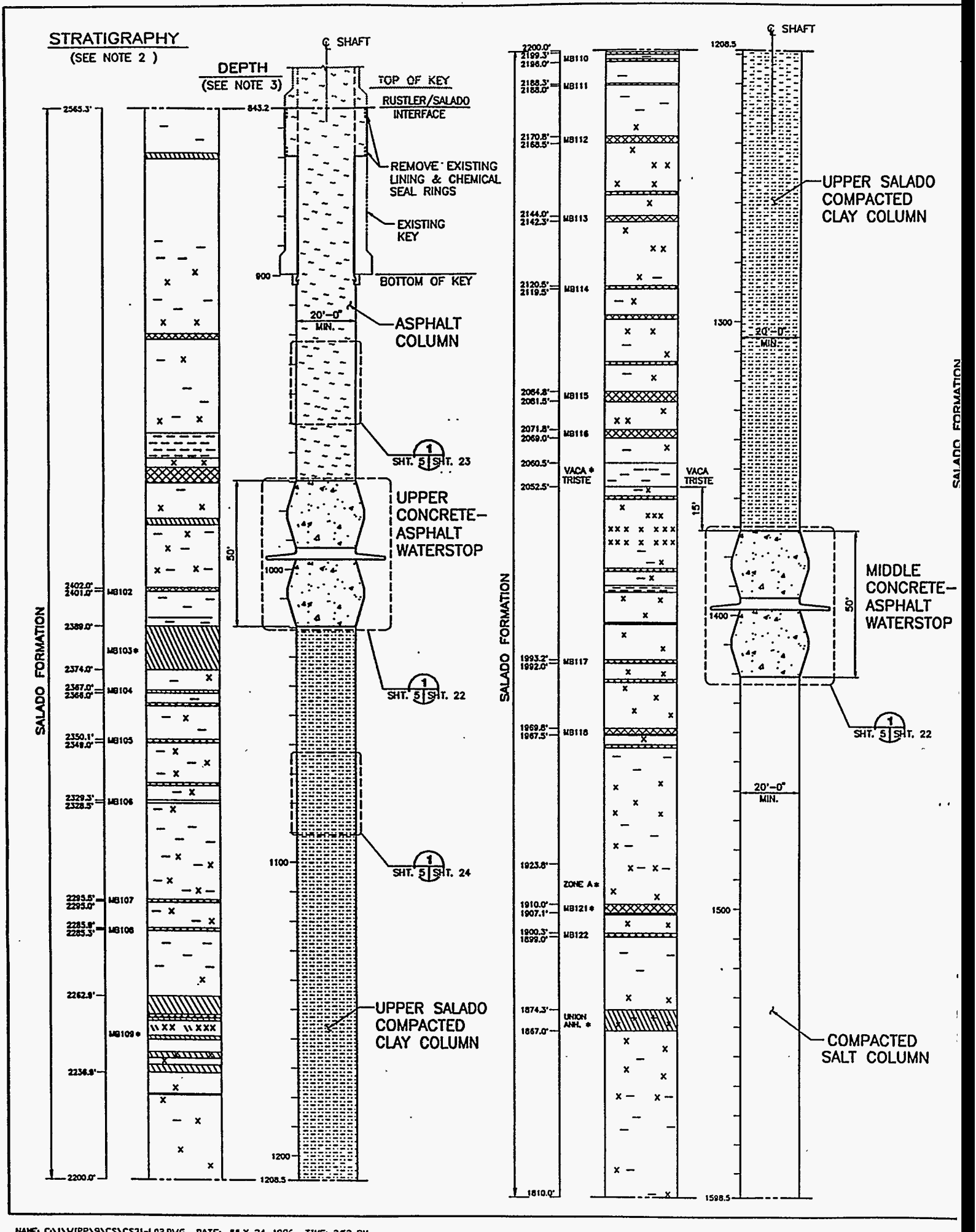
WIPP A/E SUPPORT

CONTRACT NO: AG-4909

WIPP SHAFT SEALING SYSTEM
SALADO FORMATION
WASTE SHAFT
STRATIGRAPHY & SEALING
SUBSYSTEM PROFILE

	NAME	DATE
BY		8/2/96
CK.		8/2/96
APP.		8/2/96
APP.		8/2/96
APP.		8/2/96

PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO. SNL-007	SHEET NO. 5 OF 28



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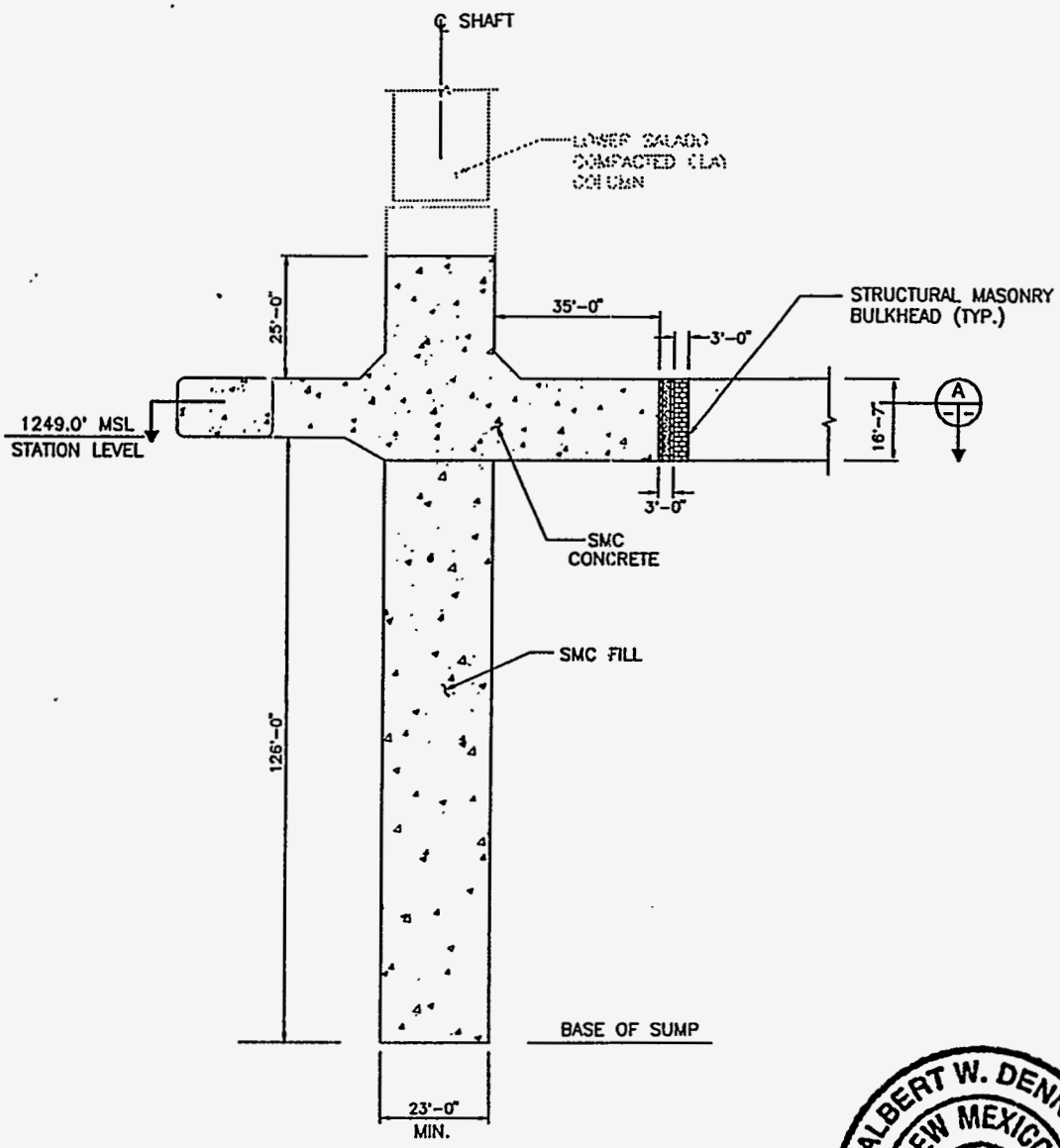


DETAIL 1
SHT. 5 SHT. 6

ALBERT W. DENNIS
NEW MEXICO
5971
REGISTERED PROFESSIONAL ENGINEER

Albert W. Dennis
8-2-96

E-9

REV.	DATE	DESCRIPTION	BY	CK.	APP.
0	8/2/96	ISSUED FOR RECORDS PACKAGE			

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

CONTRACT NO: AG-4909

WIPP SHAFT SEALING SYSTEM

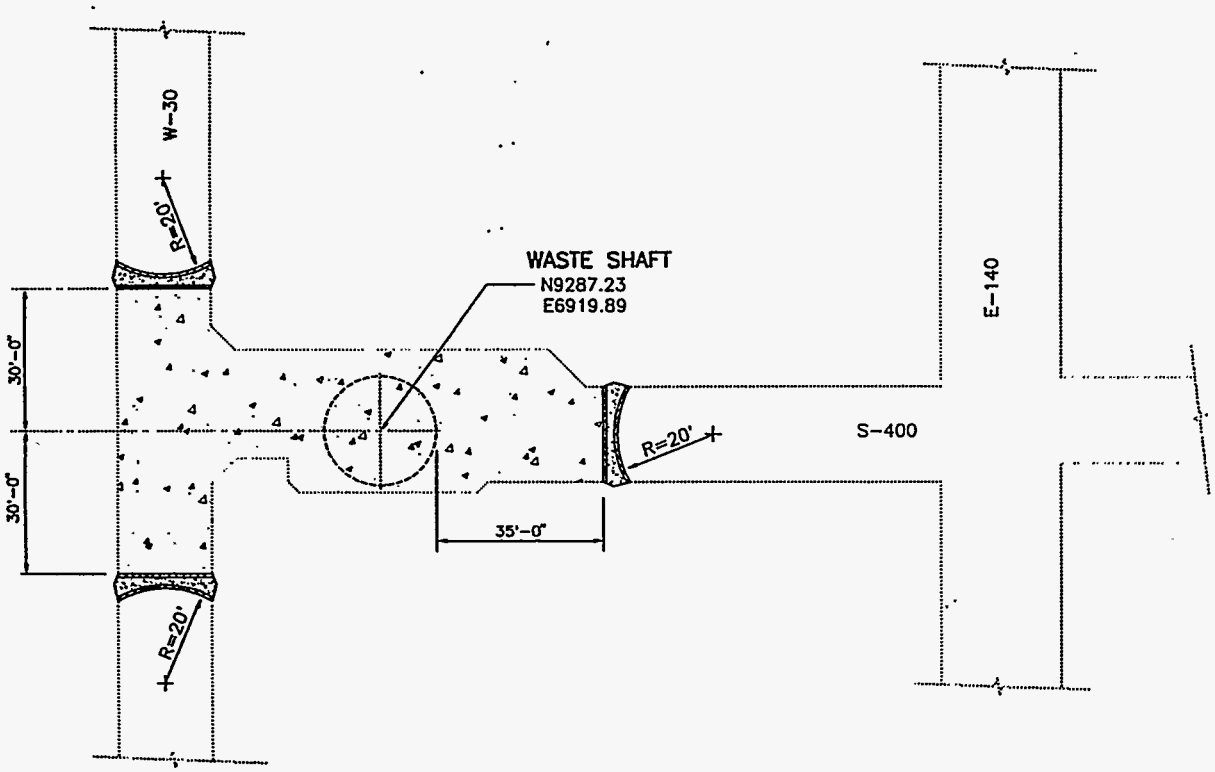
WASTE SHAFT
SHAFT STATION MONOLITH

	NAME	DATE
BY		8/1/96
CK.		8/2/96
APP.		8/2/96
APP		8/2/96
APP		8/2/96

PARSONS BRINCKERHOFF ENERGY SERVICES, INC | SCALE: | SIZE 8 | SNL DWG. NO. SNL-007 | SHEET NO. 6 OF 28

RAL NOTES, LEGEND AND

SCALE IN FEET
0 10 20 30 40 50

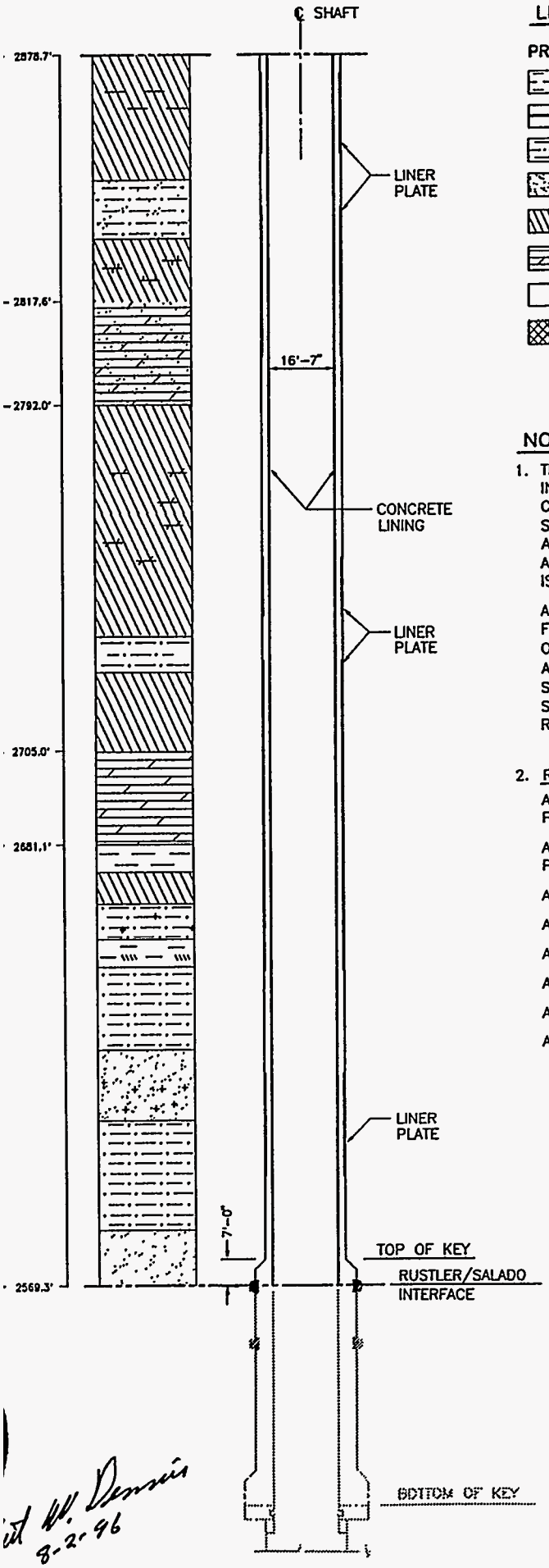


SECTION A

N

NOTES:

1. SEE SHT. 1 FOR GE
ABBREVIATIONS.



LITHOLOGY:

PRIMARY ROCK/SEDIMENT TYPES	SECONDARY CONSTITUENTS
MUDSTONE/CLAYSTONE	ARGILLACEOUS
CLAYSTONE BED	SILTY
SILTSTONE	SANDY
SANDSTONE	SULFATIC
ANHYDRITE/GYPSUM	DOLOMITIC
DOLOMITE	CALCAREOUS
HALITE	HALITIC
POLYHALITE	POLYHALITIC
	LANGBEINITE

NOTES:

1. THE STRATIGRAPHY AND GROUNDWATER BRINE SEEPAGE/WEEP INTERVALS ARE BASED ON THE LITHOLOGIC INFORMATION COMPILED DURING THE GEOLOGIC MAPPING OF THE AIR INTAKE SHAFT WALLS, DOE/WIPP-90-051, "GEOLOGIC MAPPING OF THE AIR INTAKE SHAFT AT THE WASTE ISOLATION PILOT PLANT", 1990, AND APPENDIX A OF REPORT DOE/WIPP-95-3117, "WASTE ISOLATION PILOT PLANT SEALING SYSTEM DESIGN REPORT", 1995.

   ASTERISK(*) INDICATES GROUNDWATER (RUSTLER/SUPRA RUSTLER FORMATIONS) OR BRINE SEEPAGE/WEEPS (SALADO FORMATION) OBSERVED DURING THE MAPPING OF THE AIR INTAKE SHAFT. AS OF 1994, ONLY MB103 SHOWED VISIBLE MOISTURE ON THE SALADO FORMATION SURFACE EXPOSED WITHIN THE AIR INTAKE SHAFT, "BRINE SAMPLING EVALUATION PROGRAM 1992-1993 REPORT," 1994, DOE-WIPP 94-011.

2. REFERENCE AS-BUILT DRAWINGS FROM WID:

AIR INTAKE SHAFT 331 SHAFT COLLAR / AIR INTAKE PLENUM PLAN, SECTIONS AND DETAILS.	33-C-001-W
AIR INTAKE SHAFT 331 SHAFT COLLAR / AIR INTAKE PLATFORM PLAN, SECTIONS AND DETAILS.	33-C-002-W
AIR INTAKE SHAFT 331 STRUCTURE PLAN, SECTIONS AND DETAILS	33-C-003-W1
AIR INTAKE SHAFT 331 SHAFT KEY PLAN, SECTIONS AND DETAILS	33-C-004-W1
AIR INTAKE SHAFT 331 LINING DETAILS	33-C-005-W
AIR INTAKE SHAFT 331 EXCAVATION AS-BUILT	33-D-002-W
AIR INTAKE SHAFT 331 GENERAL ARRANGEMENT	33-D-008-W
AIR INTAKE SHAFT 331 SHAFT STATION PLAN, SECTIONS AND DETAILS	51-W-212-W

SCALE IN FEET
0 10 20 30 40 50

REV.	DATE	DESCRIPTION	BY	CK.	APP.
0	8/2/96	ISSUED FOR RECORDS PACKAGE			

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

CONTRACT NO: AG-4909

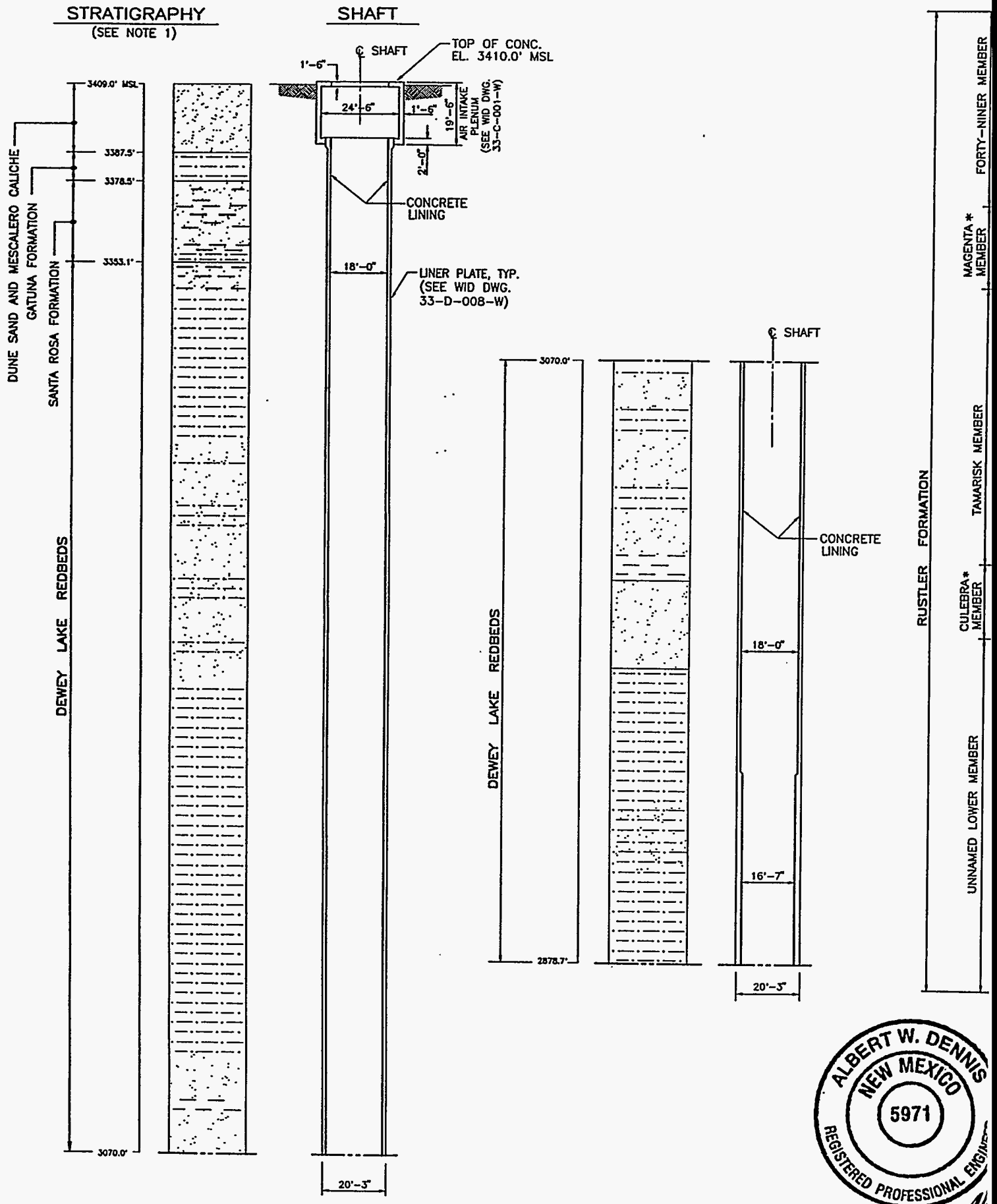
WIPP SHAFT SEALING SYSTEM
NEAR-SURFACE/RUSTLER FORMATIONS
AIR INTAKE SHAFT
STRATIGRAPHY &
AS-BUILT ELEMENTS

NAME	DATE
BY	8/1/96
CK.	8/2/96
APP.	8/1/96
APP.	8/2/96
APP.	8/2/96

PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE: B	SIZE	SNL DWG. NO. SNL-007	SHEET NO. 7 OF 28

E-10

Scott W. Dennis
8-2-96



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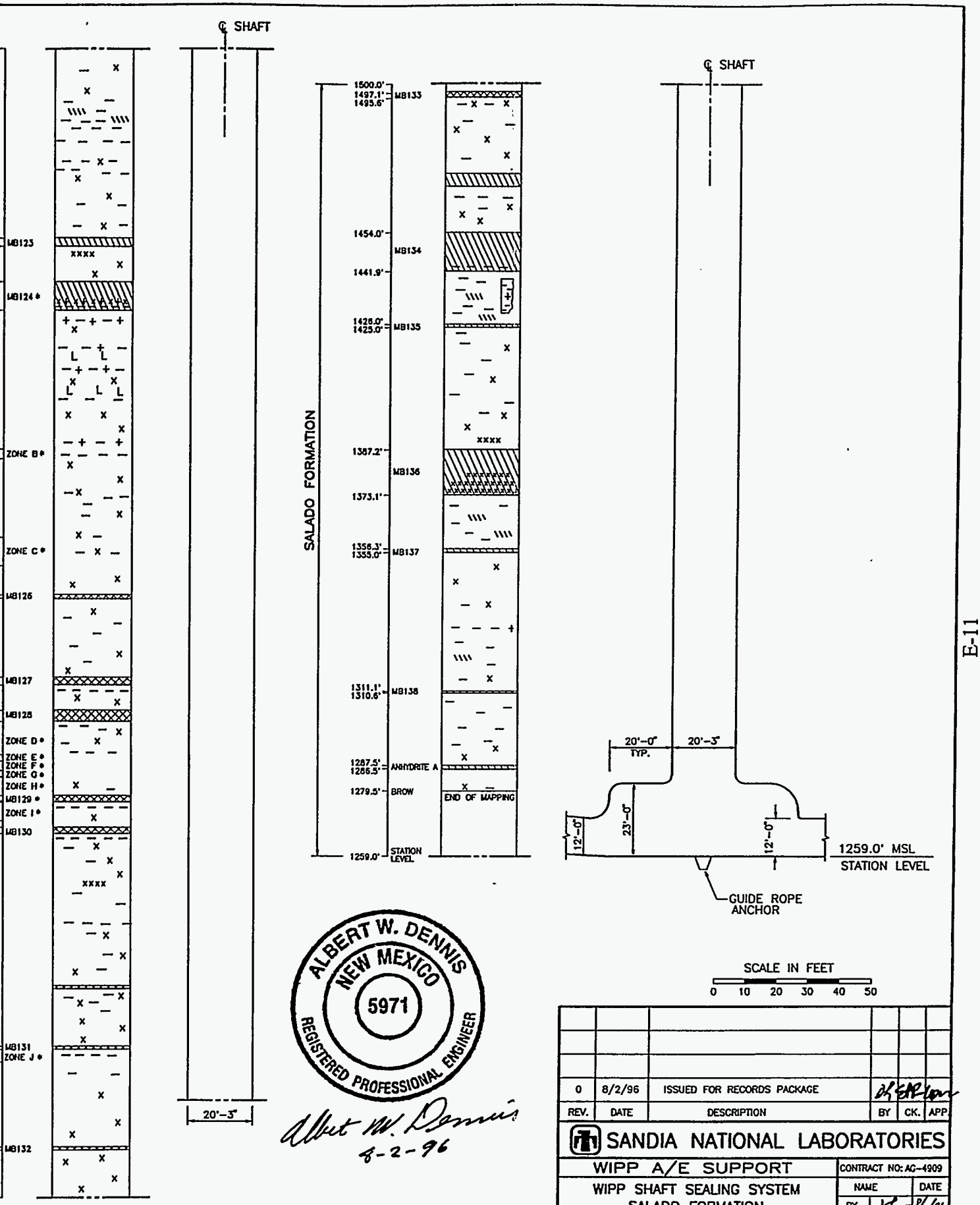


ALBERT W. DENNIS
NEW MEXICO
5971
REGISTERED PROFESSIONAL ENGINEER

Albert W. Dennis
8-2-96

NOTES:

1. SEE SHT. 1 FOR GENERAL NOTES AND ABBREAVIATIONS.
2. SEE SHT. 7 FOR LITHOLOGY AND NOTES.

REV.	DATE	DESCRIPTION	BY	CK.	APP.
0	8/2/96	ISSUED FOR RECORDS PACKAGE			

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

CONTRACT NO: AG-4909

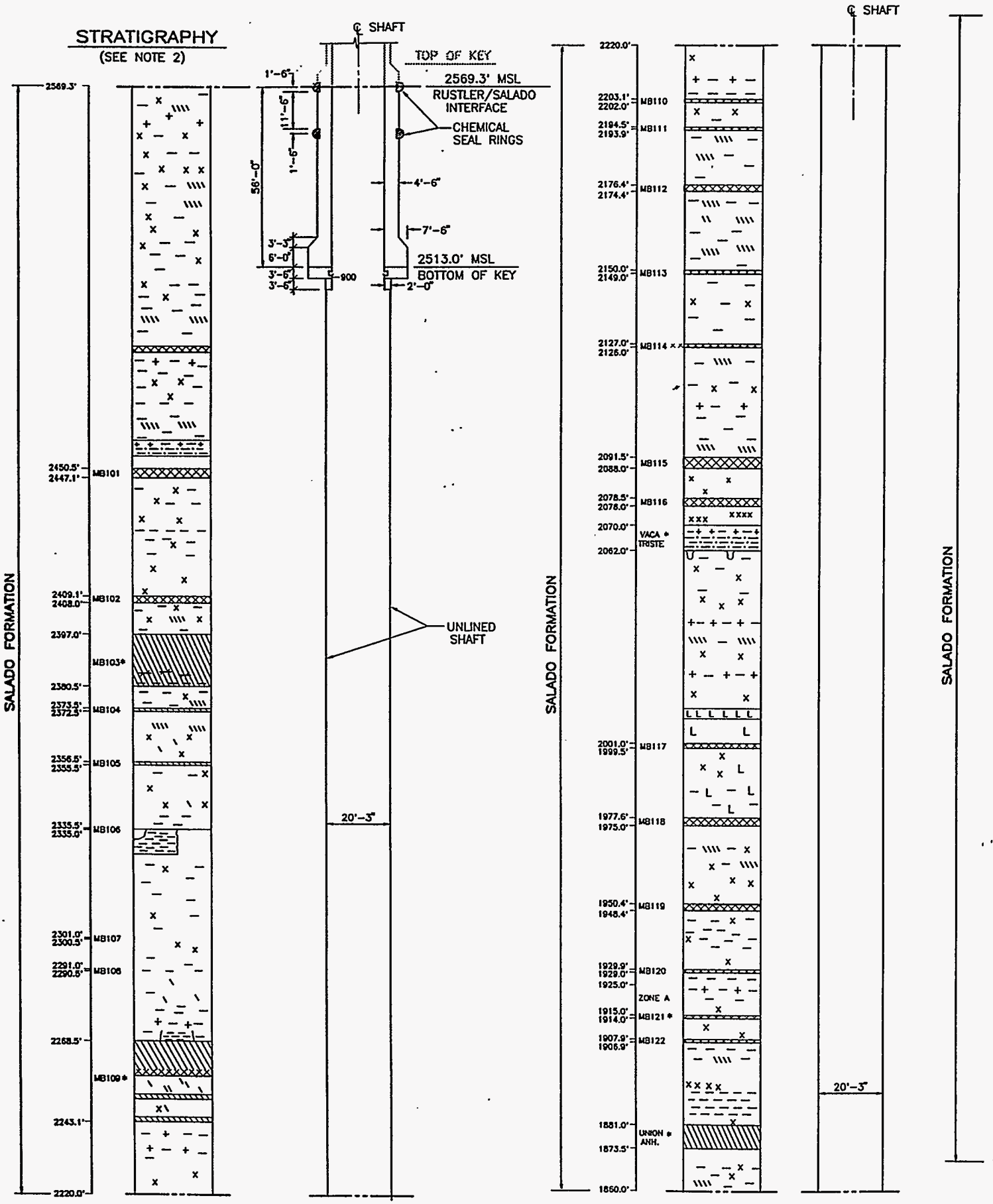
WIPP SHAFT SEALING SYSTEM
SALADO FORMATION

AIR INTAKE SHAFT
STRATIGRAPHY &
AS-BUILT ELEMENTS

NAME		DATE
BY		8/2/96
CK.		8/2/96
APP.		8/2/96
APP.		8/2/96
APP.		8/2/96

PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO. SNL-007	SHEET NO. 8 OF 28

E-11



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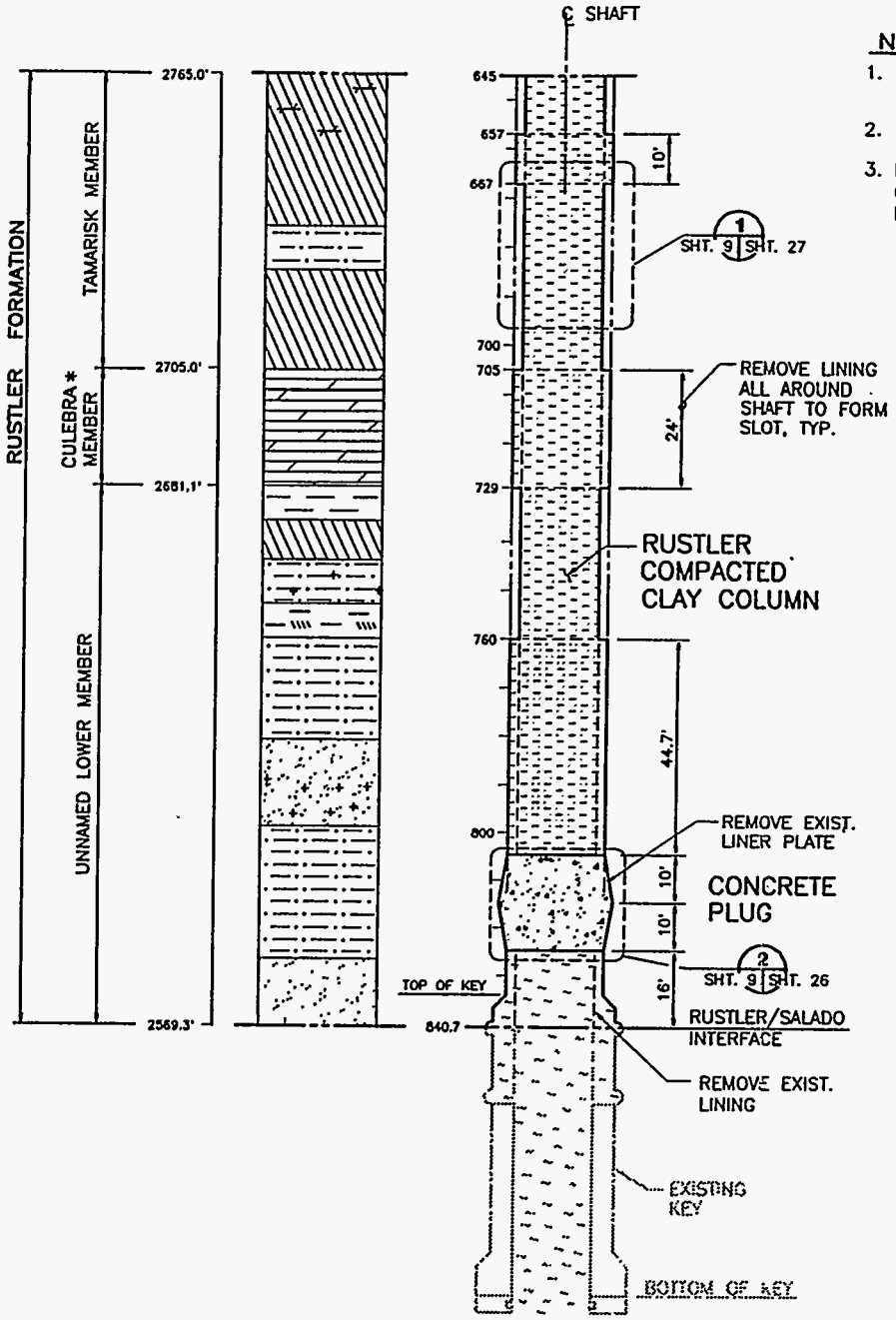


NOTES:

1. SEE SHT. 1 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS
2. SEE SHT. 7 FOR LITHOLOGY AND NOTES.
3. DEPTHS SHOWN ARE DISTANCES BELOW THE TOP OF CONCRETE, LOCATED AT EL. 3410.0' ABOVE MSL USGS 1927 NORTH AMERICAN DATUM.

