DOE/WIPP 91-005
Revision 6

Resource Conservation and Recovery Act Part B Permit Application

Volume XIII of XIII

Appendices I2 through L1

Waste Isolation Pilot Plant
Carlsbad, New Mexico

In Chapter I the Department of Energy (DOE) committed to provide the New Mexico Environment Department (NMED) with final shaft seal designs by October 1996. This final design report is attached to this application as a supplemental volume.

The report is entitled *Waste Isolation Pilot Plant Shaft Sealing System Compliance Submittal Design Report - SAND96-1326 Volumes 1 and 2.*

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APPENDIX I2
WASTE ISOLATION PILOT PLANT
SEALING SYSTEM DESIGN REPORT

DOE/WIPP-95-3117

Waste Isolation Pilot Plant Sealing System Design Report

October 1995

Waste Isolation Pilot Plant

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Certification

I certify under penalty of law that the document DOE/WIPP-95-3117 entitled "Sealing System Design Report," was prepared under my supervision for Sandia National Laboratories according to the Sandia National Laboratories Waste Isolation Pilot Plant Quality Assurance Program Description, Revision P. This quality assurance program is designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

Albert W. Dennis, P.E.
New Mexico
Certificate No. 5971
Expires December 31, 1995

ABSTRACT

This report documents the Waste Isolation Pilot Plant shaft sealing system design. The seals are designed to limit the release of radionuclides and hazardous constituents from an underground nuclear waste repository in salt. Design concepts documented in this report will form the basis for no-migration variance petition modeling. In addition, these concepts are the basis for detailed sealing system design development and evaluations that will be completed in 1996 in support of the planned Compliance Certification Application. The report describes the geologic and hydrologic setting for the seals, presents qualitative and quantitative design guidance, describes the design, documents the sealing materials and their properties, and discusses evaluations of sealing system performance. The design uses a variety of common materials that have very low permeability, demonstrated technologies for construction processes, multiple components to perform each intended function, and the entire length of the shafts to effect a seal system that will meet the performance requirements. For the permanent or long-term seal that resists both gas and brine flow, more then 500 ft of highly compacted crushed salt is used in series with more than 400 ft of clay barriers. The design retards gas flow in the short term using a combination or a rigid concrete barrier (enhanced by an asphalt waterstop) and a compacted clay barrier approximately 100 ft high. Short-term brine flow down the shaft is limited by a clay barrier within the overlying formation and by a combination of more than 500 ft of asphalt, clay, and concrete barriers within the salt.

WASTE ISOLATION PILOT PLANT
SEALING SYSTEM DESIGN REPORT

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SEALING SYSTEM DESIGN REPORT

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Introduction

Purpose of this Report

This shaft seal report documents the Waste Isolation Pilot Plant (WIPP) shaft sealing system design. Panel closure systems and borehole seal designs will be documented separately. It is intended that the design concepts documented in this report form the basis for no-migration variance petition modeling and detailed design development and evaluations that will be completed in 1996. The detailed design will be documented in a topical report and included as appropriate in the Compliance Certification Application to the Environmental Protection Agency (EPA).

Report Organization

The remainder of this report comprises 6 sections and 4 appendices. The body of the design report does not generally contain detailed backup information; this information is incorporated by reference or in the appendices. This introduction identifies the purpose of the report, explains how the report is organized, and briefly describes the design development process.

Site characteristics that provide the setting into which the seals would be placed are documented in Section 1; these characteristics include the WIPP geology and stratigraphy for both the region and the shafts along with the hydrologic setting for the seals.

Section 2 presents the design guidance used for the shaft seal program. Both qualitative and quantitative guidance are described; the quantitative guidance related to the desired effective permeability of the sealing system is described based on the more detailed discussions presented in Appendix C. Seal-related guidance from applicable regulations is briefly described. The time frame is identified for the performance of various components since some components meet short-term needs while other components are specifically intended to meet long-term (permanent) considerations.

The shaft sealing system is documented in Section 3; somewhat more detail is provided for these design concepts in the drawings provided in Appendix B. The basis for the current concepts is briefly described along with why the Air Intake Shaft (AIS) is used as the model shaft for the sealing system design discussions. For each of the elements of the design guidance identified in Section 2, the approach taken in the design and the related design uncertainties are described. Finally, design alternatives considered during the course of the development of this design are briefly discussed.

Section 4 discusses the materials used in the various seal components and explains why they are expected to function as intended. The material used to seal the shaft cross section is described along with discussions of both interface considerations between the material and the host rock and seal-related considerations in the disturbed rock near the shaft. Material properties including permeability, strength, and mechanical constitutive response are given for each material. Brief discussions of expected performance, construction techniques, longevity, and other characteristics relevant to the WIPP setting are also given.

The performance of the shaft sealing system design is evaluated in Section 5. Performance measures for the shaft sealing system are discussed along with preliminary analyses

of the sealing system. Both brine and gas flow considerations are described briefly while more details of some of the analyses are provided in Appendix D.

The sealing system discussions are concluded in Section 6 by summarizing the basis for the conclusion that an effective, implementable design concept has been presented. A section is then provided that documents principal references used in developing this design; the references provide additional information related to discussions contained in the report.

Seal Design Development Process

This report presents a conservative approach to shaft sealing system design. Shaft sealing system performance plays a crucial role in meeting regulatory radionuclide and hazardous constituents release requirements. Although all engineering materials have uncertainties in properties, a combination of available, low-permeability materials can provide an effective sealing system. To reduce system uncertainties and to provide additional assurance of compliance, additional components have been added to this sealing system. Components in this design include long columns of clay, densely compacted crushed salt, a water stop of asphaltic material sandwiched between massive low-permeability concrete plugs, and a column of asphalt. Different materials perform identical functions within the design, thereby adding confidence in system performance.

The design is based on common materials and construction technologies available today. In choosing materials, emphasis was given to permeability characteristics and mechanical properties of seal materials. However, the system is also chemically and physically compatible with the host formations, enhancing long-term performance. Advancements on several fronts have demonstrated that the specified materials can be engineered to create a very low permeability seal while enabling healing of disturbed rock zones (DRZs) within the host Salado Formation. Dense, compacted seal components and rigid concrete components are particularly effective in rapidly enhancing healing of the DRZ in the Salado Formation.

Recent laboratory experiments, construction demonstrations, and field test results have added to the broad and credible database and have supported advances in modeling capability. Results from a series of multi-year, in situ, small-scale seal performance tests show that bentonite and concrete seals maintain very low permeabilities and show no evidence of deterioration in the WIPP environment. A large-scale dynamic compaction demonstration established that crushed salt can be successfully compacted. Laboratory tests show that compacted crushed salt consolidates through creep closure of the shaft from initial conditions achieved in dynamic compaction to a dense salt mass with nearly the same permeability as in situ salt. These technological advancements now allow more credible analysis of the shaft sealing system.

The design was developed through an interactive process involving a design team consisting of technical specialists in the design and construction of underground facilities, materials behavior, rock mechanics analysis, and fluid flow analysis. The design team included specialists drawn from the staff of Sandia National Laboratories, Parsons Brinckerhoff Quade and Douglas, Inc., RE/SPEC Inc., and INTERA Inc. The three contractors were managed by Sandia National Laboratories through a single point of contact. The contractors were required to develop a quality assurance program consistent with the Sandia National Laboratories Quality Assurance Program Description, Revision P and Quality Assurance Procedure 19-1, Computer Software Requirements. All three contractor received quality assurance support visits and were

audited through the Sandia National Laboratories audit and assessment program. Quality assurance documentation is maintained in the Sandia National Laboratories WIPP Central Files. In addition to the contractor support, technical input was obtained from consultants in various technical specialty areas.

Technical, management, and QA reviews have been performed on this report under the auspices of the DOE Carlsbad Area Office Management Procedures for Document Review (MP4.2, Rev. 0). Staff from DOE (compliance; operational and experimental program), Westinghouse Waste Isolation Division, the WIPP Technical Assistance Contractor, and Sandia National Laboratories conducted this review. Documentation is in the WIPP Central File.

