# ATTACHMENT G2
# APPENDIX E

# DESIGN DRAWINGS

# SHAFT SEALING SYSTEM
# COMPLIANCE SUBMITTAL DESIGN REPORT

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Distribution
Category UC-721

# Waste Isolation Pilot Plant
# Shaft Sealing System
# Compliance Submittal Design Report

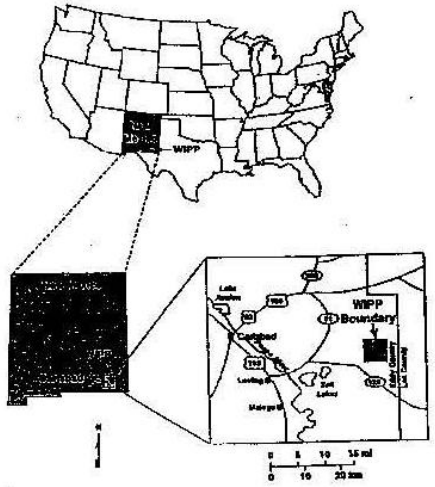
## Volume 2 of 2:
## Appendix E

Repository Isolation Systems Department
Sandia National Laboratories
Albuquerque, NM 87185

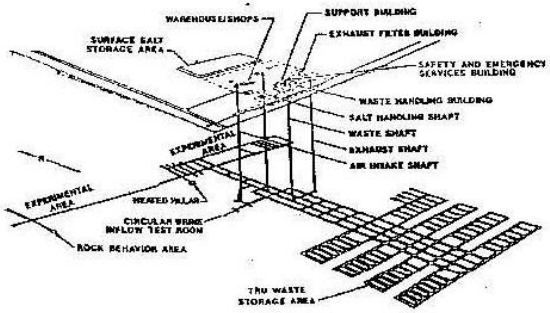
**ABSTRACT**

This is the second volume of a two-volume report describing a shaft sealing system design for the Waste Isolation Pilot Plant. This appendix contains detailed drawings of the shaft sealing system and its components.

1




WIPP LAYOUT




# WASTE ISOLATION PILOT PLANT

## CARLSBAD, NM

## SHAFT SEALING SYSTEM DESIGN

## DESIGN DRAWINGS

| DRAWING NUMBER | TITLE |
|---|---|
| SNL-007 1 OF 28 | WIPP SHAFT SEALING SYSTEM SHAFT LOCATION PLAN, ABBREVIATIONS, GENERAL NOTES AND LEGEND |
| SNL-007 2 OF 28 | WIPP SHAFT SEALING SYSTEM NEAR-SURFACE/RUSTLER FORMATIONS WASTE SHAFT STRATIGRAPHY & AS-BUILT ELEMENTS |
| SNL-007 3 OF 28 | WIPP SHAFT SEALING SYSTEM SALADO FORMATION WASTE SHAFT STRATIGRAPHY & AS-BUILT ELEMENTS |
| SNL-007 4 OF 28 | WIPP SHAFT SEALING SYSTEM NEAR-SURFACE/RUSTLER FORMATIONS WASTE SHAFT STRATIGRAPHY & SEALING SUBSYSTEM PROFILE |
| SNL-007 5 OF 28 | WIPP SHAFT SEALING SYSTEM SALADO FORMATION WASTE SHAFT STRATIGRAPHY & SEALING SUBSYSTEM PROFILE |
| SNL-007 6 OF 28 | WIPP SHAFT SEALING SYSTEM WASTE SHAFT SHAFT STATION MONOLITH |
| SNL-007 7 OF 28 | WIPP SHAFT SEALING SYSTEM NEAR-SURFACE/RUSTLER FORMATIONS AIR INTAKE SHAFT STRATIGRAPHY & AS-BUILT ELEMENTS |
| SNL-007 8 OF 28 | WIPP SHAFT SEALING SYSTEM SALADO FORMATION AIR INTAKE SHAFT STRATIGRAPHY & AS-BUILT ELEMENTS |
| SNL-007 9 OF 28 | WIPP SHAFT SEALING SYSTEM NEAR-SURFACE/RUSTLER FORMATIONS AIR INTAKE SHAFT STRATIGRAPHY & SEALING SUBSYSTEM PROFILE |
| SNL-007 10 OF 28 | WIPP SHAFT SEALING SYSTEM SALADO FORMATION AIR INTAKE SHAFT STRATIGRAPHY & SEALING SUBSYSTEM PROFILE |
| SNL-007 11 OF 28 | WIPP SHAFT SEALING SYSTEM AIR INTAKE SHAFT SHAFT STATION MONOLITH |
| SNL-007 12 OF 28 | WIPP SHAFT SEALING SYSTEM NEAR-SURFACE/RUSTLER FORMATIONS EXHAUST SHAFT STRATIGRAPHY & AS-BUILT ELEMENTS |
| SNL-007 13 OF 28 | WIPP SHAFT SEALING SYSTEM SALADO FORMATION EXHAUST SHAFT STRATIGRAPHY & AS-BUILT ELEMENTS |
| SNL-007 14 OF 28 | WIPP SHAFT SEALING SYSTEM NEAR-SURFACE/RUSTLER FORMATIONS EXHAUST SHAFT STRATIGRAPHY & SEALING SUBSYSTEM PROFILE |
| SNL-007 15 OF 28 | WIPP SHAFT SEALING SYSTEM SALADO FORMATION EXHAUST SHAFT STRATIGRAPHY & SEALING SUBSYSTEM PROFILE |
| SNL-007 16 OF 28 | WIPP SHAFT SEALING SYSTEM EXHAUST SHAFT SHAFT STATION MONOLITH |
| SNL-007 17 OF 28 | WIPP SHAFT SEALING SYSTEM NEAR-SURFACE/RUSTLER FORMATIONS SALT HANDLING SHAFT STRATIGRAPHY & AS-BUILT ELEMENTS |
| SNL-007 18 OF 28 | WIPP SHAFT SEALING SYSTEM SALADO FORMATION SALT HANDLING SHAFT STRATIGRAPHY & AS-BUILT ELEMENTS |
| 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 |

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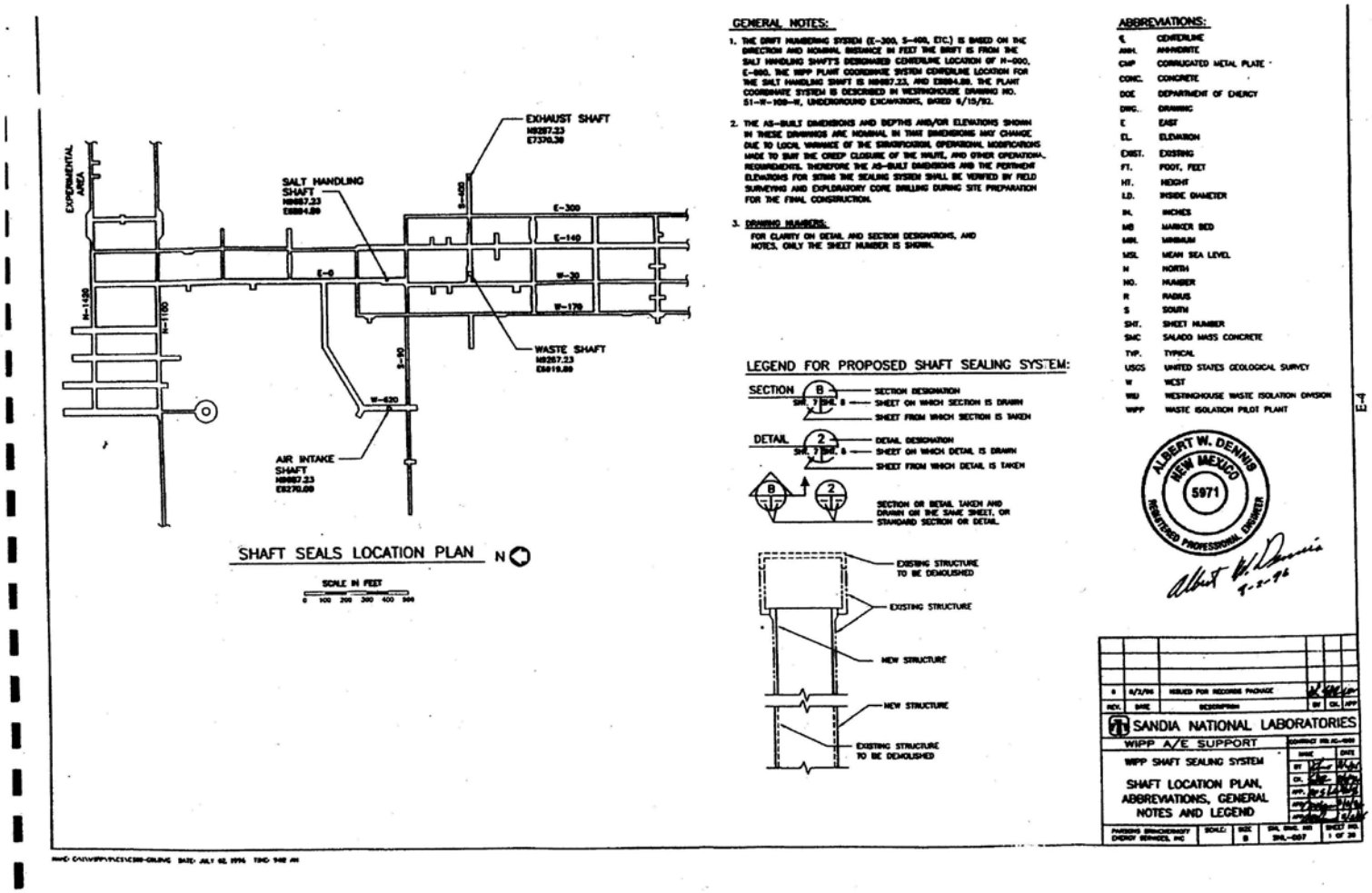
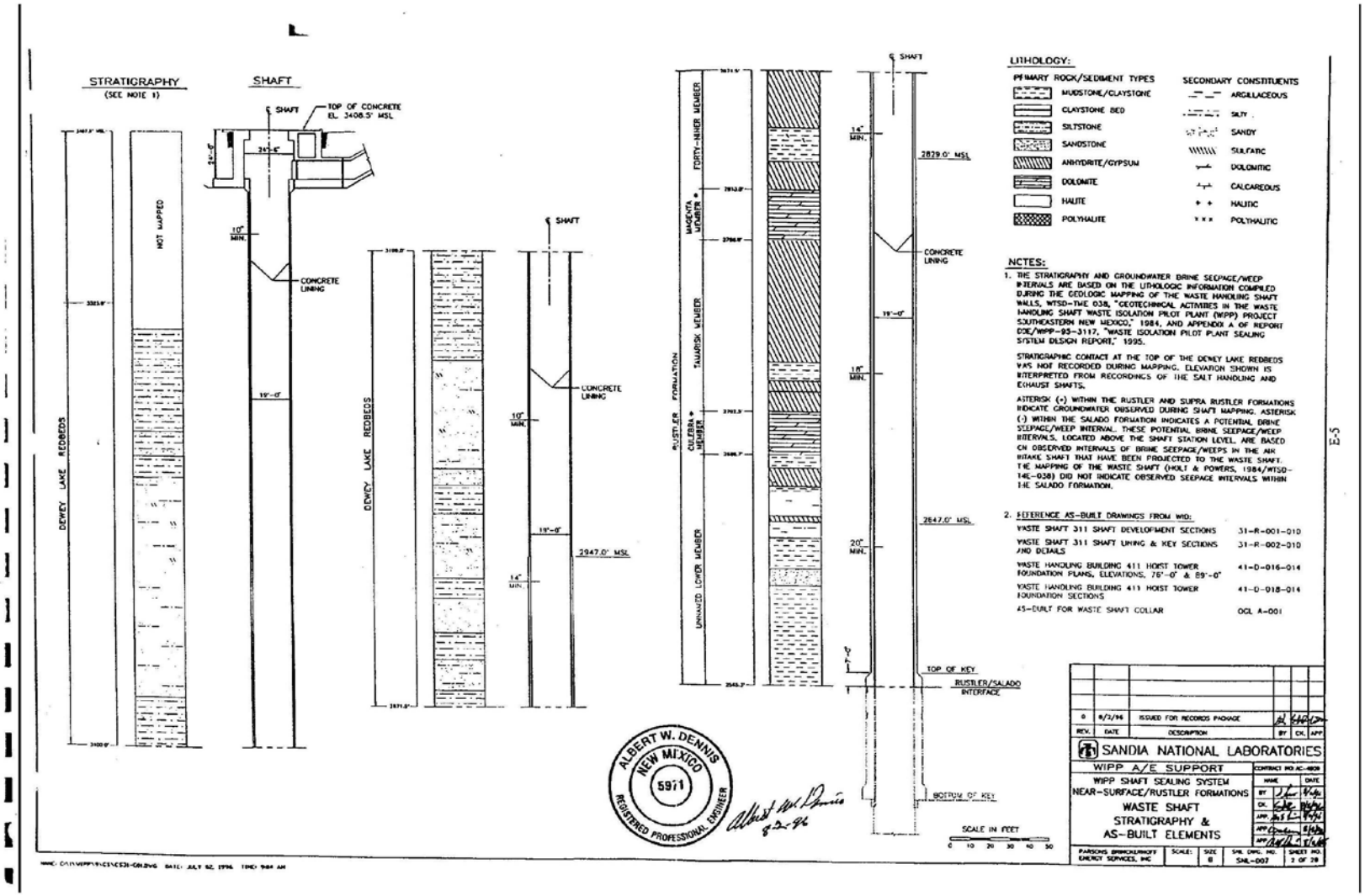
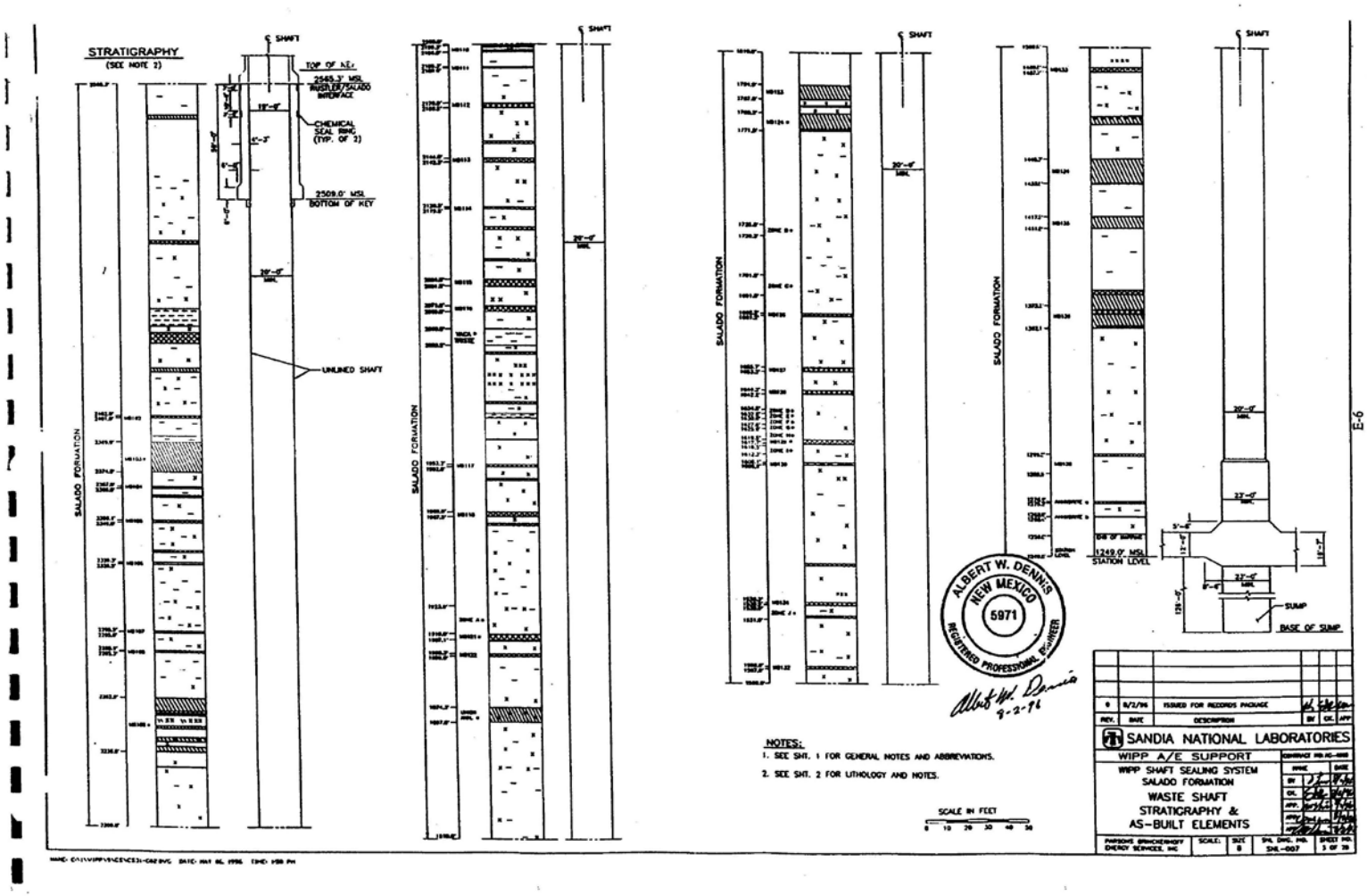