ALBERT W. DENNIS
NEW MEXICO
5971
REGISTERED PROFESSIONAL ENGINEER

Albert W. Dennis
8-2-96

SCALE IN FEET
0 10 20 30 40 50

REV.	DATE	DESCRIPTION	BY	CK.	APP.
0	8/2/96	ISSUED FOR RECORDS PACKAGE			

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

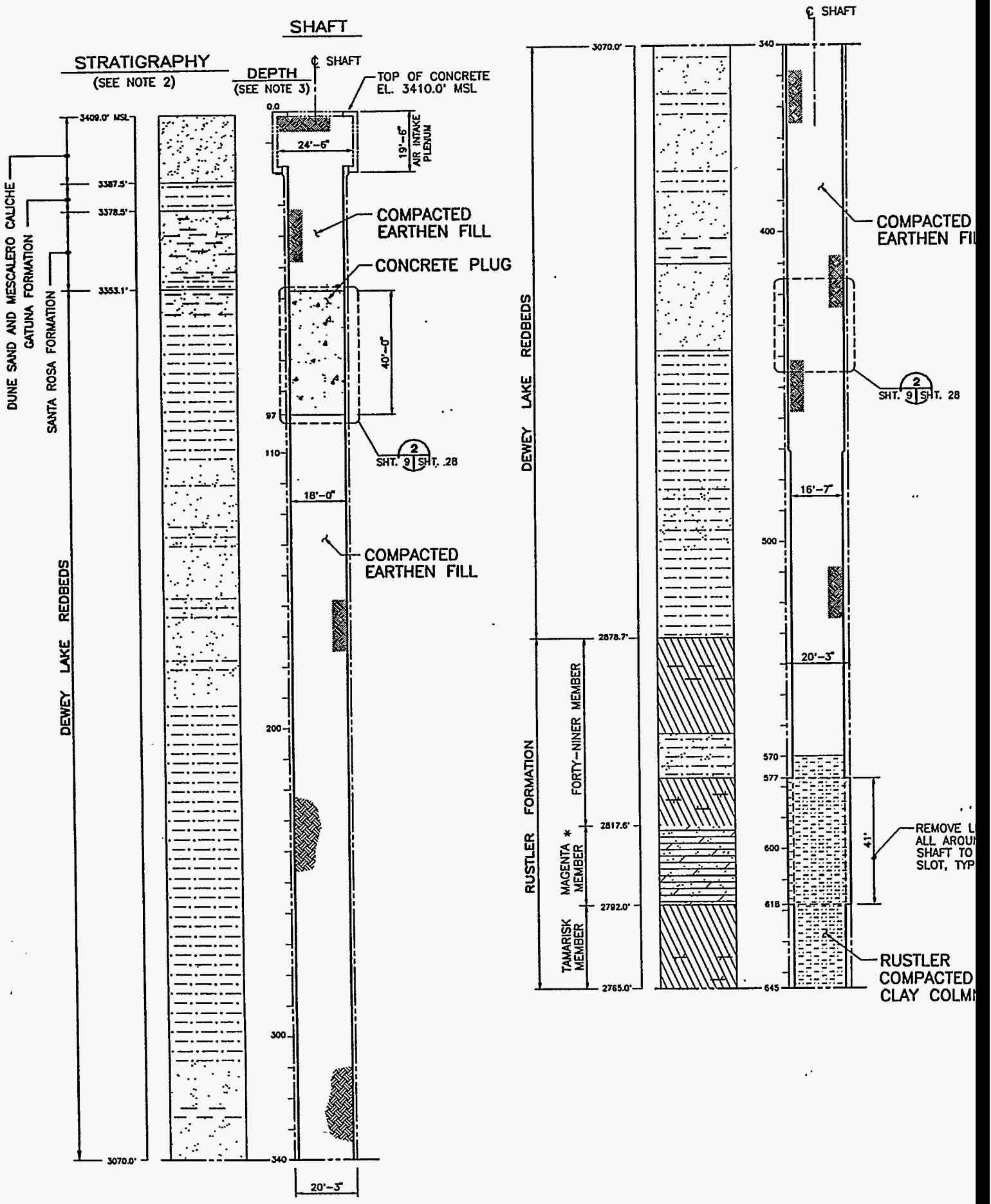
CONTRACT NO: AG-4909

WIPP SHAFT SEALING SYSTEM
NEAR-SURFACE/RUSTLER FORMATIONS
AIR INTAKE SHAFT
STRATIGRAPHY AND SEALING SUBSYSTEM PROFILE

	NAME	DATE
BY		8/6/96
CK.		8/6/96
APP.		8/6/96
APP.		8/6/96
APP.		8/6/96

PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO. SNL-007	SHEET NO. 9 OF 28

E-12



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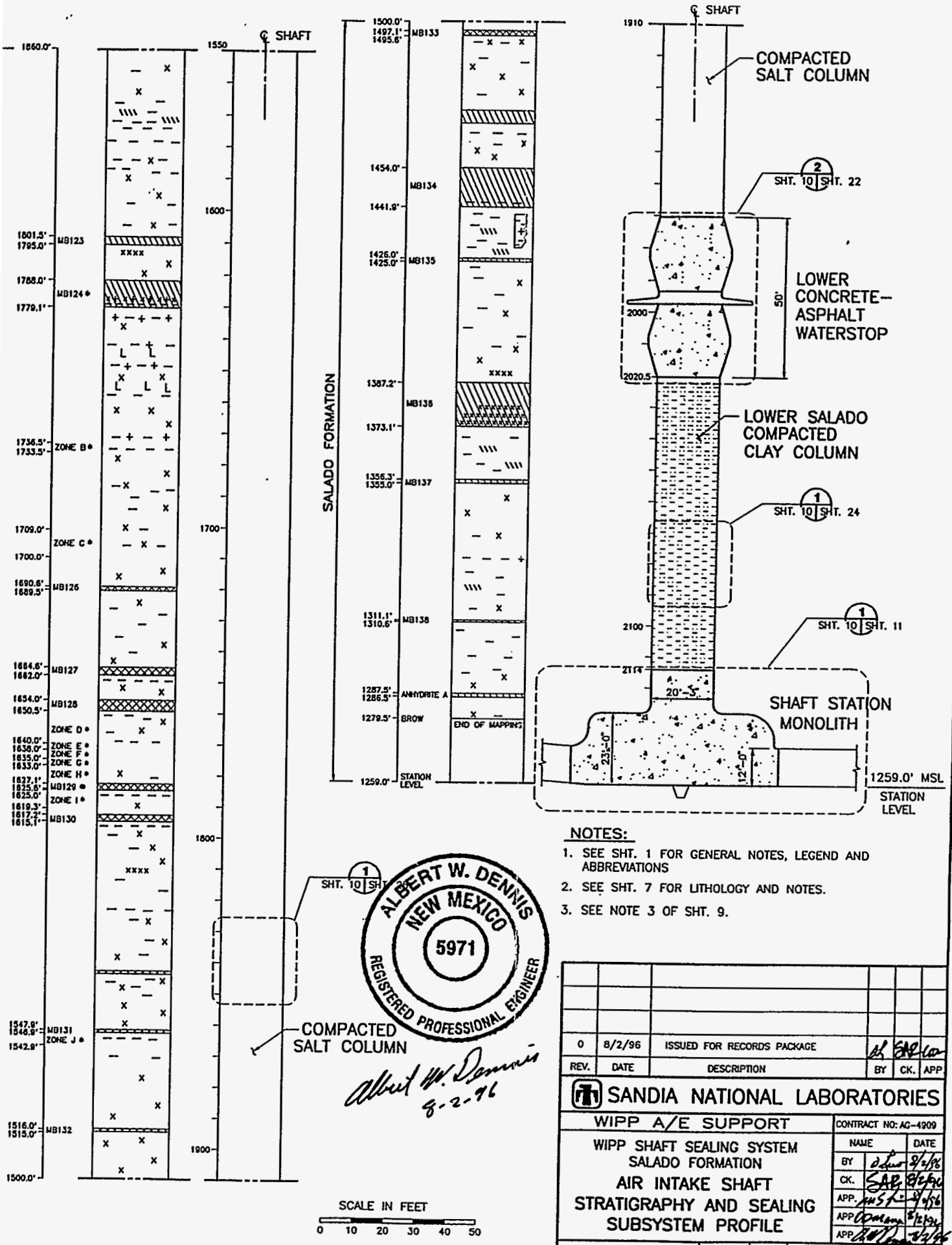


E-13

NOTES:

1. SEE SHT. 1 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS
2. SEE SHT. 7 FOR LITHOLOGY AND NOTES.
3. SEE NOTE 3 OF SHT. 9.

ALBERT W. DENNIS
NEW MEXICO
5971
REGISTERED PROFESSIONAL ENGINEER

Albert W. Dennis
8-2-96

REV.	DATE	DESCRIPTION	BY	CK.	APP
0	8/2/96	ISSUED FOR RECORDS PACKAGE			

SANDIA NATIONAL LABORATORIES

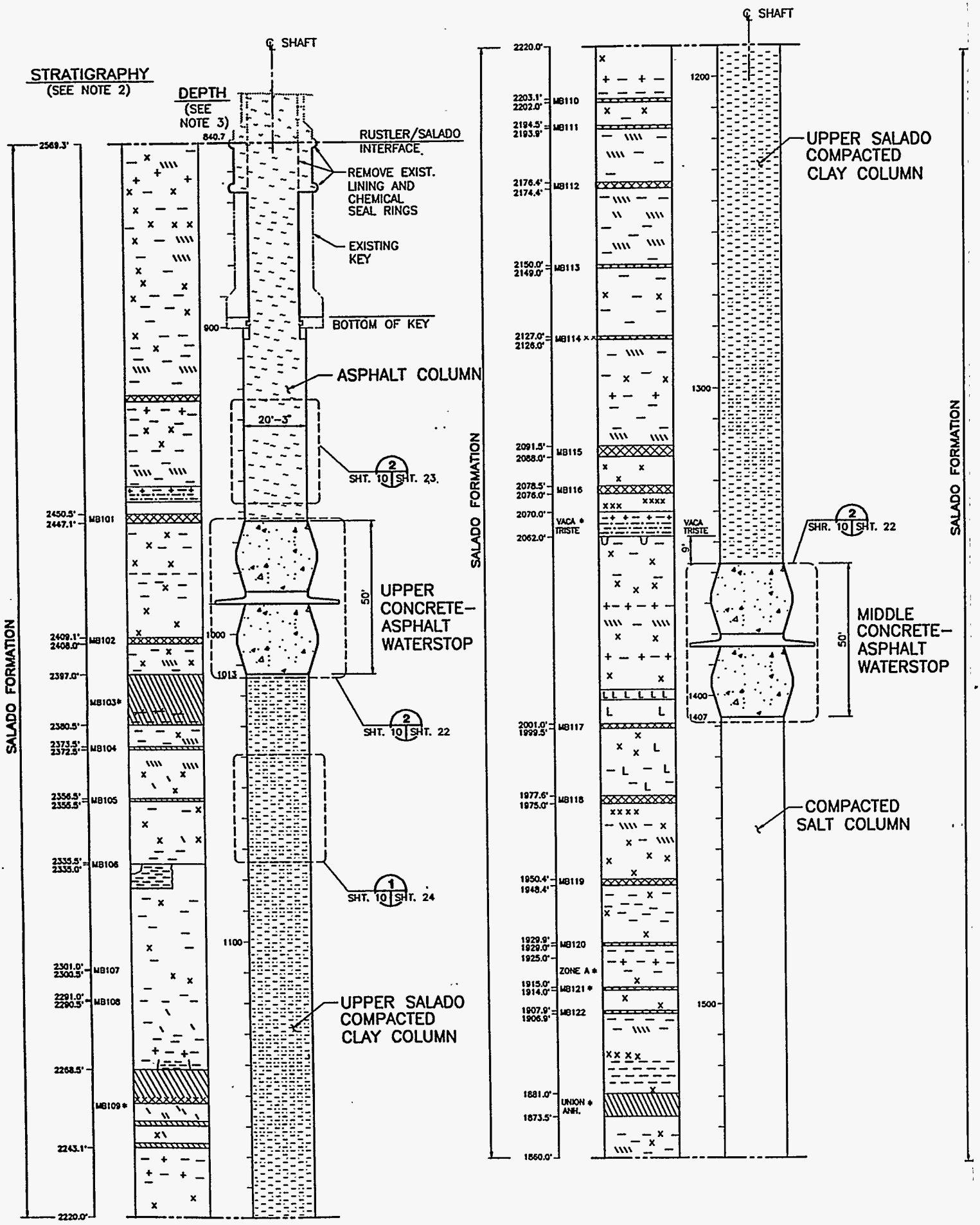
WIPP A/E SUPPORT

CONTRACT NO: AG-4909

WIPP SHAFT SEALING SYSTEM
SALADO FORMATION
AIR INTAKE SHAFT
STRATIGRAPHY AND SEALING SUBSYSTEM PROFILE

	NAME	DATE
BY		8/2/96
CK.		8/2/96
APP.		8/2/96
APP		8/12/96
APP		8/2/96

PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO. SNL-007	SHEET NO. 10 OF 28



NAME: C:\I\WIPP\9\CS\CS33-L02.DWG DATE: JULY 24, 1996 TIME: 2:58 PM

NOTES:

1. SEE SHT. 1 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS.

ALBERT W. DENNIS
NEW MEXICO
5971
REGISTERED PROFESSIONAL ENGINEER

A. W. Dennis
8-2-96

SCALE IN FEET
0 10 20 30 40 50

REV.	DATE	DESCRIPTION	BY	CK.	APP
0	8/2/96	ISSUED FOR RECORDS PACKAGE			

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

WIPP SHAFT SEALING SYSTEM

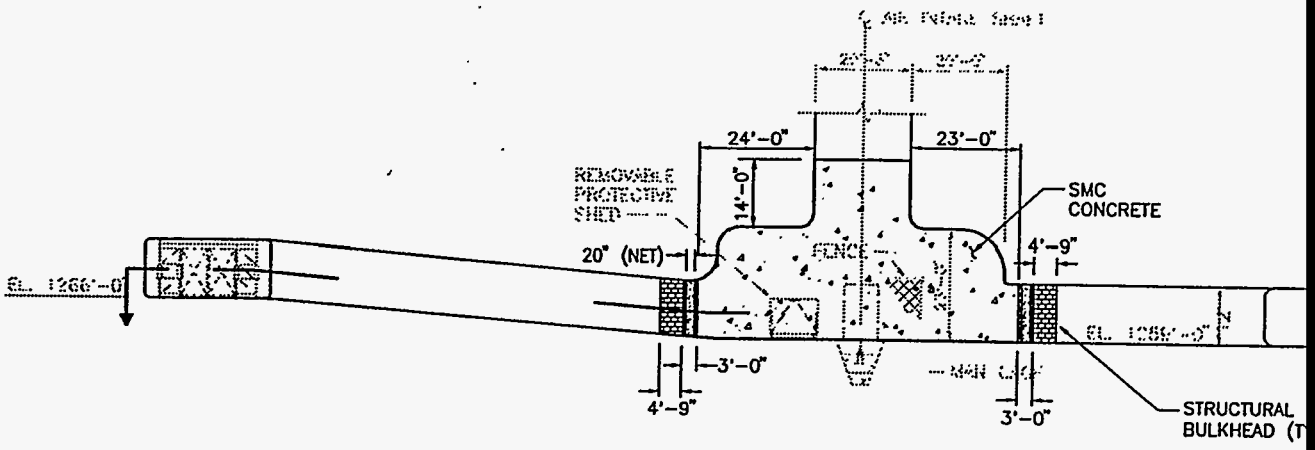
AIR INTAKE SHAFT
SHAFT STATION MONOLITH

CONTRACT NO: AC-4909

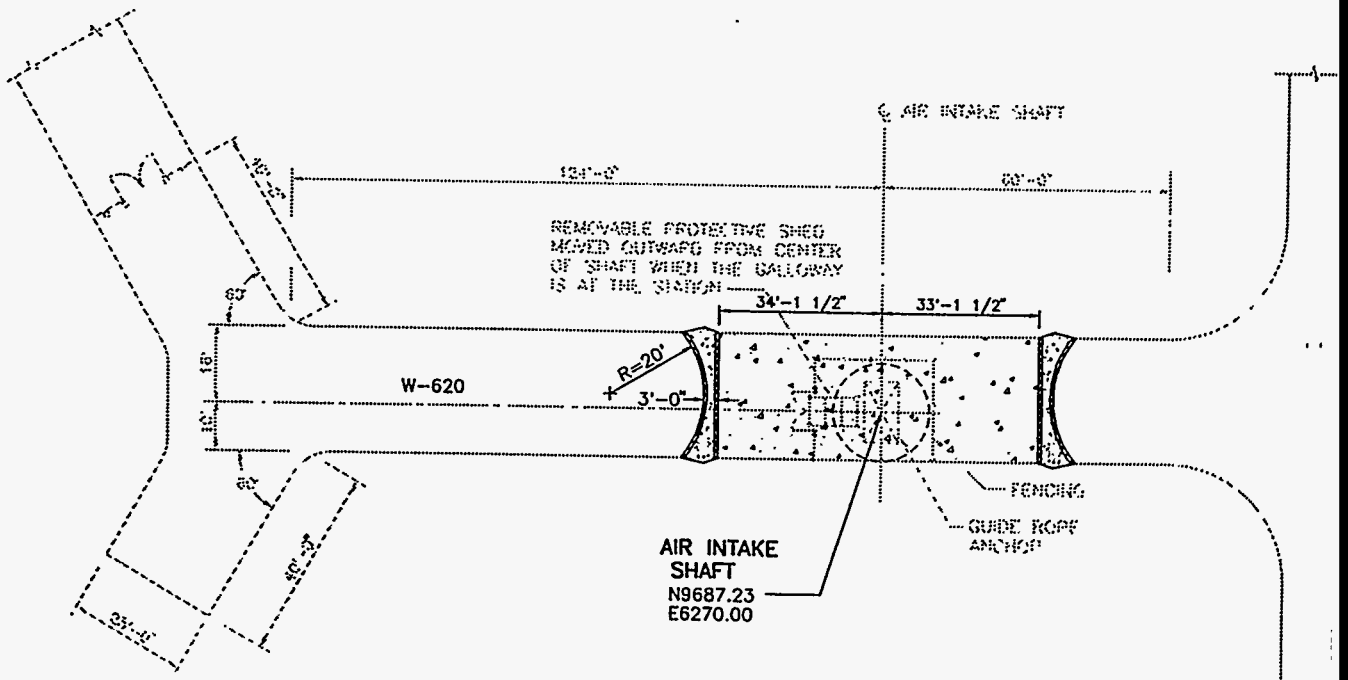
	NAME	DATE
BY		8/2/96
CK.		8/2/96
APP.		8/2/96
APP		8/2/96
APP		8/2/96

PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO. SNL-007	SHEET NO. 11 OF 28

E-14



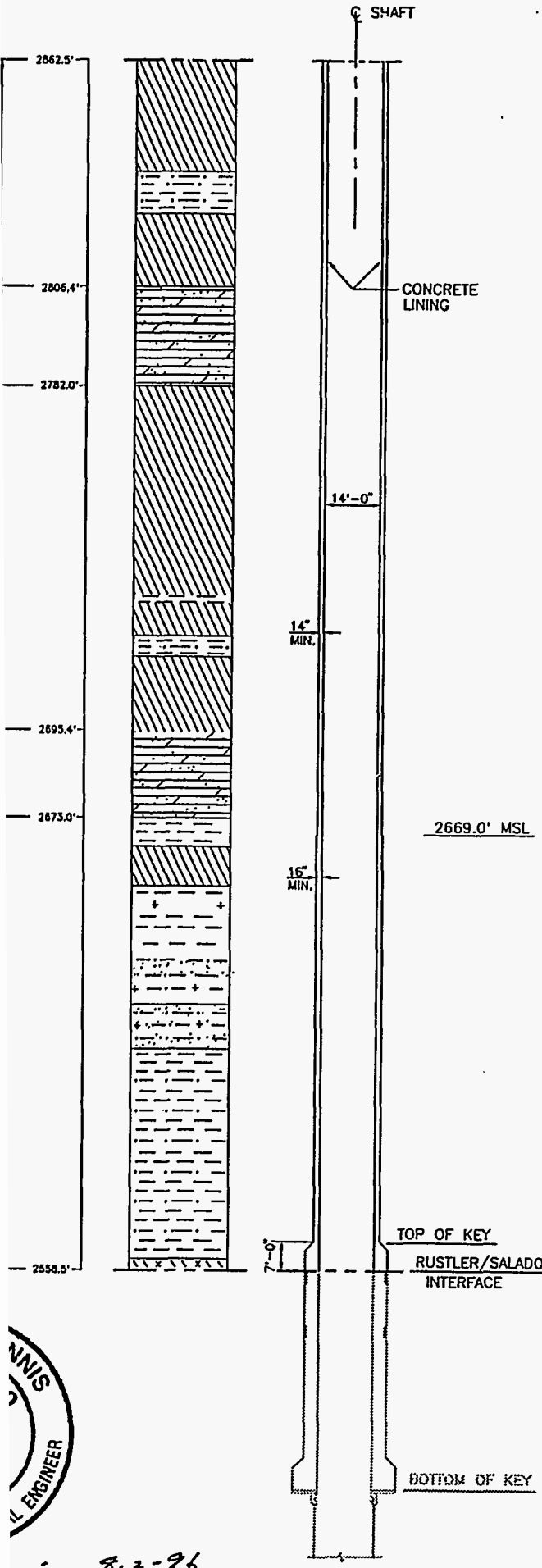
DETAIL 1 SHT. 10 SHT. 11



SECTION A

N

NAME: C:\I\WIPP\9\CS\CS33-S01.DWG DATE: JULY 30, 1996 TIME: 7:33 AM



LITHOLOGY:

PRIMARY ROCK/SEDIMENT TYPES	SECONDARY CONSTITUENTS
MUDSTONE/CLAYSTONE	ARGILLACEOUS
CLAYSTONE BED	SILTY
SILTSTONE	SANDY
SANDSTONE	SULFATIC
ANHYDRITE/GYPSUM	DOLOMITIC
DOLOMITE	CALCAREOUS
HALITE	HALITIC
POLYHALITE	POLYHALITIC
CALICHE	

NOTE:

1. THE STRATIGRAPHY AND GROUNDWATER BRINE SEEPAGE/WEEP INTERVALS ARE BASED ON THE LITHOLOGIC INFORMATION COMPILED DURING THE GEOLOGIC MAPPING OF THE EXHAUST SHAFT WALLS DOE-WIPP-86-008, "GEOTECHNICAL ACTIVITIES IN THE EXHAUST SHAFT", AND APPENDIX A OF REPORT DOE/WIPP-95-3117, "WASTE ISOLATION PILOT PLANT SEALING SYSTEM DESIGN REPORT", 1995.

   ASTERISK (*) WITHIN THE RUSTLER AND SUPRA RUSTLER FORMATIONS INDICATE GROUNDWATER OBSERVED DURING SHAFT MAPPING. ASTERISK (*) WITHIN THE SALADO FORMATION INDICATES A POTENTIAL BRINE SEEPAGE/WEEP INTERVAL. THESE POTENTIAL BRINE SEEPAGE/WEEP INTERVALS ARE BASED ON OBSERVED INTERVALS OF BRINE SEEPAGE /WEEPS IN THE AIR INTAKE SHAFT THAT HAVE BEEN PROJECTED TO THE EXHAUST SHAFT. THE MAPPING OF THE EXHAUST SHAFT (HOLT & POWERS, 1986/DOE-WIPP 86-008) DID NOT INDICATE OBSERVED SEEPAGE INTERVALS WITHIN THE SALADO FORMATION.