NOTE

Both English and Standard International (SI) units are used in this report. The construction industry uses English units during preliminary considerations and design, whereas the scientific community uses SI. In general the engineering information is retained in English units consistent with available drawings for WIPP shafts, and SI units are used in the text where the conversion makes sense. Laboratory and field measurements of density, permeability, water content, and discussion of technical results are all in SI units.

1.0 Site Geologic and Hydrologic Setting

1.1 Regional WIPP Geology and Stratigraphy

Geologically, the WIPP is located in the Delaware Basin, which began forming approximately 300 million years ago. Rapid subsidence in the early Permian Period resulted in deposition of a sequence of deep-water sandstones, shales, and limestones rimmed by shallow-water limestone reefs. Subsidence slowed during the late Permian Period. Evaporite deposits of the Salado Formation (which hosts the WIPP underground workings) filled the basin and extended over the reef margins. The evaporites, carbonates, and clastic rocks of the Rustler Formation and the Dewey Lake Red Beds were deposited above the Salado Formation near the end of the Permian Period. The Santa Rosa and Gatuña Formations were deposited after the close of the Permian Period.

From the surface downward, the stratigraphic units in the WIPP vicinity above the repository are the Quaternary surface sand sediments, Gatuña Formation, Santa Rosa Formation, Dewey Lake Red Beds, the Rustler Formation, and the Salado Formation. Detailed stratigraphic information on these formations is provided in Holt and Powers (1990). The stratigraphic profile for the Air Intake Shaft (AIS) from the surface to the repository horizon is illustrated in Figures 1-1 and 1-2. The principal stratigraphic units, the Dewey Lake Red Beds, the Rustler Formation and the Salado Formation comprise all but the upper 56 ft (17m) of the geologic section above the WIPP facility.

The Dewey Lake Red Beds, which extend from a mean sea level (MSL) elevation of approximately 3353 ft MSL to 2879 ft MSL, a distance of 474 ft (144 m), consist of alternating layers of reddish-brown, fine-grained sandstone and siltstone cemented with calcite and gypsum (Vine, 1963). The Rustler Formation lies below the Dewey Lake Red Beds and extends from approximately 2879 ft MSL to about 2569 ft MSL, a distance of 310 ft (94 m). This formation, the youngest of the Late Permian evaporite sequence, includes units that provide potential pathways for radionuclide migration from the WIPP. Five units of the Rustler have been described (from youngest to oldest): (1) the Forty-niner Member, (2) the Magenta Dolomite Member, (3) the Tamarisk Member, (4) the Culebra Dolomite member, and (5) an unnamed lower member.

The 250-million-year-old Salado Formation lies below the Rustler Formation. It is about 2000 ft (600 m) thick and consists of three informal members (from youngest to oldest): (1) an upper member (unnamed) composed of reddish-orange to brown halite interbedded with polyhalite, anhydrite, and sandstone, (2) a middle member (the McNutt Potash Zone) composed of reddish-orange and brown halite with deposits of sylvite and langbeinite; and (3) a lower member (unnamed) composed of mostly halite with lesser amounts of anhydrite, polyhalite, and glauberite, with some layers of fine clastic material. These lithologic layers are nearly horizontal at the WIPP, with a regional dip of less than one degree. The WIPP repository is located in the unnamed lower member of the Salado Formation. The facility station level varies between the shafts; however, it is located between 1306 and 1316 feet (398 and 401 m) below the top of the Salado Formation.

1.2 Local WIPP Stratigraphy and Groundwater / Brine Occurrence

To establish the geologic framework required for the design of the WIPP facility shaft sealing system, an evaluation was performed to assess the geologic conditions existing in and between the shafts, where the individual shaft sealing systems will eventually be emplaced. The study evaluated shaft stratigraphy, regional groundwater occurrence, brine occurrence in the exposed Salado Formation section, and the consistency between data recorded on shaft as-built drawings and the actual field data. The following sections discuss shaft stratigraphy, regional groundwater occurrence, and brine occurrence in the exposed Salado Formation section. The complete report of the stratigraphic evaluation results is included in Appendix A.

1.2.1 Shaft Stratigraphy

Four shafts connect the WIPP underground workings to the surface. These shafts are currently identified as the

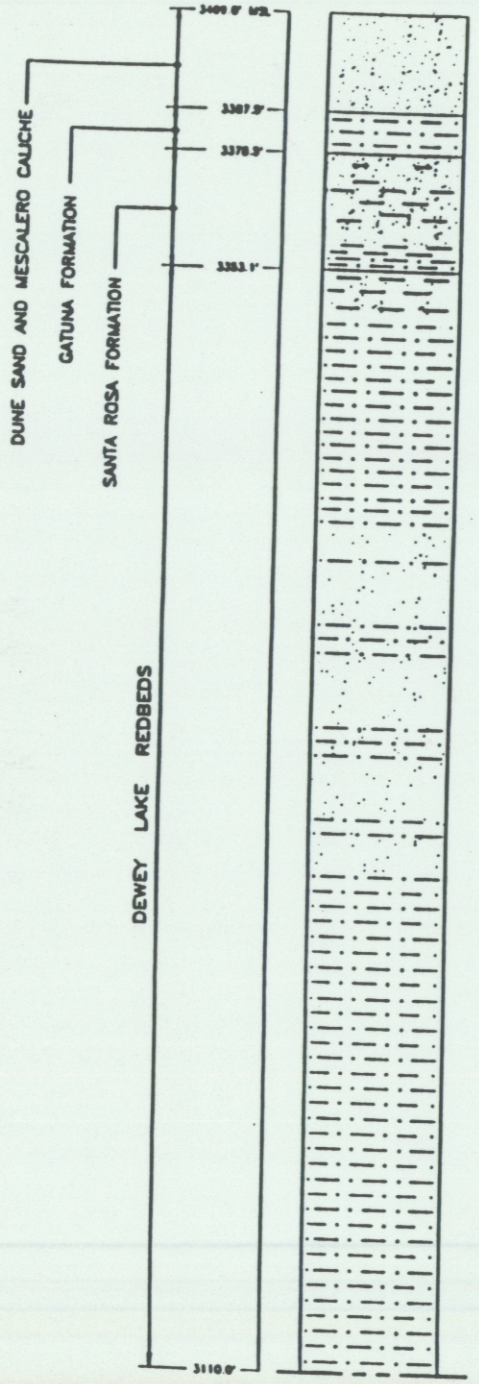
- Air Intake Shaft (AIS),
- Exhaust Shaft,
- Salt Handling Shaft (formerly referred to as the Exploratory Shaft or the Construction and Salt Handling Shaft), and
- Waste Shaft (formerly referred to as the Ventilation Shaft).

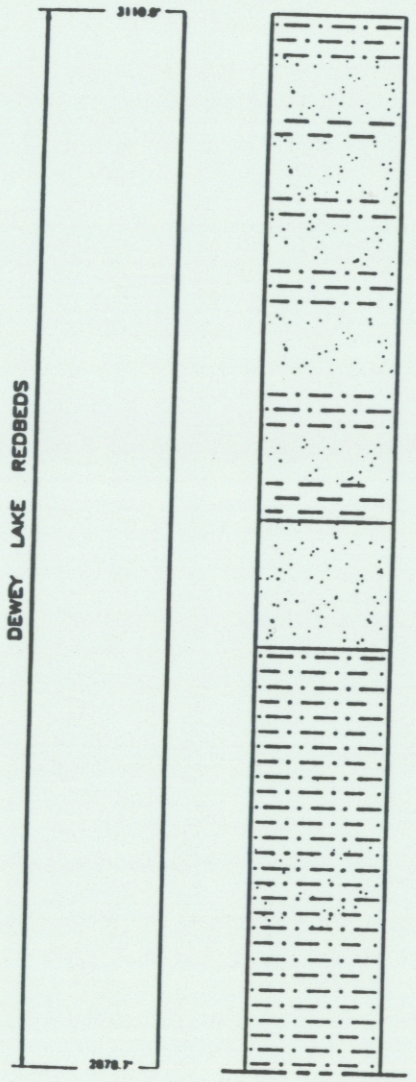
Stratigraphic correlation and evaluation of the unit contacts present in the four shafts indicates that the lithologic units mapped within each shaft during the geologic mapping of the shafts typically have vertical consistency and horizontal continuity, which is demonstrated by the occurrence of lithologic units at approximately the same level in all four shaft locations. Some stratigraphic contact elevations vary because of regional structure and the stratigraphic thinning and thickening of units. However, the majority of the stratigraphic contacts used to date are suitable for engineering design reference because they intersect all four shafts. This stratigraphic consistency is beneficial because it will allow the shaft sealing system to be designed based on the AIS and then applied to the other three shafts with minor adjustments for stratigraphic variations. The ten stratigraphic contacts unsuitable for design reference, because they are not present in all four shafts, are listed in Table 1-1.