1 Shaft Location Plan, Abbreviations, General Notes and Legend Sheet 1 of 28



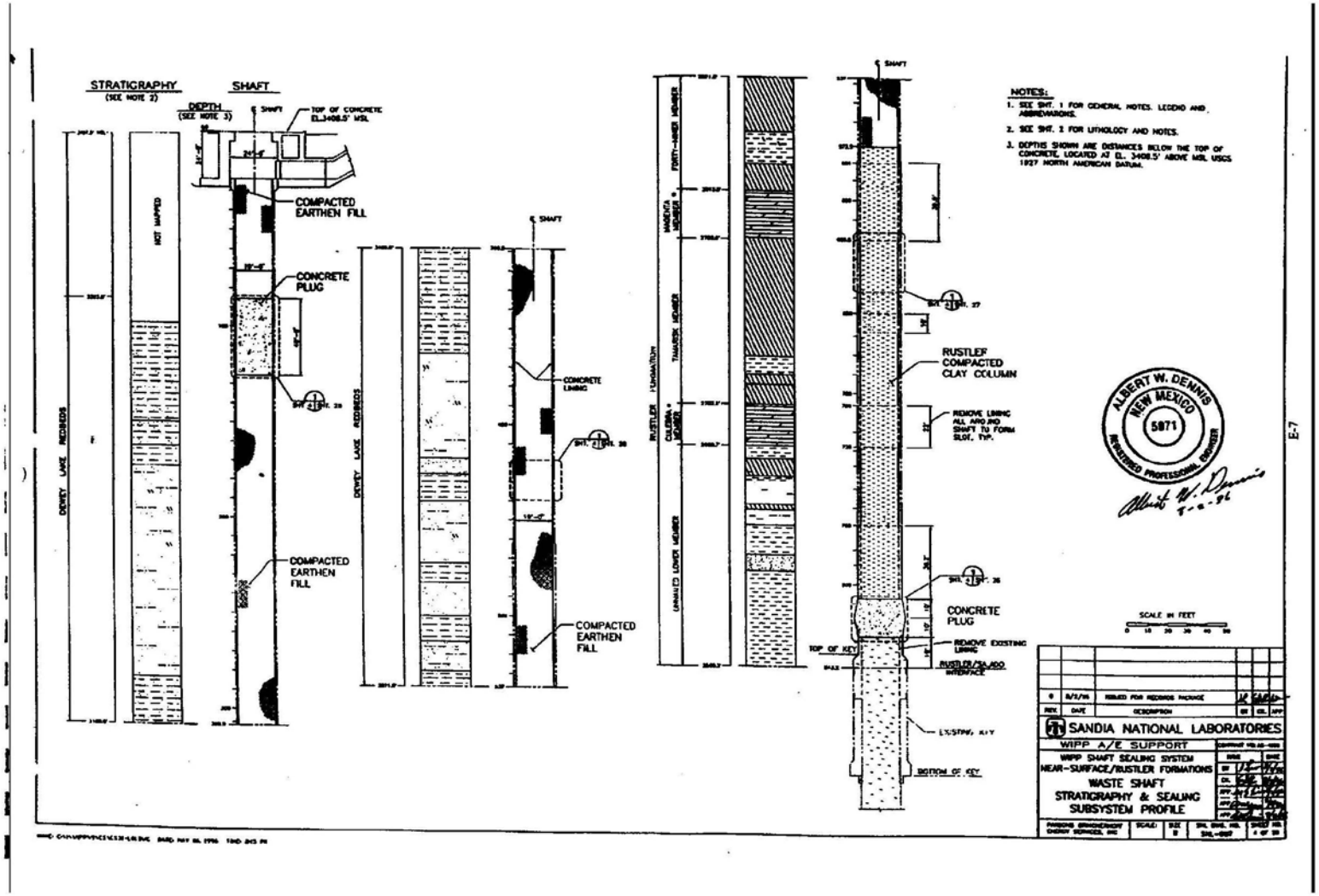

1 Near-Surface/Rustler Formations Waste Shaft Stratigraphy and AS-Built Elements Sheet 2 of 28




Salado Formation Waste Shaft Stratigraphy and AS-Built Elements

Sheet 3 of 28

1




Near-Surface/Rustler Formations Waste Shaft Stratigraphy and Sealing Subsystem Profile Sheet 4 of 28

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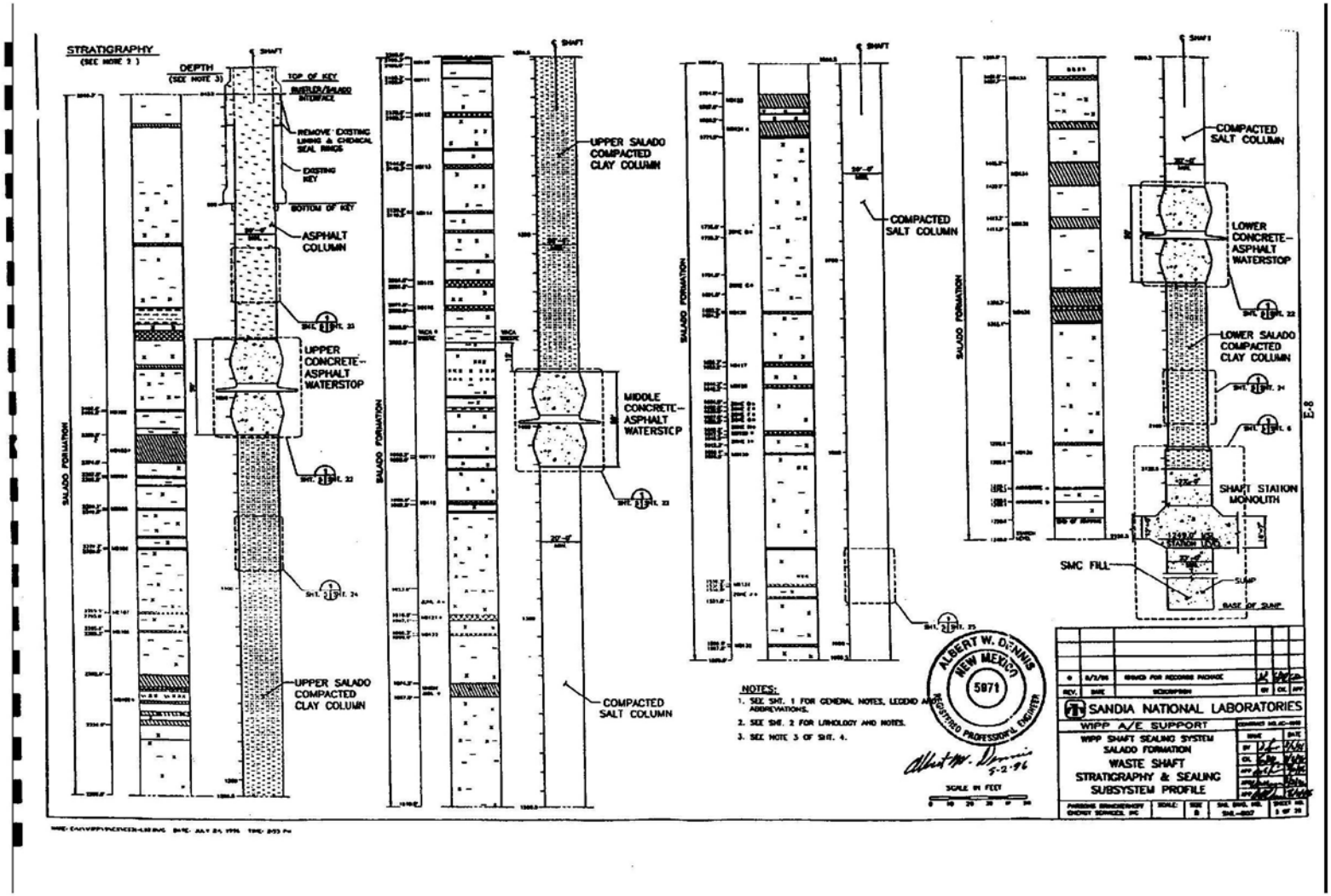


Salado Formation Waste Shaft Stratigraphy and Sealing Subsystem Profile Sheet 5 of 28

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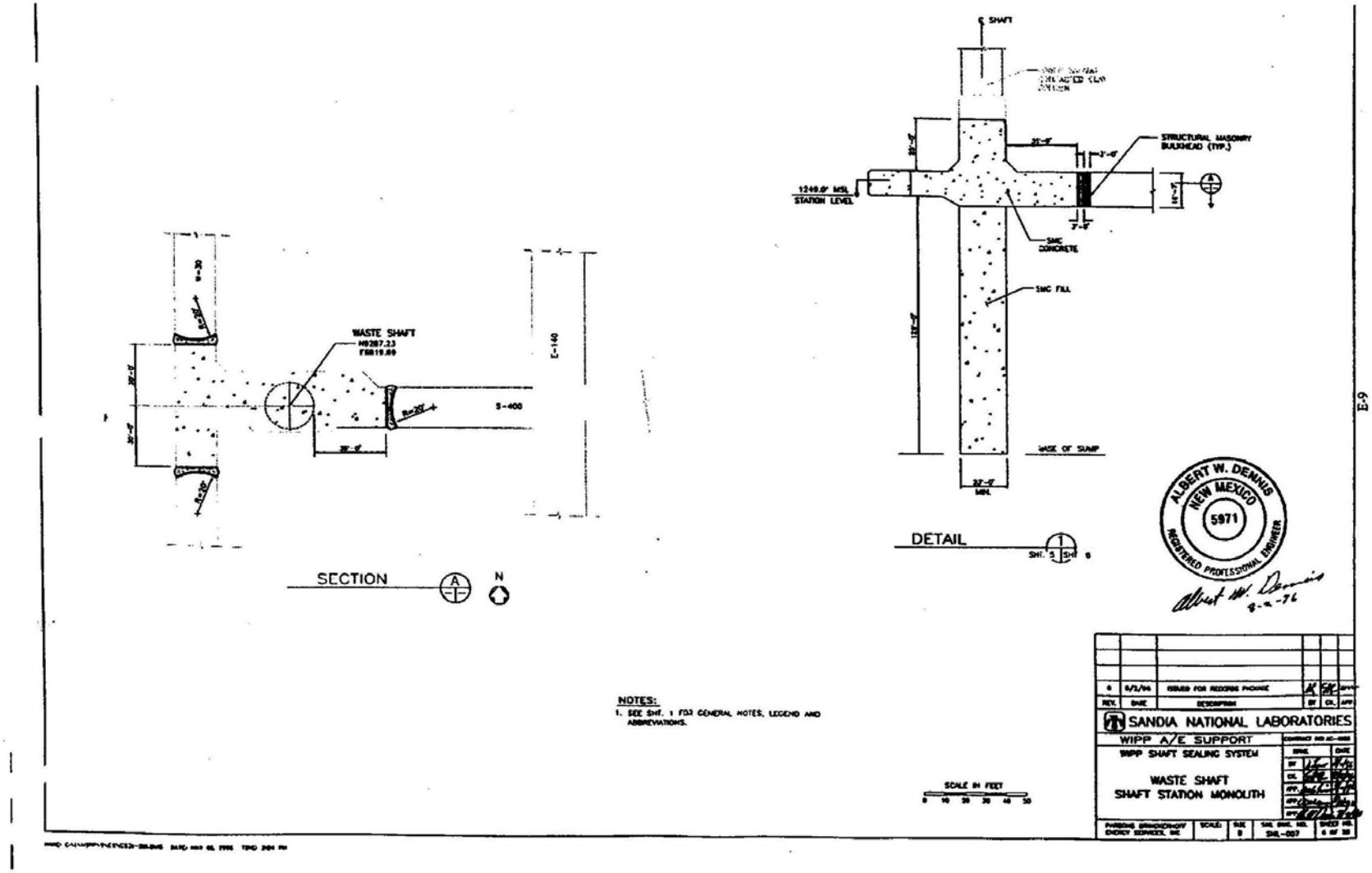
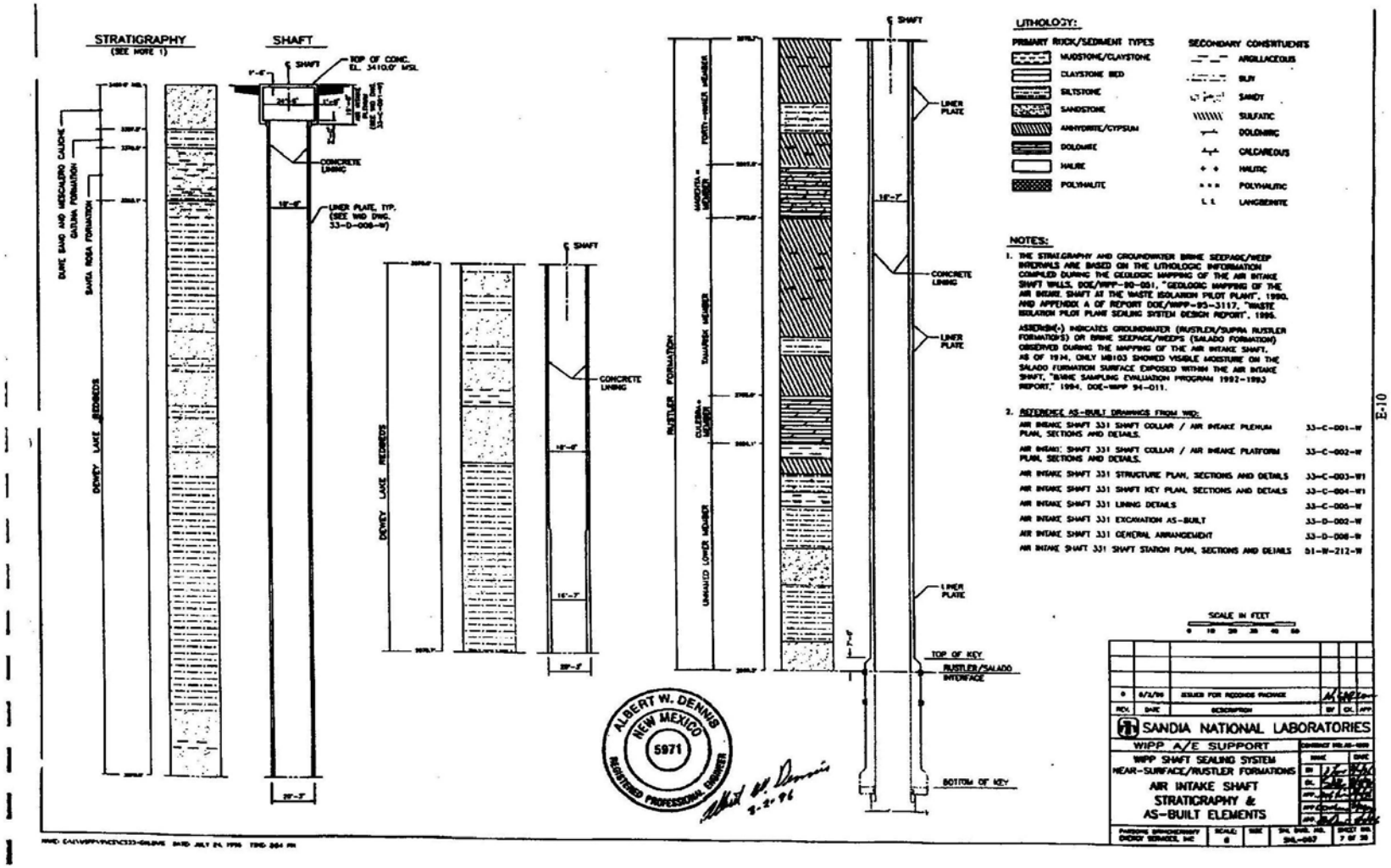