2. REFENCE AS-BUILT DRAWINGS FROM WID:

EXHAUST SHAFT 351, SHAFT LINING AND KEY SECTION AND DETAILS	35-R-002-01D
EXHAUST SHAFT 351, GENERAL ARRRANGEMENT, PLANS AND SECTIONS	35-R-004-01D
EXHAUST SHAFT WINCH AND COLLAR LAYOUT - SHOWS PERMANENT COLLAR STRUCTURE	OGL-S-020-1FB
EXHAUST SHAFT, SHAFT DEVELOPMENT, PLAN, SECTIONS AND DETAIL	WTSD 390D064 (1 of 2)

SCALE IN FEET

0 10 20 30 40 50

REV.	DATE	DESCRIPTION	BY	CK.	APP.
0	8/2/96	ISSUED FOR RECORDS PACKAGE			

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

CONTRACT NO: AC-4909

WIPP SHAFT SEALING SYSTEM
NEAR-SURFACE/RUSTLER FORMATIONS

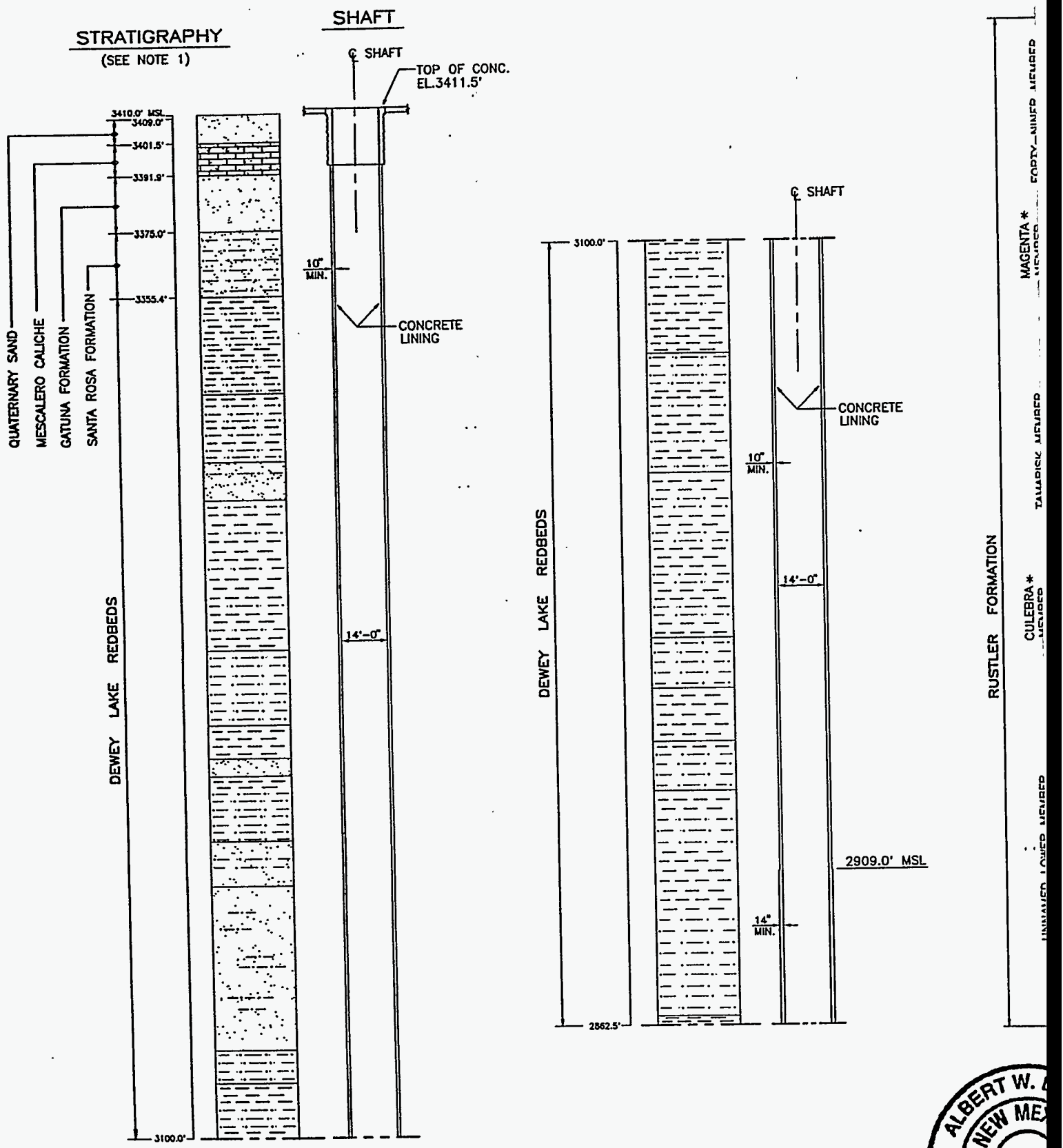
EXHAUST SHAFT
STRATIGRAPHY &
AS-BUILT ELEMENTS

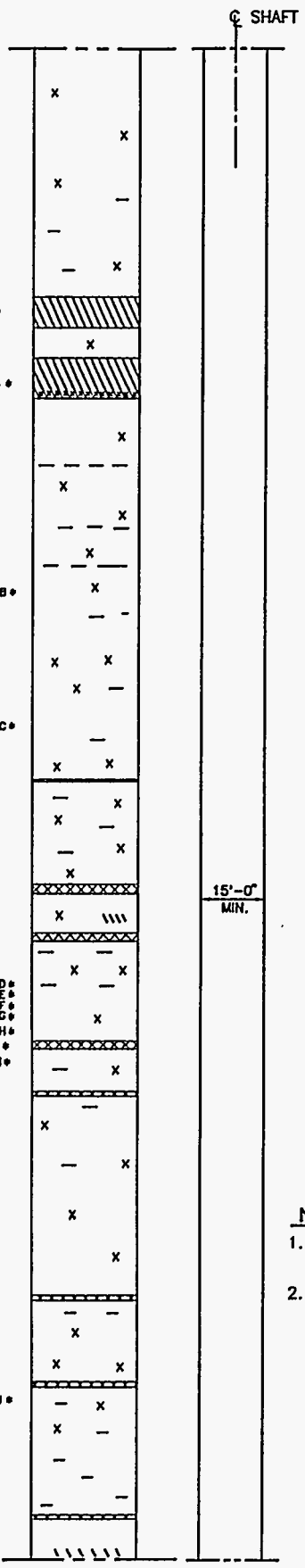
	NAME	DATE
BY		8/2/96
CK.		8/2/96
APP.		8/2/96
APP.		8/2/96
APP.		8/2/96

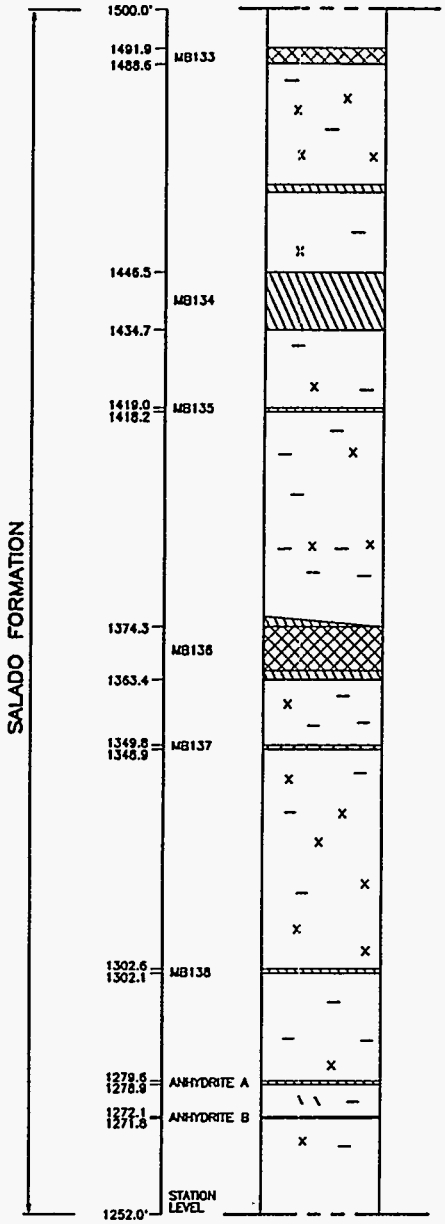
PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO. SNL-007	SHEET NO. 12 OF 28

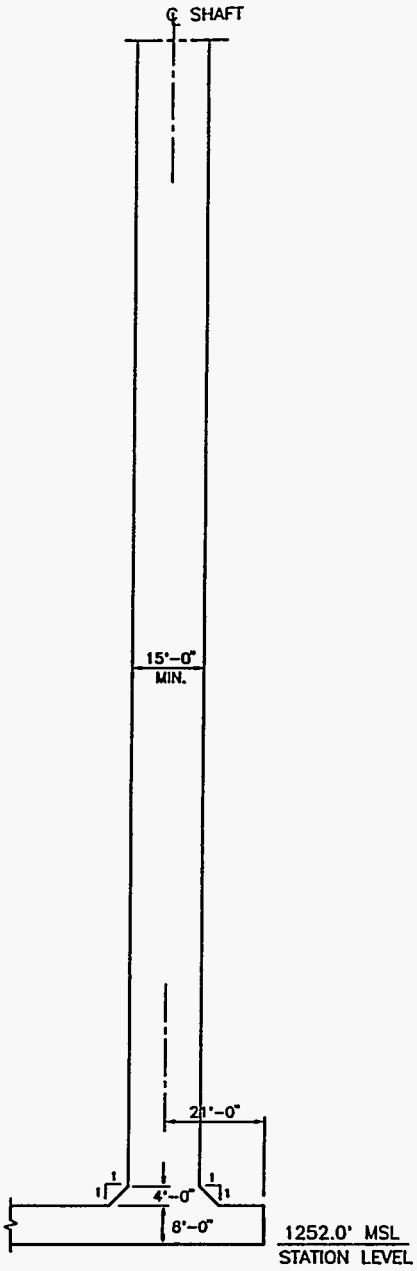
8-2-96

E-15


STRATIGRAPHY
(SEE NOTE 1)
SHAFT
℄ SHAFT
TOP OF CONC.
EL.3411.5'
3410.0' MSL
3409.0'
3401.5'
3391.9'
3375.0'
3355.4'
QUATERNARY SAND
MESCALERO CALICHE
GATUNA FORMATION
SANTA ROSA FORMATION
DEWEY LAKE REDBEDS
3100.0'
10" MIN.
CONCRETE LINING
14'-0"
℄ SHAFT
3100.0'
DEWEY LAKE REDBEDS
CONCRETE LINING
10" MIN.
14'-0"
2909.0' MSL
14" MIN.
2862.5'
RUSTLER FORMATION
MAGENTA *
CULEBRA *







E-16

NOTES:

1. SEE SHT. 1 FOR GENERAL NOTES AND ABBREVIATIONS
2. SEE SHT. 12 FOR LITHOLOGY AND NOTES.

SCALE IN FEET

0 10 20 30 40 50

ALBERT W. DENNIS
NEW MEXICO
5971
REGISTERED PROFESSIONAL ENGINEER

A. W. Dennis
8-2-96

REV.	DATE	DESCRIPTION	BY	CK.	APP
0	8/2/96	ISSUED FOR RECORDS PACKAGE			

SANDIA NATIONAL LABORATORIES

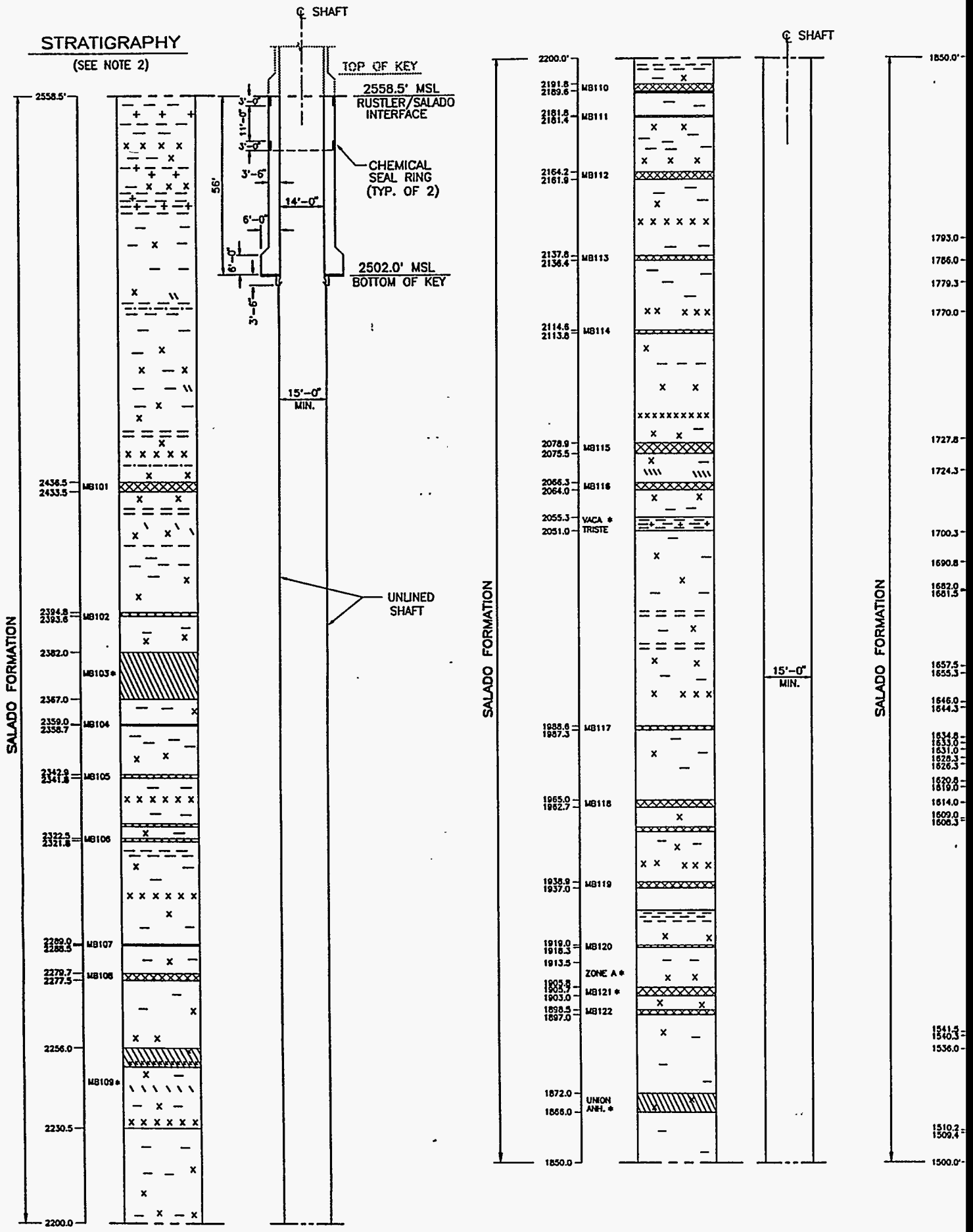
WIPP A/E SUPPORT

CONTRACT NO: AG-4909

WIPP SHAFT SEALING SYSTEM
SALADO FORMATION
EXHAUST SHAFT
STRATIGRAPHY &
AS-BUILT ELEMENTS

	NAME	DATE
BY		8/2/96
CK.	SAR	8/2/96
APP.		8/2/96
APP.		8/2/96
APP.		8/2/96

PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO. SNL-007	SHEET NO. 13 OF 28



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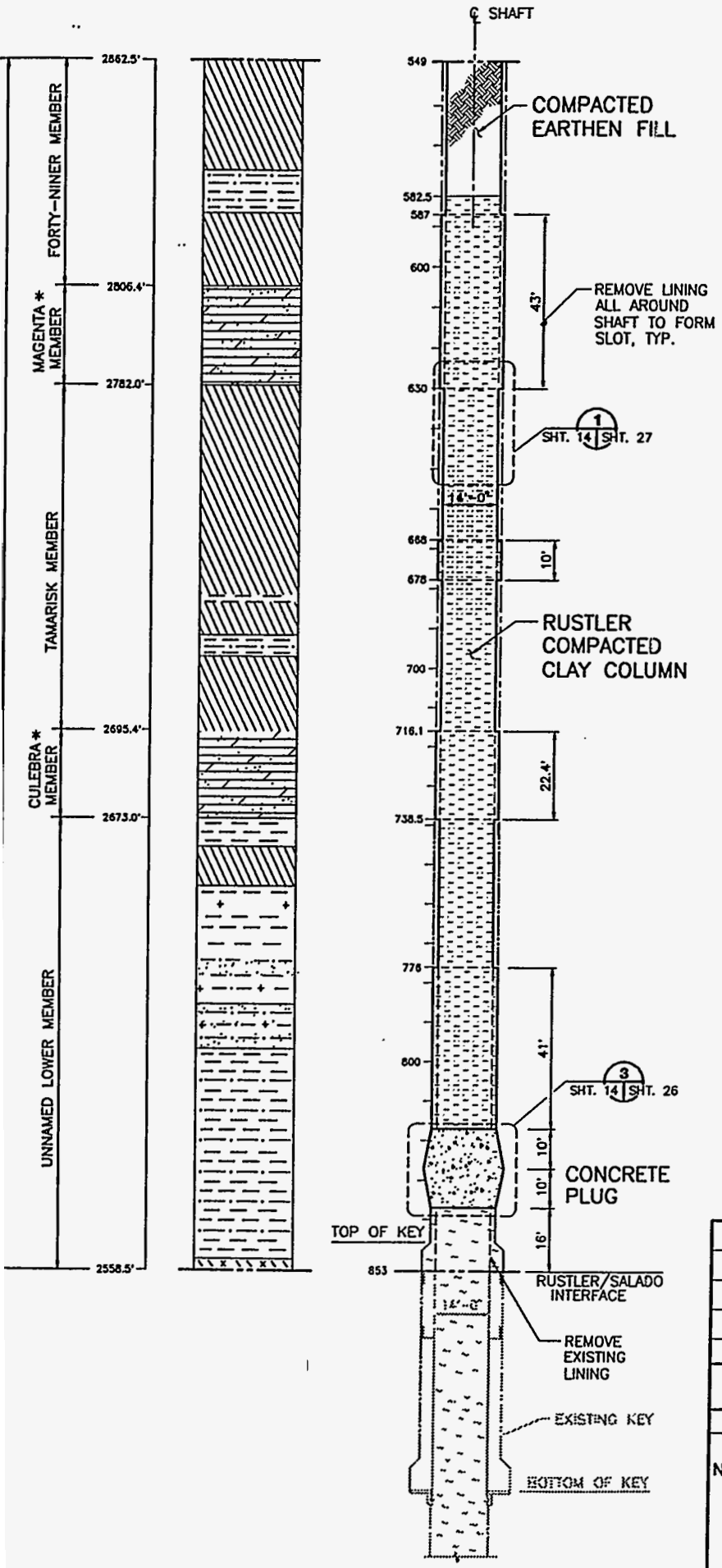


NOTES:

1. SEE SHT. 1 FOR GENERAL NOTE, LEGEND AND ABBREVIATIONS
2. SEE SHT. 12 FOR LITHOLOGY AND NOTES.
3. DEPTHS SHOWN ARE DISTANCES BELOW THE TOP OF CONCRETE, LOCATED AT EL. 3411.5' ABOVE MSL USGS 1927 NORTH AMERICAN DATUM.

ALBERT W. DENNIS
NEW MEXICO
5971
REGISTERED PROFESSIONAL ENGINEER

A.W. Dennis 8-2-96

SCALE IN FEET
0 10 20 30 40 50

REV.	DATE	DESCRIPTION	BY	CK.	APP.
0	8/2/96	ISSUED FOR RECORDS PACKAGE			

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

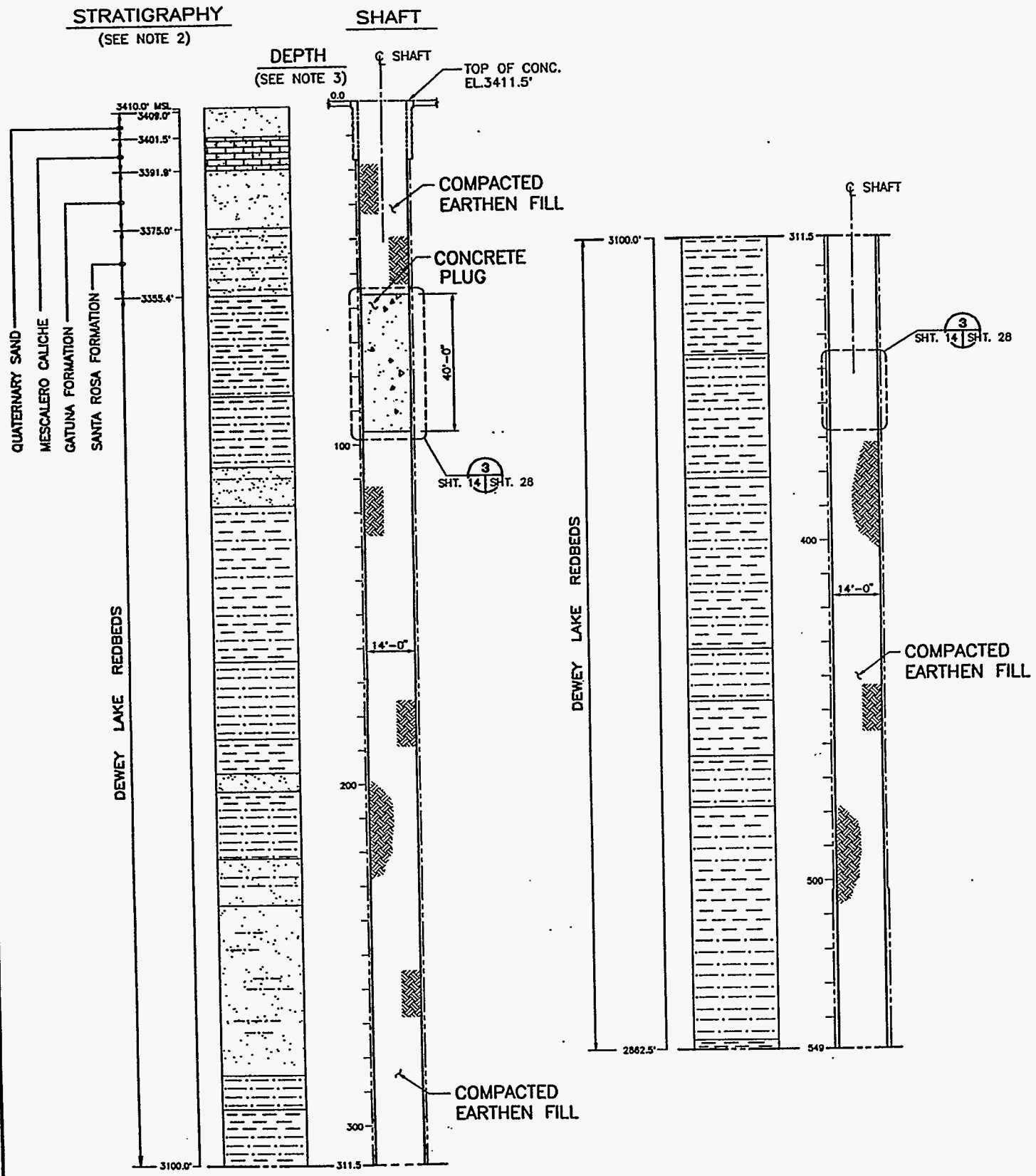
CONTRACT NO: AC-4909

WIPP SHAFT SEALING SYSTEM
NEAR-SURFACE/RUSTLER FORMATIONS
EXHAUST SHAFT
STRATIGRAPHY & SEALING
SUBSYSTEM PROFILE

	NAME	DATE
BY		8/2/96
CK.		8/2/96
APP.		8/2/96
APP.		8/2/96
APP.		8/2/96

PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO. SNL-007	SHEET NO. 14 OF 28

E-17



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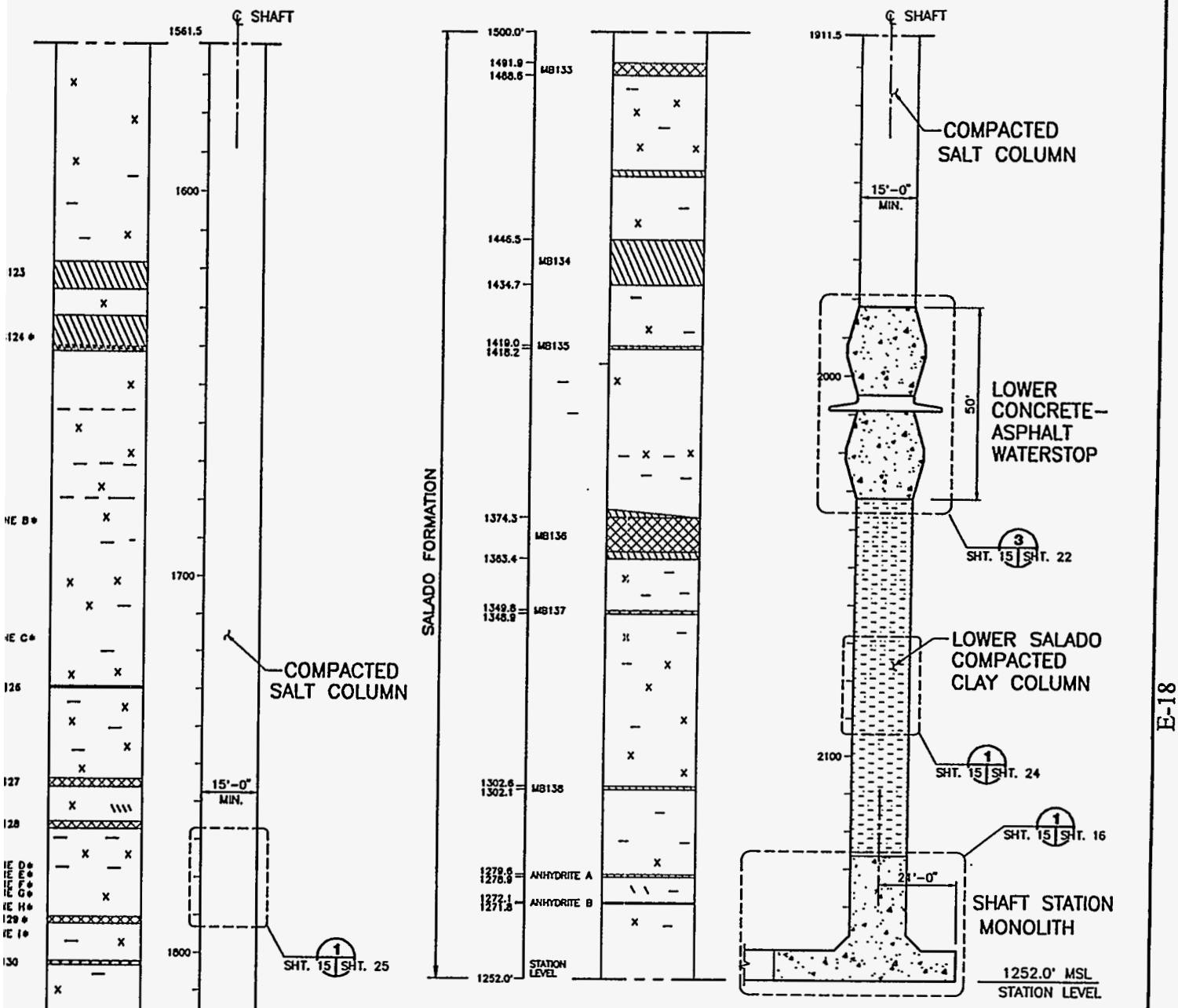


E-18

NOTES:

1. SEE SHT. 1 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS.
2. SEE SHT. 12 FOR LITHOLOGY AND NOTES.
3. SEE NOTE 3 OF SHT. 14.

SCALE IN FEET

0 10 20 30 40 50

ALBERT W. DENNIS
NEW MEXICO
5971
REGISTERED PROFESSIONAL ENGINEER

A W. Dennis
8-2-96

REV.	DATE	DESCRIPTION	BY	CK.	APP
0	8/2/96	ISSUED FOR RECORDS PACKAGE			

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

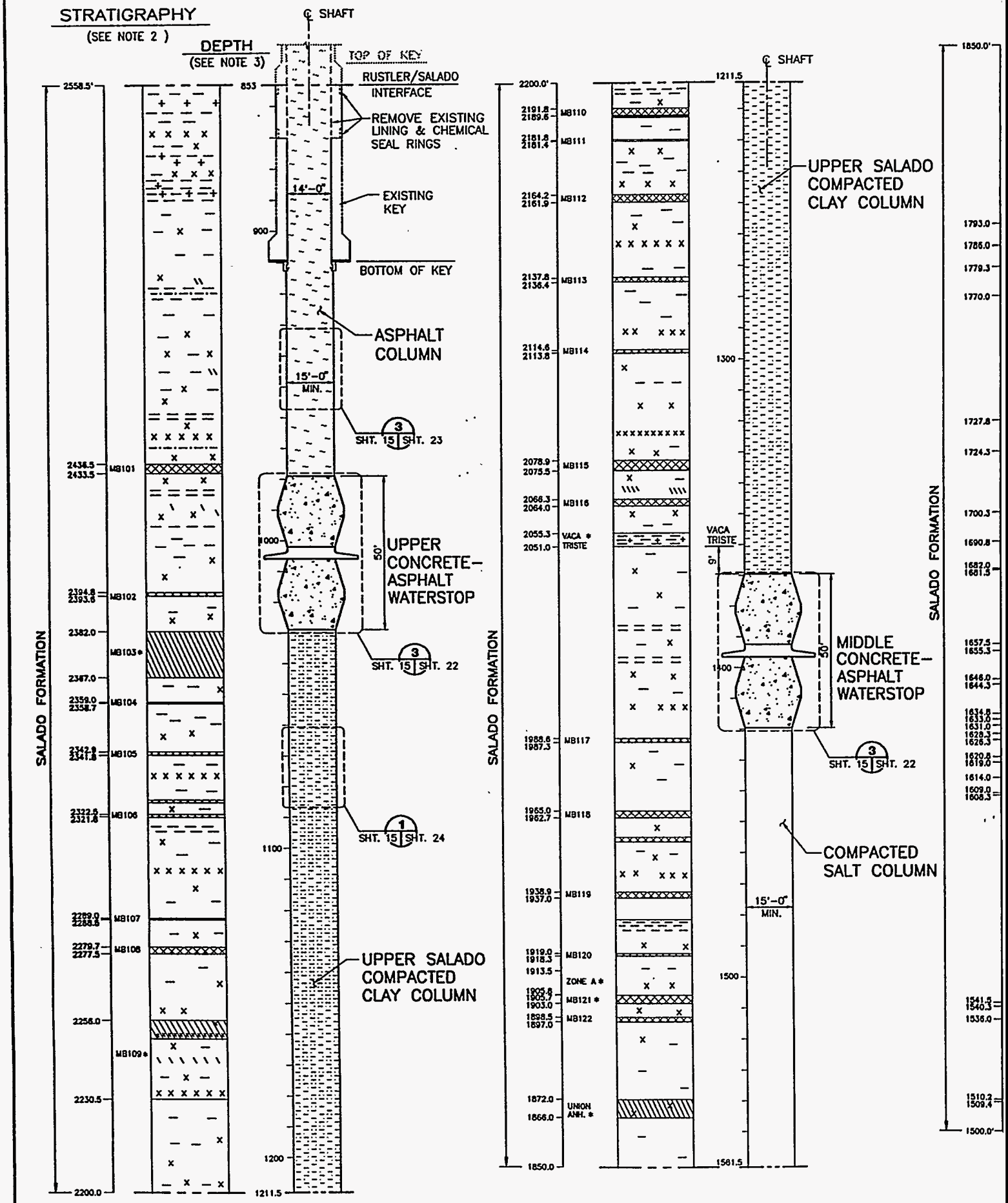
CONTRACT NO: AC-4909

WIPP SHAFT SEALING SYSTEM
SALADO FORMATION

EXHAUST SHAFT
STRATIGRAPHY & SEALING
SUBSYSTEM PROFILE

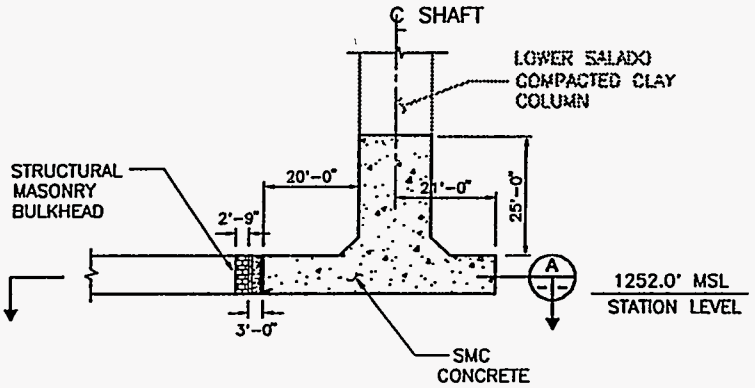
	NAME	DATE
BY		8/2/96
CK.		8/2/96
APP.		8/2/96
APP		8/2/96
APP		8/2/96

PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO. SNL-007	SHEET NO. 15 OF 28



NAME: G:\I\WIPP\9\CS\CS35-L02.DWG DATE: JULY 24, 1996 TIME: 3:00 PM

EXHAUST SHAFT
N9287.23
E7370.39

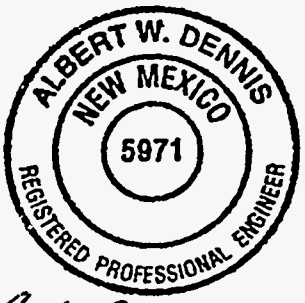


DETAIL 1
SHT. 15 | SHT. 16

E-19

NOTES:

1. SEE SHT. 1 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS.



A. W. Dennis 8-2-96

SCALE IN FEET
0 10 20 30 40 50

REV.	DATE	DESCRIPTION	BY	CK.	APP
0	8/2/96	ISSUED FOR RECORDS PACKAGE			

SANDIA NATIONAL LABORATORIES

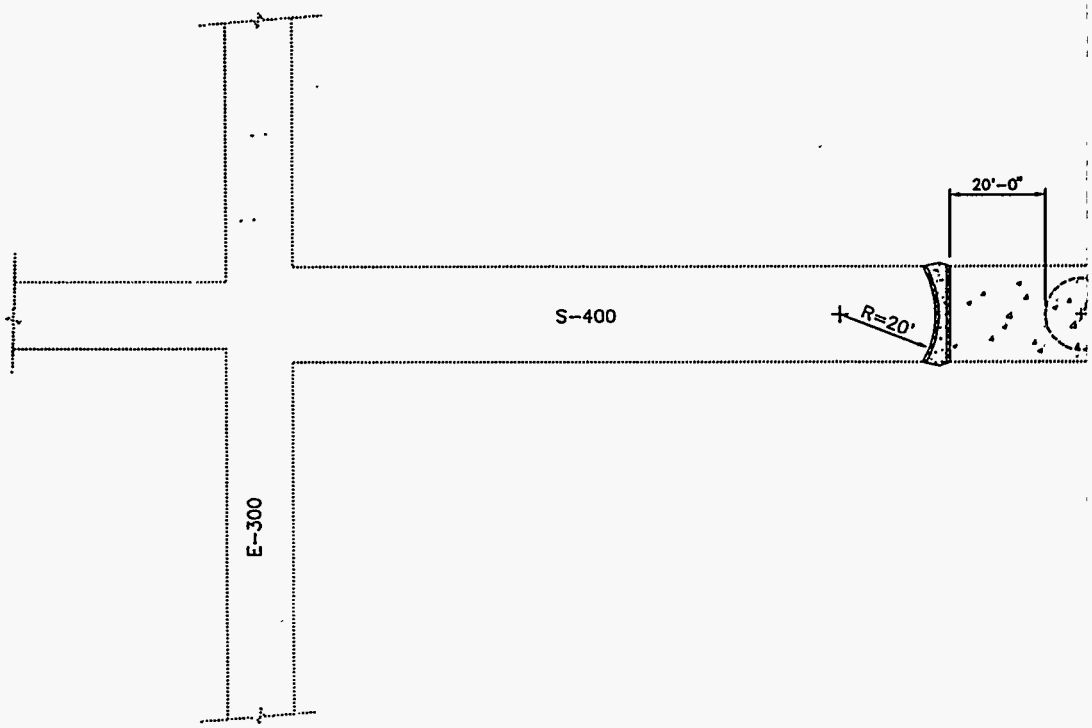
WIPP A/E SUPPORT — CONTRACT NO: AG-4909

WIPP SHAFT SEALING SYSTEM

EXHAUST SHAFT
SHAFT STATION MONOLITH

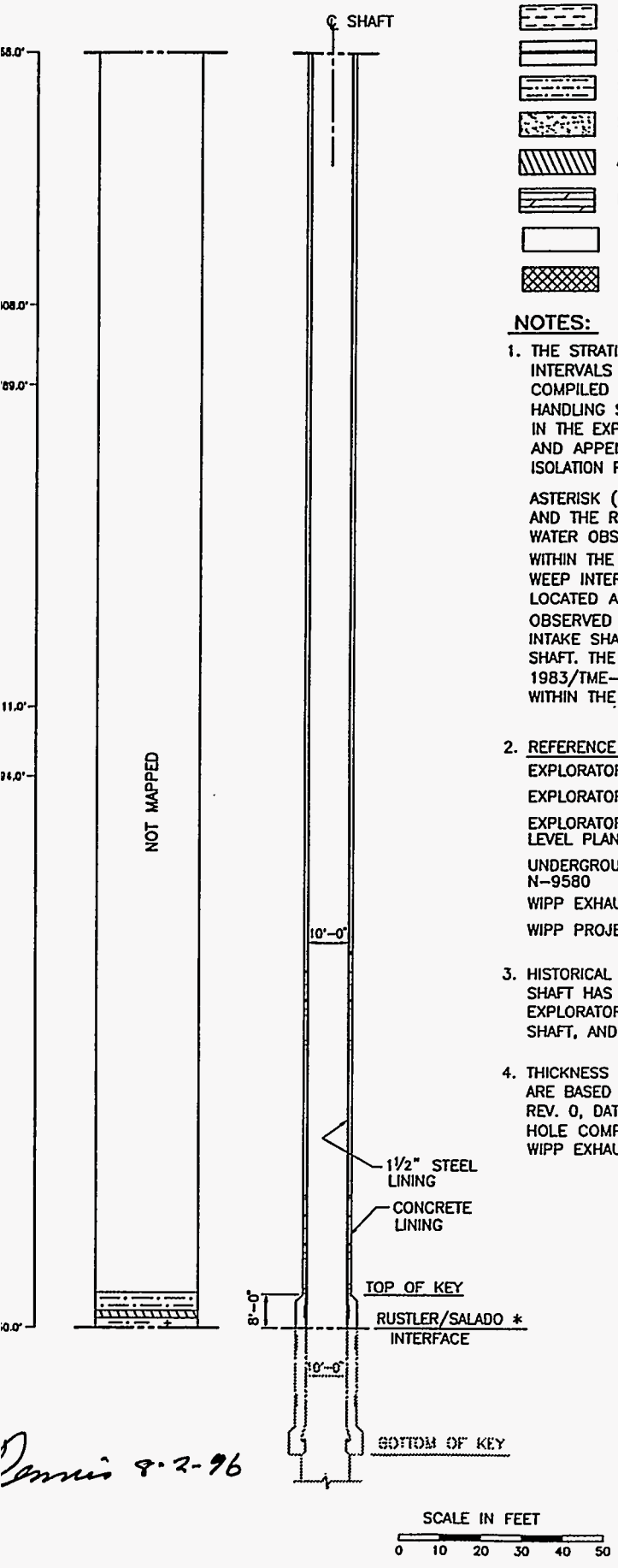
	NAME	DATE
BY		8/2/96
CK.		8/2/96
APP.		8/2/96
APP.		8/2/96
APP.		8/2/96

PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO. SNL-007	SHEET NO. 16 OF 28



SECTION A

N



Dennis 8-2-96

LITHOLOGY:

PRIMARY ROCK/SEDIMENT TYPES	SECONDARY CONSTITUENTS
MUDSTONE/CLAYSTONE	ARGILLACEOUS
CLAYSTONE BED	SILTY
SILTSTONE	SANDY
SANDSTONE	SULFATIC
ANHYDRITE/GYPSUM	DOLOMITIC
DOLOMITE	CALCAREOUS
HALITE	HALITIC
POLYHALITE	POLYHALITIC

NOTES:

1. THE STRATIGRAPHY AND GROUNDWATER BRINE SEEPAGE/WEEP INTERVALS ARE BASED ON THE LITHOLOGIC INFORMATION COMPILED DURING THE GEOLOGIC MAPPING OF THE SALT HANDLING SHAFT WALLS, TME 3178; "GEOTECHNICAL ACTIVITIES IN THE EXPLORATORY SHAFT-SELECTION OF THE FACILITY INTERVAL"; AND APPENDIX A OF REPORT DOE/WIPP-95-3117, "WASTE ISOLATION PILOT PLANT SEALING SYSTEM DESIGN REPORT", 1995.

   ASTERISK (*) WITHIN THE RUSTLER AND SUPRA RUSTLER FORMATIONS AND THE RUSTLER/SALADO FORMATION CONTACT INDICATES GROUNDWATER OBSERVED PRIOR TO SHAFT LINING INSTALLATION. ASTERISK (*) WITHIN THE SALADO FORMATION INDICATES A POTENTIAL BRINE SEEPAGE/WEEP INTERVAL. THESE POTENTIAL BRINE SEEPAGE/WEEP INTERVALS, LOCATED ABOVE THE SHAFT STATION LEVEL, ARE BASED ON OBSERVED INTERVALS OF BRINE SEEPAGE/WEEPS IN THE AIR INTAKE SHAFT THAT HAVE BEEN PROJECTED TO THE SALT HANDLING SHAFT. THE MAPPING OF THE SALT HANDLING SHAFT (JAROLIMEK ET AL., 1983/TME-3178) DID NOT INDICATE OBSERVED SEEPAGE INTERVALS WITHIN THE SALADO FORMATION.

2. REFERENCE AS-BUILT DRAWINGS FROM WID:

EXPLORATORY SHAFT KEY SHAFT STATION LOCATION, SECTIONS	37-R-010
EXPLORATORY SHAFT KEY, SECTIONS AND DETAILS	37-R-012
EXPLORATORY SHAFT STATION DEVELOPMENT - EXPERIMENTAL LEVEL PLAN AND SECTIONS	37-R-019
UNDERGROUND BASE PLAN E-0 DRIFT FROM N-9900 TO N-9580	51-W-126-W5
WIPP EXHAUST SHAFT 120" I.D. CASING x 834'	FS-M3259-01
WIPP PROJECT 120" I.D. CASING LINER HOLE COMPLEX	FS M3259-02

3. HISTORICAL NOTE: SINCE ITS CONSTRUCTION, THE SALT HANDLING SHAFT HAS BEEN REFERRED TO AS THE EXHAUST SHAFT, THE EXPLORATORY SHAFT, THE CONSTRUCTION AND SALT HANDLING SHAFT, AND THE SALT HANDLING SHAFT.

4. THICKNESS OF STEEL LINING VARIES, LINING TYPE AND LENGTH ARE BASED ON FENIX AND SCISSON AS-BUILT DWGS. M3259-02, REV. 0, DATED 11/30/79, WIPP PROJECT 120" I.D. CASING LINER HOLE COMPLEX, AND M3259-01, REV. 1, DATED 10/13/80, WIPP EXHAUST SHAFT 120" I.D. CASING x 834'.

REV.	DATE	DESCRIPTION	BY	CK.	APP.
0	8/2/96	ISSUED FOR RECORDS PACKAGE			

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

CONTRACT NO: AG-4909

WIPP SHAFT SEALING SYSTEM
NEAR-SURFACE/RUSTLER FORMATIONS
SALT HANDLING SHAFT
STRATIGRAPHY &
AS-BUILT ELEMENTS

NAME	DATE
BY	8/2/96
CK.	8/2/96
APP.	8/2/96
APP.	8/2/96
APP.	8/2/96

PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO. SNL-007	SHEET NO. 17 OF 28

E-20

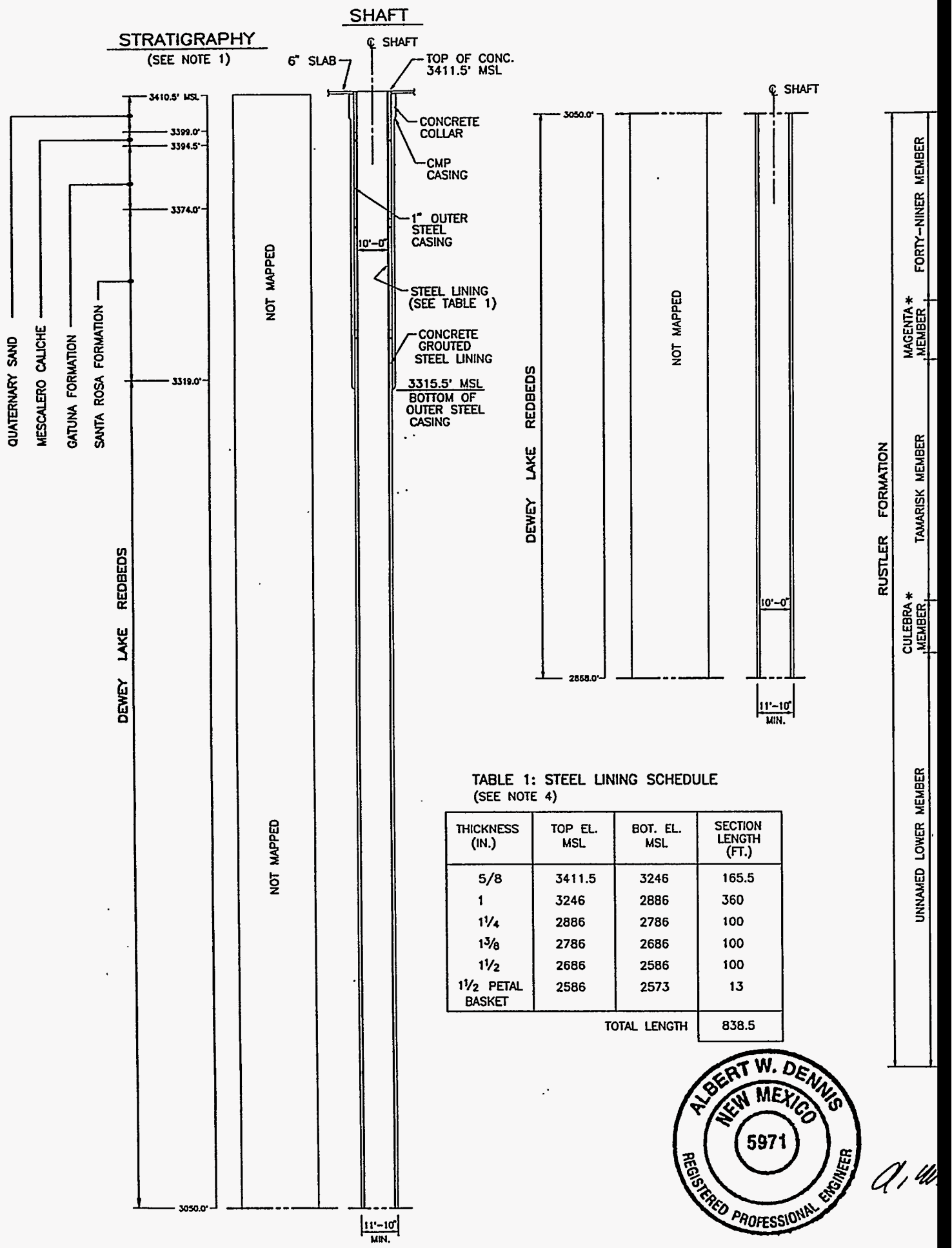
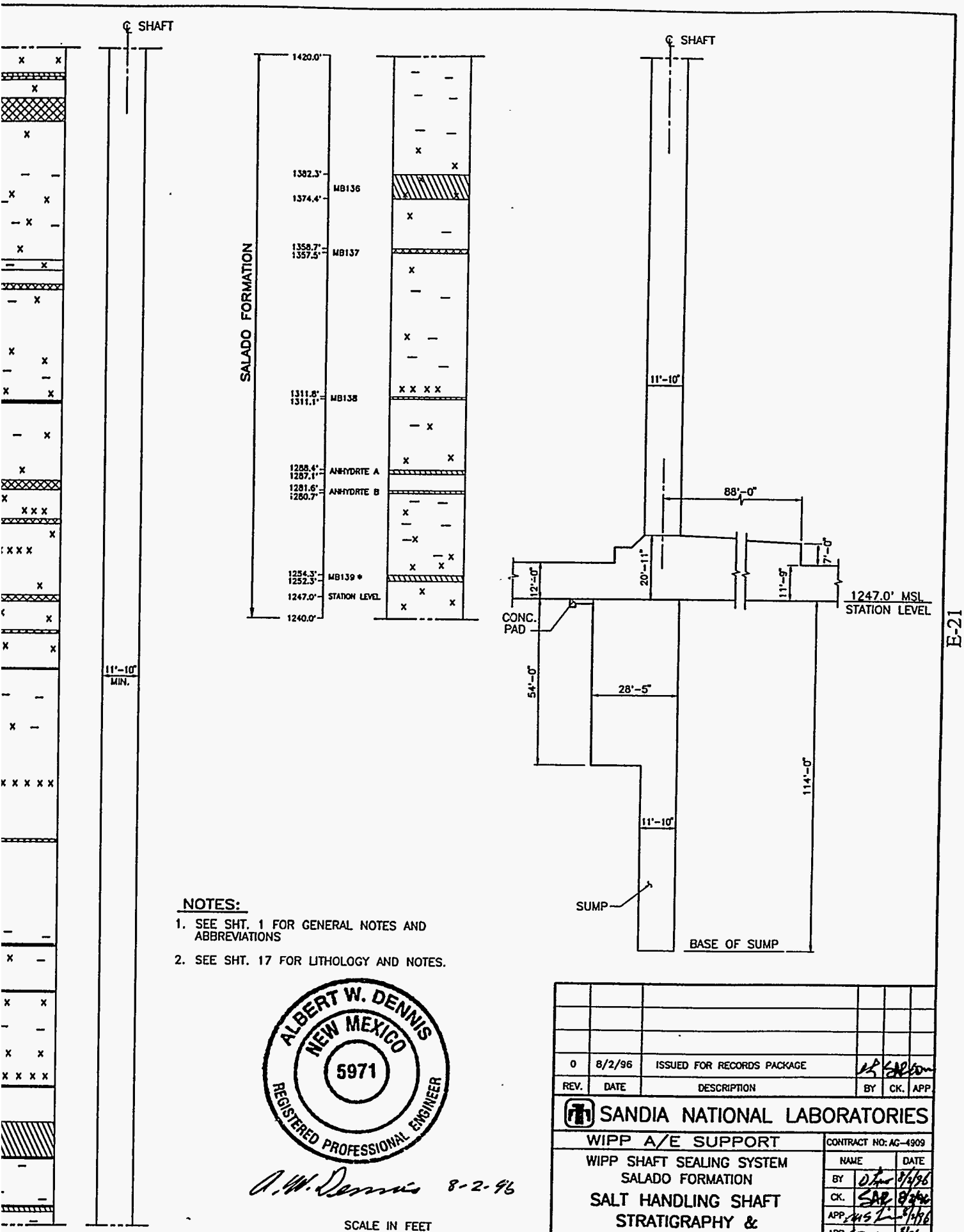


TABLE 1: STEEL LINING SCHEDULE
(SEE NOTE 4)

THICKNESS (IN.)	TOP EL. MSL	BOT. EL. MSL	SECTION LENGTH (FT.)
5/8	3411.5	3246	165.5
1	3246	2886	360
1¼	2886	2786	100
1⅜	2786	2686	100
1½	2686	2586	100
1½ PETAL BASKET	2586	2573	13
		TOTAL LENGTH	838.5

ALBERT W. DENNIS
NEW MEXICO
5971
REGISTERED PROFESSIONAL ENGINEER

NAME: C:\I\WIPP\9\CS\CS37-GOLDWG DATE: JULY 24, 1996 TIME: 3:01 PM



E-21

NOTES:

1. SEE SHT. 1 FOR GENERAL NOTES AND ABBREVIATIONS
2. SEE SHT. 17 FOR LITHOLOGY AND NOTES.

ALBERT W. DENNIS
NEW MEXICO
5971
REGISTERED PROFESSIONAL ENGINEER

A.W. Dennis 8-2-96

SCALE IN FEET
0 10 20 30 40 50

REV.	DATE	DESCRIPTION	BY	CK.	APP.
0	8/2/96	ISSUED FOR RECORDS PACKAGE			

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

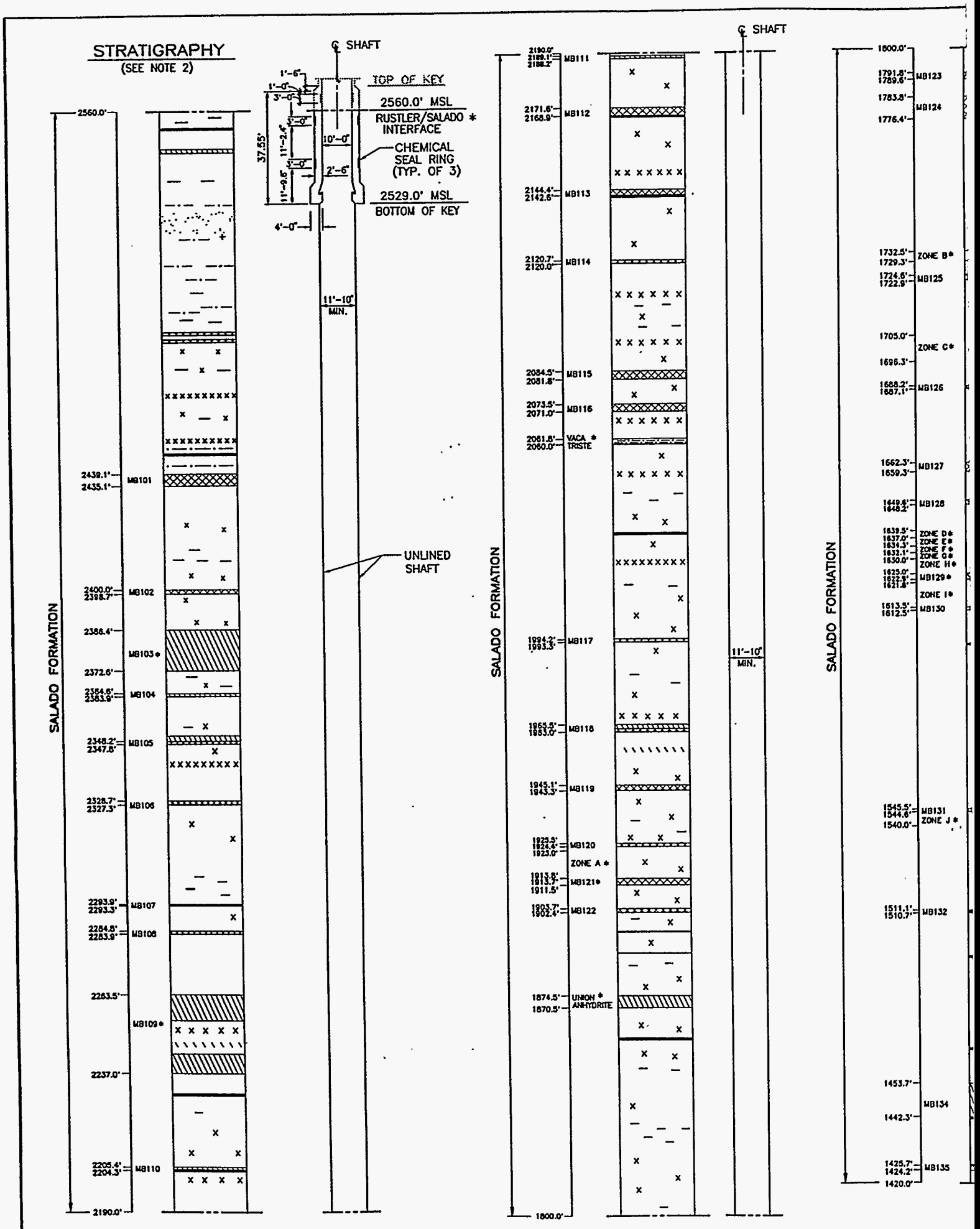
CONTRACT NO: AG-4909

WIPP SHAFT SEALING SYSTEM
SALADO FORMATION

SALT HANDLING SHAFT
STRATIGRAPHY &
AS-BUILT ELEMENTS

	NAME	DATE
BY		8/2/96
CK.		8/2/96
APP.		8/2/96
APP.		8/2/96
APP.		8/2/96

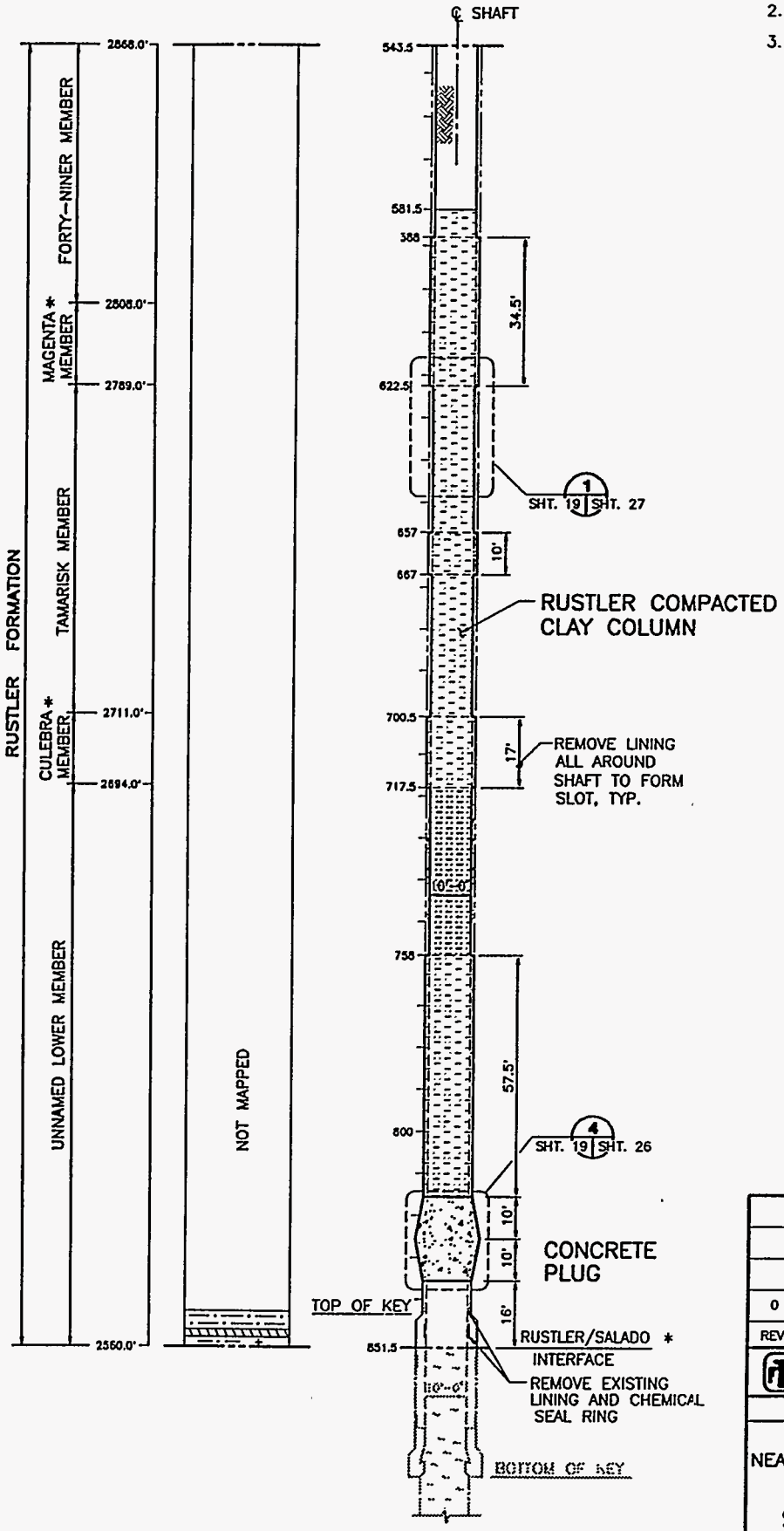
PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO. SNL-007	SHEET NO. 18 OF 28



NAME: C:\1\WIPP\9\CS\CS37-G02.DWG DATE: JULY 30, 1996 TIME: 7:46 AM

NOTES:

1. SEE SHT. 1 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS.
2. SEE SHT. 17 FOR LITHOLOGY AND NOTES.
3. DEPTHS SHOWN ARE DISTANCES BELOW THE TOP OF CONCRETE, LOCATED AT EL. 3411.5' ABOVE MSL USGS 1927 NORTH AMERICAN DATUM.