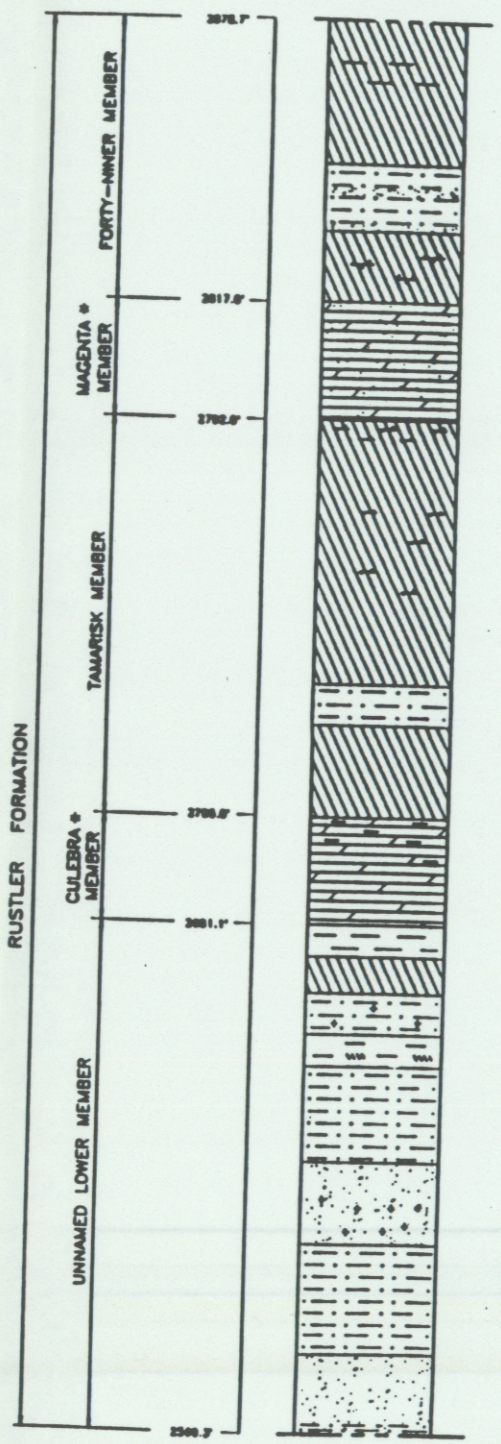
Table 1-1. Stratigraphic Contacts Unsuitable for Engineering Design Reference

Stratigraphic Contact	Comment
Mescalero Caliche	Not mapped in air intake and waste shafts.
Gatuña Formation	Not mapped in waste shaft.
Dewey Lake Red Beds	Erosional contact - highly irregular upper surface.
Marker Bed 100	Not present in all four shafts.
Marker Bed 119	Not present in all four shafts.
Marker Bed 120	Not present in all four shafts.
Marker Bed 125	Not present in all four shafts.
Marker Bed 133	Not present in all four shafts.
Marker Bed 137	Not present in all four shafts.
Anhydrite "b"	Not present in all four shafts.
Marker Bed 139	Not present in all four shafts.

STRATIGRAPHY
(SEE NOTE 1)







SCALE IN FEET
0 10 20 30 40 50

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

NOTE:

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 "LETTER REPORT ON THE RESULTS OF THE WASTE ISOLATION PILOT PLANT SHAFT STRATIGRAPHY CORRELATION PROJECT", 1994.

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.

ABBREVIATION:

ANH.	ANHYDRITE
COL.	COLUMN
CONC.	CONCRETE
D	DIAMETER
DET.	DETAIL
DOE	DEPARTMENT OF ENERGY
DWG.	DRAWING
EL.	ELEVATION
EXIST.	EXISTING
MSL	MEAN SEA LEVEL
TYP.	TYPICAL
VACA TR.	VACA TRISTE
WHO	WESTINGHOUSE WASTE ISOLATION DIVISION
WIPP	WASTE ISOLATION PILOT PLANT

REV.	DATE	DESCRIPTION	BY	CK.	APP

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT — CONTRACT NO: AC-4000

WIPP SHAFT SEALING SYSTEM
NEAR-SURFACE/RUSTLER FORMATIONS

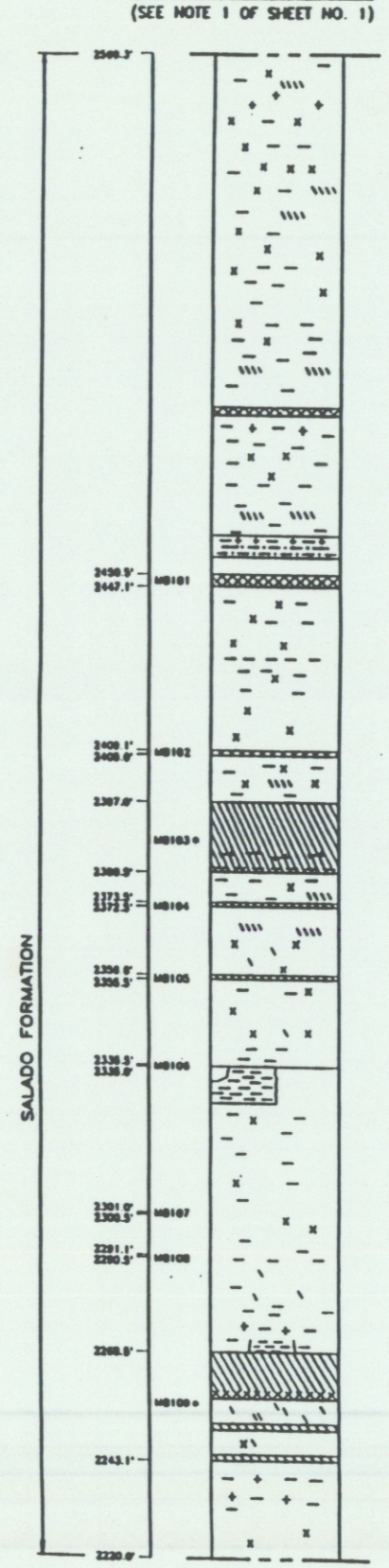
AIR INTAKE SHAFT
STRATIGRAPHIC PROFILE

	NAME	DATE
BY	W Thal	9-6-94
CK.	J Tyler	9/6/94
APP.	Paul Davies	9/6/94
APP.	Roger Nelson	9/6/94
APP.	[illegible]	9/6/94

PARSON'S BRINCKERHOFF ENERGY SERVICES, INC | SCALE: | SIZE B | SNL DWG. NO. 33-SNL-003 | SHEET NO 1 OF 2

STRATIGRAPHY

(SEE NOTE 1 OF SHEET NO. 1)



LITHOLOGY:

PRIMARY ROCK/SEDIMENT TYPES

- MUDSTONE/CLAYSTONE
- CLAYSTONE BED
- SILTSTONE
- SANDSTONE
- ANHYDRITE/GYPSUM
- DOLOMITE
- HALITE
- POLYHALITE

SECONDARY CONSTITUENTS

- ARGILLACEOUS
- SILTY
- SANDY
- SULFATIC
- DOLOMITIC
- CALCAREOUS
- HALITIC
- POLYHALITIC
- LANGBEINITE

SCALE IN FEET

0 10 20 30 40 50

REV.	DATE	DESCRIPTION	BY	CK.	APP

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT — CONTRACT NO: AO-4000

WIPP SHAFT SEALING SYSTEM
SALADO FORMATION

AIR INTAKE SHAFT
STRATIGRAPHIC PROFILE

	NAME	DATE
BY		
CK.		
APP.		
APP.		
APP.		

PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO. 33-SNL-003	SHEET NO. 2 OF 2

Figure 1-2.

Figures 1-3 and 1-4 are structural cross sections based on MSL elevations that illustrate the typical consistency of stratigraphic unit contacts both vertically and horizontally among the four shafts. With the exception of the 11 lithologic units listed above in Table 1-1, all of the unit contacts and marker beds shown in Figures 1-3 and 1-4 are suitable for reference for the shaft sealing system design. It should be noted that there is a 440-ft (122-m) north-south offset between the Salt Handling Shaft and the Waste Shaft, as indicated on the figure legends.

1.2.2 Regional and Local Groundwater Occurrence in the Rustler Formation and Shallower Units

Geohydrological surveys of the WIPP site have identified six regional intervals of groundwater occurrence (Beauheim and Holt, 1990). These intervals are listed in Table 1-2.

Table 1-2. Regional Intervals of Groundwater Occurrence

Stratigraphic Unit	Remarks
Rustler Formation	
Forty-niner Member	Aquitard; water producing unit is a claystone interbedded with anhydrite and or gypsum units.
Magenta Dolomite Member	Regional aquifer; consists of fine grained gypsiferous arenaceous dolomite.
Tamarisk Member	Aquitard; consists of claystone sandwiched between two anhydrites.
Culebra Dolomite Member	Regional aquifer; consists of a finely crystalline, locally argillaceous and arenaceous, vuggy dolomite.
Unnamed Lower Member	Aquitard; consists of interbedded siltstone, sandstone, halite, and anhydrite. Regionally has two water producing units; however only one is present at the WIPP site. It is characterized by low permeability.
Rustler/Salado Formation Contact	Groundwater seeps at formation contact; general area of "brine aquifer" at Nash Draw

The Dewey Lake Red Beds geologic unit is not a regionally productive source of water. Drilling has identified only a few localized zones of relatively high permeability (Mercer, 1983; Beauheim, 1987). In the Rustler Formation most groundwater flow occurs in the Culebra Dolomite and Magenta Dolomite members, as well as in the Rustler-Salado contact residuum or "brine aquifer" in the vicinity of Nash Draw (Beauheim and Holt, 1990). The other units (the Forty-niner Member, Tamarisk Member, and Unnamed Lower Member) are considered aquitards (a confining bed that retards but does not prevent the flow of water to or from an adjacent aquifer) because of their low permeability throughout the area. Groundwater near the WIPP usually contains large concentrations of total dissolved solids. Moisture at the Rustler-Salado contact was observed in the Salt Handling Shaft but not the other three shafts. The only discussion of seepage rates in the references used for the stratigraphic evaluation was related to the Rustler Formation.

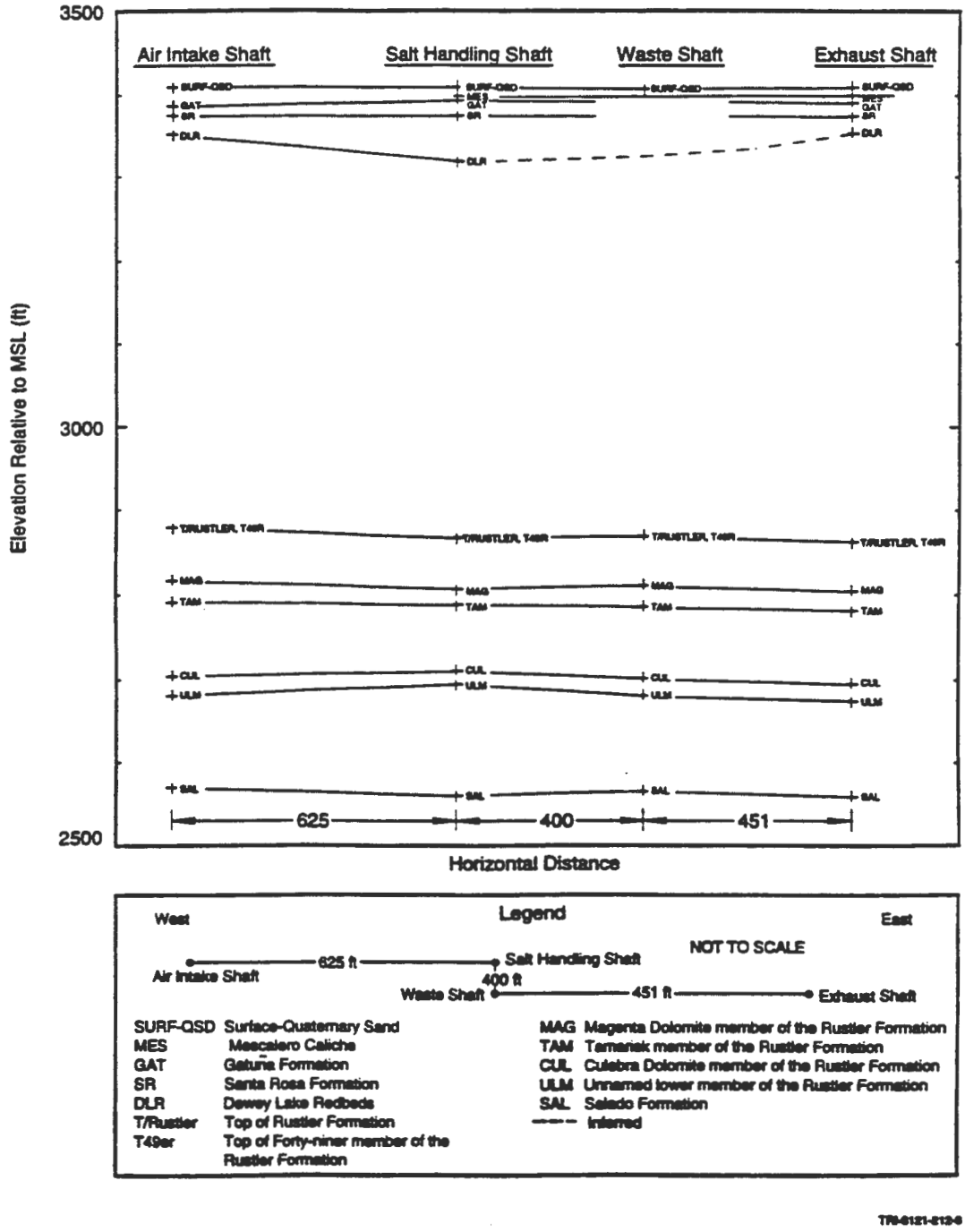


Figure 1-3. Structural cross section through excavated shafts (based on stratagraphic unit top), ground surface to top of Salado Formation.