Waste Shaft Station Monolith

Sheet 6 of 28




Near-Surface / Rustler Formations Air Intake Shaft Stratigraphy and AS-Built Elements Sheet 7 of 28

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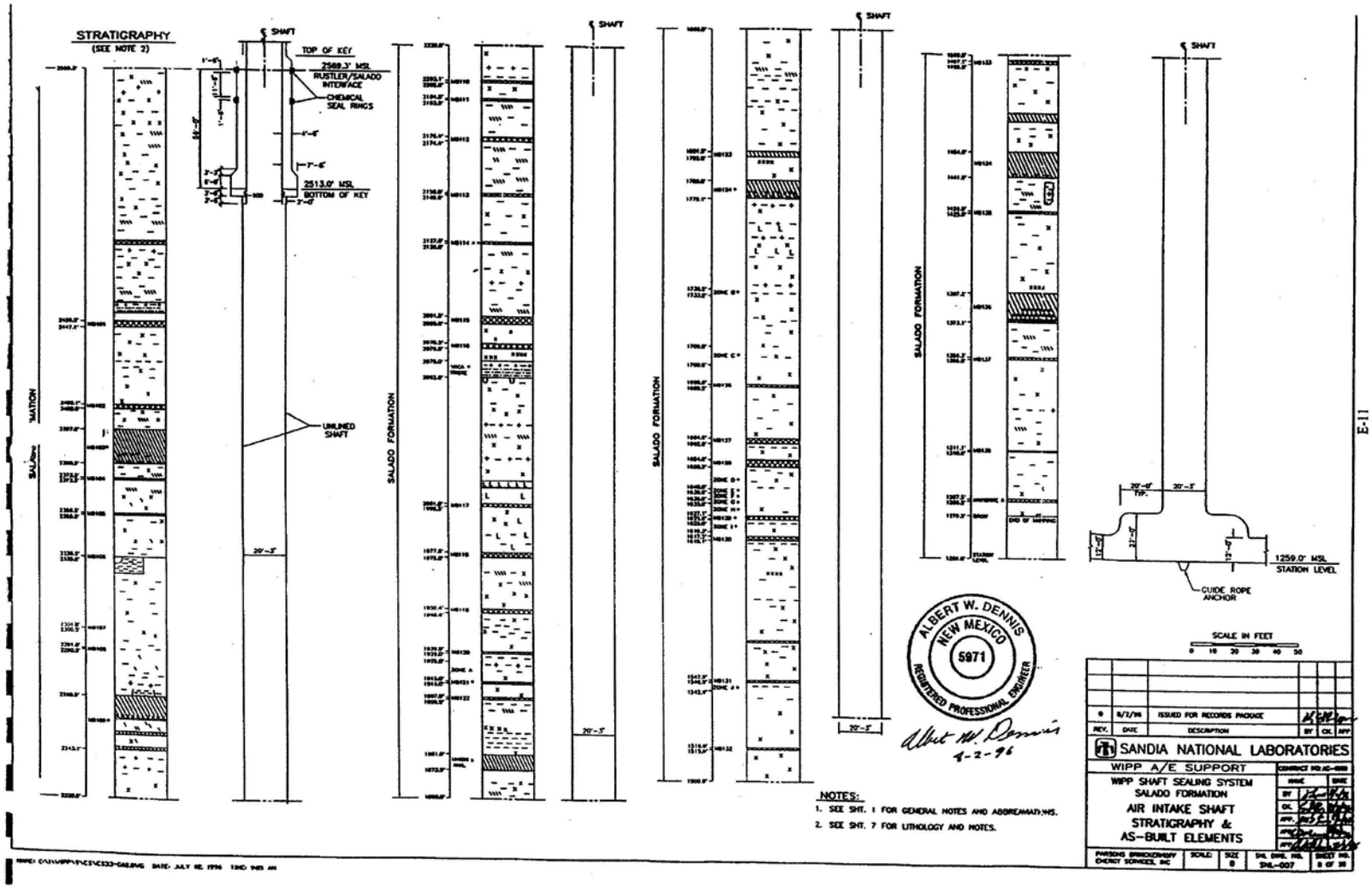
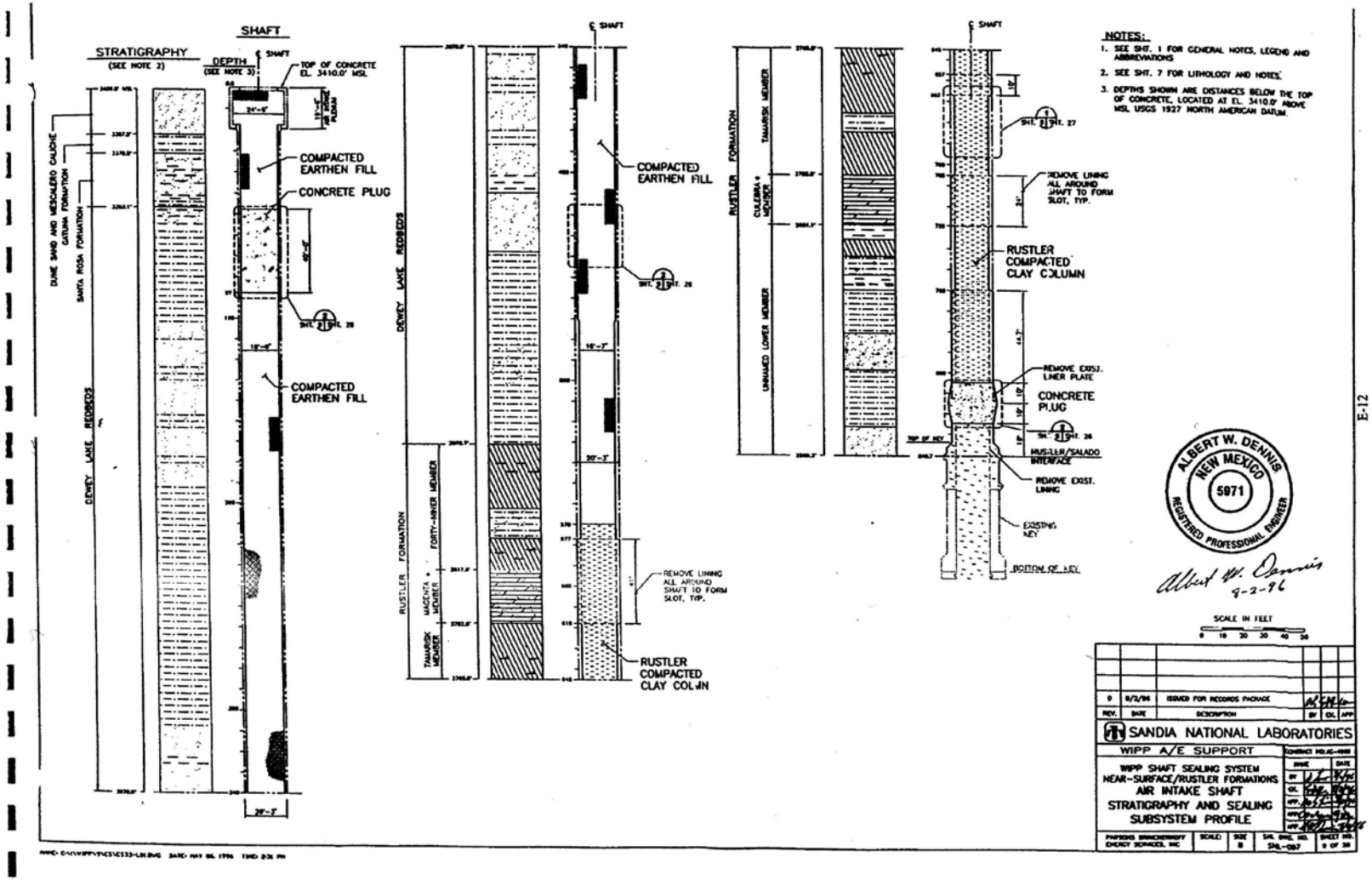



Salado Formation Air Intake Shaft Stratigraphy and AS-Built Elements

Sheet 8 of 28

1




Near-Surface / Rustler Formations Air Intake Shaft Stratigraphy and Sealing Subsytem Profile Sheet 9 of 28

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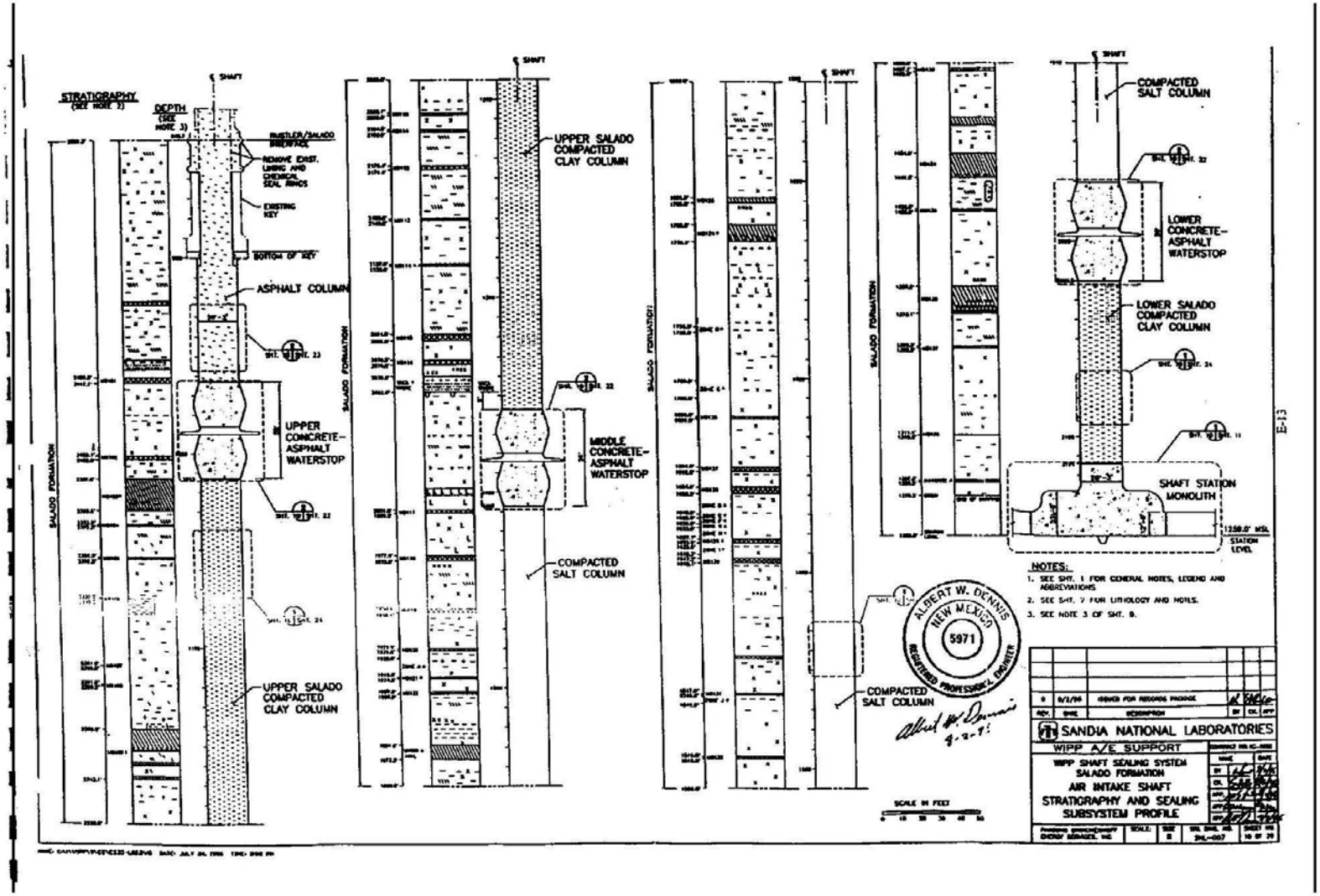


Salado Formation Air Intake Shaft Stratigraphy and Sealing Subsytem Profile Sheet 10 of 28