ALBERT W. DENNIS
NEW MEXICO
5971
REGISTERED PROFESSIONAL ENGINEER

A. W. Dennis 8-2-96

SCALE IN FEET
0 10 20 30 40 50

REV.	DATE	DESCRIPTION	BY	CK.	APP
0	8/2/96	ISSUED FOR RECORDS PACKAGE			

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

CONTRACT NO: AG-4909

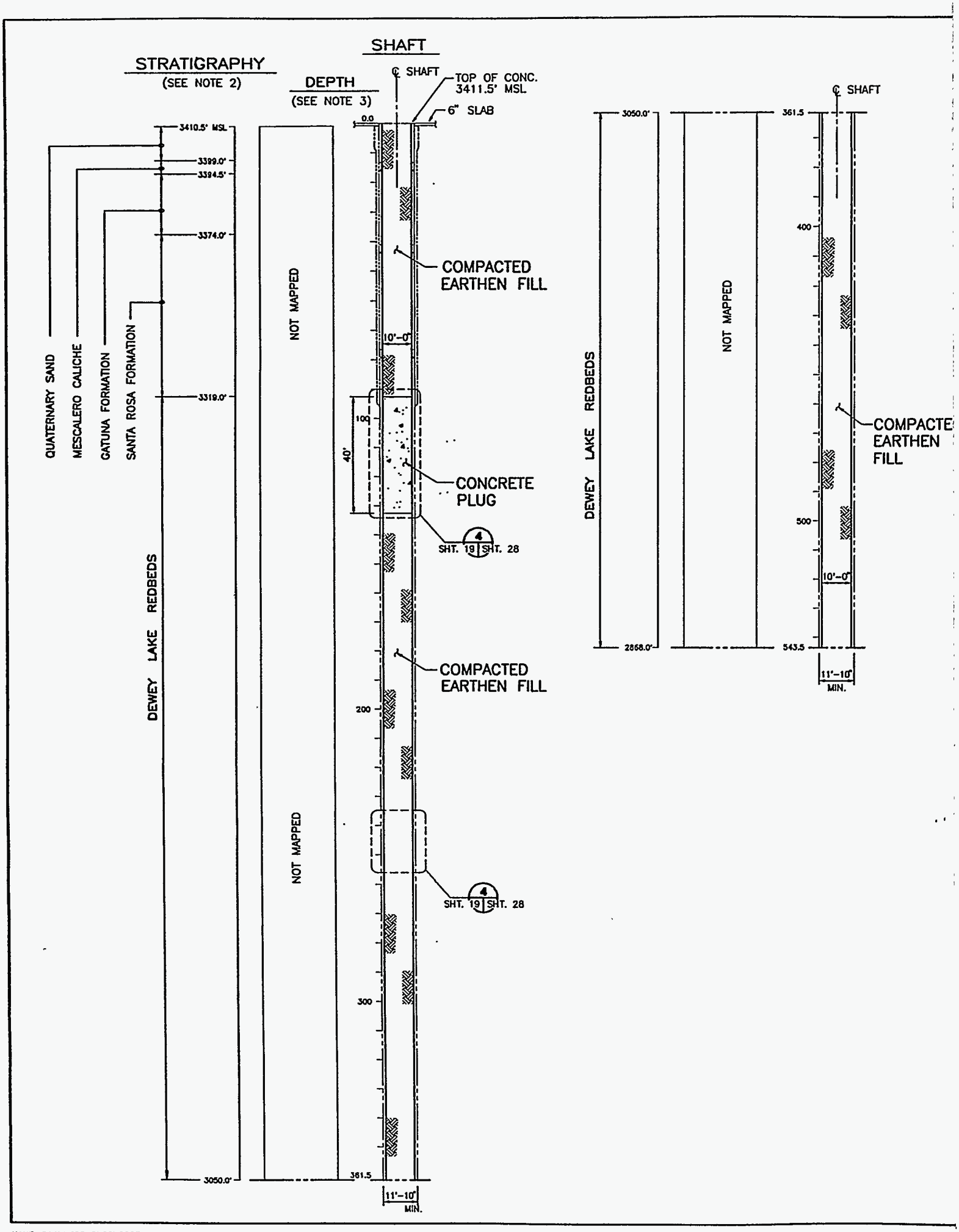
WIPP SHAFT SEALING SYSTEM
NEAR-SURFACE/RUSTLER FORMATIONS

SALT HANDLING SHAFT
STRATIGRAPHY & SEALING
SUBSYSTEM PROFILE

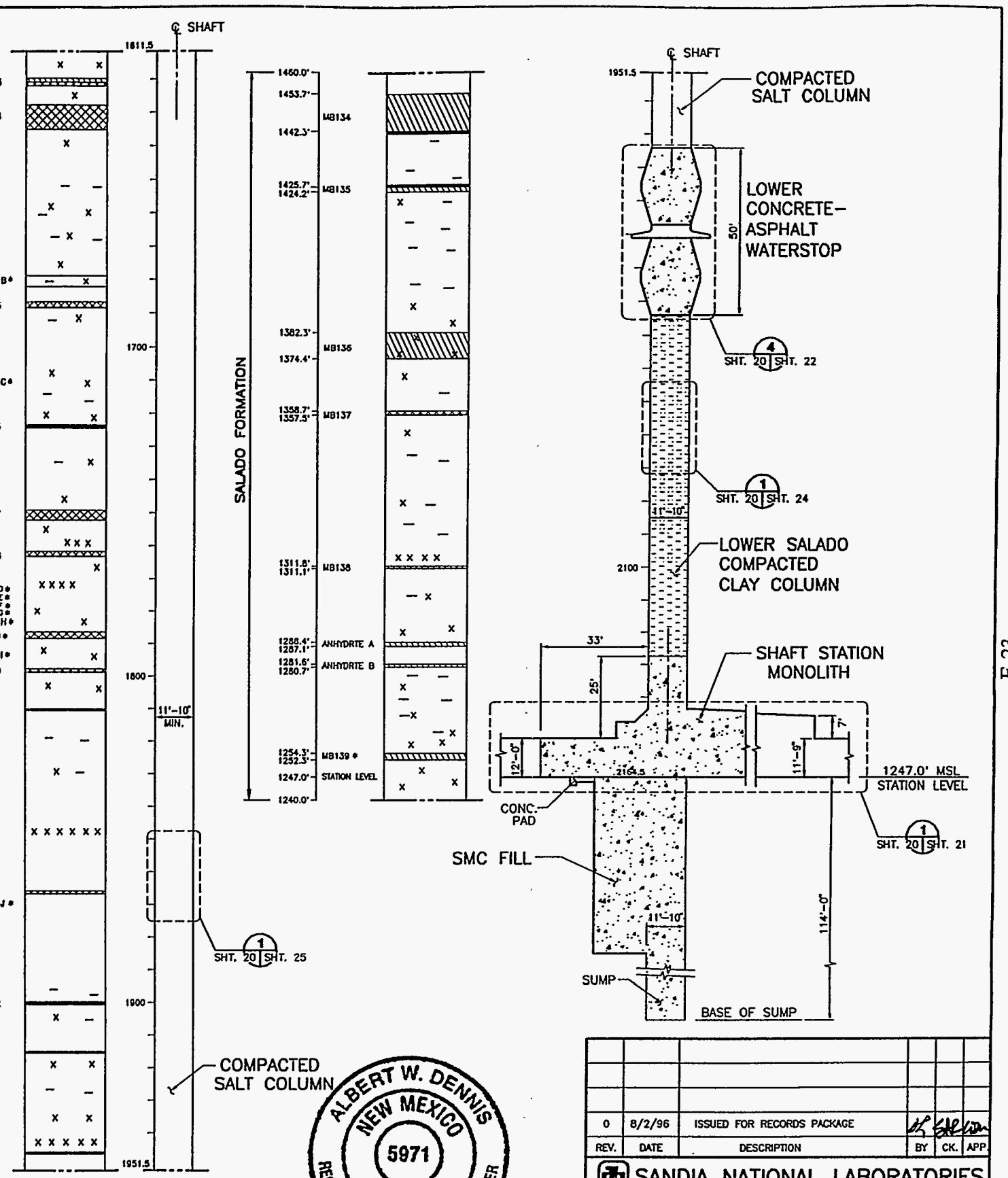
	NAME	DATE
BY		8/1/96
CK.		8/1/96
APP.		8/1/96
APP.		8/2/96
APP.		8/2/96

PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO. SNL-007	SHEET NO. 19 OF 28

E-22



NAME: C:\I\WIPP\9\CS\CS37-L01.DWG DATE: MAY 06, 1996 TIME: 3:32 PM



NOTES, LEGEND AND

Y AND NOTES.

ALBERT W. DENNIS
NEW MEXICO
5971
REGISTERED PROFESSIONAL ENGINEER

A.W. Dennis 8-2-96

REV.	DATE	DESCRIPTION	BY	CK.	APP.
0	8/2/96	ISSUED FOR RECORDS PACKAGE			

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

CONTRACT NO: AC-4909

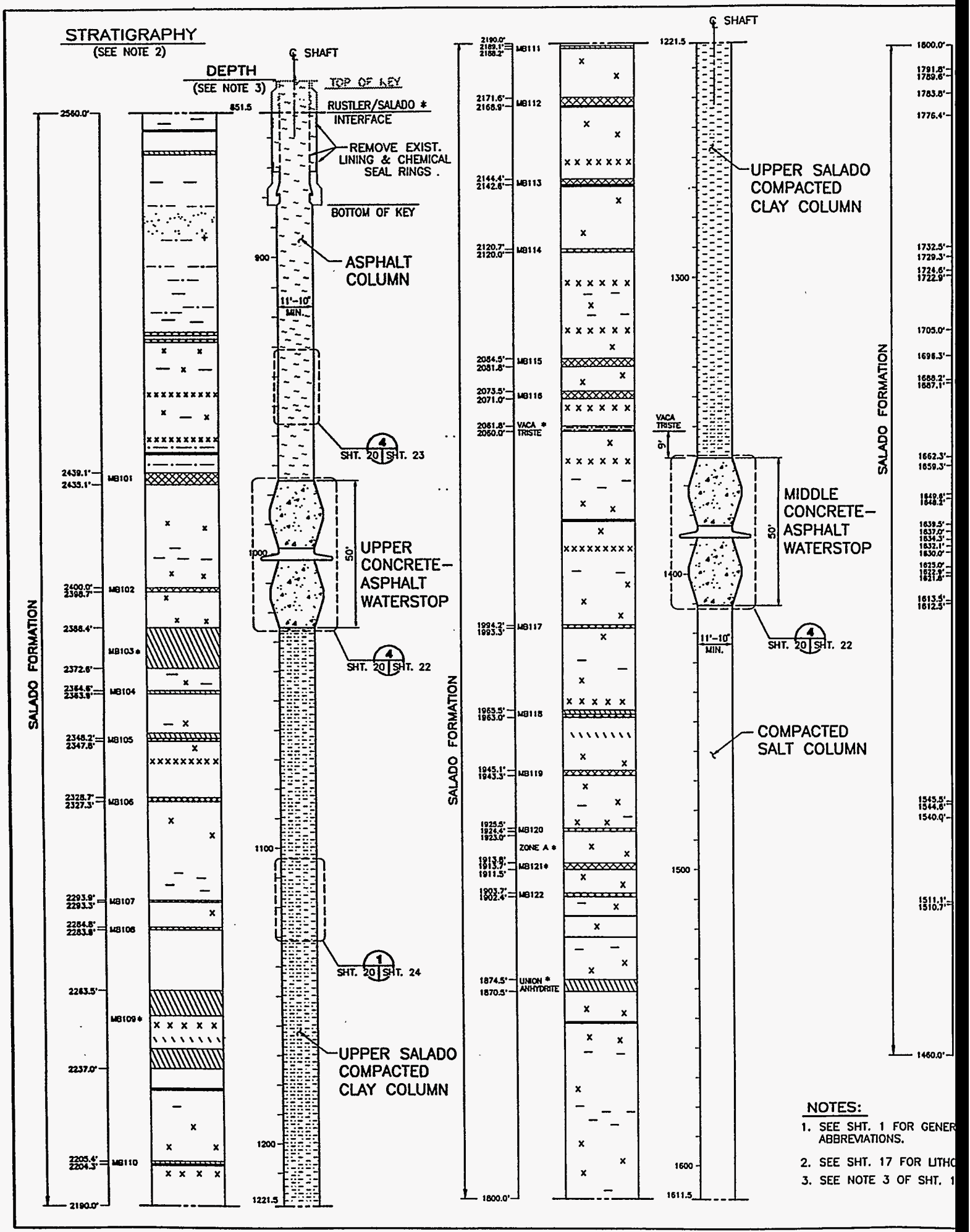
WIPP SHAFT SEALING SYSTEM
SALADO FORMATION

SALT HANDLING SHAFT
STRATIGRAPHY & SEALING
SUBSYSTEM PROFILE

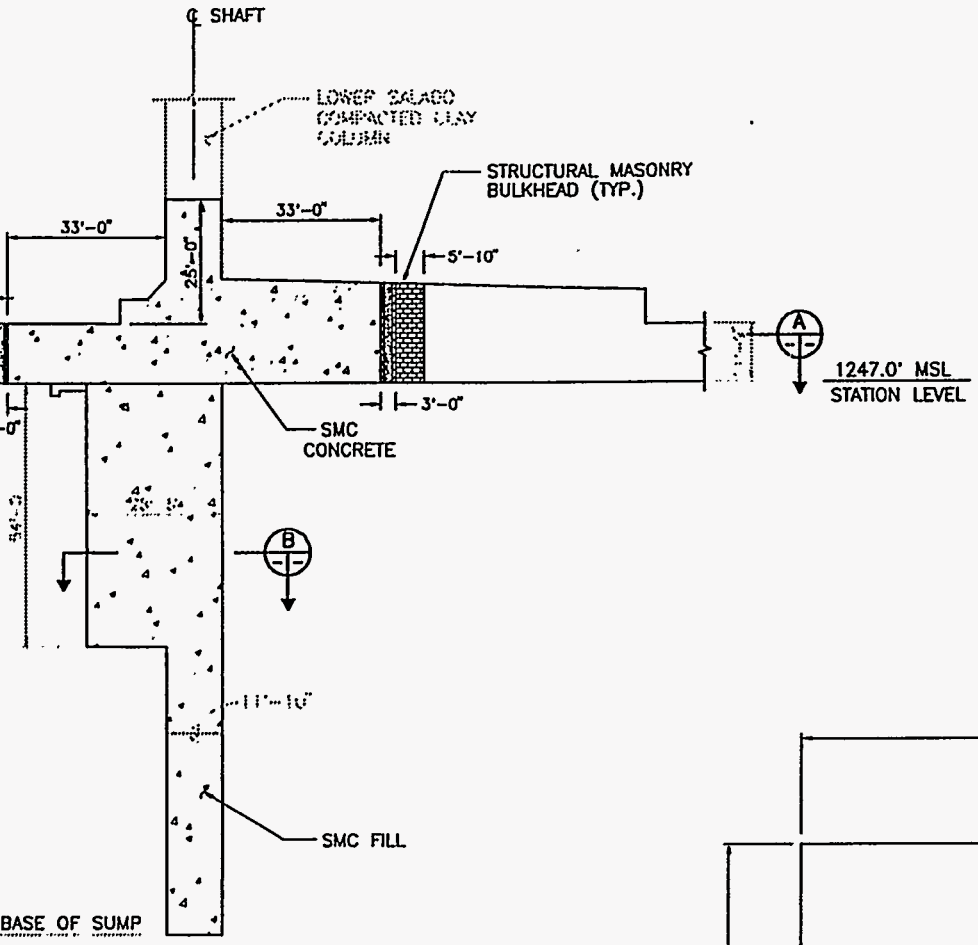
NAME	DATE
BY	8/2/96
CK.	8/2/96
APP.	8/2/96
APP.	8/2/96
APP.	8/2/96

PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO. SNL-007	SHEET NO. 20 OF 28

E-23



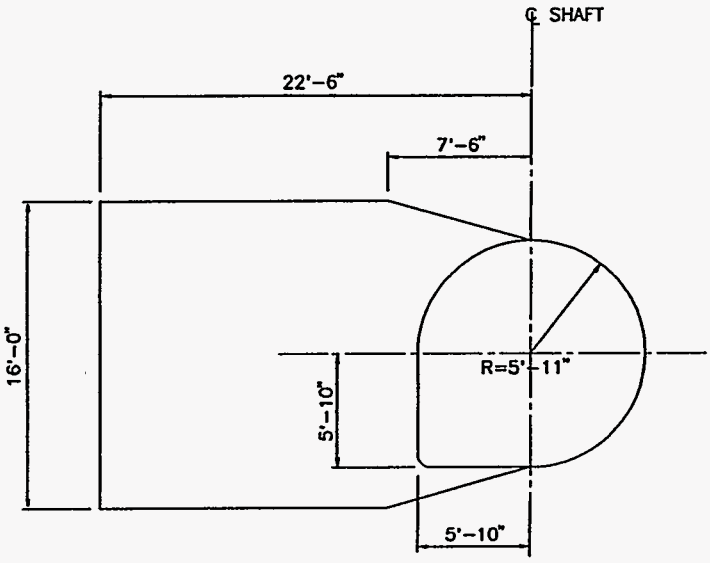
NAME: C:\1\WIPP\9\CS\CS37-L02.DWG DATE: JULY 24, 1996 TIME: 3:06 PM



DETAIL 1 SHT. 20 SHT. 21

SCALE IN FEET

10 20 30 40 50



SECTION B

SCALE IN FEET

0 5 10 15 20

E-24

NOTES:

1. SEE SHT. 1 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS.

ALBERT W. DENNIS NEW MEXICO 5971 REGISTERED PROFESSIONAL ENGINEER

Albert W. Dennis 8-2-96

REV.	DATE	DESCRIPTION	BY	CK.	APP
0	8/2/96	ISSUED FOR RECORDS PACKAGE			

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

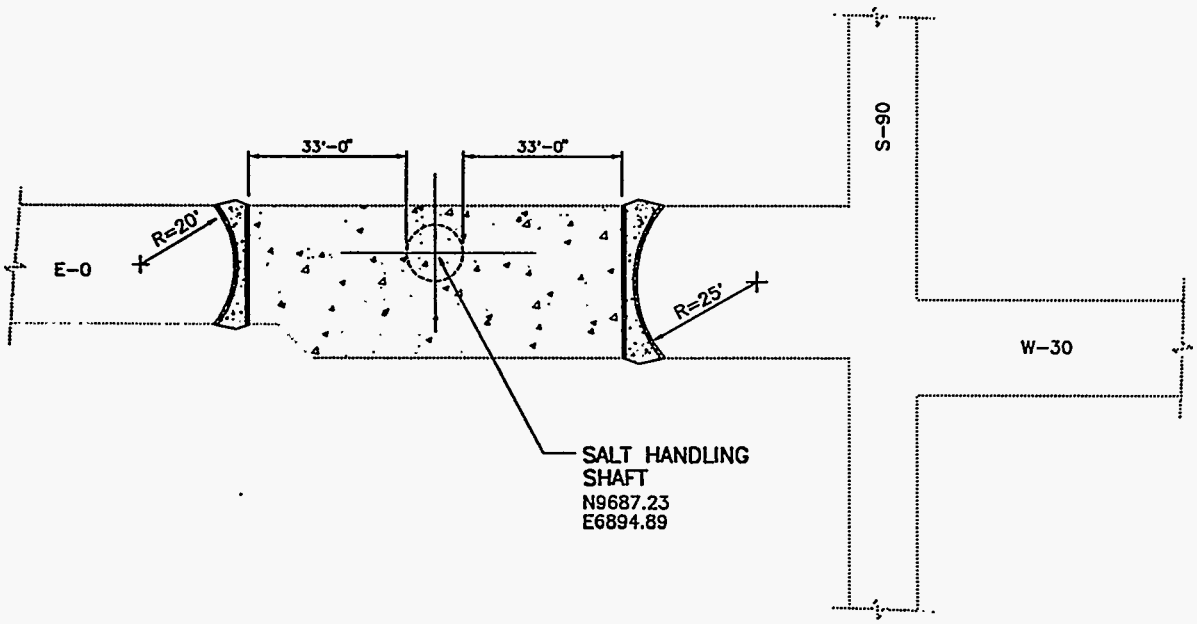
CONTRACT NO: AC-4909

WIPP SHAFT SEALING SYSTEM

SALT HANDLING SHAFT
SHAFT STATION MONOLITH

	NAME	DATE
BY		8/2/96
CK.		8/2/96
APP.		8/2/96
APP.		8/2/96
APP.		8/2/96

PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO. SNL-007	SHEET NO. 21 OF 28



SECTION A

N

SCALE IN FEET

0 10 20 30 40 50

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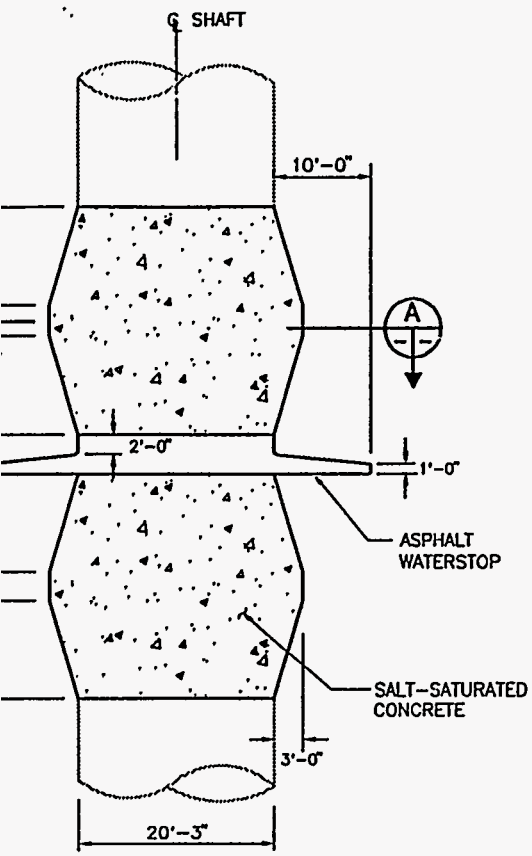
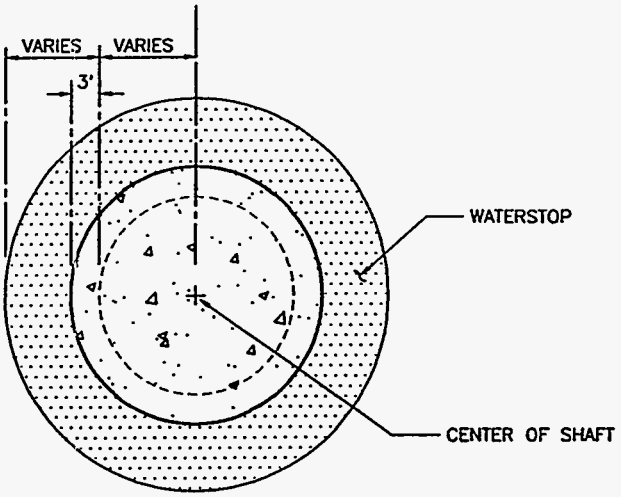
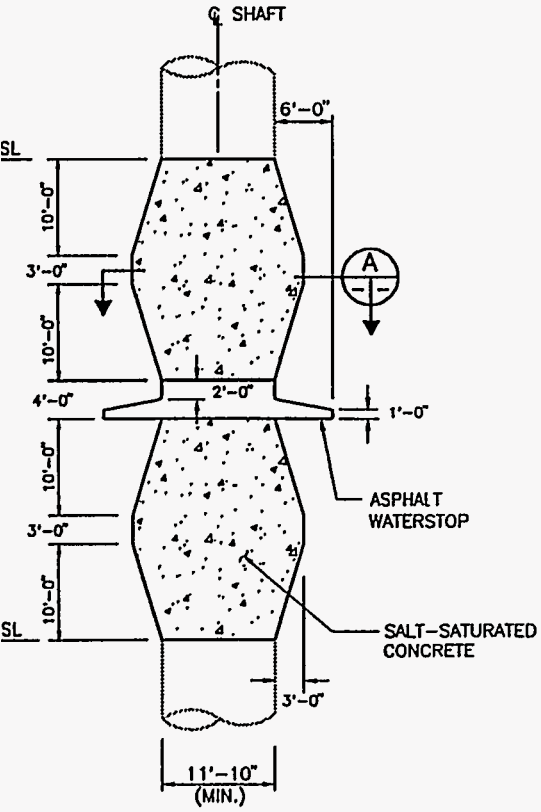


DETAIL 2
R INTAKE SHAFT SHT. 10 SHT. 22



SECTION A
NO SCALE



DETAIL 4
SALT HANDLING SHAFT SHT. 20 SHT. 22

ALBERT W. DENNIS
NEW MEXICO
5971
REGISTERED PROFESSIONAL ENGINEER

Albert W. Dennis
8-2-96

SCALE IN FEET
0 5 10 15 20 25

REV.	DATE	DESCRIPTION	BY	CK.	APP.
0	8/2/96	ISSUED FOR RECORDS PACKAGE			

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

CONTRACT NO: AG-4909

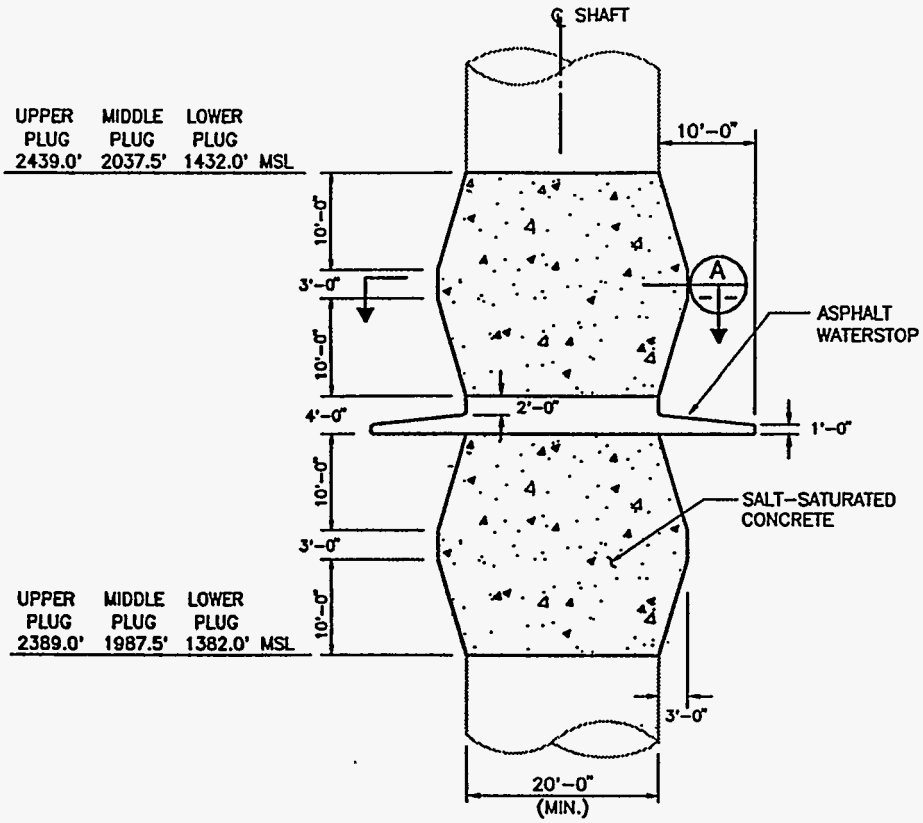
WIPP SHAFT SEALING SYSTEM

CONCRETE-ASPHALT WATERSTOP IN SALADO FORMATION

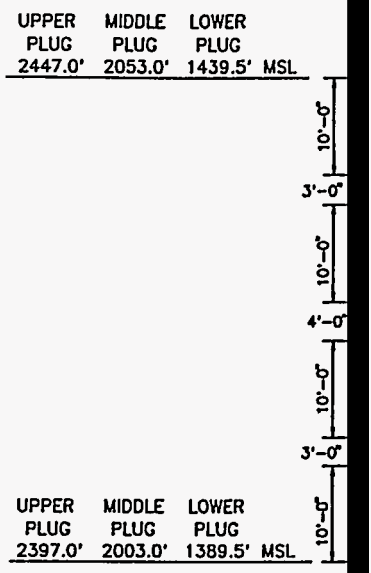
	NAME	DATE
BY		
CK.		
APP		
APP.		
APP		

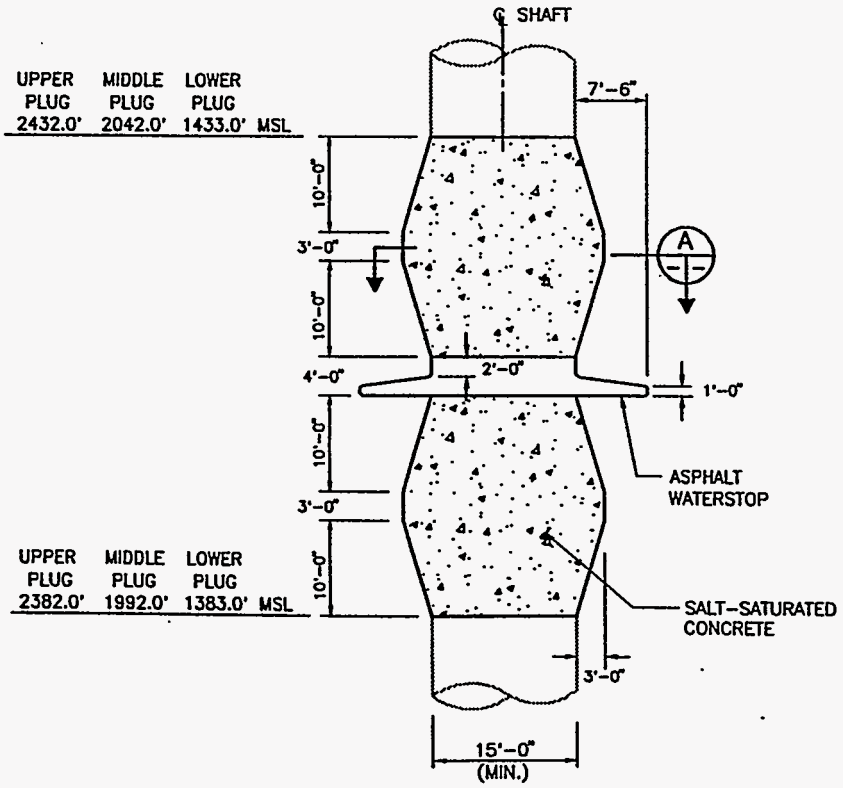
PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO. SNL-007	SHEET NO. 22 OF 28