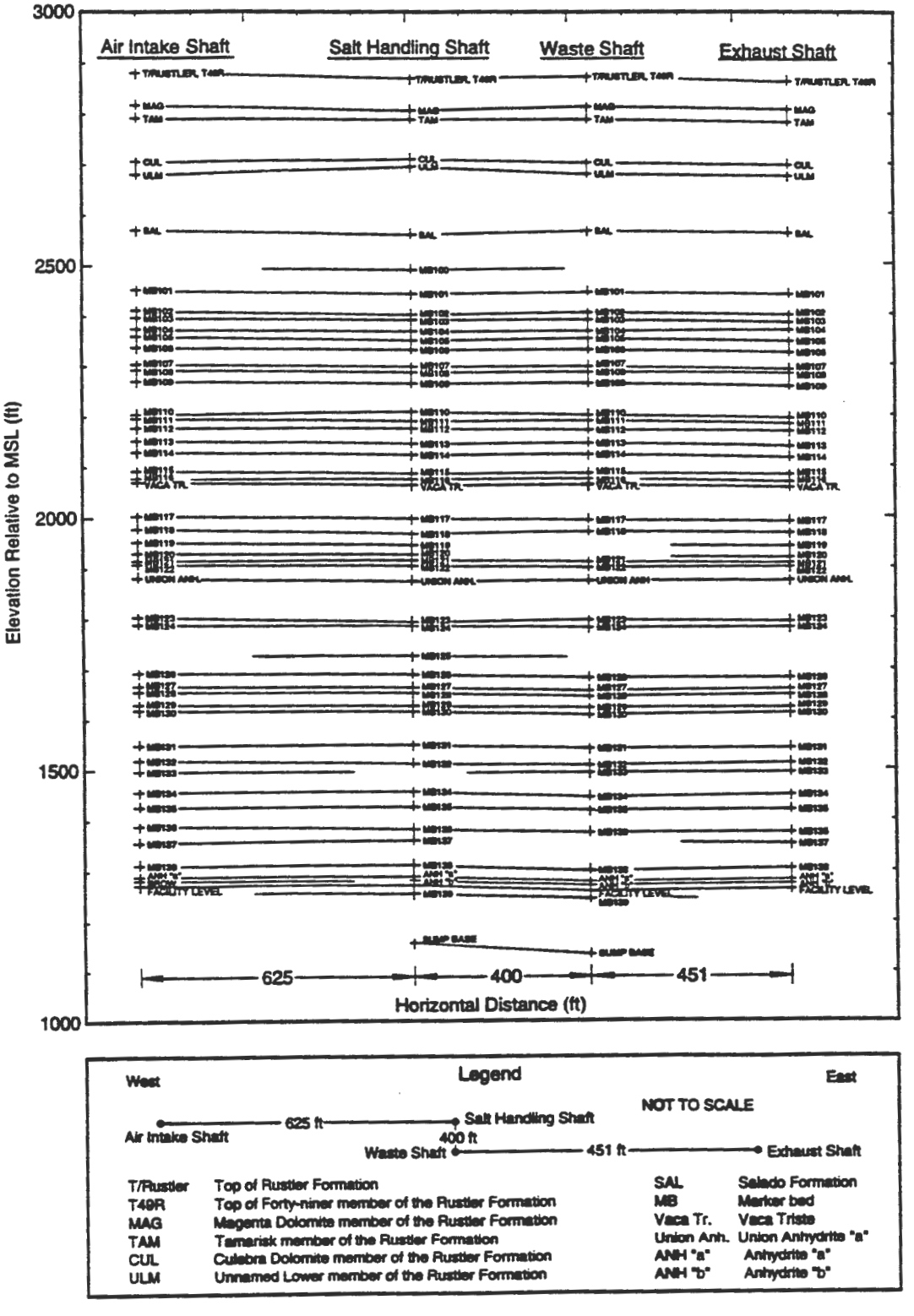


Figure 1-4. Structural cross section through excavated shafts (based on stratagraphicunit top), top of Rustler Formation to total depth.

1.2.3 Regional and Local Groundwater and Brine Occurrence in the Salado Formation

The Salado Formation has not been disturbed by post-depositional processes such as structural deformation and dissolution in the WIPP area. The formation is assumed to be brine-saturated throughout the WIPP area because of the presence of a regional hydrostatic pressure gradient (Mercer, 1983). Groundwater (brine) flow within it is extremely low because primary porosity and open fractures are lacking in the salt (Mercer, 1983) and low permeability, averaging 5.0×10^{-20} m², allows for little groundwater movement (Powers et al., 1978). Groundwater found in the Salado Formation appears in the form of seeps and weeps and is salt saturated.

The shafts were evaluated for intervals of brine seepage occurrence below the Rustler-Salado Formation contact within the exposed Salado Formation section. Of the four shafts, brine seepage in this interval was observed and noted only in the AIS during shaft mapping. However, the identified brine seepage intervals in the AIS have been projected to the other shafts—for shaft sealing system design purposes—in anticipation that these seepage intervals may be present in all four of the shafts (see Appendix A). There were no notations indicating volume quantities of brine seepage in the references used for the stratigraphic evaluation. Four of the seventeen intervals observed in the AIS (MB 103, MB 124, Vaca Triste siltstone, and Union Anhydrite) were identified during the AIS mapping as primary brine-producing intervals in the Salado Formation (Holt and Powers, 1990). Ten of the seventeen seepage intervals were not named when the shaft was mapped. These intervals have subsequently been designated as zones A through J (see Appendix A). Seepage (i.e., seeps and weeps) observed in the exposed Salado Formation AIS has not been quantified but can be contrasted with recorded water-inflow data from the Rustler Formation water bearing units, which flowed less than a total of 1.5 gallons per minute into the shaft prior to liner installation. After liner installation, the inflow rate dropped to less than 0.1 gallon per minute (Jarolimek et al., 1983). The terms *weeps* and *seeps*, which refer to low volume fluid flow, such as water oozing from the rock, are used to describe brine occurrence in the Salado Formation exposed in the AIS. The unquantified seepage in the Salado Formation is minor in comparison to the Rustler Formation flow rates after liner installation.

The identified intervals from the AIS lithologic log are presented in Table 1-3. A recent observation (July 1994) of seepage intervals within the AIS was conducted as part of the Brine Sampling and Evaluation Program (BSEP). These recent observations indicated the presence of salt encrustations in 73 locations, including the surfaces of the brine seepage intervals identified during shaft mapping; however, only the salt encrustations on the surface of Marker Bed 103 were observed to be wet (Deal et al., 1995).

Table 1-3. Observed Brine Seepage Intervals (Salado Formation) Logged during the Mapping of the Air Intake Shaft

Stratigraphic Unit/ Engineering Feature	Unit/Feature Top (ft-MSL)	Unit/Feature Bottom (ft-MSL)	Comments
Salado Formation	2569.3	Did not penetrate	Regional potential for groundwater (brine) occurrence at the Rustler/Salado Formation contact; (Holt & Powers, 1990). No groundwater at contact noted on lithologic log. Shaft did not penetrate base of unit.
Marker Bed 103	2397.0	2380.5	Brine; Weeps - moist surface in lower 4 ft; Anhydridic dolomite overlying claystone where weeps occur (Holt & Powers, 1990).
Marker Bed 109	2268.5	2243.1	Brine; Weeps: weep symbol on log with no weep description. Weeps occur in mudstone with anhydrite nodules (Holt & Powers, 1990).
Vaca Triste	2070.0	2062.0	Brine (Holt & Powers, 1990). Composed of halitic siltstone and mudstone.
Zone A	1925.0	1915.5	Brine; Some weeps, halite with a trace of polyhalite: AIS log (Holt & Powers, 1990).
Marker Bed 121	1915.5	1914.0	Brine; Weeps: AIS log. Weep symbol on log near base of unit (polyhalite) - no description. 2-3" clay at base (Holt & Powers, 1990).
Union Anhydrite	1881.0	1873.5	Brine; Unit as a whole bears fluid. Weeps parallel to strata are very common around zones with clastic halite. Weeps occur also around fractures and contacts. AIS log (Holt & Powers, 1990).
Marker Bed 124	1788.0	1779.1	Brine; Recent weeps parallel to fractures and bedding planes in anhydrite: AIS log (Holt & Powers, 1990).
Zone B	1736.5	1733.5	Brine; Abundant weeps, halite argillaceous to trace clay: AIS log (Holt & Powers, 1990).
Zone C	1709.0	1700.0	Brine; Modest amount of weeps, halite, trace clay and polyhalite: AIS log (Holt & Powers, 1990).
Zone D	1650.5	1640.0	Brine; Weeps in lower most part, interbedded polyhalite and argillaceous halite: AIS log (Holt & Powers, 1990).
Zone E	1640.0	1638.0	Brine: Weeps in pits, argillaceous halite: DOE-AIS log (Holt & Powers, 1990).
Zone F	1638.0	1635.0	Brine; Moderate weeps in unit, halite with trace polyhalite and clay: AIS log (Holt & Powers, 1990).
Zone G	1635.0	1633.0	Brine; Abundant weeps from pits, argillaceous halite and halitic claystone: AIS log (Holt & Powers, 1990).
Zone H	1633.0	1627.1	Brine; Moderate weeps, halite and polyhalite: AIS log (Holt & Powers, 1990).
Marker Bed 129	1627.1	1625.6	Brine; Abundant weeps: AIS log (Holt & Powers, 1990).
Zone I	1625.0	1619.3	Brine; Weeps, halite with polyhalite and claystone interbeds: AIS log (Holt & Powers, 1990).
Zone J	1546.9	1542.9	Brine; Abundant weeps, halite trace to some clay and polyhalite: AIS log (Holt & Powers, 1990).