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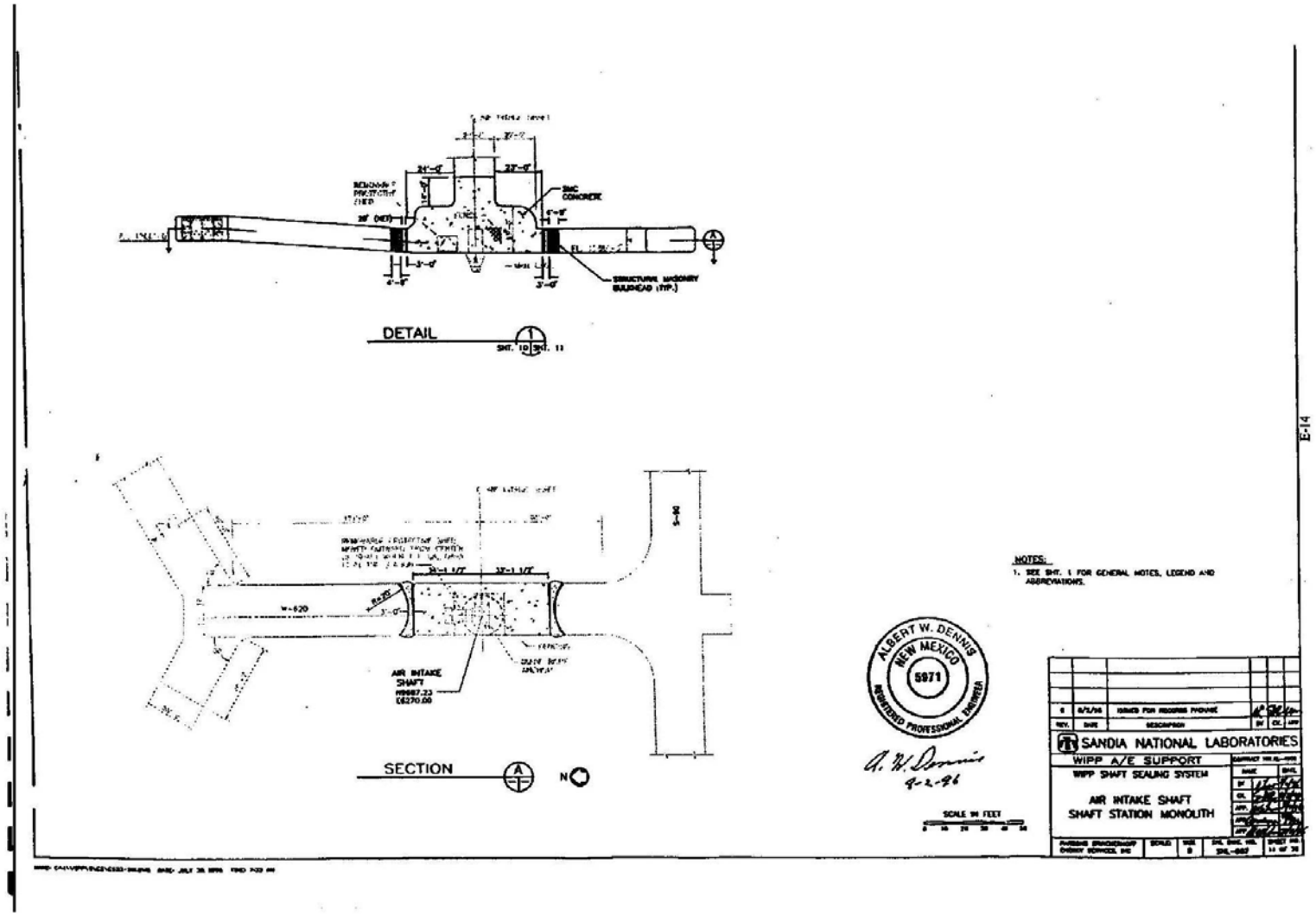
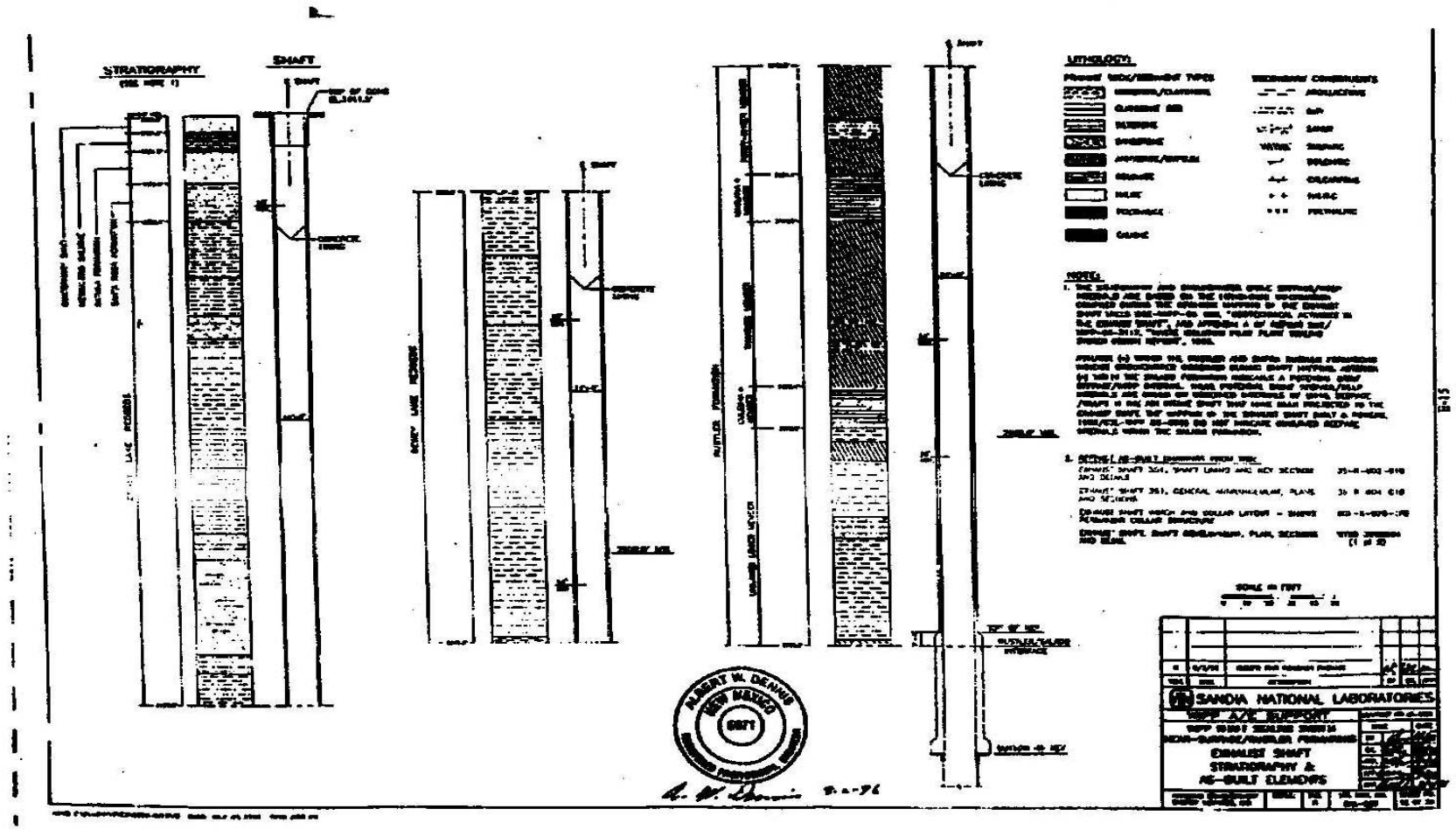



Air Intake Shaft Station Monolith

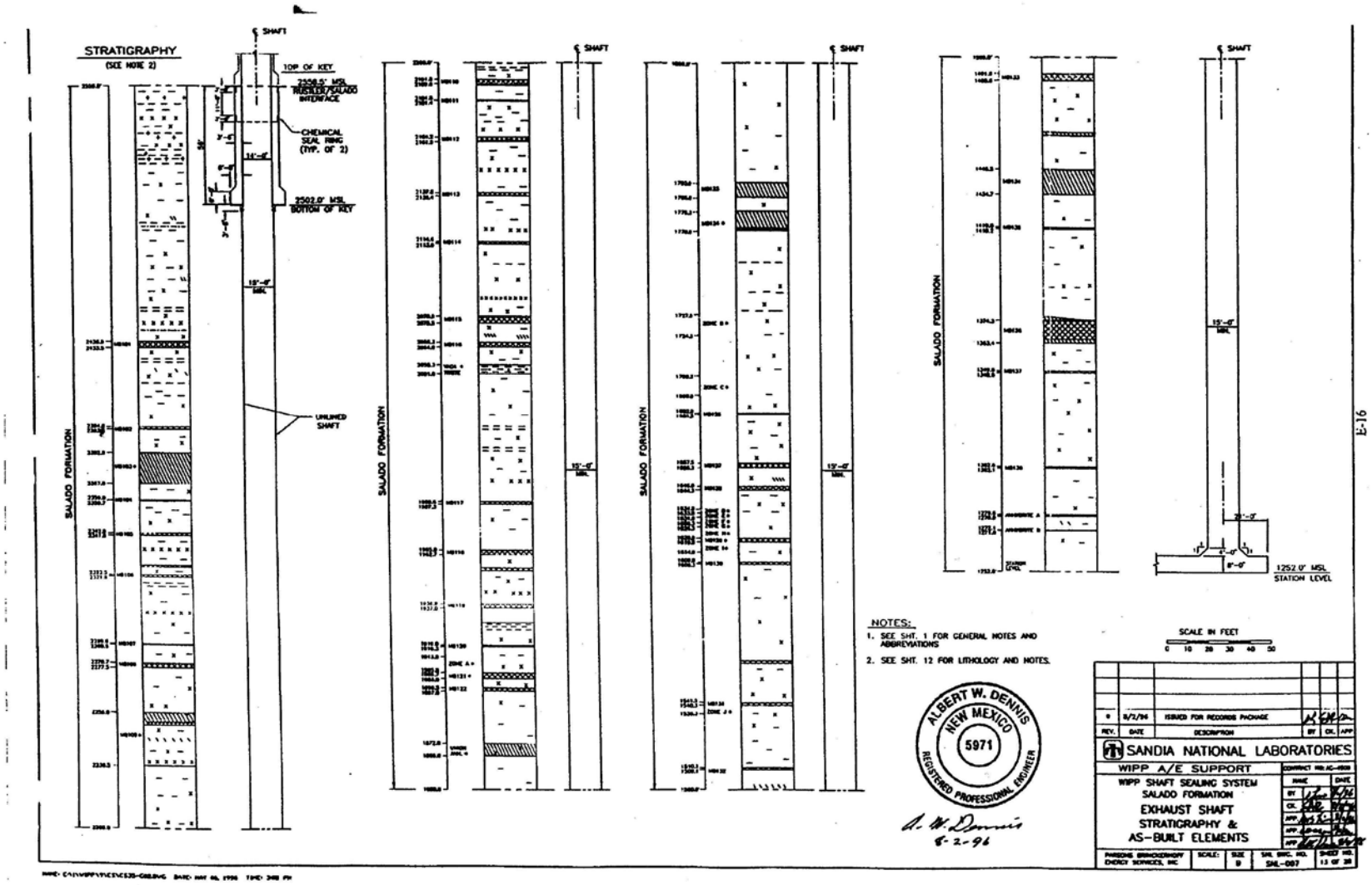
Sheet 11 of 28

1




Near-Surface / Rustler Formations Exhaust Shaft Stratigraphy and AS-Built Elements Sheet 12 of 28

1




Salado Formation Exhaust Shaft Stratigraphy and AS-Built Elements

Sheet 13 of 28

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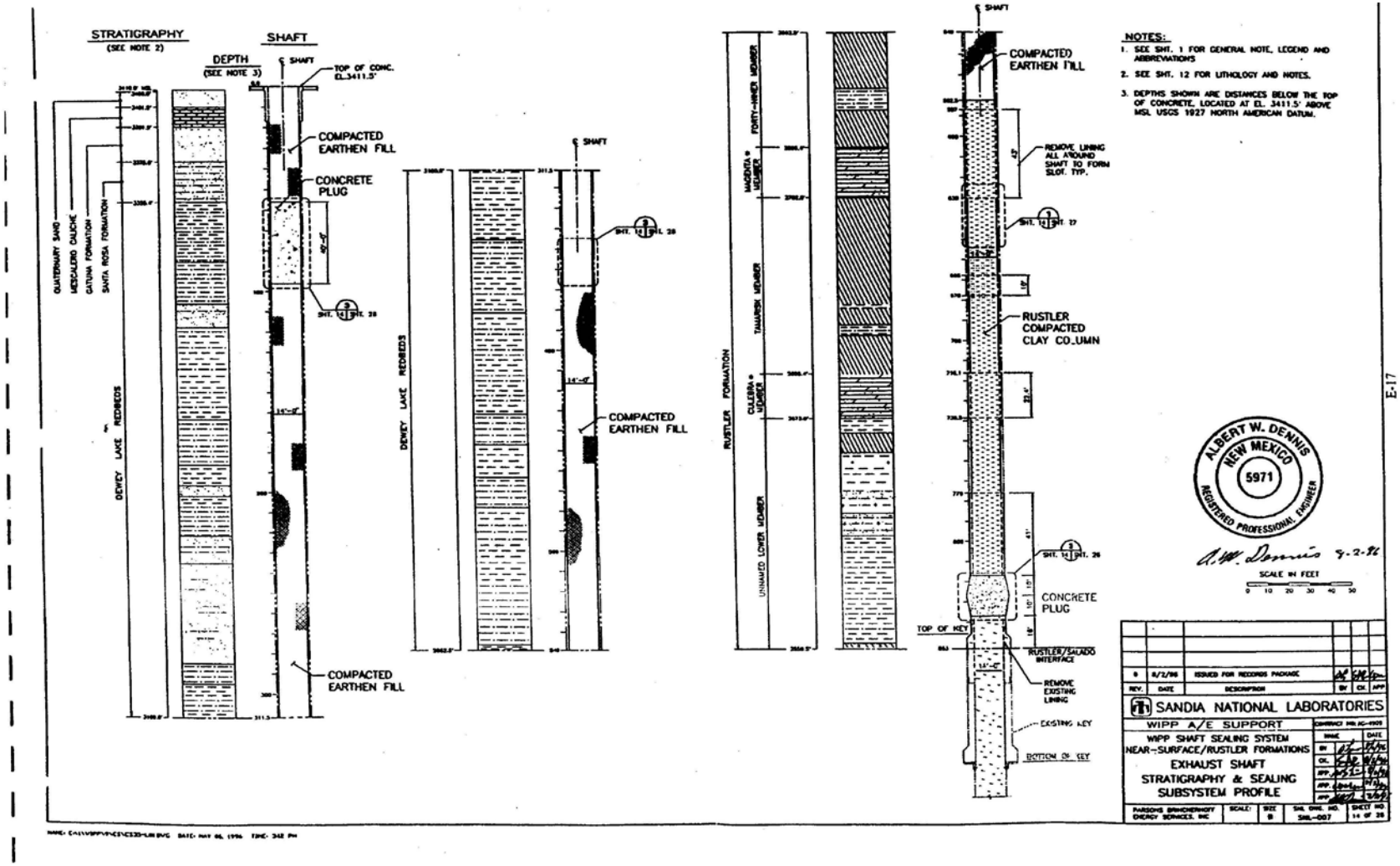
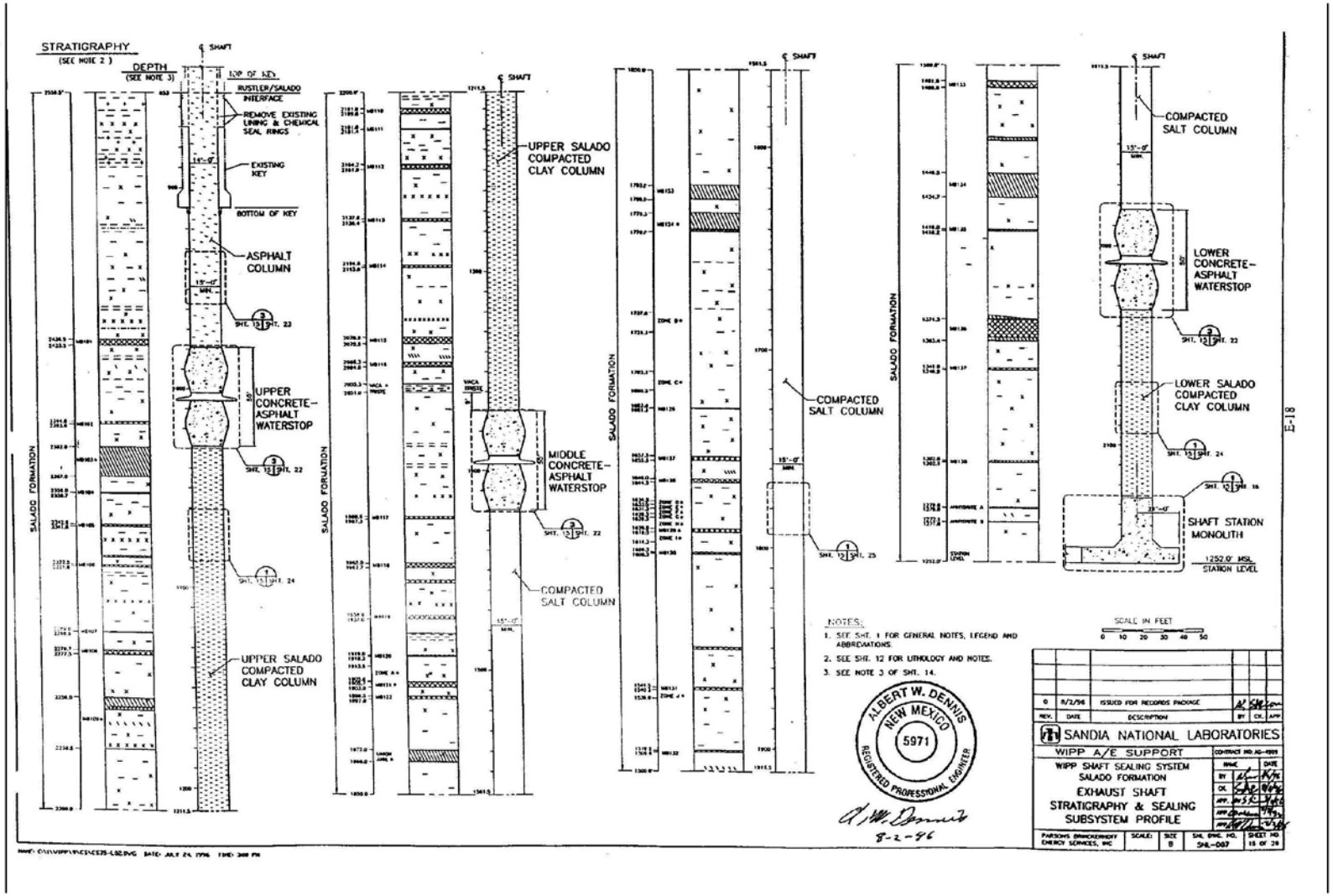