E-25

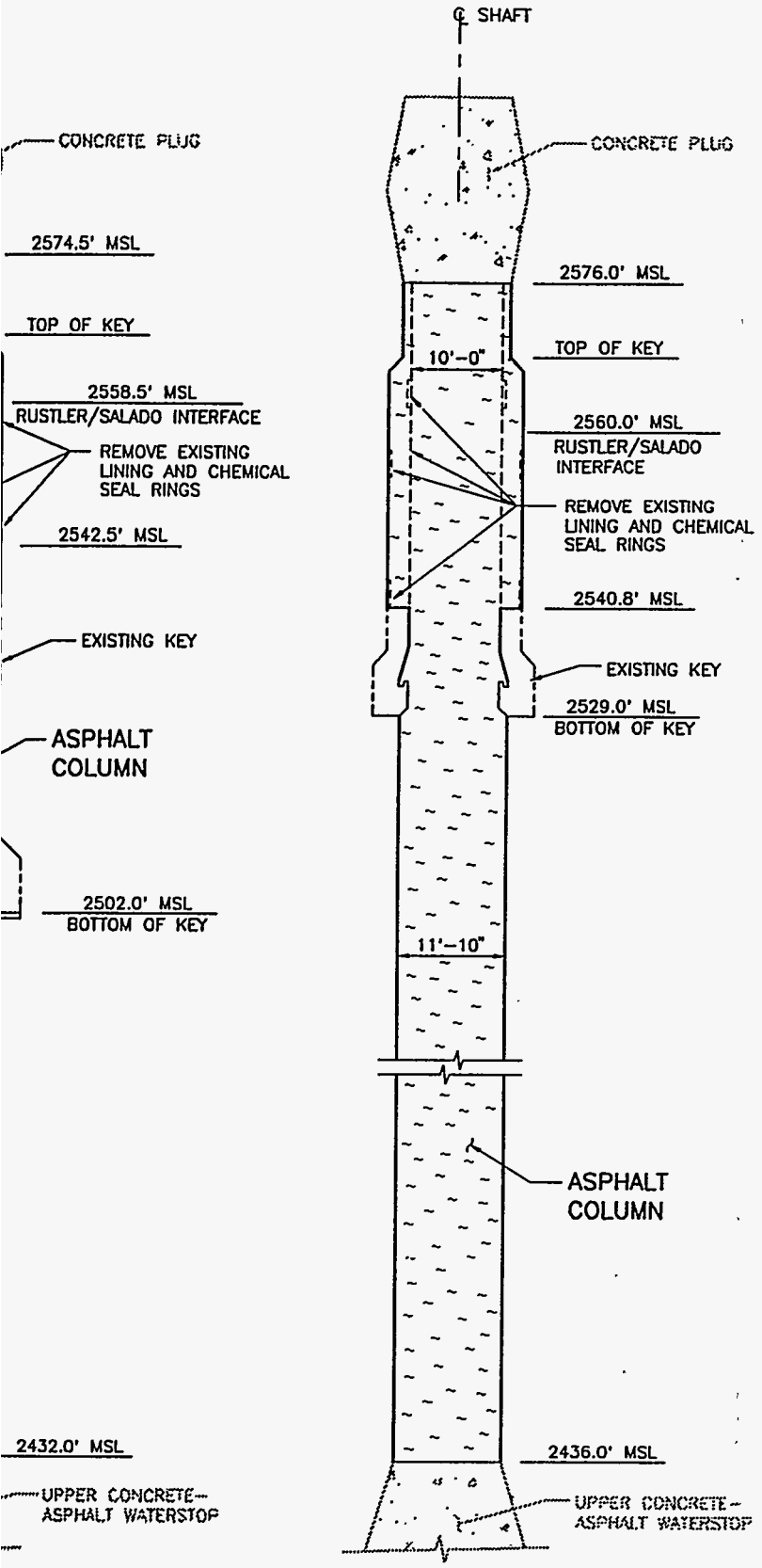


DETAIL 1
WASTE SHAFT SHT. 5 SHT. 22





DETAIL 3
EXHAUST SHAFT SHT. 15 SHT. 22



3
SHT. 15 | SHT. 23

DETAIL
SALT HANDLING SHAFT

4
SHT. 20 | SHT. 23

ALBERT W. DENNIS
NEW MEXICO
5971
REGISTERED PROFESSIONAL ENGINEER

Albert W. Dennis
8-2-96

SCALE IN FEET
0 5 10 15 20 25

REV.	DATE	DESCRIPTION	BY	CK.	APP
0	8/2/96	ISSUED FOR RECORDS PACKAGE			

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

CONTRACT NO: AG-4909

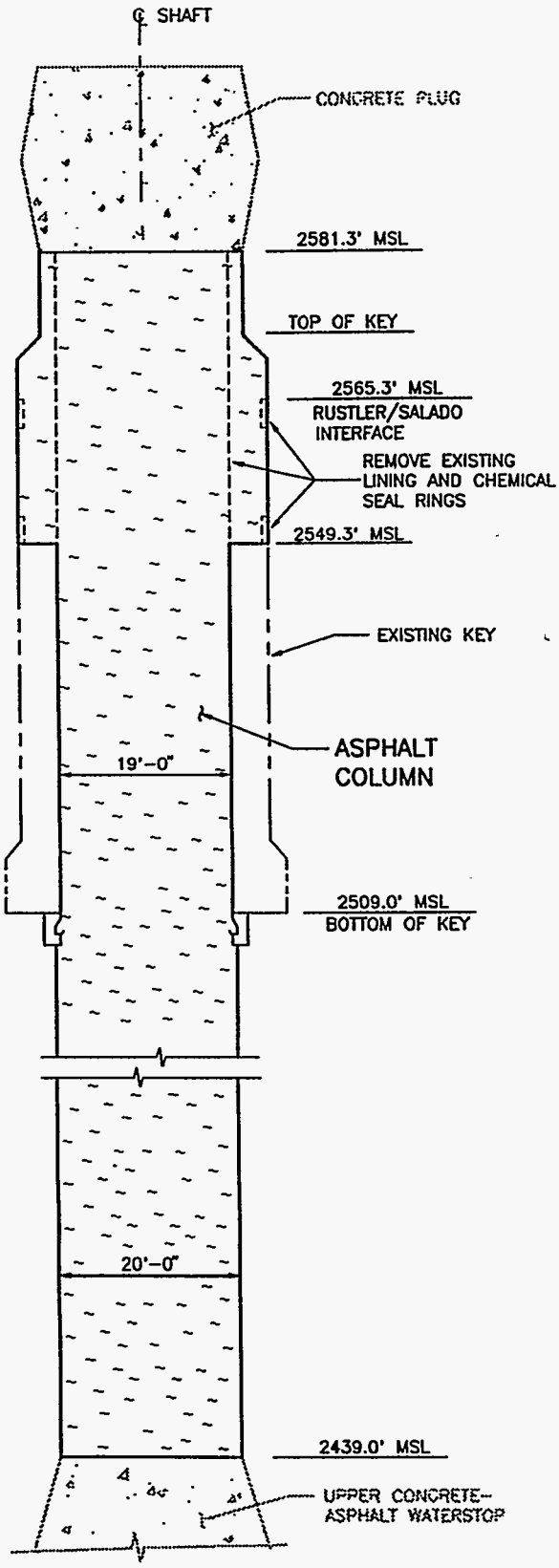
WIPP SHAFT SEALING SYSTEM

ASPHALT COLUMN

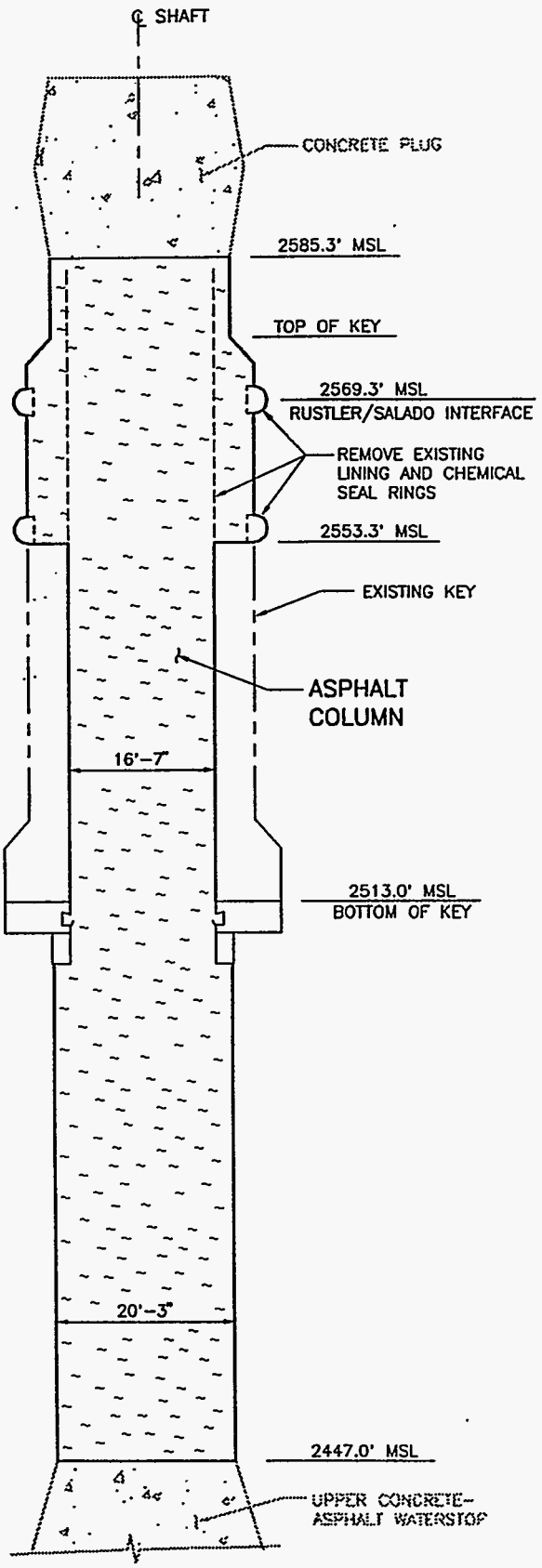
	NAME	DATE
BY		8/2/96
CK.		8/2/96
APP		8/2/96
APP.		8/2/96
APP		8/2/96

PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO. SNL-007	SHEET NO. 23 OF 28

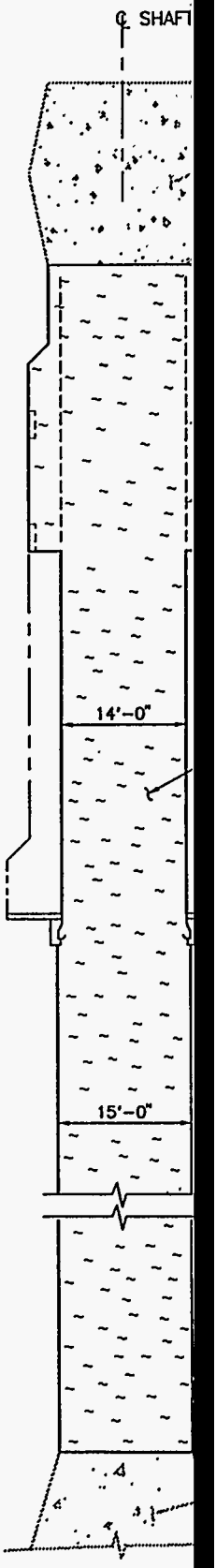
E-26



DETAIL 1
WASTE SHAFT SHT. 5 SHT. 23



DETAIL 2
AIR INTAKE SHAFT SHT. 10 SHT. 23



DETAIL
EXHAUST SHAFT

LE 1

HAFT	NOMINAL SHAFT DIAMETER D	UPPER SALADO COMPACTED CLAY COLUMN			LOWER SALADO COMPACTED CLAY COLUMN		
		TOP EL. (FT. MSL)	BOTTOM EL. (FT. MSL)	TOTAL HT. (FT.)	TOP EL. (FT. MSL)	BOTTOM EL. (FT. MSL)	TOTAL HT. (FT.)
ASTE	20'-0"	2389.0	2037.5	351.5	1382.0	1286.0	96.0
AIR ITAKE	20'-3"	2397.0	2053.0	344.0	1389.5	1296.0	93.5
HAUST	15'-0"	2382.0	2042.0	340.0	1383.0	1285.0	98.0
ALT NDLING	11'-10"	2386.0	2051.0	335.0	1391.0	1284.0	107.0

E-27

ALBERT W. DENNIS
NEW MEXICO
5971
REGISTERED PROFESSIONAL ENGINEER

Albert W. Dennis
8-2-96

REV.	DATE	DESCRIPTION	BY	CK.	APP.
0	8/2/96	ISSUED FOR RECORDS PACKAGE			

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

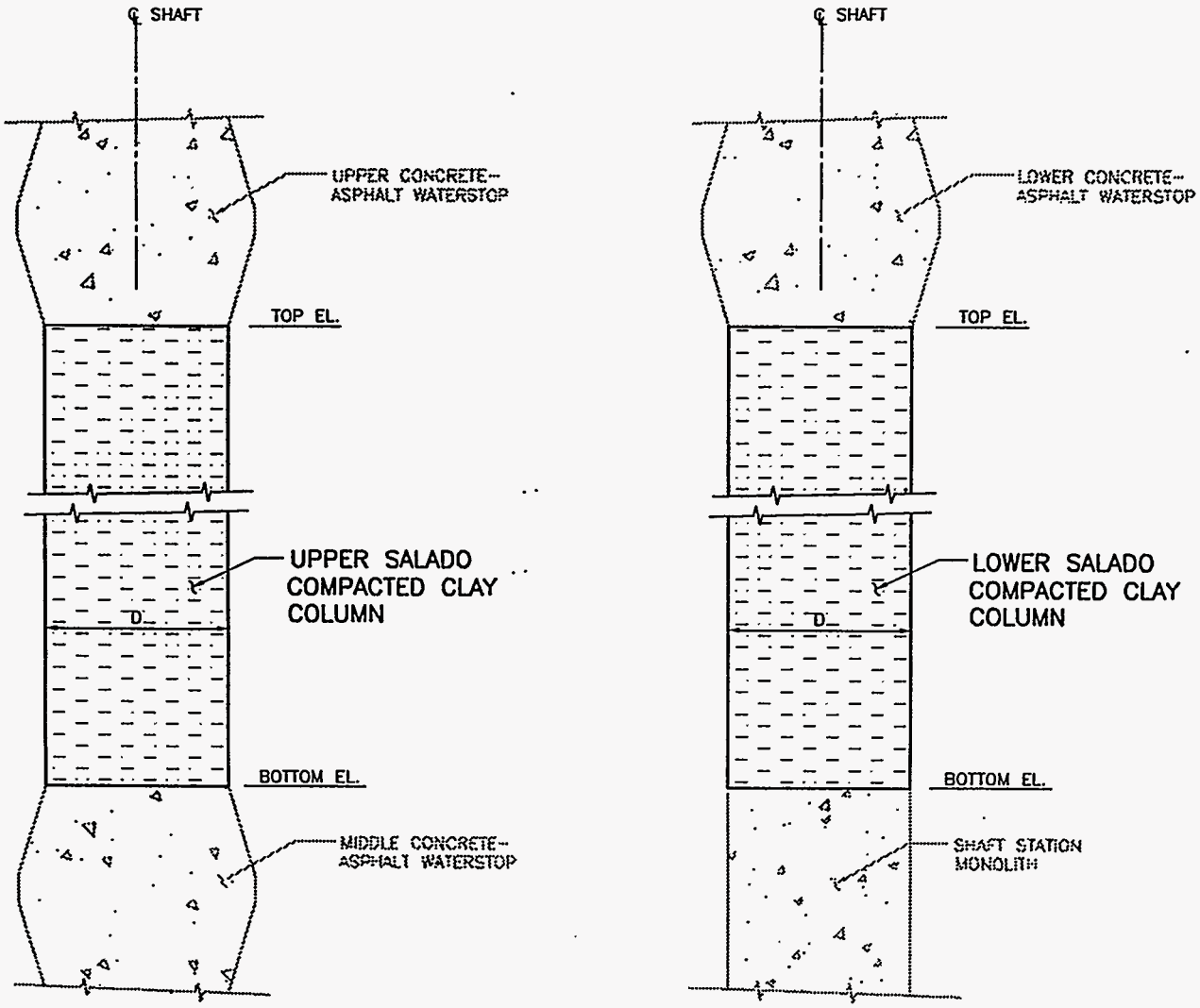
CONTRACT NO: AC-4909

WIPP SHAFT SEALING SYSTEM

UPPER AND LOWER SALADO COMPACTED CLAY COLUMNS

	NAME	DATE
BY		8/2/96
CK.		8/2/96
APP.		8/2/96
APP.		8/2/96
APP.		8/2/96

PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO. SNL-007	SHEET NO. 24 OF 28



DETAIL 1

SEE TABLE 1 FOR DETAILS
NO SCALE

SHT. 5 | SHT. 24
SHT. 10
SHT. 15
SHT. 20

BLE 1

HAFT	NOMINAL SHAFT DIAMETER D	COMPACTED SALT COLUMN		
		TOP EL. (FT. MSL)	BOTTOM EL. (FT. MSL)	TOTAL HT. (FT.)
ASTE	20'-0"	1987.5	1432.0	555.5
AIR ITAKE	20'-3"	2003.0	1439.5	563.5
HAUST	15'-0"	1992.0	1433.0	559.0
ALT NDLING	11'-10"	2001.0	1441.0	560.0

ALBERT W. DENNIS
NEW MEXICO
5971
REGISTERED PROFESSIONAL ENGINEER

Albert W. Dennis
8-2-96

REV.	DATE	DESCRIPTION	BY	CK.	APP.
0	8/2/96	ISSUED FOR RECORDS PACKAGE			

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

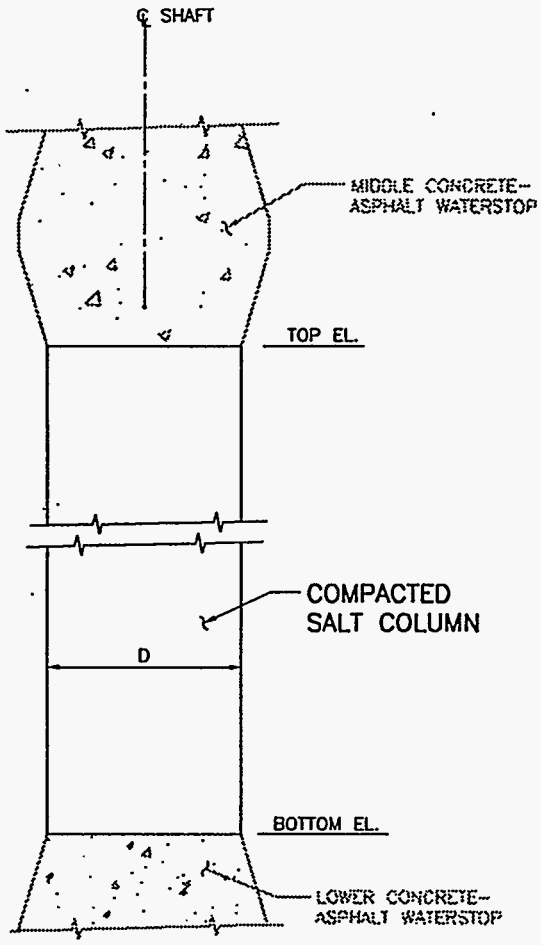
CONTRACT NO: AG-4909

WIPP SHAFT SEALING SYSTEM

COMPACTED SALT COLUMN

	NAME	DATE
BY		8/2/96
CK.		8/2/96
APP.		8/2/96
APP.		8/2/96
APP.		8/2/96

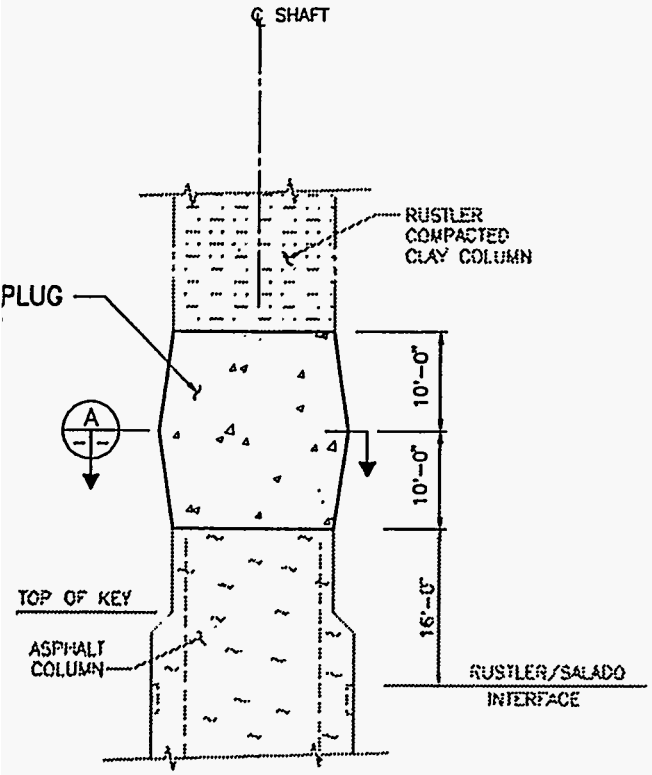
PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE 8	SNL DWG. NO. SNL-007	SHEET NO. 25 OF 28



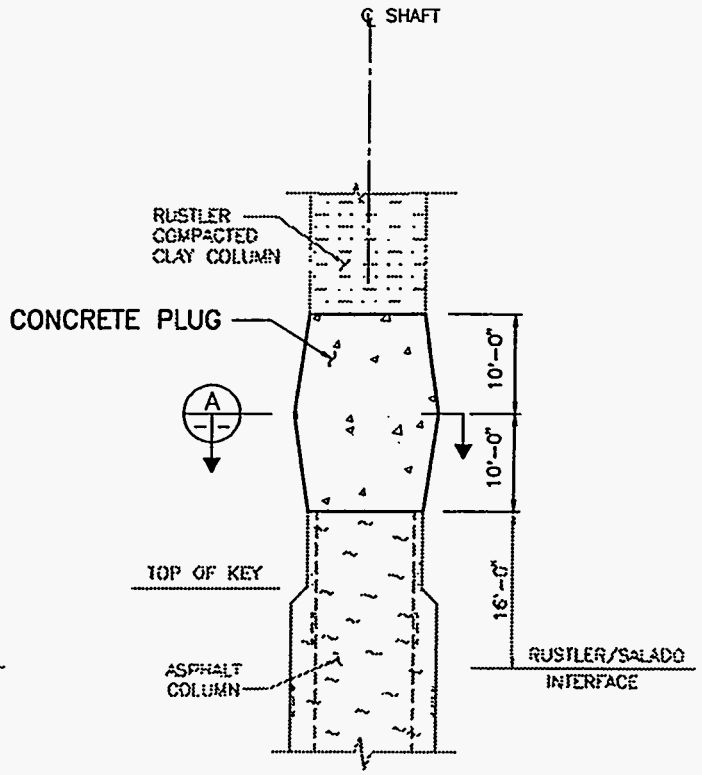
DETAIL 1

SEE TABLE 1 FOR DETAILS
NO SCALE

SHT. 5 | SHT. 25
SHT. 10
SHT. 15
SHT. 20



DETAIL 3
EXHAUST SHAFT SHT. 14 | SHT. 26



DETAIL 4
SALT HANDLING SHAFT SHT. 19 | SHT. 26

E-29

ALBERT W. DENNIS
NEW MEXICO
5971
REGISTERED PROFESSIONAL ENGINEER

Albert W. Dennis
8-2-96

REV.	DATE	DESCRIPTION	BY	CK.	APP.
0	8/2/96	ISSUED FOR RECORDS PACKAGE			

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

CONTRACT NO: AG-4909

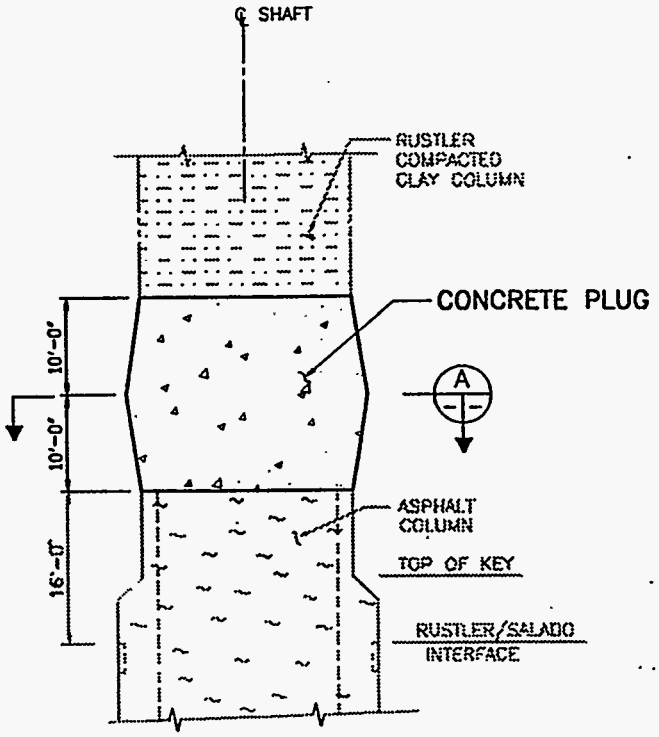
WIPP SHAFT SEALING SYSTEM

CONCRETE PLUG

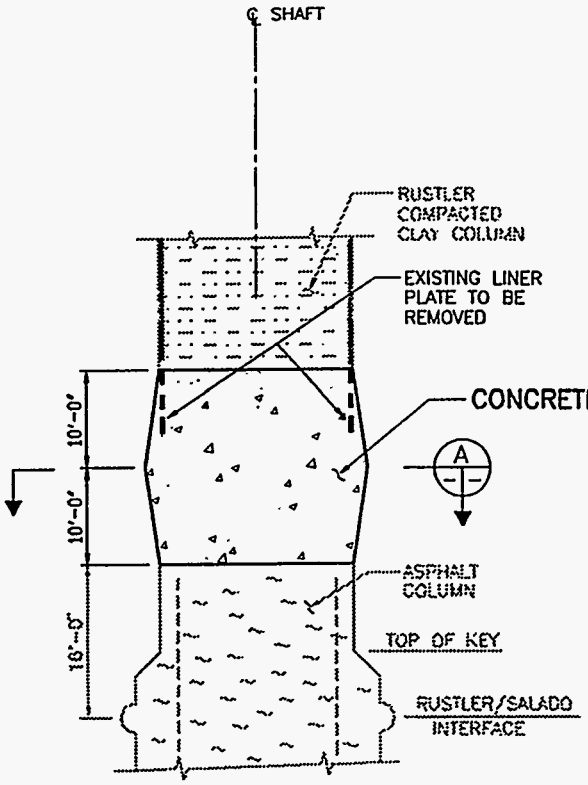
	NAME	DATE
BY		8/6/96
CK.		8/9/96
APP.		8/9/96
APP.		8/9/96
APP.		8/12/96

SCALE IN FEET
0 5 10 15 20 25

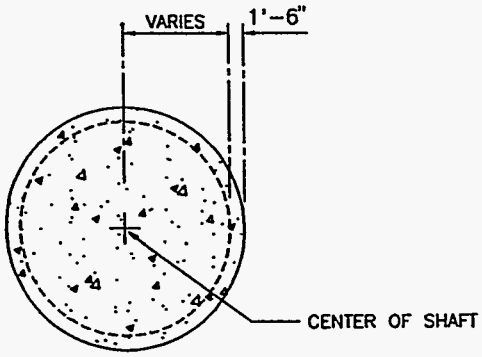
PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO. SNL-007	SHEET NO. 26 OF 28



DETAIL 1
WASTE SHAFT SHT. 4 SHT. 26



DETAIL 2
AIR INTAKE SHAFT SHT. 9 SHT. 26



SECTION A
NO SCALE

TABLE 1

SHAFT	NOMINAL SHAFT DIAMETER D	RUSTLER COMPACTED CLAY COLUMN		
		TOP EL. (FT. MSL)	BOTTOM EL. (FT. MSL)	TOTAL HT. (FT.)
WASTE	19'-0"	2836.0	2601.3	234.7
AIR INTAKE	16'-7"	2840.0	2605.3	234.7
EXHAUST	14'-0"	2829.0	2594.5	234.5
SALT HANDLING	10'-0"	2830.0	2596.0	234.0