2.0 Design Guidance

The WIPP is subject to numerous regulatory requirements. The use of both engineered and natural barriers to isolate wastes from the accessible environment is required by 40 CFR 191.14(d). Quantitative requirements for potential releases of radioactive and other hazardous materials from the repository system are specified in 40 CFR 191 and 40 CFR 268. The regulations do not impose quantitative requirements on individual components of the repository sealing system.

The absence of regulatory requirements at the component level allows repository designers to identify and assess the components and component parameters that have the greatest impact on potential releases from the repository. For example, a preliminary assessment of the "undisturbed performance" of the WIPP (WIPP PA Department, 1993) identified four parameters associated with the waste form, one parameter associated with the site, and the shaft sealing system permeability as *"very important"* when repository performance is compared to the regulatory requirements.

The guidance described for the design of the shaft sealing system in this section addresses the need for the WIPP to comply with system requirements noted above and to follow accepted engineering practices using demonstrated technology. The design guidance addresses the need to limit:

1. radiological or other hazardous constituents reaching the regulatory boundaries,
2. groundwater flow into and through the sealing system,
3. chemical and mechanical incompatibility,
4. structural failure of system components,
5. subsidence and accidental entry,
6. development of new construction technologies and/or materials.

Qualitative design guidance and design approach for the shaft sealing system are presented in Section 2.1. Quantitative design guidance for fluid flow is presented in Section 2.2. Qualitative as well as quantitative guidance is applicable to the design described in Section 3.0, but quantitative guidance serves as the basis for the evaluation of the sealing system presented in Section 5.0. Because the shaft sealing system depends in part on assumptions made in other parts of the repository system, the quantitative design guidance for the shaft sealing system may change as the evaluation of the total repository system performance progresses. For example, the need to retard gas flow is dependent on assumptions related to waste form, brine availability, etc.

2.1 Qualitative Design Guidance and Design Approach

Table 2-1 contains qualitative design guidance and the design approach used to implement it.

Table 2-1. Shaft Sealing System Design Guidance

Qualitative Design Guidance	Design Approach
The shaft sealing system shall limit:	The shaft sealing system shall be designed to meet the qualitative design guidance in the following ways:
1. the migration of radiological or other hazardous constituents from the repository horizon to the regulatory boundary during the 10,000-year regulatory period following closure;	1. brine migrating from the repository horizon to the Rustler Formation must pass through a low permeability sealing system;
2. groundwater flowing into and through the shaft sealing system;	2. groundwater migrating from the Rustler Formation to the repository horizon must pass through a low permeability sealing system ;
3. chemical and mechanical incompatibility of seal materials with the seal environment;	3. the sealing system materials are chemically and mechanically compatible with the seal environment or can be protected;
4. the possibility for structural failure of individual components of the sealing system;	4. structural analysis shows that each component is adequate to withstand the forces expected from rock creep and hydraulic pressure;
5. the possibility for subsidence of the ground surface in the vicinity of the shafts and accidental entry after sealing;	5. the shaft is completely filled with low porosity materials, and construction equipment would be needed to gain entry;
6. the need to develop new technologies or materials for construction of the shaft sealing system.	6. construction of the shaft sealing system is feasible using available technologies and materials.

2.2 Quantitative Design Guidance for Fluid Flow

Quantitative guidance is derived from 40 CFR 191 and 40 CFR 268. These design concerns involving fluid flow are design-specific. The shaft sealing system has been designed to control migration of radionuclides and other hazardous materials from the time of repository closure. The shaft sealing system is depicted in Figure 2-1. Control is achieved by utilizing shaft sealing system components constructed of asphalt, clay, and concrete that will be effective upon emplacement and a compacted salt component that will become effective during the 100 years following emplacement. The upper clay component and the consolidated salt component constitute long-term barriers (lasting through the 10,000-year regulatory period and beyond) to fluid flow for the sealing system. (The 100 years following repository closure are referred to as the "short term"; the 100 to 10,000-year period is referred to as the "long term.") The asphalt and concrete components provide additional assurance that the sealing system will be effective during the consolidation period for the salt component (the 100 years following closure).