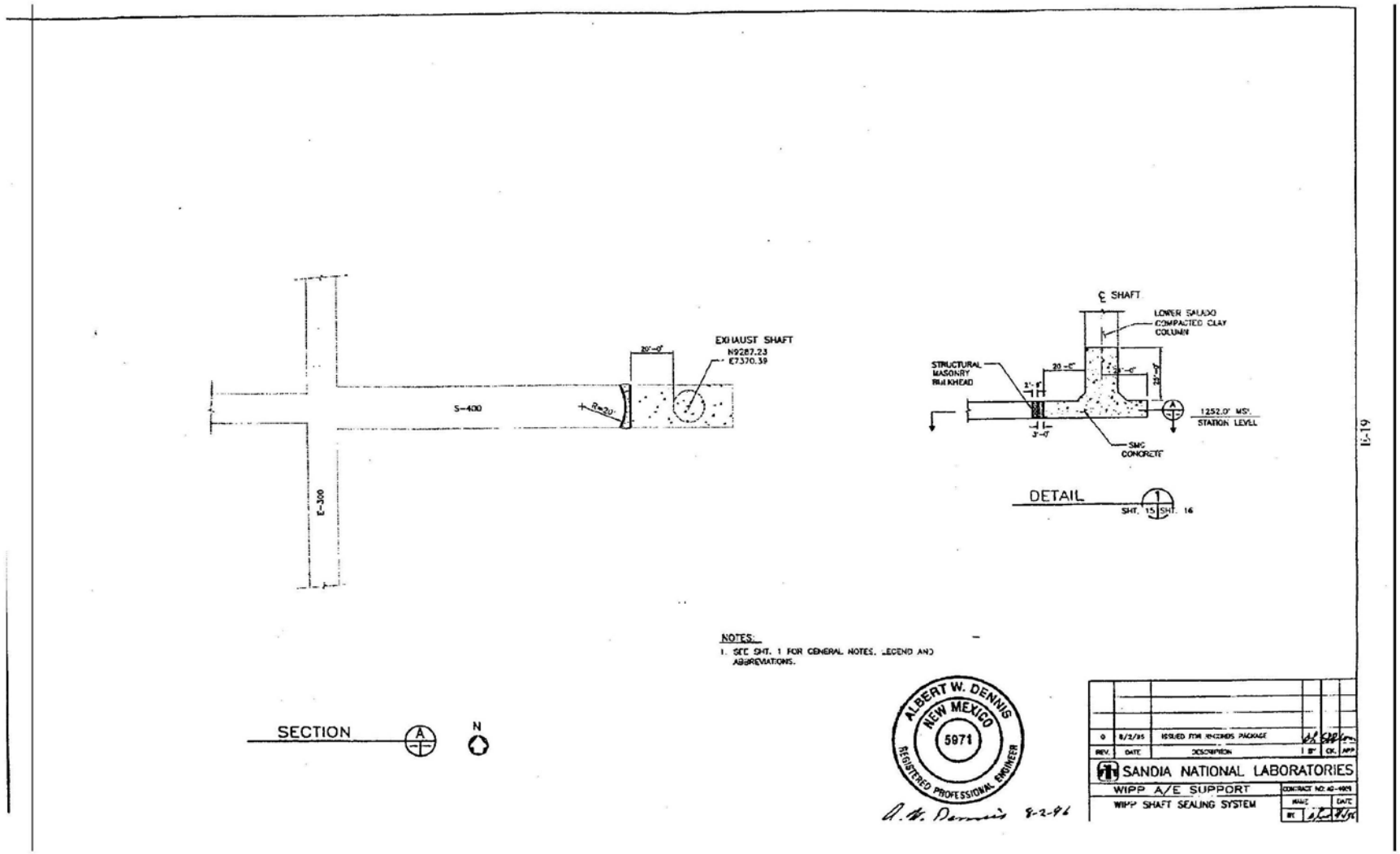

Near-Surface / Rustler Formations Exhaust Shaft Stratigraphy and Sealing Subsystem Profile Sheet 14 of 28

1



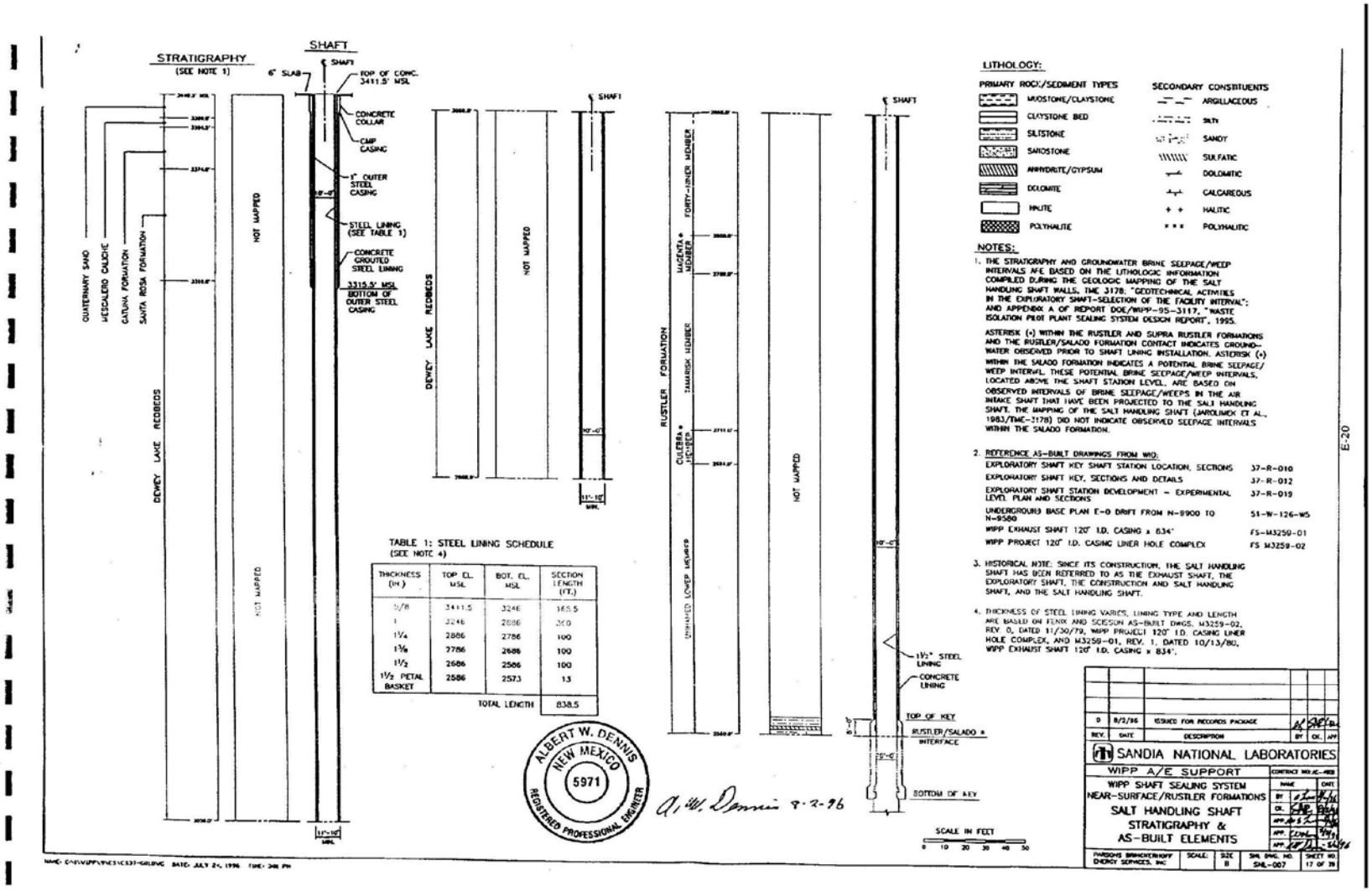

Salado Formation Exhaust Shaft Stratigraphy and Sealing Subsystem Profile Sheet 15 of 28

1



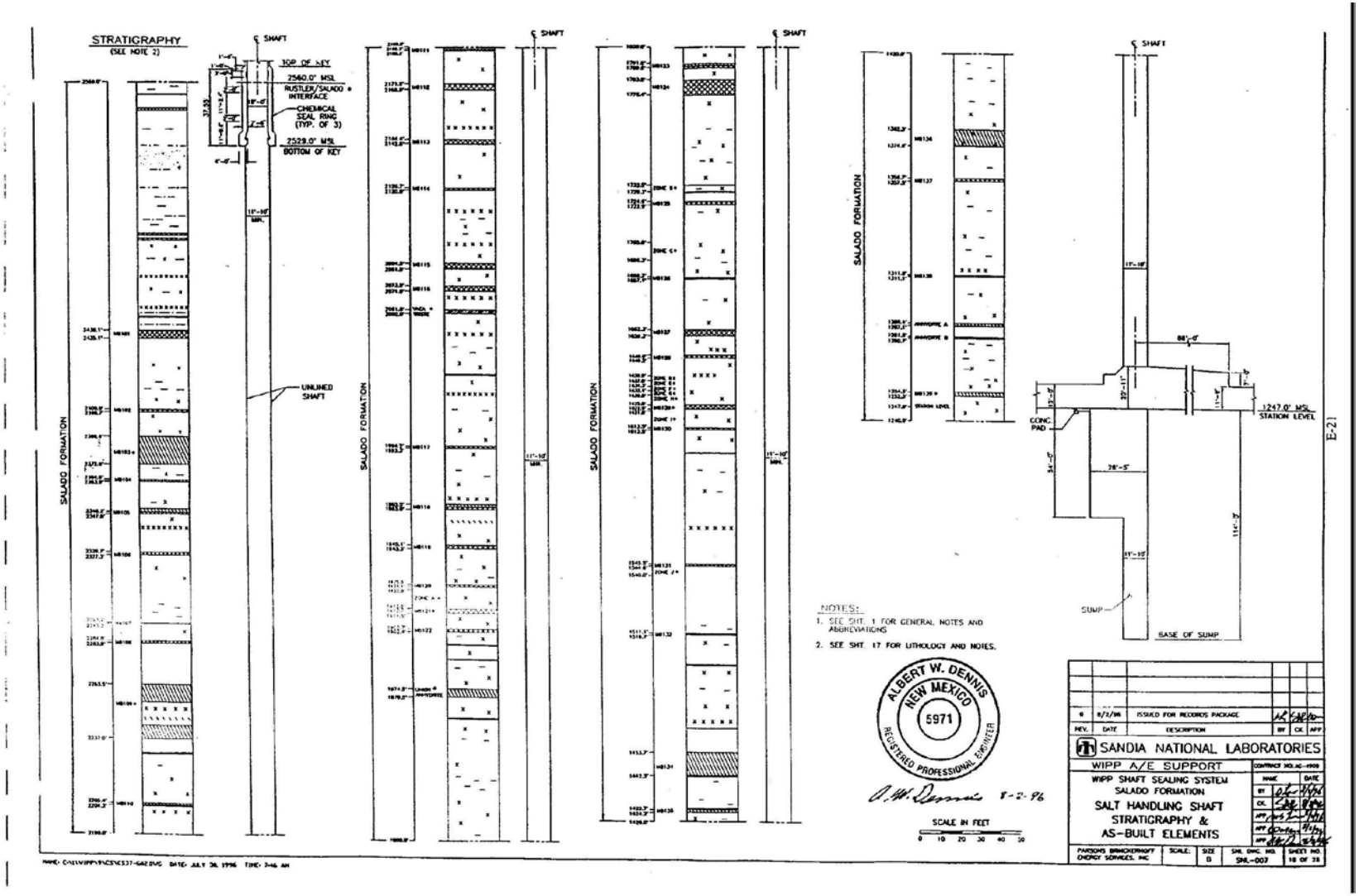

Exhaust Shaft Station Monolith

Sheet 16 of 28




Near-Surface / Rustler Formations Salt Handling Shaft Stratigraphy and AS-Built Elements Sheet 17of 28