E-30

ALBERT W. DENNIS
NEW MEXICO
5971
REGISTERED PROFESSIONAL ENGINEER

Albert W. Dennis
8-2-96

REV.	DATE	DESCRIPTION	BY	CK.	APP
0	8/2/96	ISSUED FOR RECORDS PACKAGE			

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

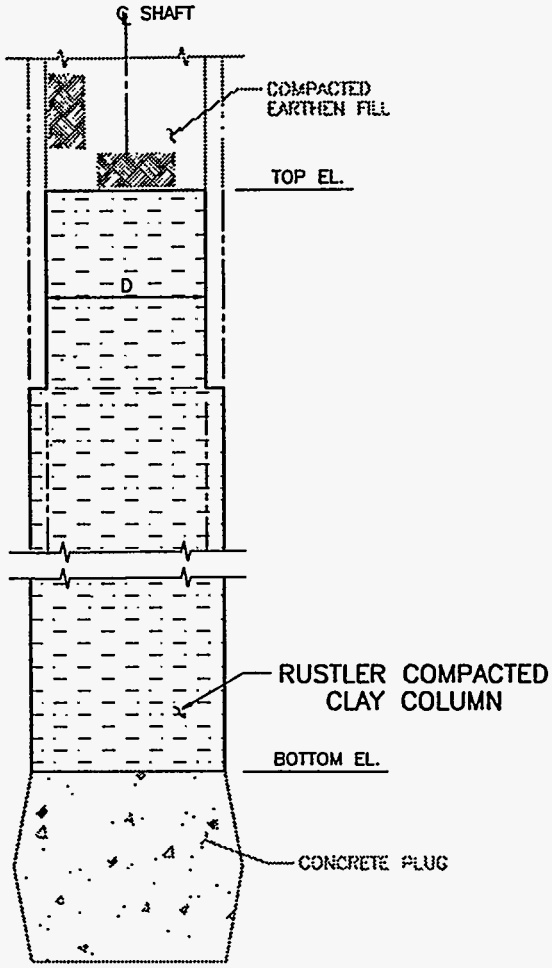
CONTRACT NO: AG-4909

WIPP SHAFT SEALING SYSTEM

RUSTLER COMPACTED CLAY COLUMN

	NAME	DATE
BY		8/2/96
CK.		8/2/96
APP.		8/2/96
APP.		8/2/96
APP.		8/2/96

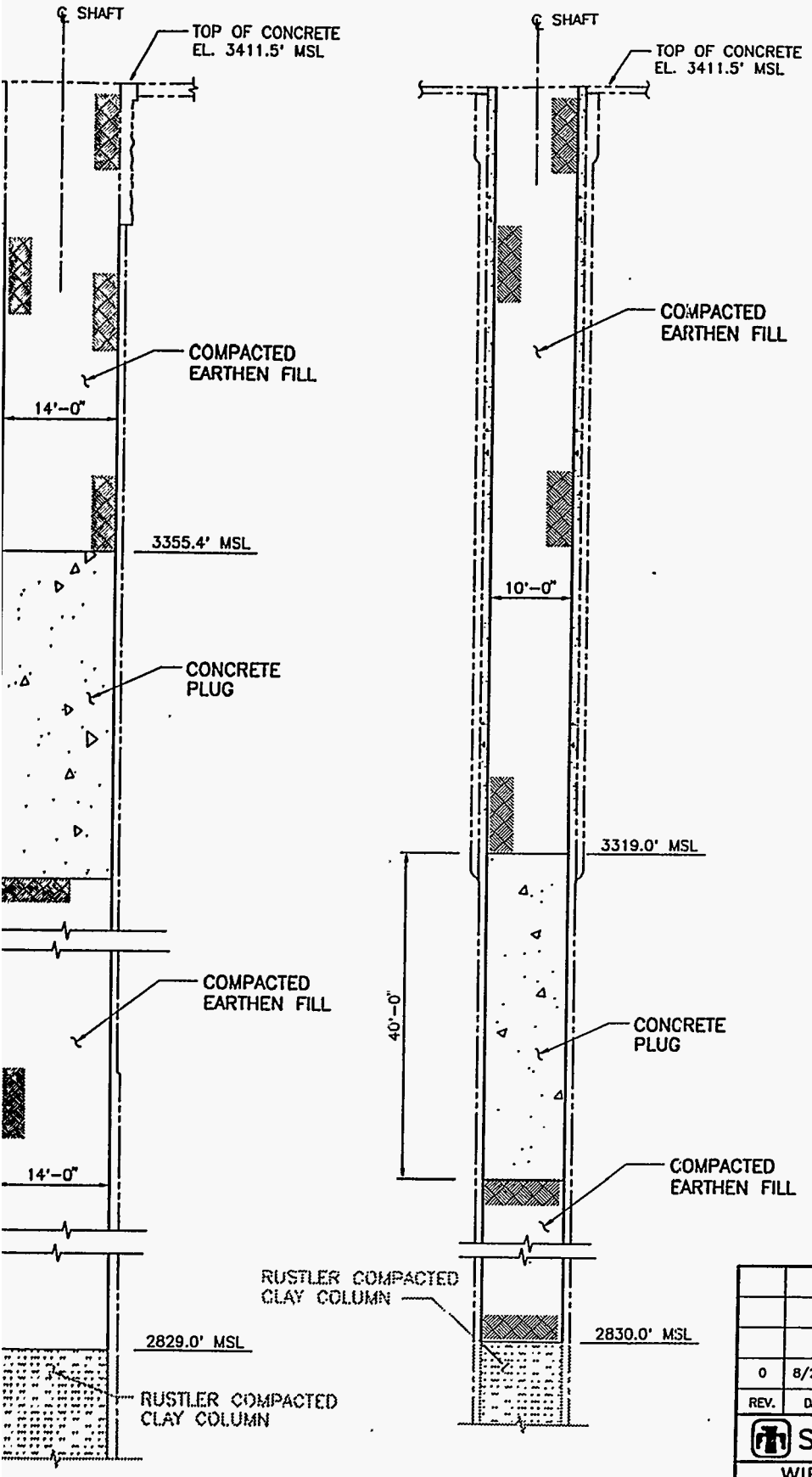
PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO. SNL-007	SHEET NO. 27 OF 28



DETAIL 1

SEE TABLE 1 FOR DETAILS
NO SCALE

SHT. 4 | SHT. 27
SHT. 9
SHT. 14
SHT. 19



DETAIL 3
SHAFT SHT. 14 SHT. 28

DETAIL 4
SALT HANDLING SHAFT SHT. 19 SHT. 28

SCALE IN FEET
0 5 10 15 20 25

ALBERT W. DENNIS
NEW MEXICO
5971
REGISTERED PROFESSIONAL ENGINEER

Albert W. Dennis
8-2-96

REV.	DATE	DESCRIPTION	BY	CK.	APP
0	8/2/96	ISSUED FOR RECORDS PACKAGE			

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

CONTRACT NO: AG-4909

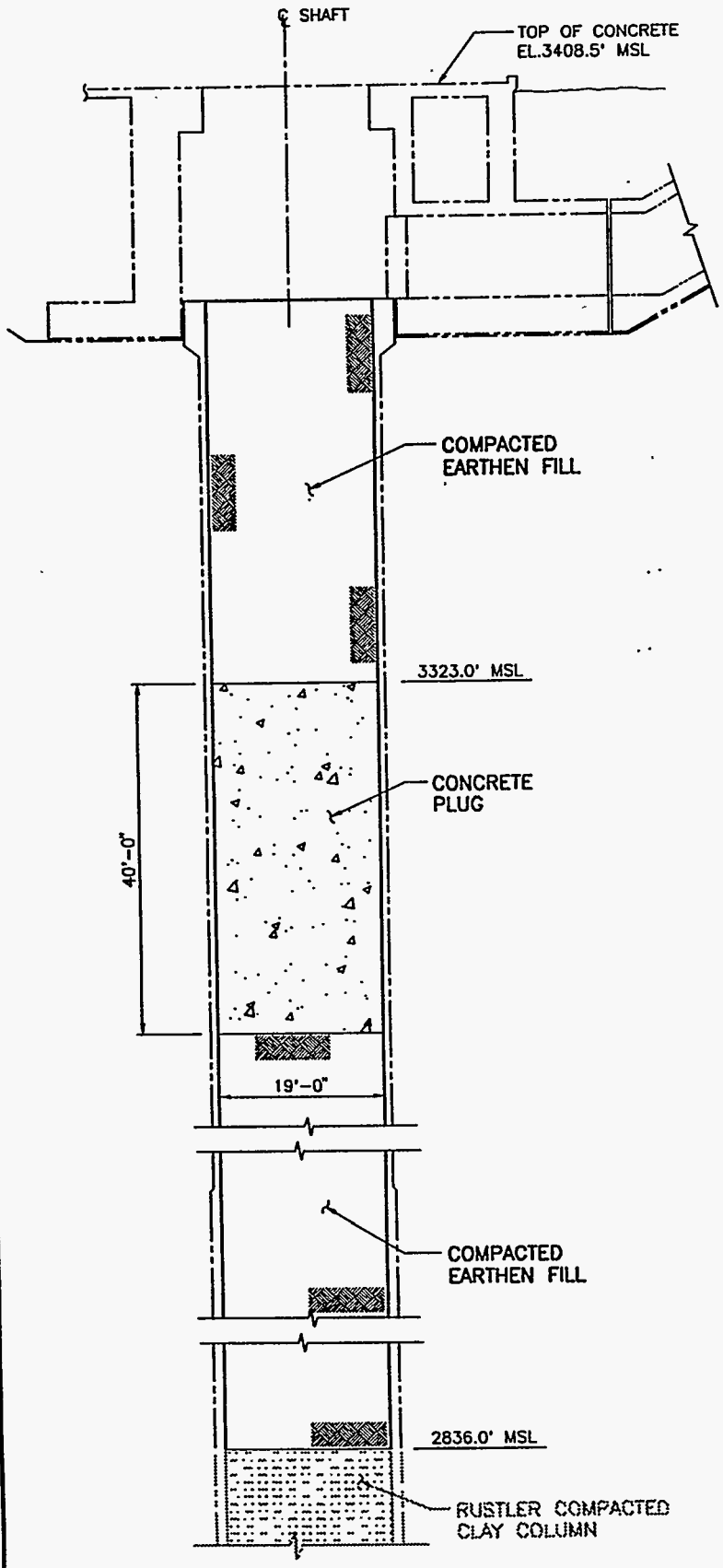
WIPP SHAFT SEALING SYSTEM

COMPACTED EARTHEN FILL AND CONCRETE PLUG

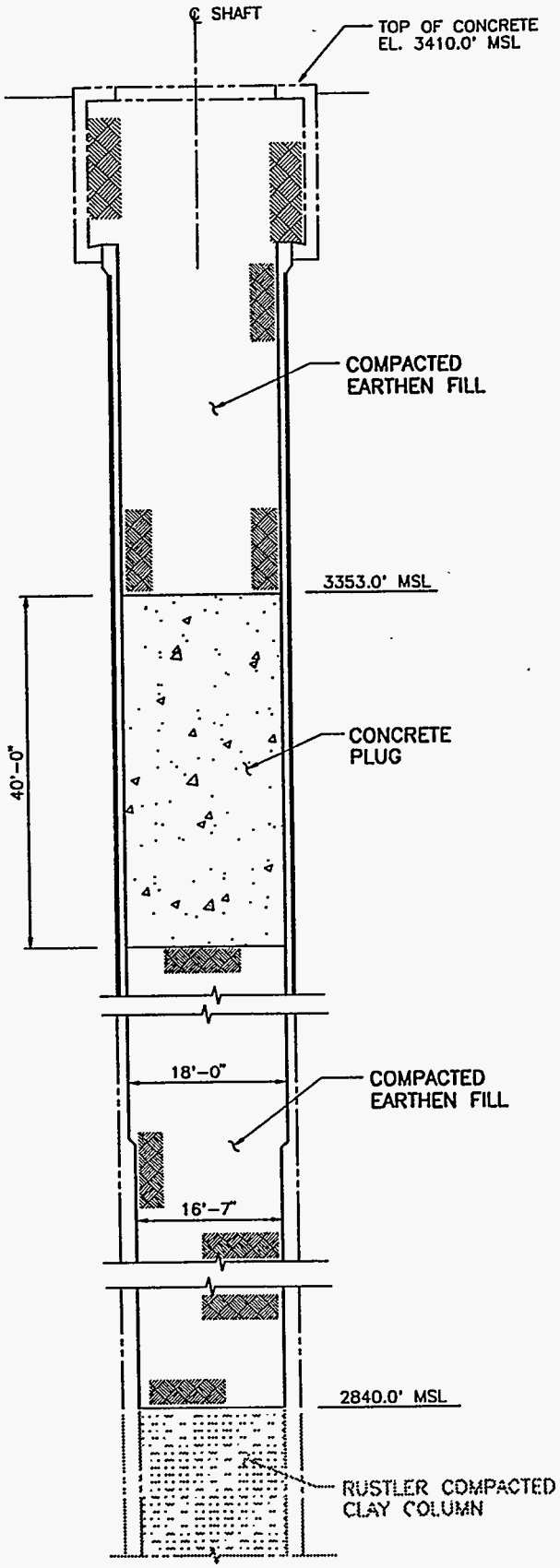
	NAME	DATE
BY		8/2/96
CK.		8/2/96
APP.		8/2/96
APP.		8/2/96
APP.		8/2/96

PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO. SNL-007	SHEET NO. 28 OF 28

E-31



DETAIL 1
WASTE SHAFT SHT. 4 SHT. 28



DETAIL 2
AIR INTAKE SHAFT SHT. 9 SHT. 28

LOT PLANT

M

TEM DESIGN

UCTION SKETCHES

YSTEM
GENERAL
AND SECTIONS

YSTEM
ENERAL
AND SECTIONS

YSTEM

SYSTEM
AME AND
FACILITIES

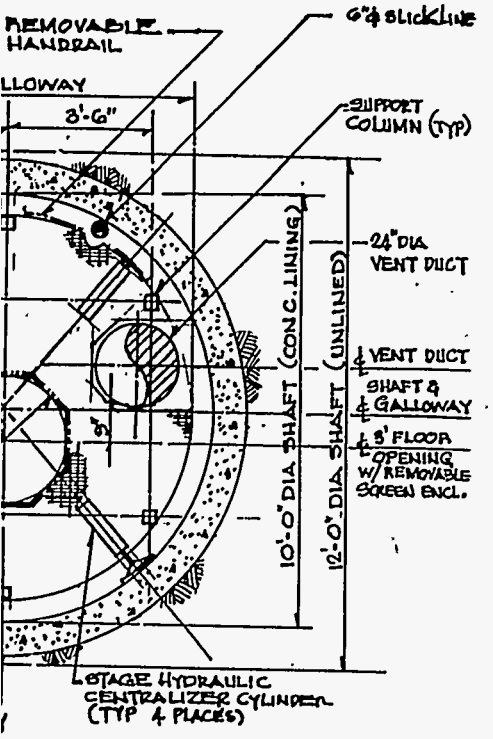
WASTE ISOLATION

CARLSBAD

SHAFT SEALING S

EQUIPMENT AND CONS

DRAWING NUMBER	TITLE
SKETCH E-1	WIPP SHAFT SEALIN SMALLER GALLOW ARRANGEMENT PL
SKETCH E-2	WIPP SHAFT SEALIN LARGER GALLOWA ARRANGEMENT PL
SKETCH E-3	WIPP SHAFT SEALIN TYPICAL HEADFRA PLANS AND SECTIO
SKETCH E-4	WIPP SHAFT SEALIN PERSPECTIVE HEAD ASSOCIATED SURFA

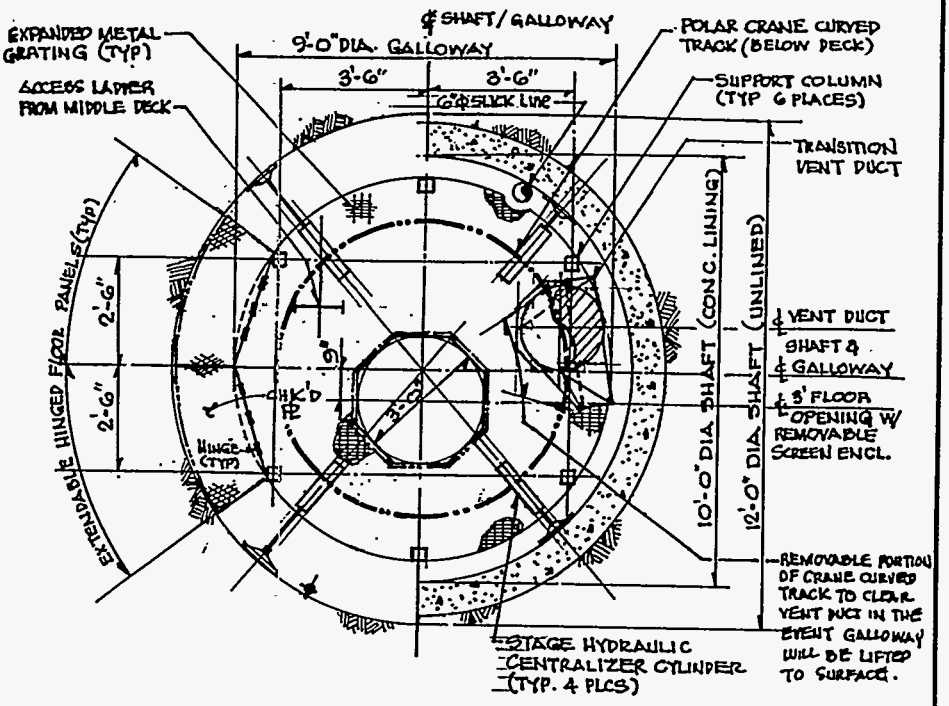


DDLE DECK

A SHAFT

3 4 5

FEET

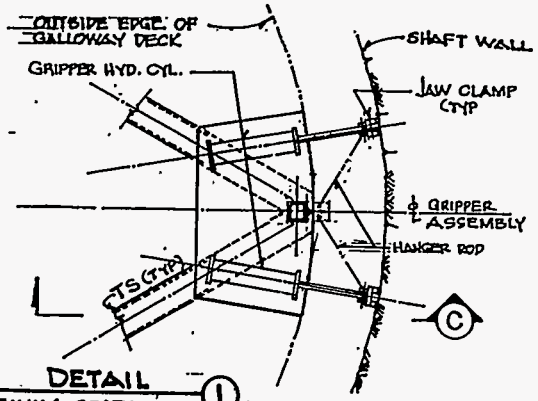


PLAN - BOTTOM DECK

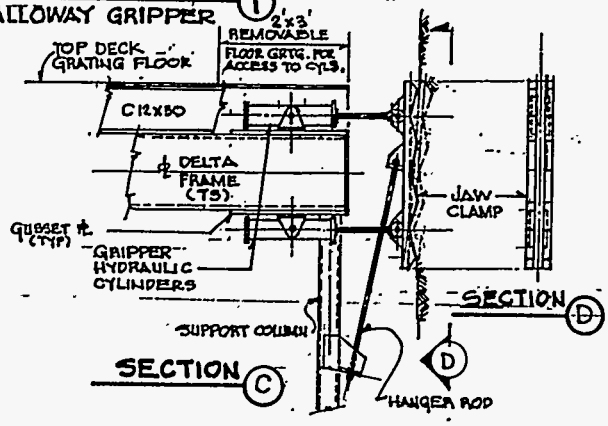
10 FT DIA SHAFT

0 1 2 3 4 5

SCALE IN FEET



DETAIL 1
GALLOWAY GRIPPER

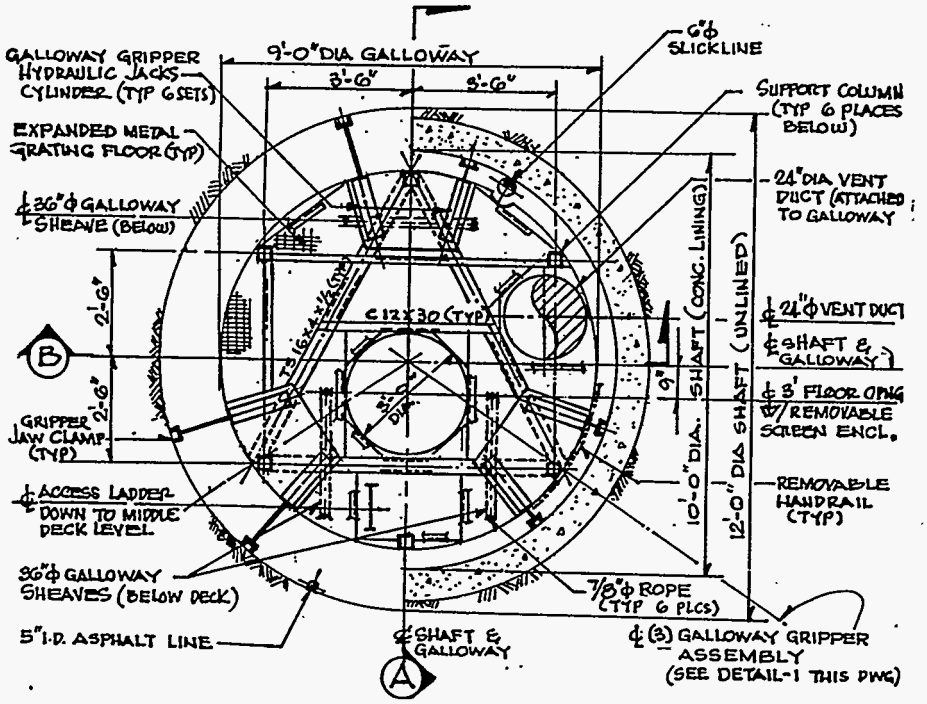


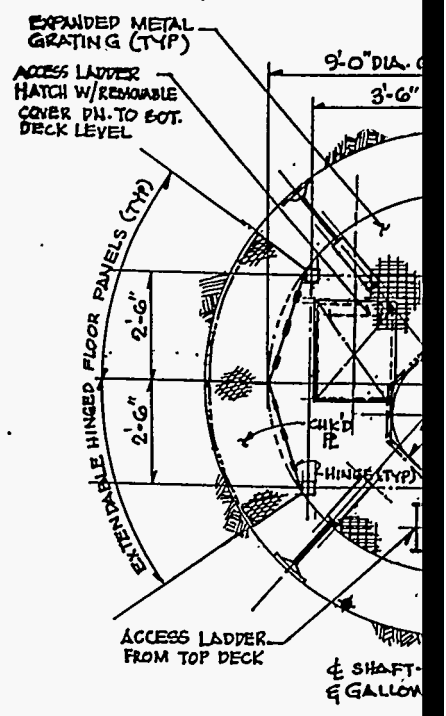
WIPP SHAFT SEALING SYSTEM

SMALLER GALLOWAY
GENERAL ARRANGEMENT
PLANS & SECTIONS

SKETCH E-1

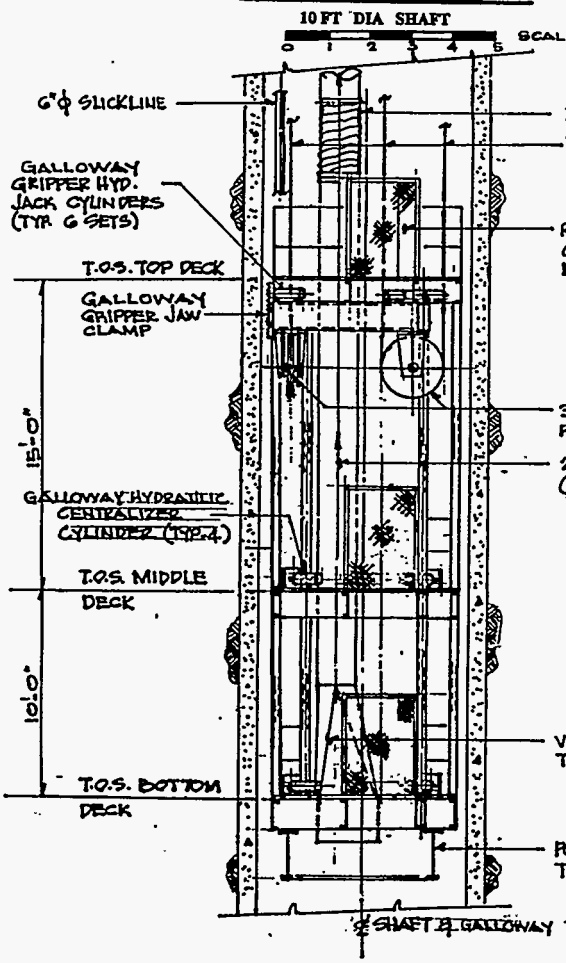
E-33





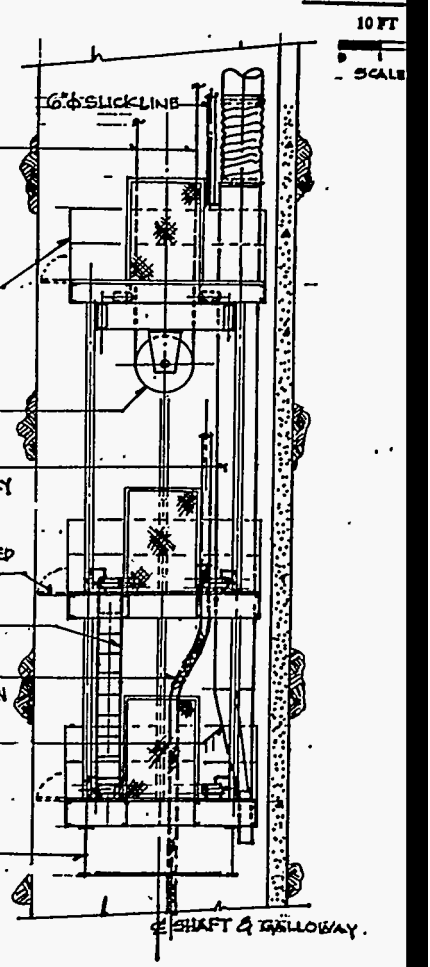
PLAN - TOP DECK

PLAN -



SECTION A

0 1 2 3 4 5
SCALE IN FEET



SECTION B

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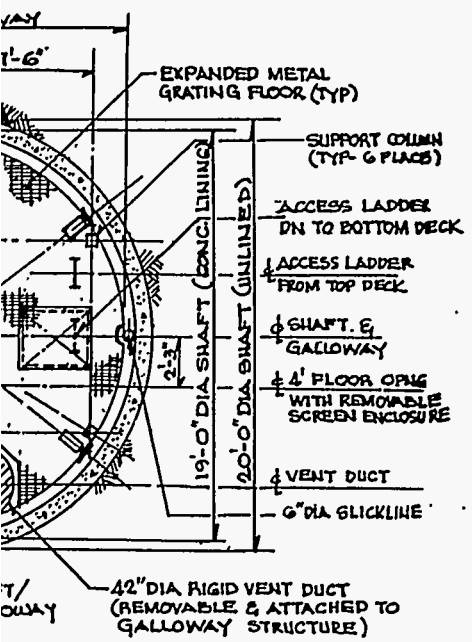
SCALE IN FEET



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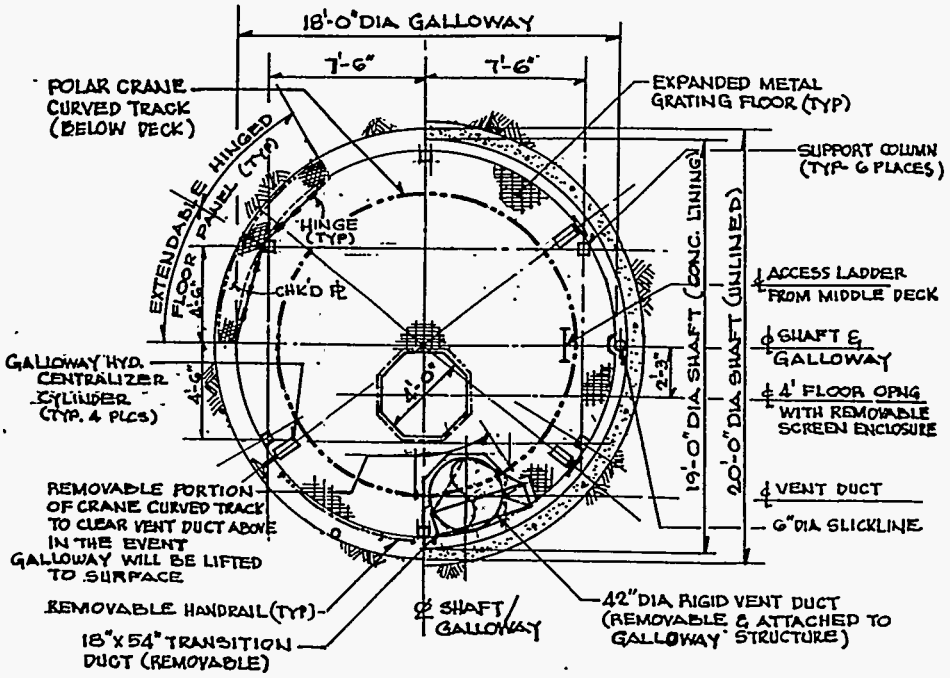
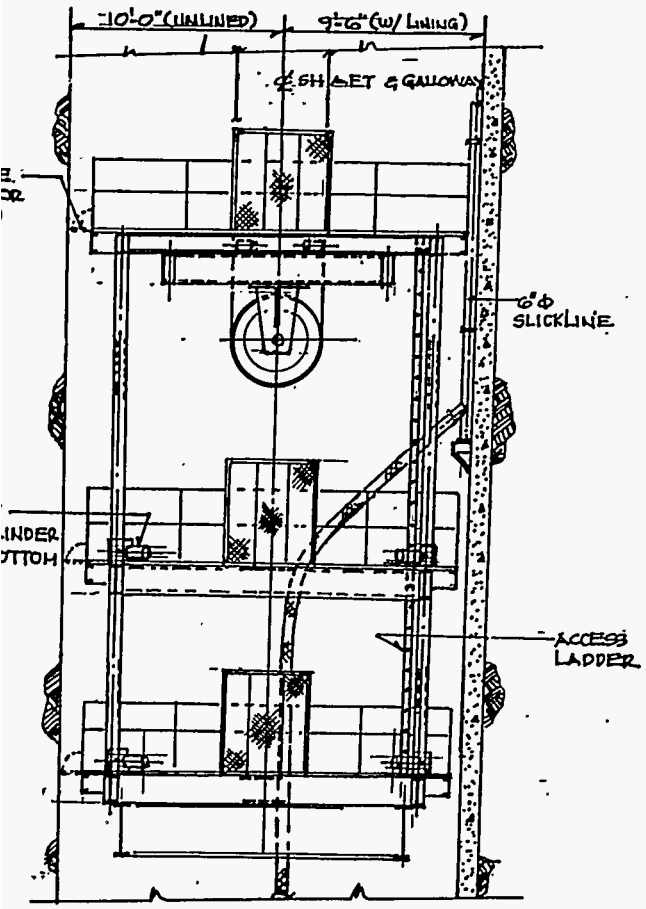


PLAN - BOTTOM DECK

20 FT DIA SHAFT



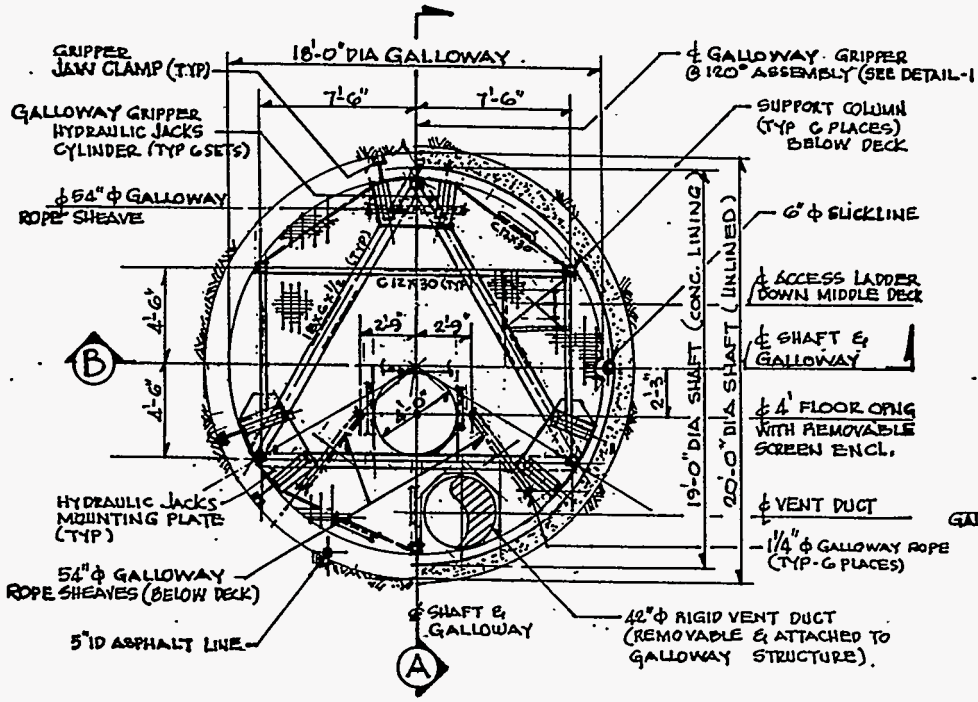
SECTION B

GALLOWAY DESIGN DATA				
	SALT HANDLING SHAFT	EXHAUST SHAFT	AIR INTAKE SHAFT	WASTE SHAFT
Shaft Diameter	10'-0"(lined) 11'-10"(unlined)	14'(lined) 15'(unlined)	16'-7"(lined) 20'(unlined)	19'-0"(lined) 20'(unlined)
Dia of Galloway	9ft	13ft	15'-7"	18ft
Height of Galloway	25ft	25ft	26ft	26ft
Dia of Vent duct	24 inch	36 inch	42 inch	42 inch
No. of Galloway rope	6	6	6	6
No. of Galloway sheave	3	3	3	3
Dia of Galloway rope	7/8 inch	1 1/8 inch	1 1/4 inch	1 1/4 inch
Dia of Galloway sheaves	36 inch	36 inch	54 inch	54 inch
Wt. of Galloway(struct)	18000 lb	29000 lb	40200 lb	49600 lb
Polar crane wt.	38696 lb	48606 lb	58696 lb	58696 lb
Tamper weight	11394 lb	11394 lb	11394 lb	11394 lb
Total Wt. Galloway (live and dead load)	80409 lb	113816 lb	143622 lb	162622 lb