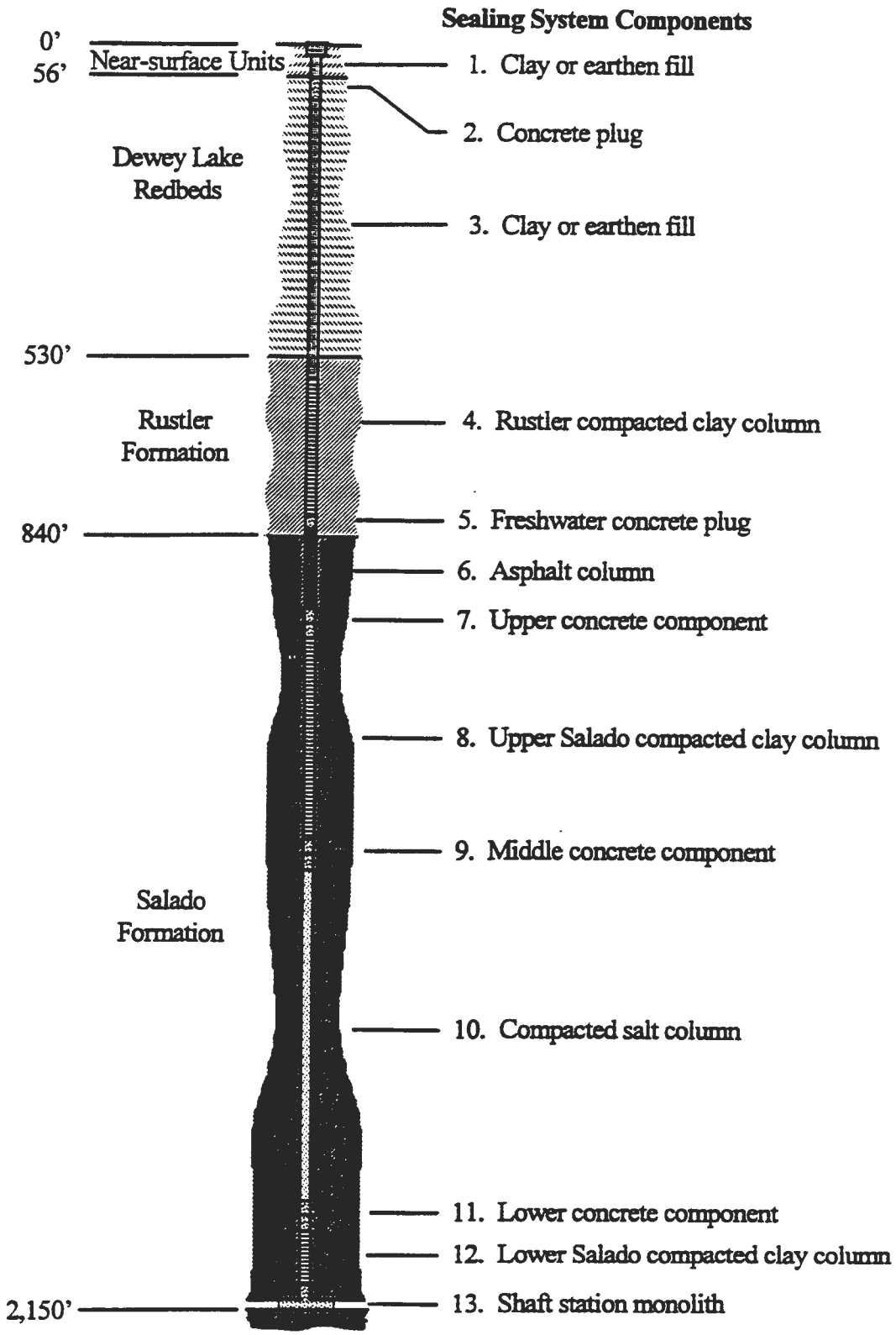


Figure 2-1. Arrangement of the Air Intake Shaft Sealing System.

Fluid flow provides the principal mechanism for radiological or other hazardous constituents to be transported from the repository to the regulatory boundaries. As a consequence, the approach taken to isolate these materials is limiting fluid flow through the sealing system.

The Rustler Subsystem consists of Components 4 and 5. It extends from the base of the Near-Surface Subsystem to within 16 ft (5 m) of the Rustler-Salado Contact, a distance of 255 ft (79 m). In both the short term and long term, this subsystem shall limit the flow of groundwater from the Rustler Formation into and through the shaft and assist in limiting accidental entry and subsidence. The Rustler compacted clay column (Component 4) shall provide short-term and long-term separation of water bearing zones in the Rustler.

The Salado Formation Subsystem is divided into two elements, hereafter referred to as the upper seal system and the lower seal system. The upper seal system consists of Components 6 through 9 and extends from the bottom of the Rustler Subsystem to the bottom of the middle concrete component, a distance of 582 ft (177 m). In the short term, the upper seal system shall limit the flow of Rustler-Salado Contact groundwater into and through the shaft. In the long term, the upper Salado clay column (Component 8) shall act as a permanent barrier to the flow of brine and gas. The lower seal system consists of Components 10, 11, and 12. It extends from the bottom of the upper seal system to the shaft station monolith (Component 13), a distance of 707 ft (215 m). The monolith is the structural component that stabilizes and limits deformation of the shaft station area. In the short term, the lower concrete component (Component 11) and the lower Salado compacted clay column (Component 12) shall retard the flow of brine and gas from the repository into the compacted salt column. The compacted salt column will consolidate during the short term and shall serve as a permanent (long-term) barrier to the flow of brine and gas. The lower Salado compacted clay column shall also act as a barrier to the flow of brine and gas during the long term.

Modeling studies have provided quantitative design guidance for limits of brine or gas flow through the total sealing system. These studies (presented in Appendix C) have shown for a shaft sealing system having the equivalent of 100 m in length:

- a permeability of 10^{-16} m^2 limits brine flow, and
- permeabilities of less than 10^{-18} m^2 reduce gas flow.

In addition, a design assumption has been made that gas generation in the waste region during the 100 years following seal construction will not result in pressure differences in excess of 2 MPa through the shaft sealing systems.

3.0 Design Description

The design presented in this section was developed to limit the release of radioactive materials and hazardous constituents to levels that are below regulatory limits. This design is based on the design guidance outlined in Section 2.0, past designs, the desire to reduce the uncertainties associated with the performance of sealing system, and the need to effectively seal the shaft wall disturbed rock zone (DRZ) at the time the sealing system is installed. Knowledge related to the ability to compact salt to high densities, which was gained from recent experimental results, has also been used in the design.

The past designs are:

- the initial reference seal system design (Nowak et al., 1990),
- the seal design alternative study (Van Sambeek et al., 1993), and
- the sealing system for a representative WIPP shaft (Hansen et al., 1995).

The sealing system design has progressed over the past five years from the initial concepts presented by Nowak (1990) to the concepts presented in this document. The design changes were implemented to take advantage of knowledge gained from small scale seals tests conducted at the WIPP, salt compaction tests and laboratory determination of the permeability of compacted salt samples conducted by Sandia National Laboratories, advances in the ability to predict the time-dependent mechanical behavior of the intact salt rock, and technical studies.

Reduction of the uncertainty associated with long-term performance is addressed by replacing the upper and lower Salado Formation salt columns used in the earlier designs with compacted clay columns and by adding an asphalt sealing component in the Salado Formation. Use of different materials for sealing system components reduces the uncertainty associated with a common-mode failure. The compacted salt column provides a seal with an initial permeability several orders of magnitude higher than the clay or asphalt columns but with long-term properties approaching those of the host rock. The use of clay also allows testing of the "as-emplaced" material to verify that the values for permeability used in design are achieved in the field. Asphalt provides an assured seal of the shaft cross section and the interface at the time of installation. Sealing of the DRZ at the time of installation is addressed by grouting in the Rustler Formation and including an asphalt waterstop in each of the concrete components in the Salado Formation. Recent experimental results (Ahrens and Hansen, 1995) established that crushed salt can be compacted to an initial density that is at or near 90 percent of the density of undisturbed salt. These materials are used in concert to reduce overall uncertainty of the seal system.

3.1 Use of the Air Intake Shaft Sealing System Design as a Representative Design for all Shaft Sealing Systems

The stratigraphy at the WIPP site is uniform from shaft to shaft. As noted in Section 1.1, a few of the marker beds are not present in all shafts, and some thinning and thickening of lithologic units exist, but typically the units have vertical consistency and horizontal continuity. Vertical consistency is demonstrated by the fact that shaft mapping shows relatively little change in the elevation of marker beds and thickness of units when all four shafts are considered, and horizontal continuity is demonstrated by the fact that the shaft mapping reports show all major geologic formations and almost all marker beds to be present at all four shaft locations. The sources for potential groundwater (Appendix A, Sect. 3) are the same for all four WIPP shafts, as is the source for gas and brine. Groundwater sources are the Culebra and Magenta Members of

the Rustler Formation, the Rustler-Salado Contact Zone, and several Marker Beds in the Salado Formation. The waste emplacement area of the repository is the source for gas and brine. The waste emplacement area is connected to the shafts by the access drifts, marker beds, and the DRZ. Because the stratigraphy is consistent and the sources for groundwaters, gas, and brine are the same; a sealing system developed for the Air Intake Shaft (AIS) can be used to seal the remaining WIPP shafts. Adjustments in the diameter of components and minor adjustments in component locations, to suit shaft-specific variations in the stratigraphy, will be required in each of the remaining shafts. The AIS was selected as the model shaft for design of the sealing system because the shaft mapping report (Holt and Powers, 1990) describes the stratigraphy in greater detail than the mapping reports for the other shafts.

The Waste Shaft and Salt Handling Shaft have sumps, while the AIS and Exhaust Shaft do not have sumps. The sumps will be backfilled at closure to provide a base for construction of the shaft sealing system. This backfill is not relied on to perform a sealing function. Therefore, the absence of a sump in the AIS does not adversely impact the design of the shaft sealing system.

3.2 Air Intake Shaft Sealing System

The general arrangement of the shaft sealing system is shown in Figures 3-1 and 3-2. A complete set of design drawings is included in Appendix B. The AIS sealing system design was developed to meet the design guidance presented in Section 2.0 of this document. This section discusses, qualitatively, how each of the elements of design guidance is addressed by the design. In Section 5.0 an evaluation of the design's ability to meet the objectives is presented. To facilitate discussion, each of the sealing system components has been assigned a unique number and a descriptive name. The component numbers and names are presented in Figure 2-1.