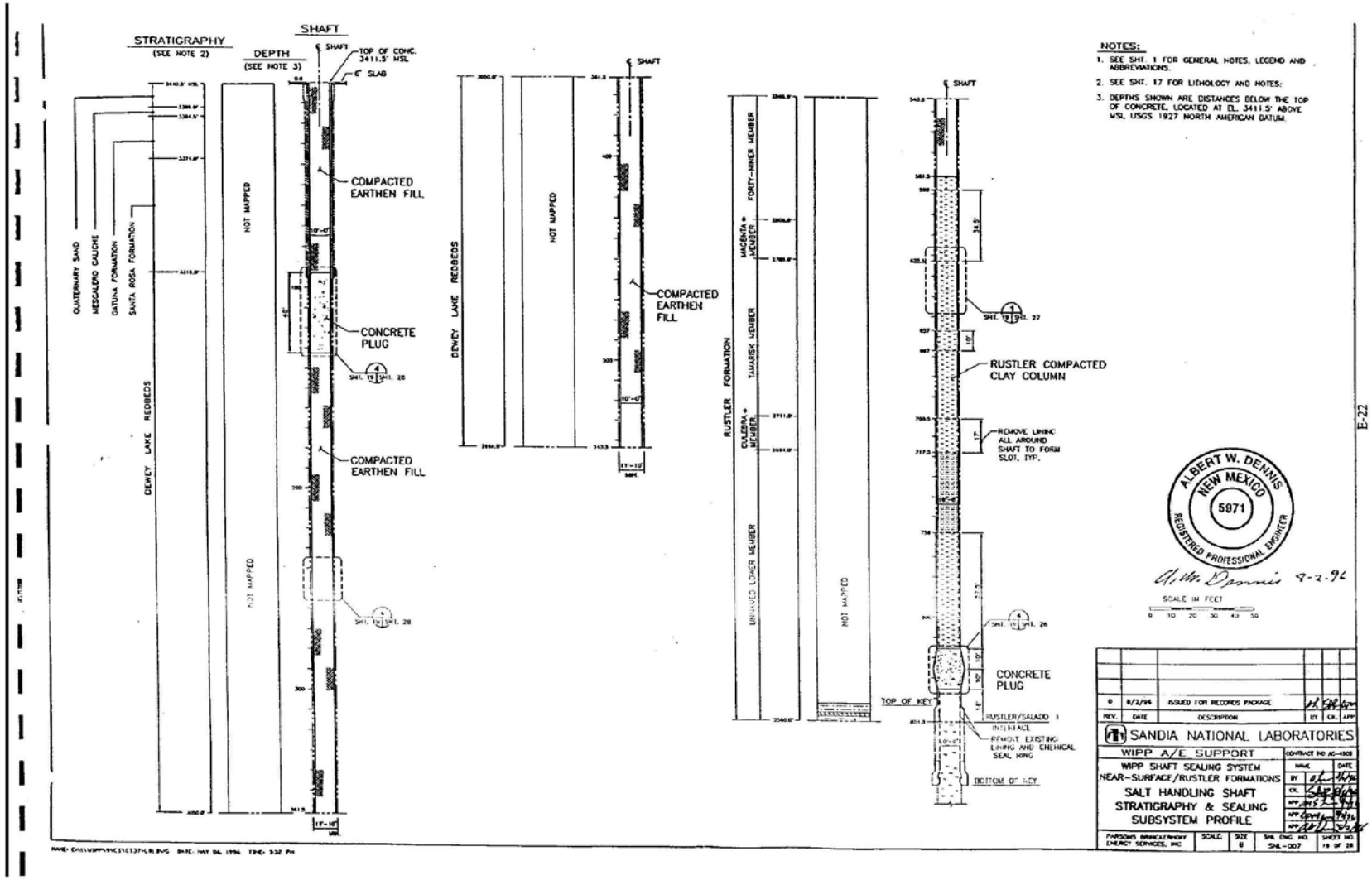
1




Salado Formation Salt Handling Shaft Stratigraphy and AS-Built Elements

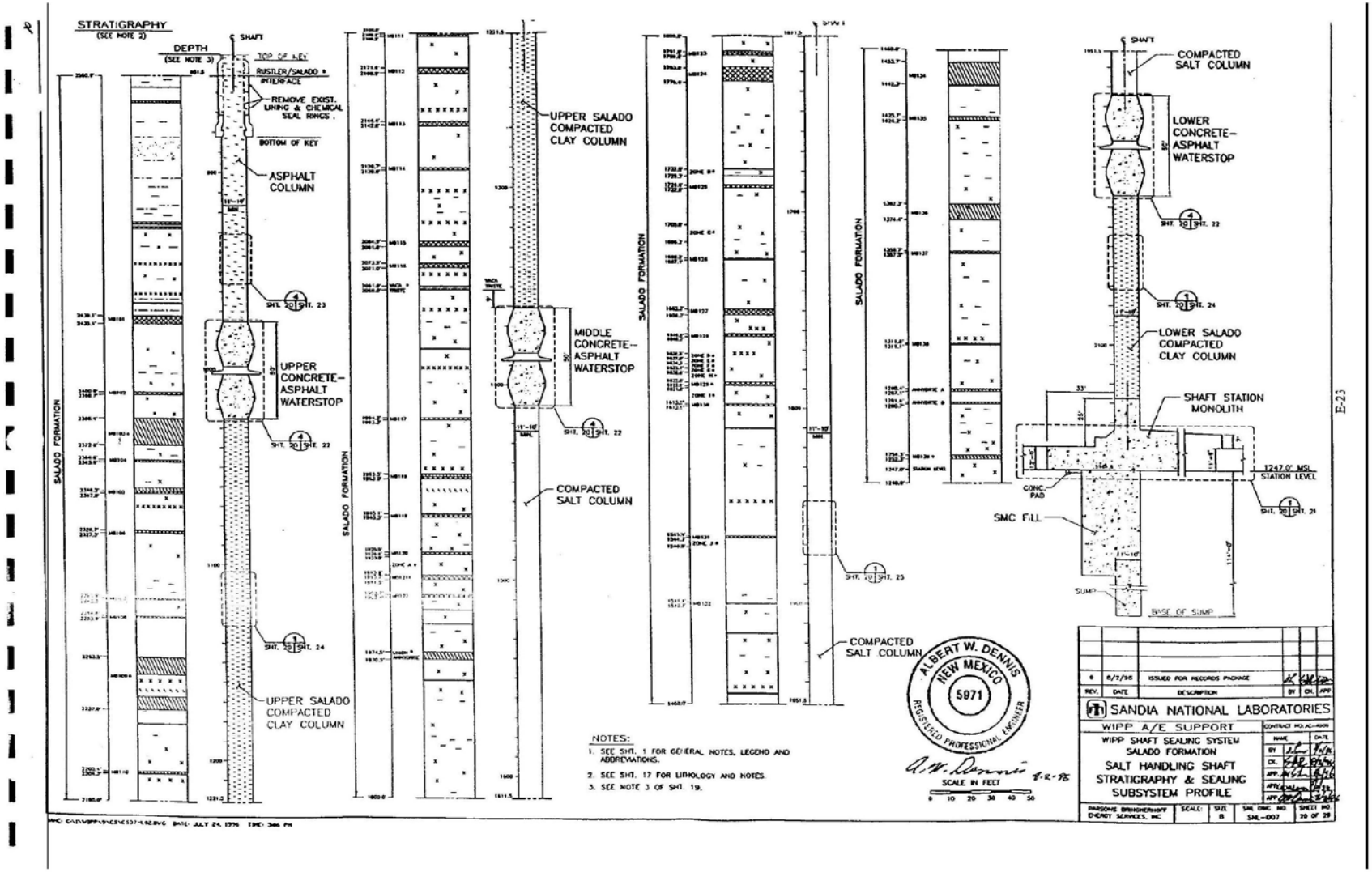
Sheet 18 of 28

1




Near-Surface / Rustler Formations Salt Handling Shaft Stratigraphy and Sealing Subsystem Profile Sheet 19 of 28