SCALE IN FEET
0 1 2 3 4 5 6

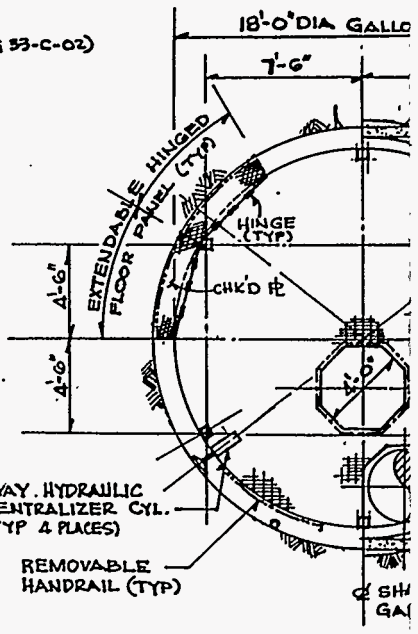
WIPP SHAFT SEALING SYSTEM

LARGER GALLOWAY
GENERAL ARRANGEMENT
PLANS & SECTIONS
SKETCH E-2



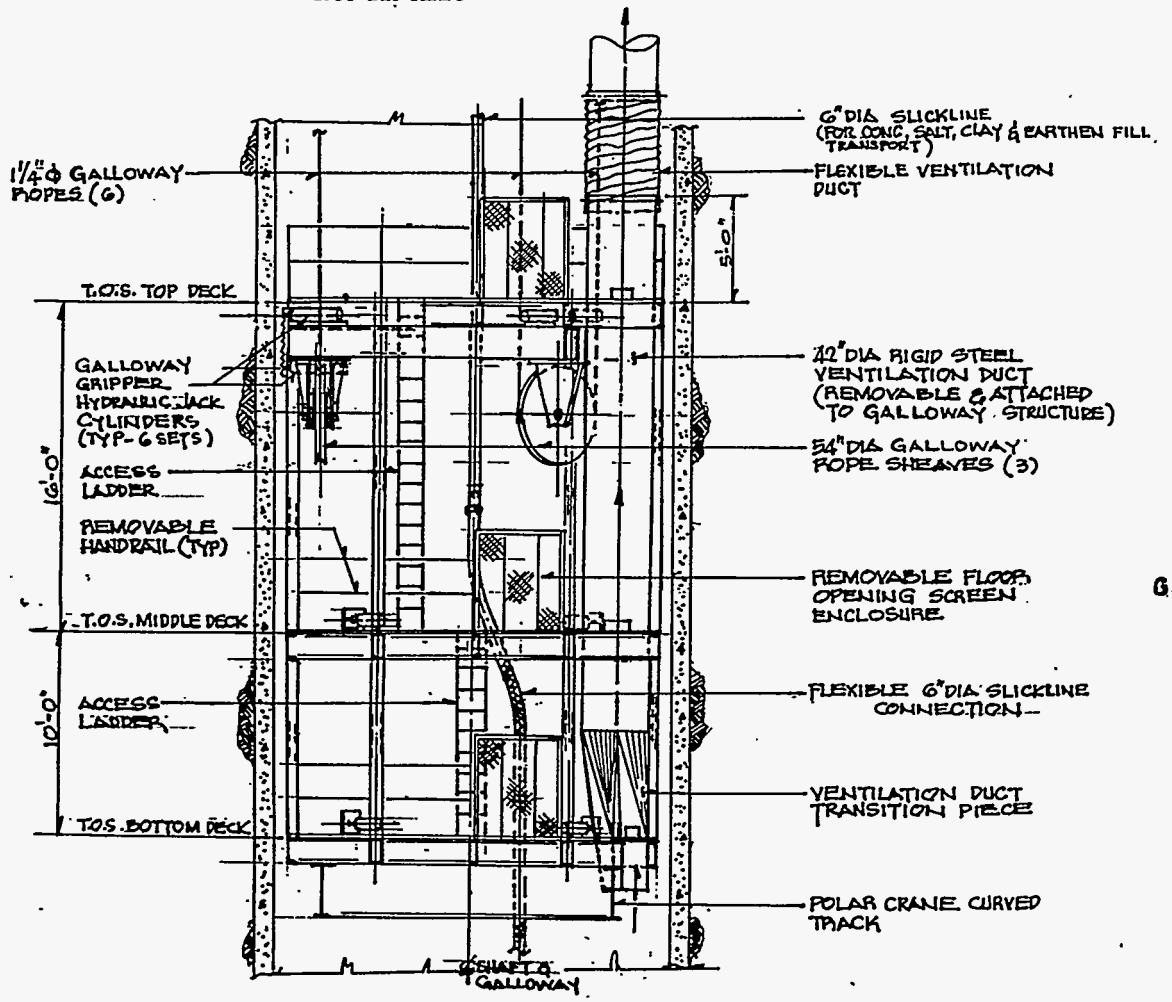
PLAN - TOP DECK

20 FT DIA SHAFT



PLAN - MIDDL

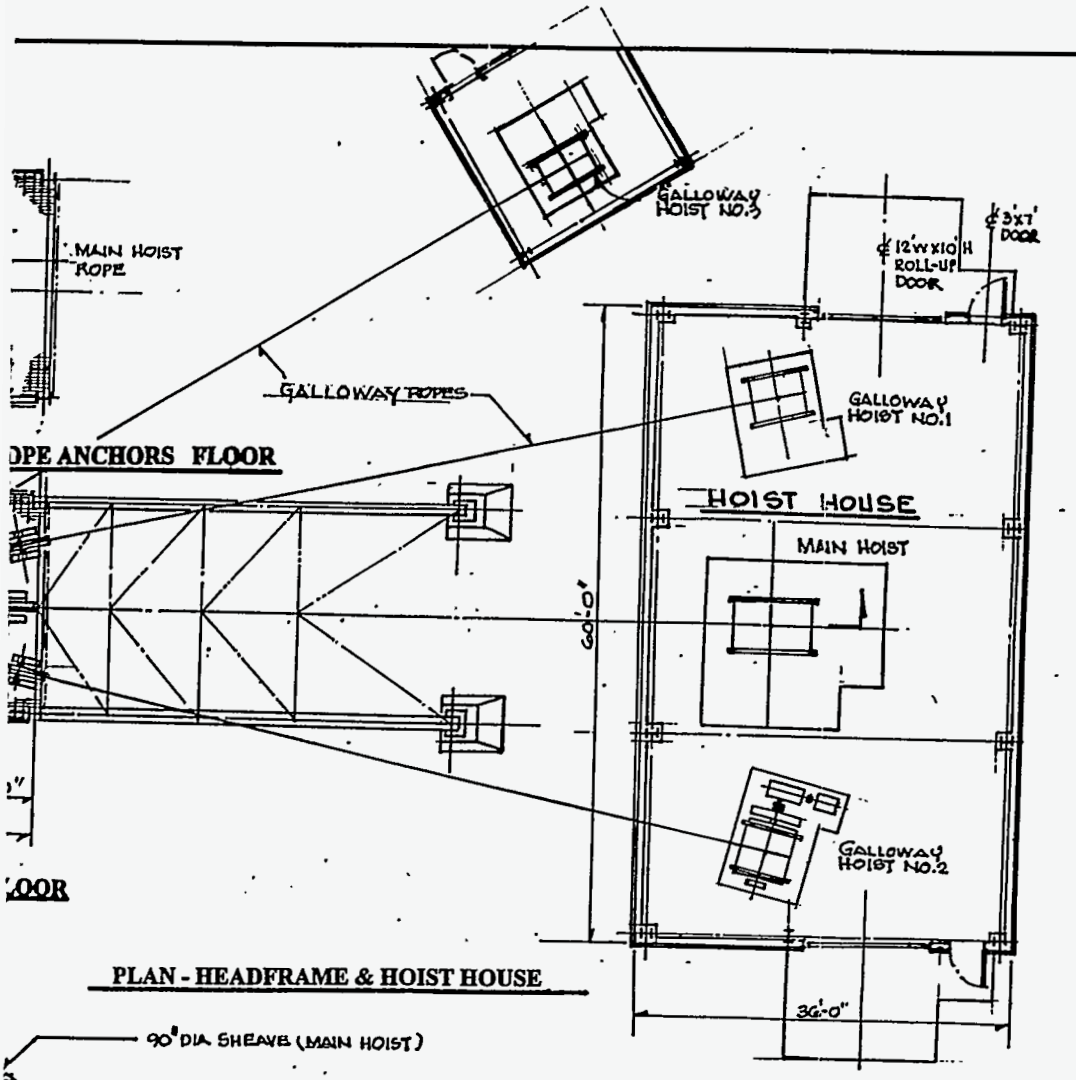
20 FT DIA SHA



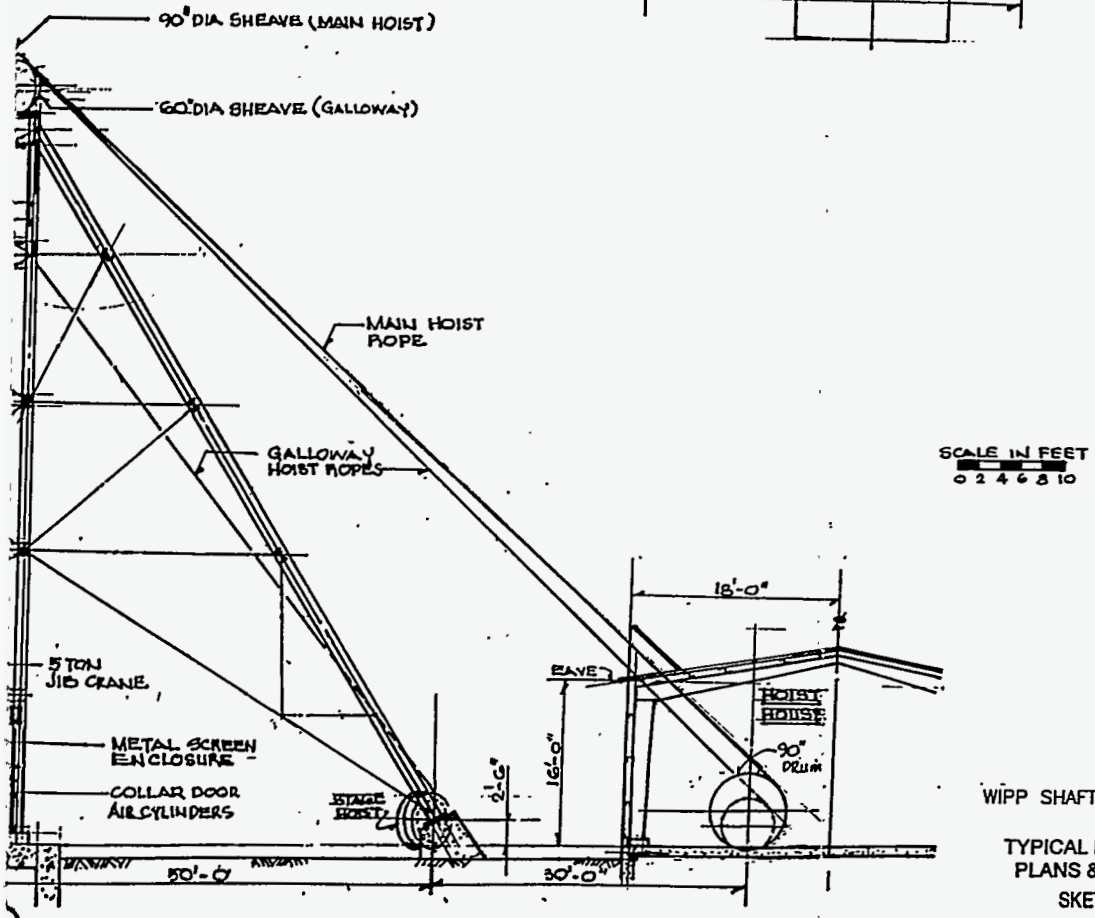
SECTION A

EXTENDAB
HINGED FL
PANEL (TY

GALLOWAY HYDRAULI
CENTRALIZER C
(TYP. MIDDLE &
DECKS)



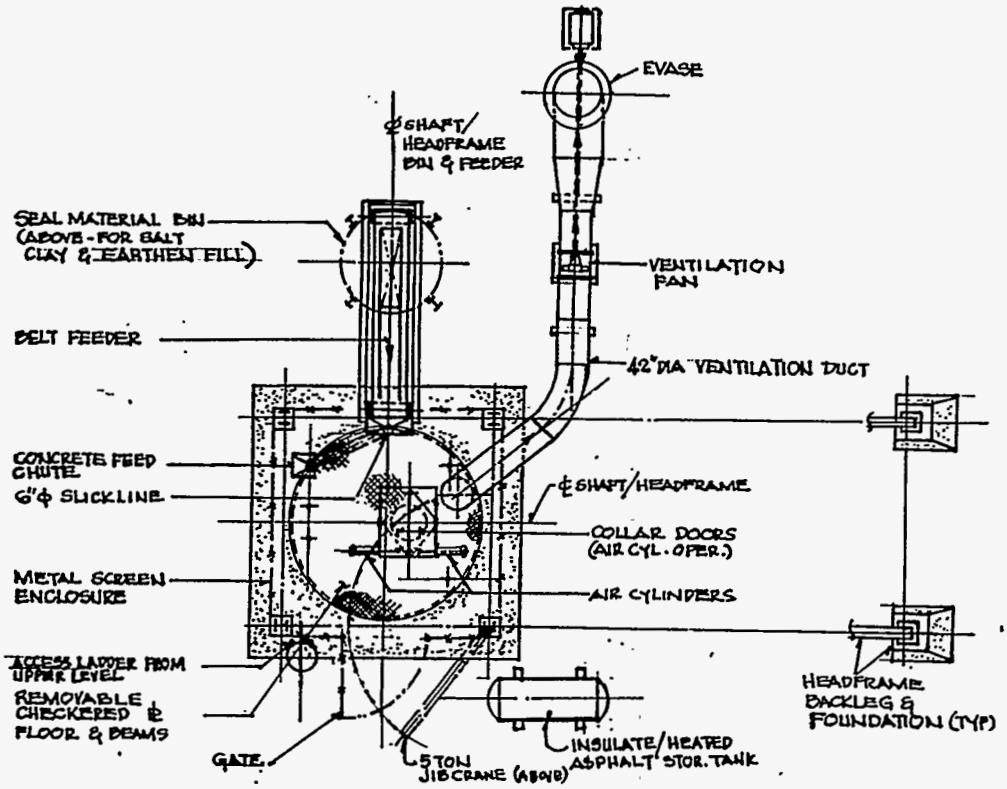
PLAN - HEADFRAME & HOIST HOUSE



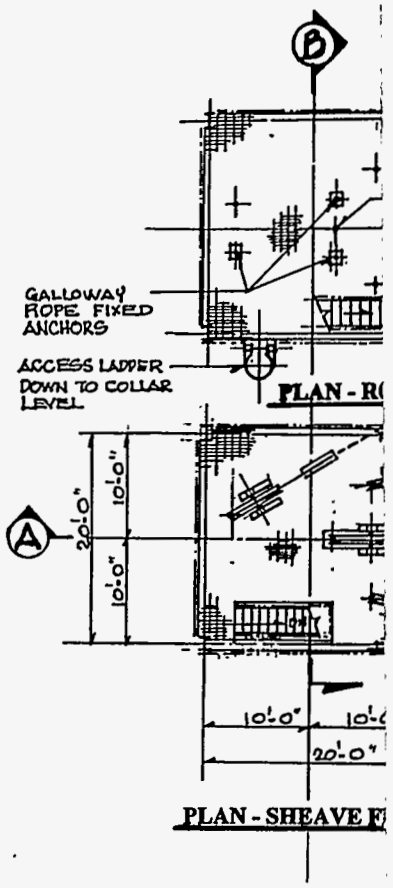
WIPP SHAFT SEALING SYSTEM

TYPICAL HEADFRAME PLANS & SECTIONS

SKETCH E-3

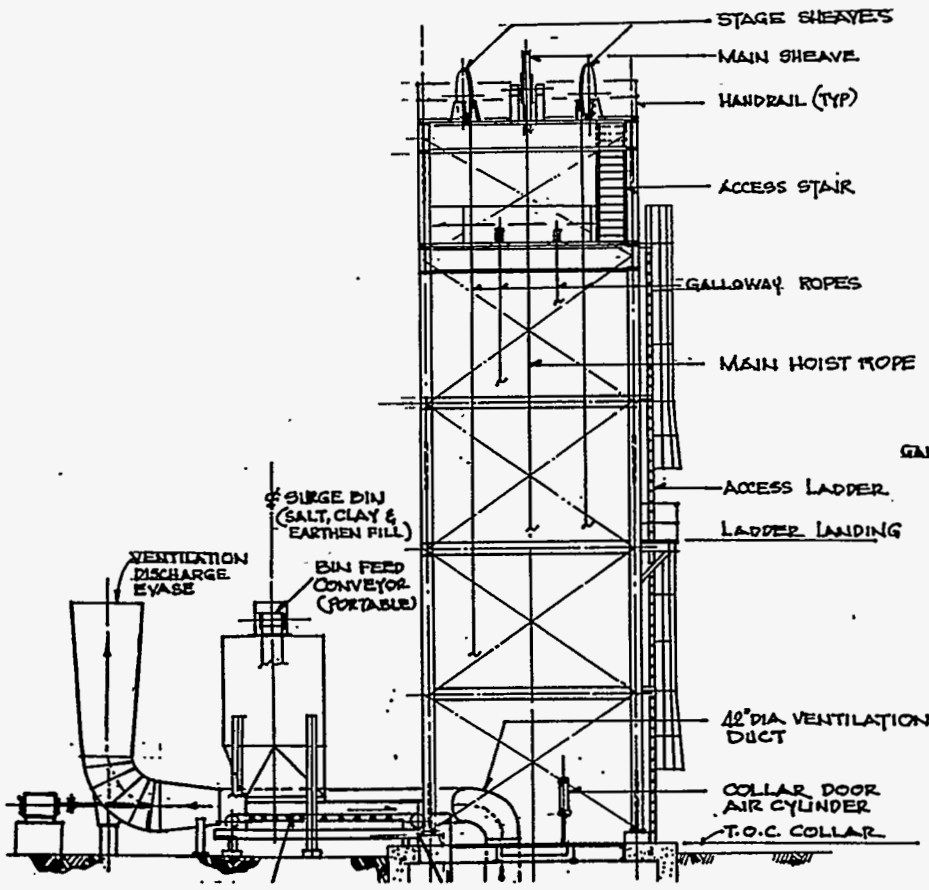


PLAN- COLLAR LEVEL

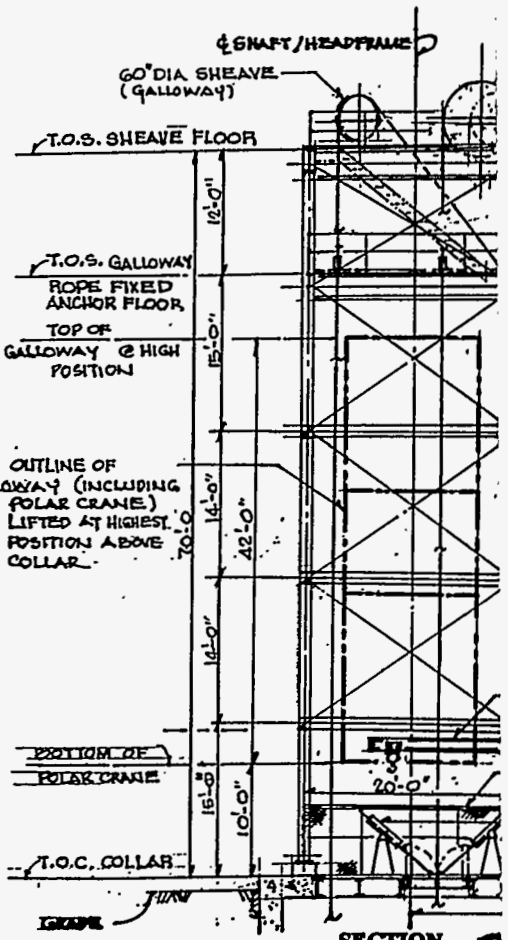


PLAN - R

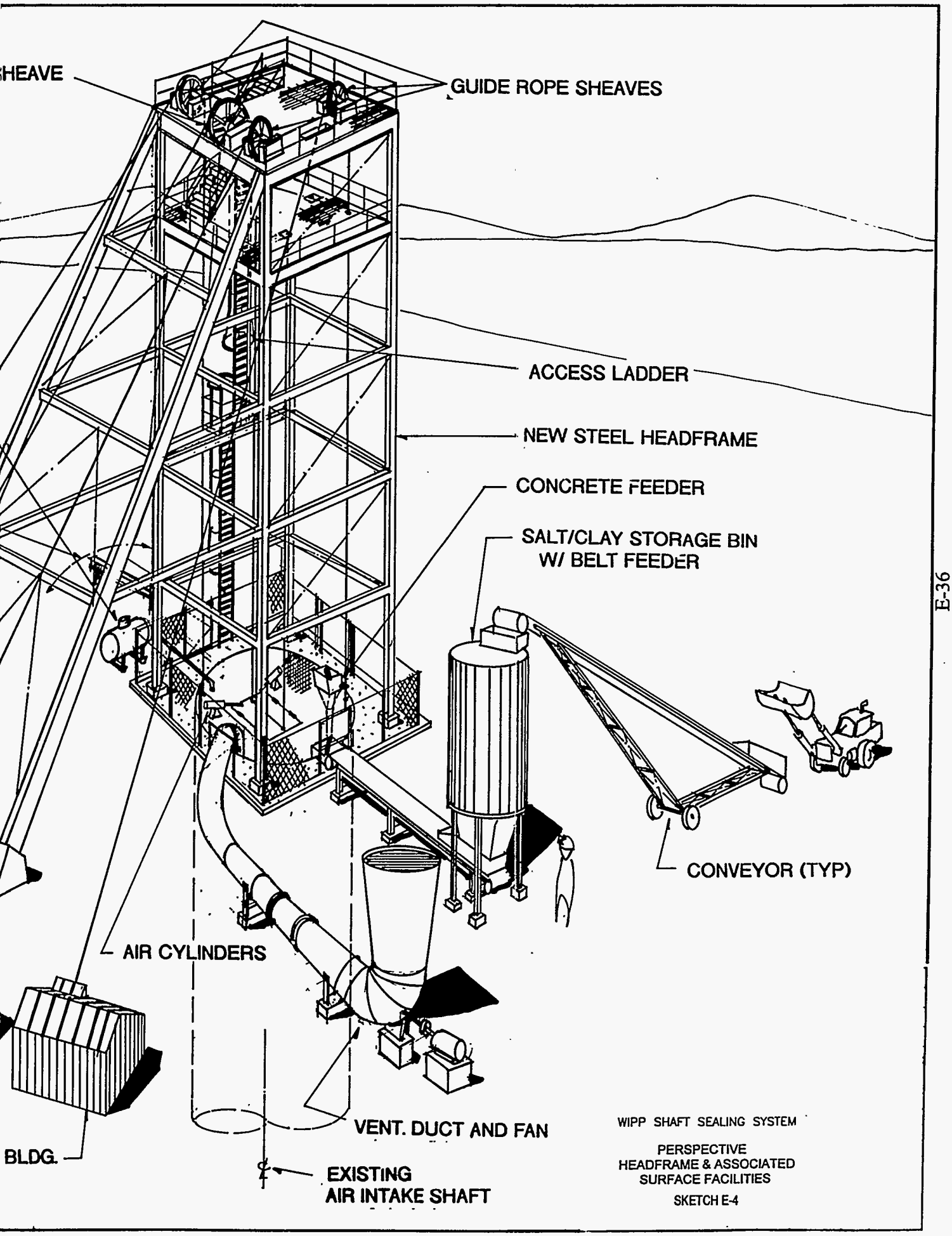
PLAN - SHEAVE F



SECTION B



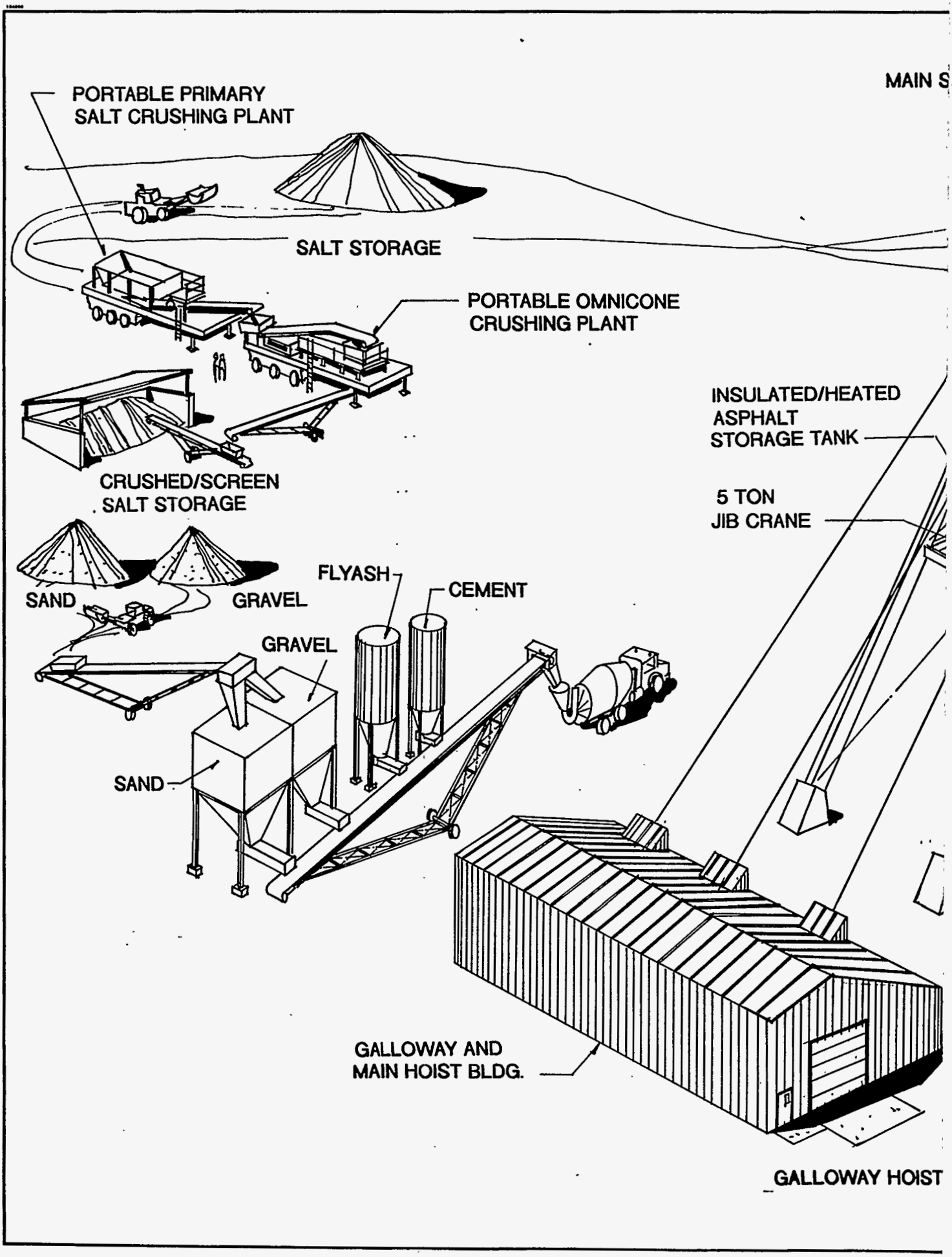
SECTION A



WIPP SHAFT SEALING SYSTEM

PERSPECTIVE
HEADFRAME & ASSOCIATED
SURFACE FACILITIES

SKETCH E-4


MAIN S
PORTABLE PRIMARY
SALT CRUSHING PLANT
SALT STORAGE
PORTABLE OMNICONE
CRUSHING PLANT
INSULATED/HEATED
ASPHALT
STORAGE TANK
CRUSHED/SCREEN
SALT STORAGE
5 TON
JIB CRANE
FLYASH
CEMENT
SAND
GRAVEL
GRAVEL
SAND
GALLOWAY AND
MAIN HOIST BLDG.
GALLOWAY HOIST

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NM Environment Department (3)
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Santa Fe, NM 87503-0968

NM Bureau of Mines & Mineral Resources
Socorro, NM 87801

NM Environment Department
WIPP Project Site
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One Penn Plaza
New York, NY 10119

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Washington, DC 20004

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Attn: Chairman
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Arlington, VA 22209-2297

State Agencies

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Santa Fe, NM 87504-1508

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Konrad B. Krauskopf
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