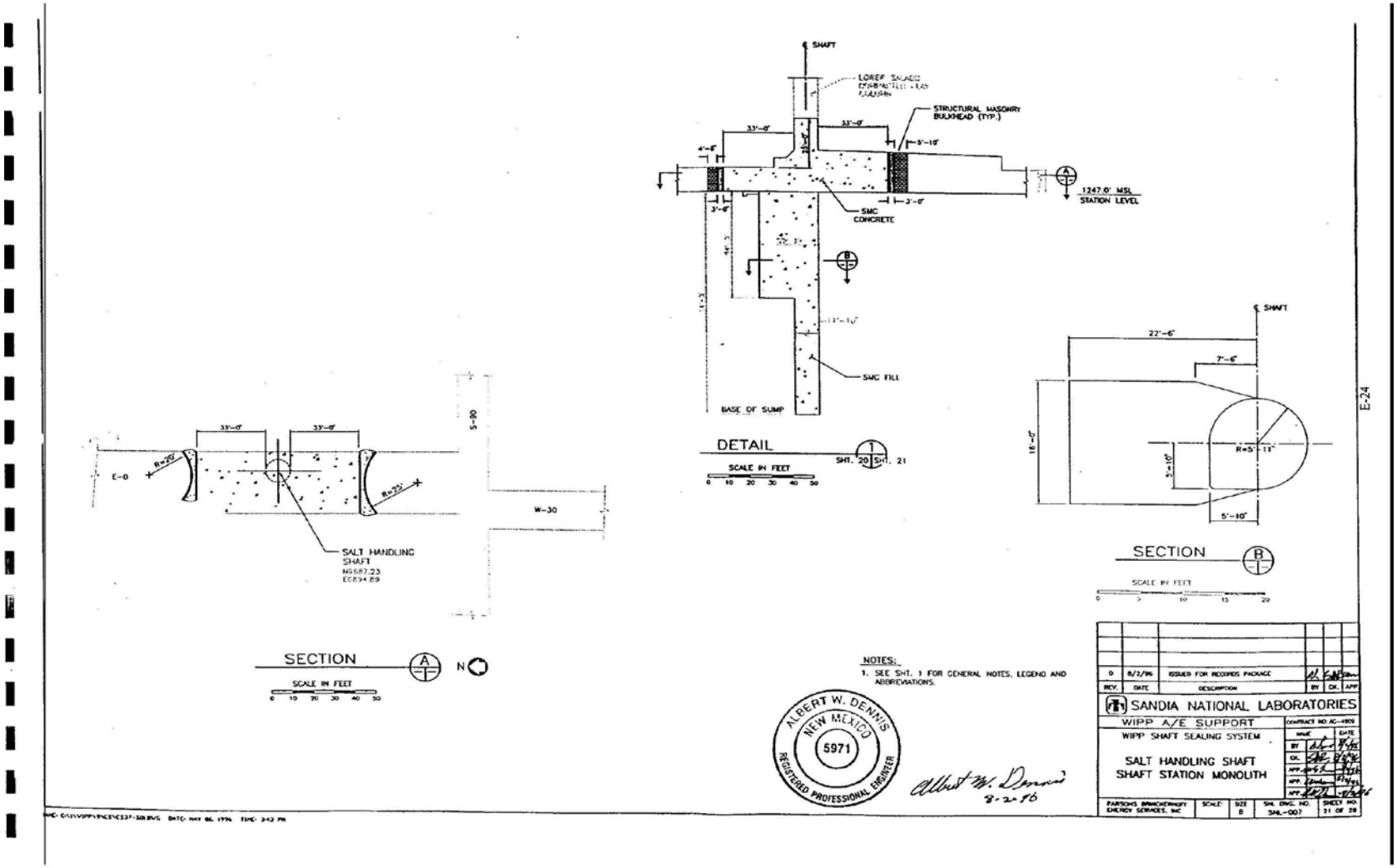
1




Salado Formation Salt Handling Shaft Stratigraphy and Sealing Subsystem Profile

Sheet 20 of 28

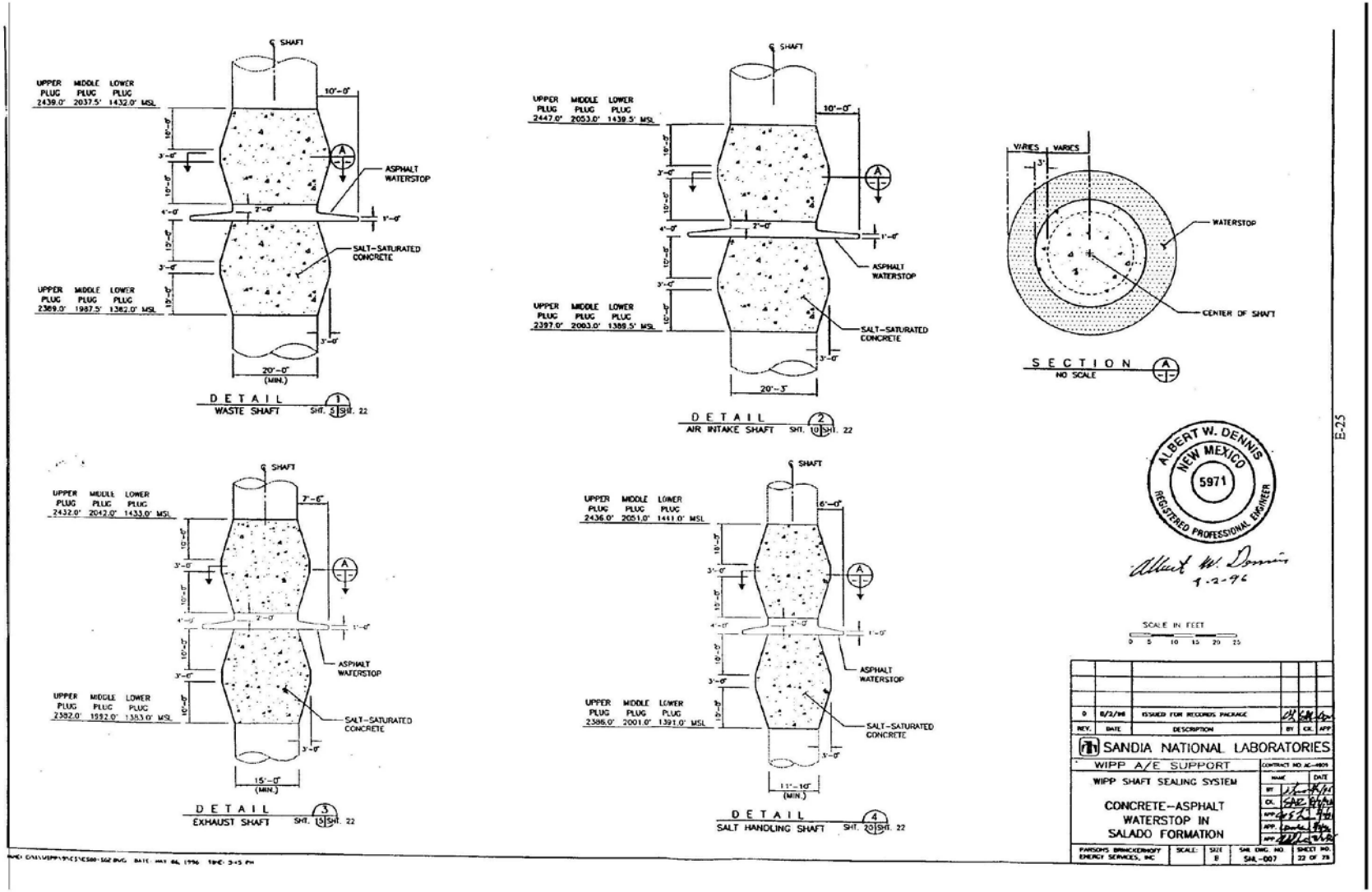
1




Salt Handling Shaft Shaft Station Monolith

Sheet 21 of 28

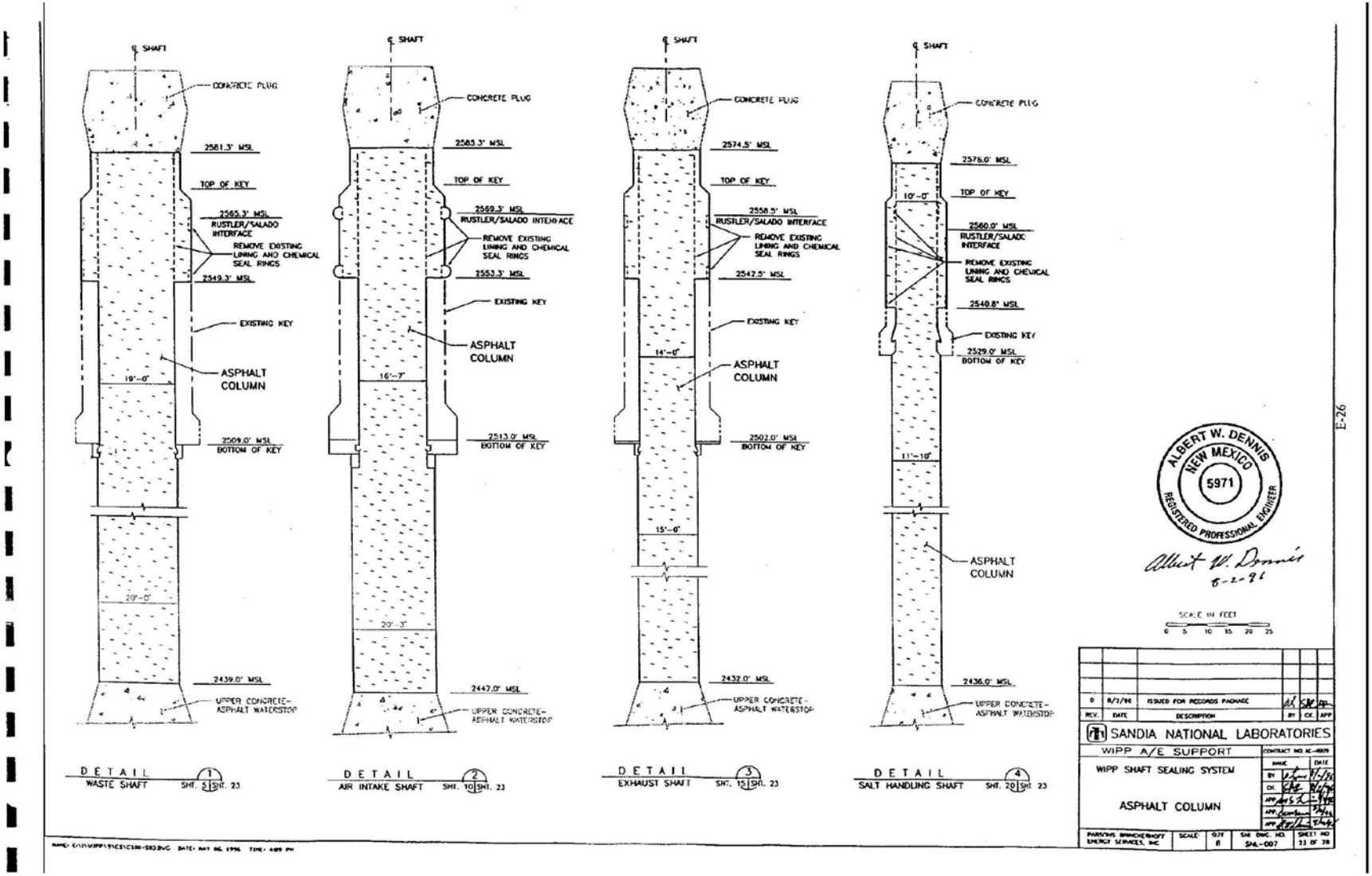
1




Concrete-Asphalt Water Stop in Salado Formation

Sheet 22 of 28

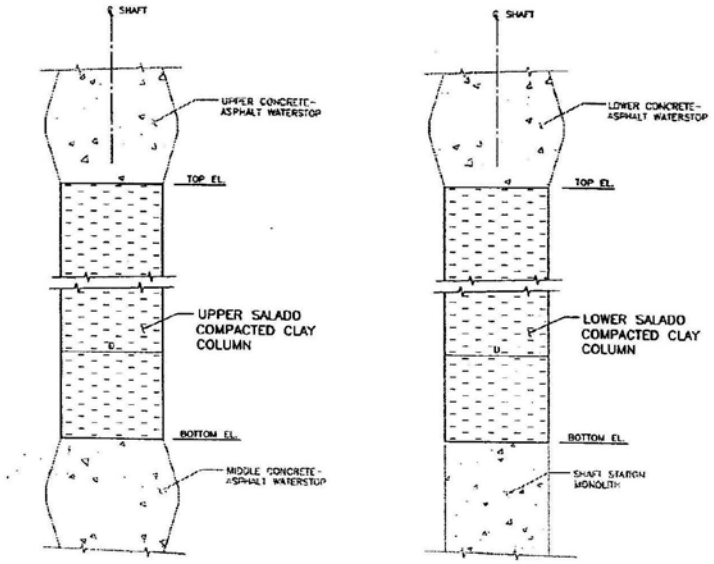
1




Asphalt Column

Sheet 23 of 28

1




DETAIL 1
SEE TABLE 1 FOR DETAILS
NO SCALE
SHT. 5 SHT. 24
SHT. 10
SHT. 15
SHT. 20

TABLE 1

| SHAFT | 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.) |
| WASTE | 20'-0" | 2389.0 | 2037.5 | 351.5 | 1382.0 | 1286.0 | 96.0 |
| AIR INTAKE | 20'-3" | 2397.0 | 2053.0 | 344.0 | 1389.5 | 1296.0 | 93.5 |
| EXHAUST | 15'-0" | 2382.0 | 2042.0 | 340.0 | 1383.0 | 1285.0 | 98.0 |
| SALT HANDLING | 11'-10" | 2386.0 | 2051.0 | 335.0 | 1391.0 | 1284.0 | 107.0 |

ALBERT W. DENNIS NEW MEXICO 5971 REGISTERED PROFESSIONAL ENGINEER
Albert W. Dennis 9-2-96

E-27

| 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
UPPER AND LOWER SALADO COMPACTED CLAY COLUMNS
PARSONS BRINCKERHOFF ENERGY SERVICES, INC. | SCALE: | SIZE B | SNL DWG. NO. SNL-007 | SHEET NO. 24 OF 28

Upper and Lower Salado Compacted Clay Columns Sheet 24 of 28

1

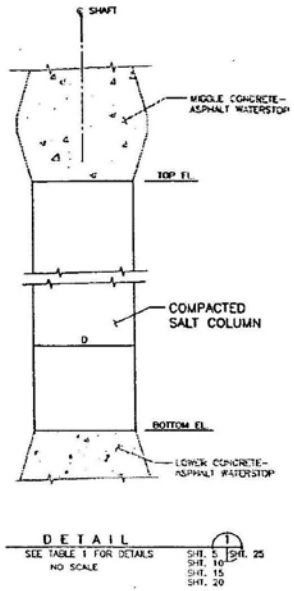



TABLE 1

| SHAFT | NOMINAL SHAFT DIAMETER D | COMPACTED SALT COLUMN | | |
|---|---|---|---|---|
| | | TOP EL. (FT. MSL) | BOTTOM EL. (FT. MSL) | TOTAL HT. (FT.) |
| WASTE | 20'-0" | 1987.5 | 1432.0 | 555.5 |
| AIR INTAKE | 20'-3" | 2003.0 | 1439.5 | 563.5 |
| EXHAUST | 15'-0" | 1992.0 | 1433.0 | 559.0 |
| SALT HANDLING | 11'-10" | 2001.0 | 1441.0 | 560.0 |

E-28

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
WIPP SHAFT SEALING SYSTEM
COMPACTED SALT COLUMN
PARSONS BRINCKERHOFF ENERGY SERVICES, INC. | SCALE: | SIZE: B | SNL DWG. NO. SNL-007 | SHEET NO. 25 OF 28

Compacted Salt Column

Sheet 25 of 28

1

WIPP Shaft Sealing System Concrete Plug

Drawing SNL 007 26 of 28 not currently available. Drawing is not displayed in the Permit.

WIPP Shaft Sealing System Plug Sheet 26 of 28

1

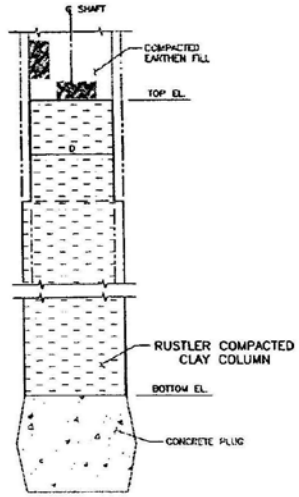



TABLE 1

| 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 |

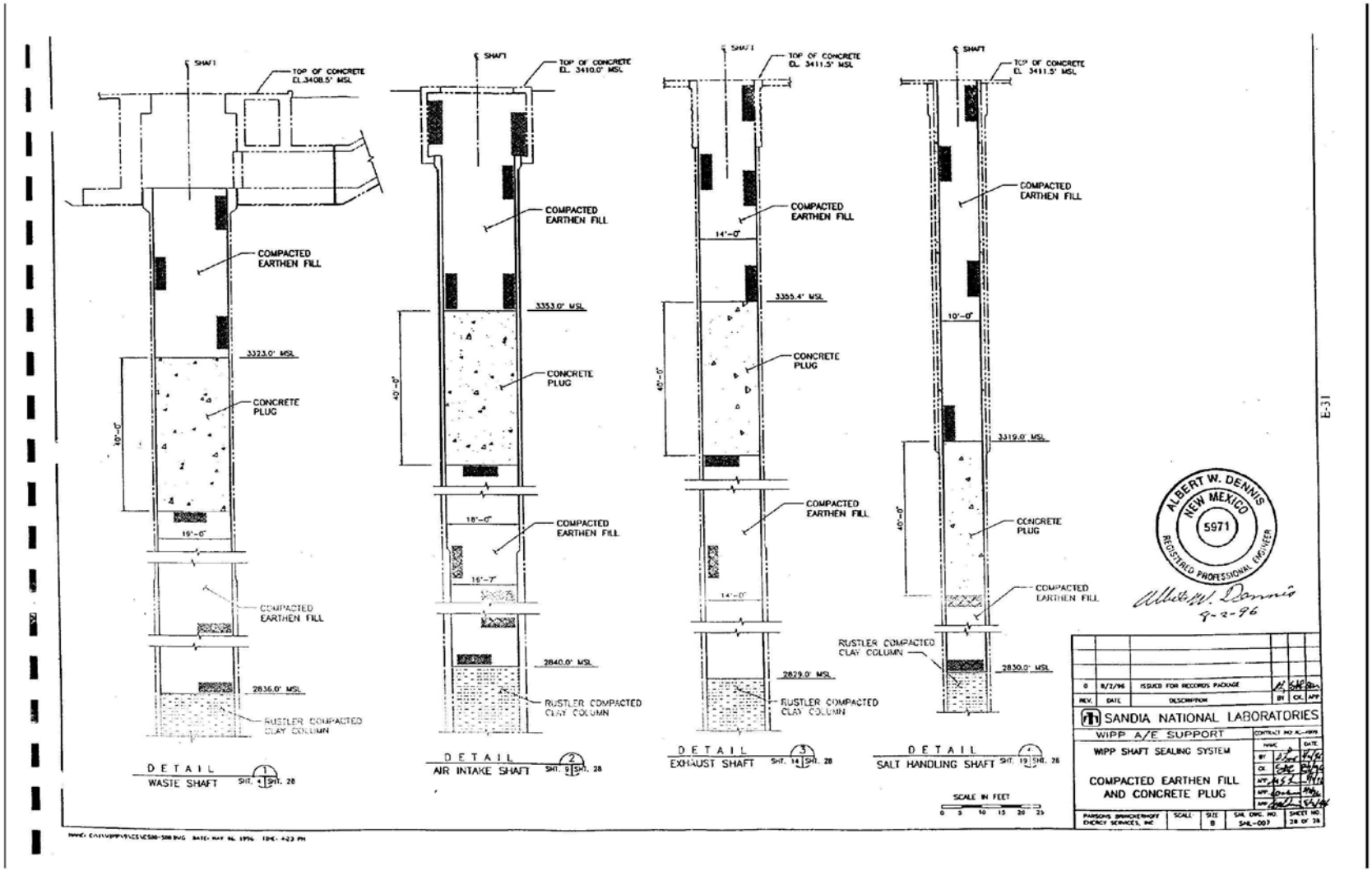
ALBERT W. DENNIS
NEW MEXICO
5971
REGISTERED PROFESSIONAL ENGINEER
Albert W. Dennis
9-2-96

E-30

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

1 Rustler Compacted Clay Cloumn Sheet 27 of 28




Compacted Earthen Fill and Concrete Plug

Sheet 28 of 28

1

# WASTE ISOLATION PILOT PLANT

# CARLSBAD, NM

# SHAFT SEALING SYSTEM DESIGN

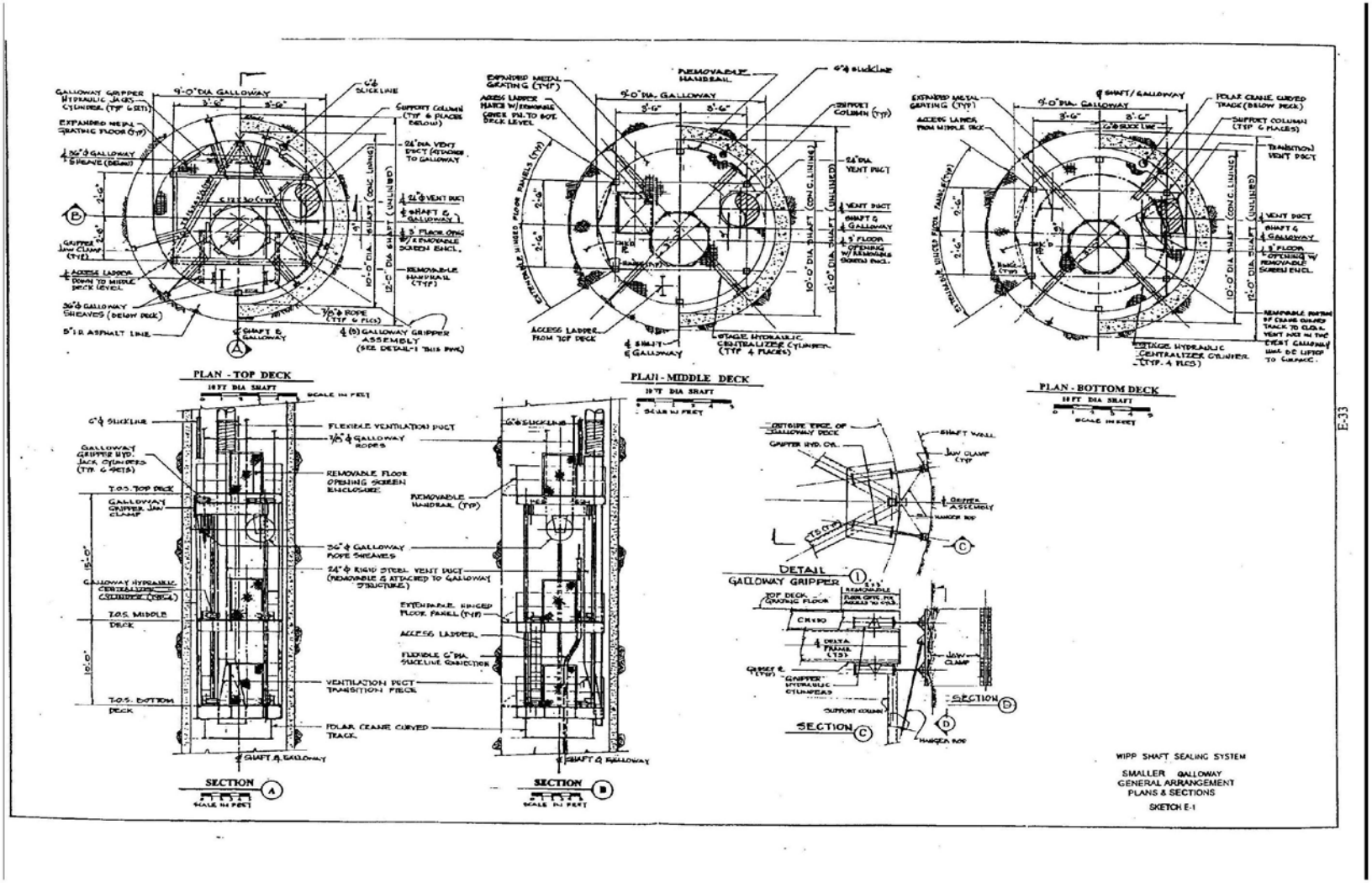
# EQUIPMENT AND CONSTRUCTION SKETCHES

E-32

| DRAWING NUMBER | TITLE |
|---|---|
| SKETCH E-1 | WIPP SHAFT SEALING SYSTEM<br>SMALLER GALLOWAY GENERAL<br>ARRANGEMENT PLANS AND SECTIONS |
| SKETCH E-2 | WIPP SHAFT SEALING SYSTEM<br>LARGER GALLOWAY GENERAL<br>ARRANGEMENT PLANS AND SECTIONS |
| SKETCH E-3 | WIPP SHAFT SEALING SYSTEM<br>TYPICAL HEADFRAME<br>PLANS AND SECTIONS |
| SKETCH E-4 | WIPP SHAFT SEALING SYSTEM<br>PERSPECTIVE HEADFRAME AND<br>ASSOCIATED SURFACE FACILITIES |

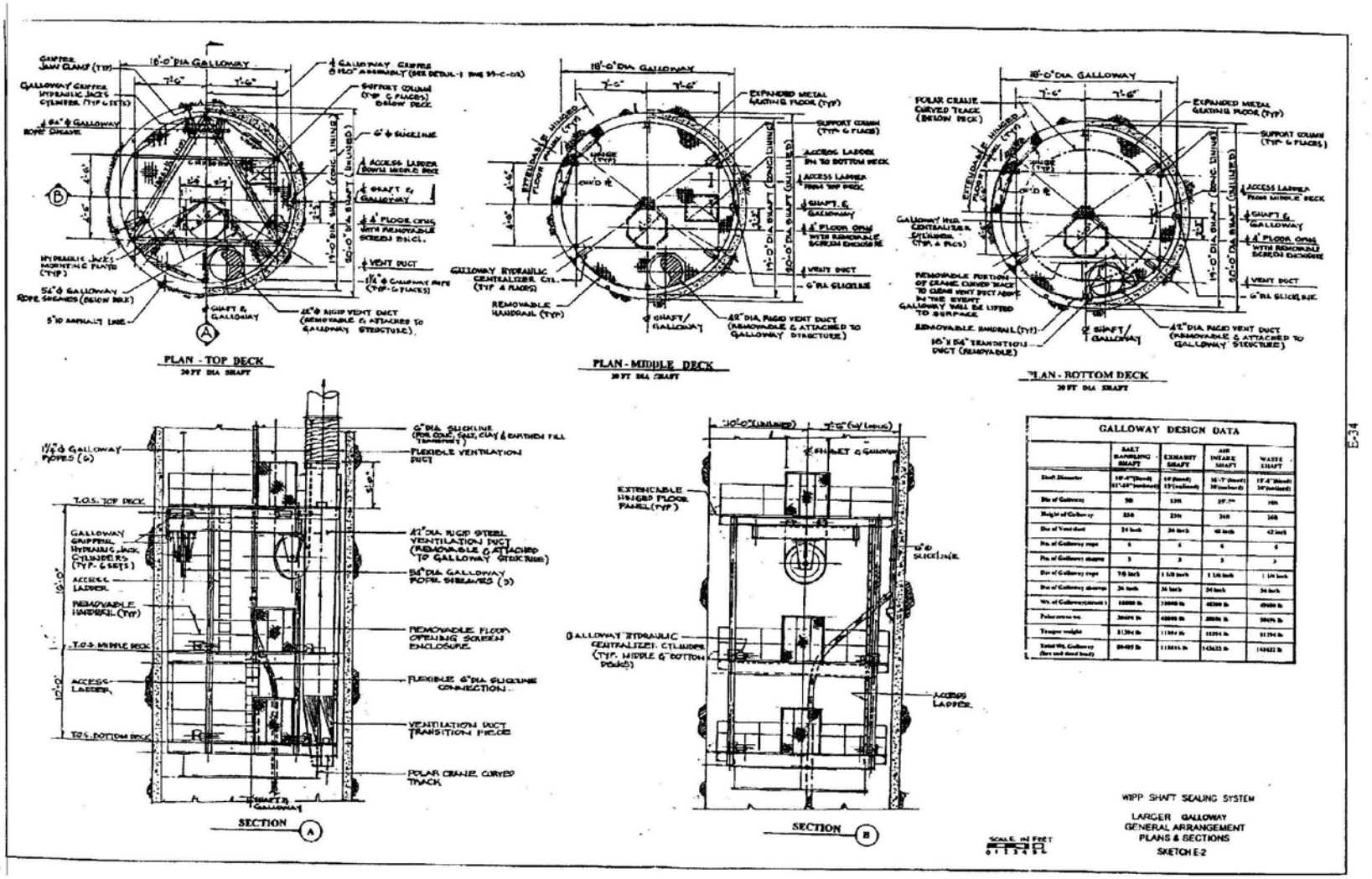
List of Sketches

1

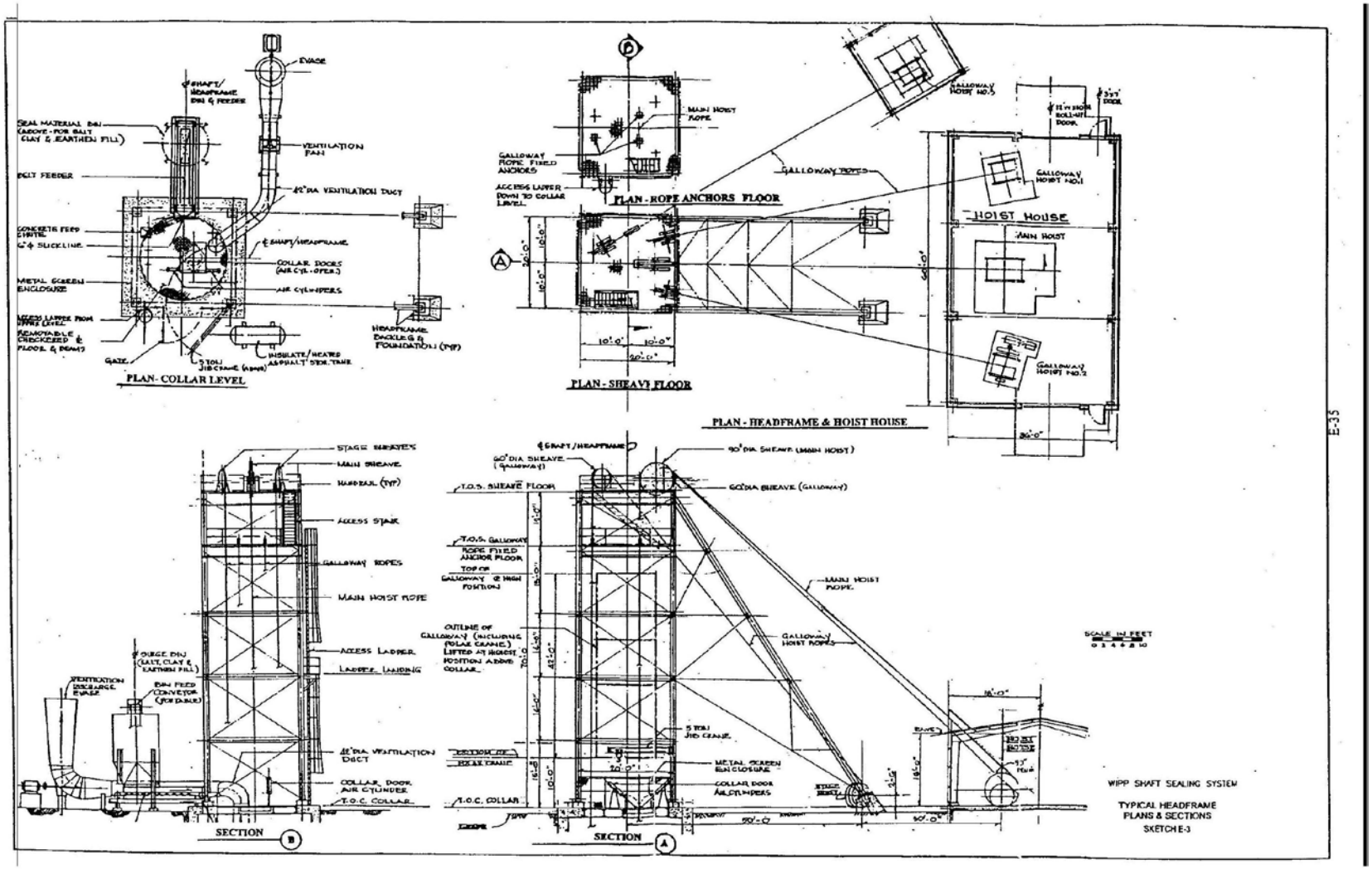



WIPP Shaft Sealing System Smaller Galloway Genral Arrangement Plans and Sections

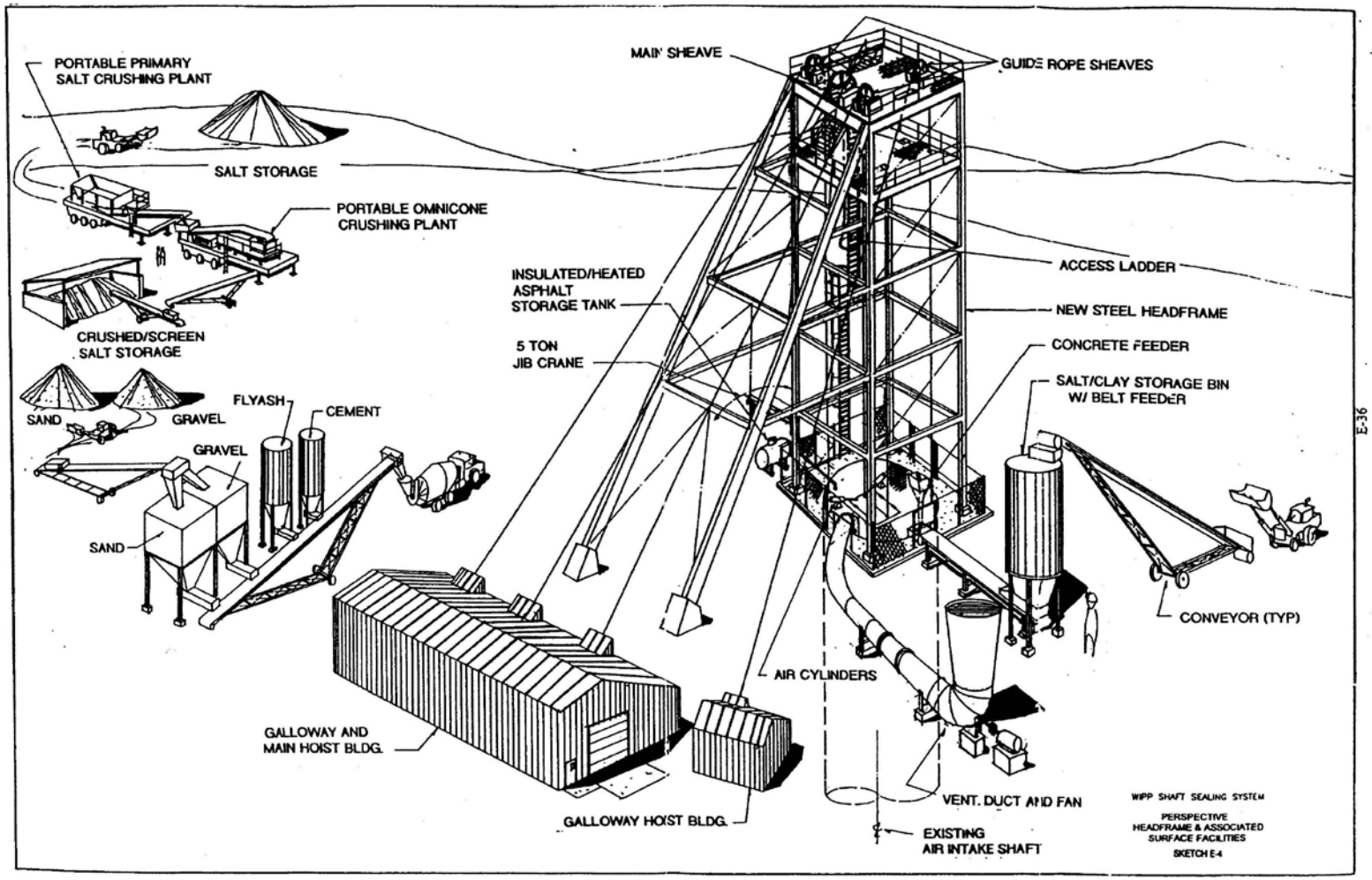
1




1 WIPP Shaft Sealing System Larger Galloway General Arrangement Plans and Sections




1 WIPP Shaft Sealing System Typical Headframe Plans and Sections




1 WIPP Shaft Sealing System Typical Headframe and Associated Surface Faclities

**WIPP**
**UC721 Distribution List**

**Federal Agencies**

US Department of Energy (4)
Office of Civilian Radioactive Waste Mgmt.
Attn: Deputy Director, RW-2
Acting Director, RW-10
Office of Human Resources & Admin.
Director, RW-30
Office of Program Mgmt. & Integ.
Director, RW-40
Office of Waste Accept., Stor., & Tran.
Forrestal Building
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NM Environment Department (3)
Secretary of the Environment
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NM Bureau of Mines & Mineral Resources
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NM Environment Department
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Environmental & Waste Technology
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