Each of the elements of the design guidance is addressed in this discussion. The migration of groundwater into and through the sealing system is discussed first because it offers an opportunity to introduce each of the sealing system components in order from the surface to the repository horizon. The guidance on brine reaching the accessible environment is discussed next, and the remaining guidance elements are discussed in the same order as they are listed above in Table 2-1.

3.2.1 Groundwater Migration into the Sealing System

a. **Design Guidance.** The shaft sealing system shall limit groundwater flowing into and through the shaft sealing system.

b. **Source of Groundwater.** During the mapping of the AIS, brine was observed entering the shaft from the Magenta and Culebra members of the Rustler Formation, the Rustler-Salado Formation contact zone, and 17 brine seepage intervals in the Salado Formation (Section 1.2). The region between the surface and the upper Salado Formation was mapped in the fall of 1988, and the remainder of the Salado Formation was mapped in the fall of 1989. The quantity of brine migrating into the shaft was small: the Rustler Formation water bearing zones were estimated to have an inflow rate of 1.5 gpm before the shaft lining was installed and 0.1 gpm after liner installation. Only one of the 17 brine seepage intervals in

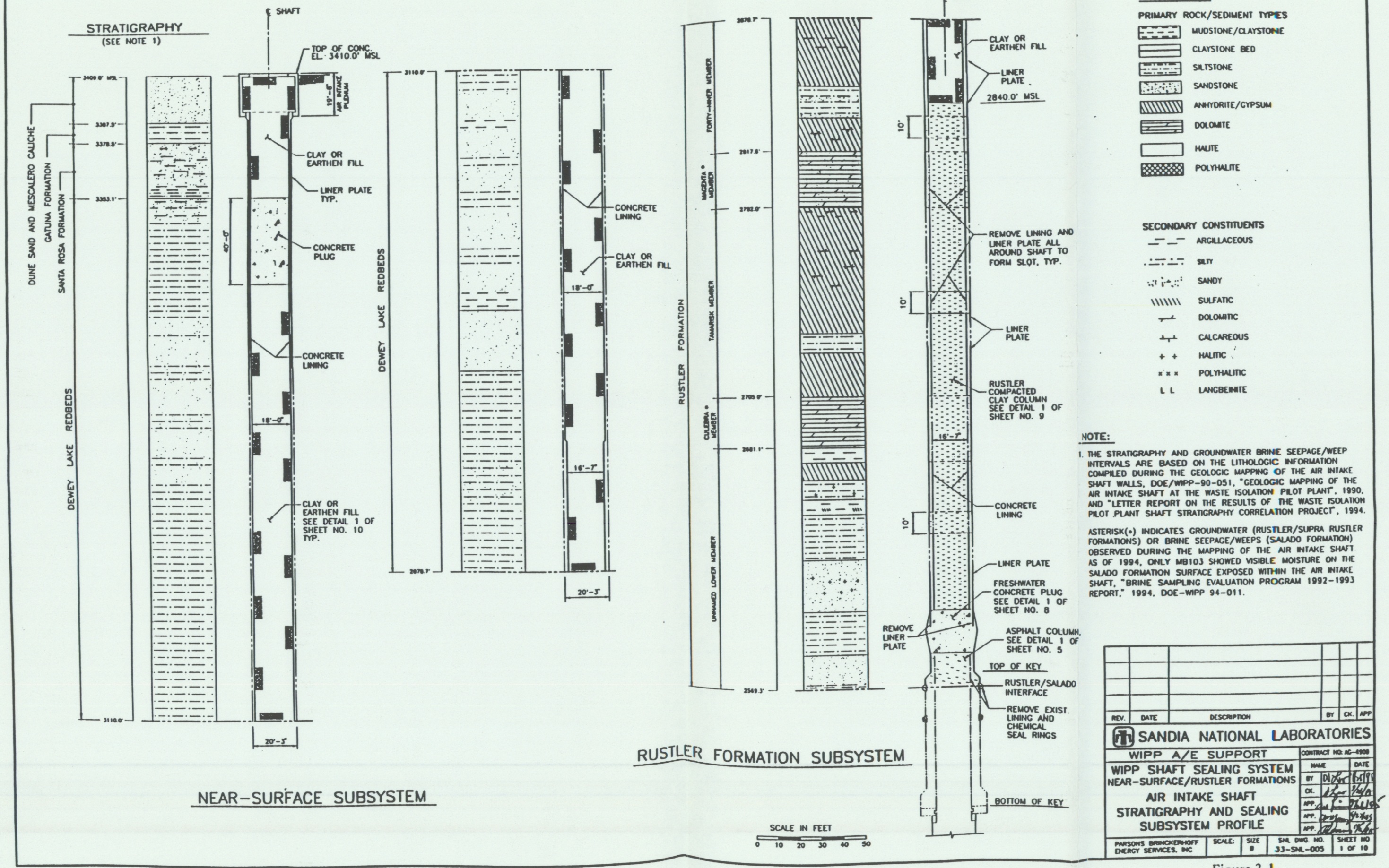

STRATIGRAPHY
(SEE NOTE 1)
DUNE SAND AND MESCALERO CALICHE
GATUNA FORMATION
SANTA ROSA FORMATION
DEWEY LAKE REDBEDS
3409.8' MSL
3387.5'
3378.5'
3353.1'
3110.0'
℄ SHAFT
TOP OF CONC. EL. 3410.0' MSL
19'-4" AIR INTAKE PLENUM
CLAY OR EARTHEN FILL
LINER PLATE TYP.
40'-0"
CONCRETE PLUG
CONCRETE LINING
18'-0"
CLAY OR EARTHEN FILL SEE DETAIL 1 OF SHEET NO. 10 TYP.
20'-3"
DEWEY LAKE REDBEDS
3110.0'
2978.7'
CONCRETE LINING
CLAY OR EARTHEN FILL
18'-0"
16'-7"
20'-3"
RUSTLER FORMATION
FORTY-NINER MEMBER
MAGENTA MEMBER
TAMARISK MEMBER
CULEBRA MEMBER
UNNAMED LOWER MEMBER
2878.7'
2817.5'
2762.0'
2705.0'
2681.1'
2549.3'
℄ SHAFT
CLAY OR EARTHEN FILL
LINER PLATE
2840.0' MSL
10'
REMOVE LINING AND LINER PLATE ALL AROUND SHAFT TO FORM SLOT, TYP.
10'
LINER PLATE
RUSTLER COMPACTED CLAY COLUMN SEE DETAIL 1 OF SHEET NO. 9
16'-7"
CONCRETE LINING
10'
LINER PLATE
FRESHWATER CONCRETE PLUG SEE DETAIL 1 OF SHEET NO. 8
REMOVE LINER PLATE
ASPHALT COLUMN, SEE DETAIL 1 OF SHEET NO. 5
TOP OF KEY
RUSTLER/SALADO INTERFACE
REMOVE EXIST. LINING AND CHEMICAL SEAL RINGS
BOTTOM OF KEY
NEAR-SURFACE SUBSYSTEM
RUSTLER FORMATION SUBSYSTEM
SCALE IN FEET
0 10 20 30 40 50
LITHOLOGY:
PRIMARY ROCK/SEDIMENT TYPES
MUDSTONE/CLAYSTONE
CLAYSTONE BED
SILTSTONE
SANDSTONE
ANHYDRITE/GYPSUM
DOLOMITE
HALITE
POLYHALITE
SECONDARY CONSTITUENTS
ARGILLACEOUS
SILTY
SANDY
SULFATIC
DOLOMITIC
CALCAREOUS
HALITIC
POLYHALITIC
LANGBEINITE
NOTE:
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 "LETTER REPORT ON THE RESULTS OF THE WASTE ISOLATION PILOT PLANT SHAFT STRATIGRAPHY CORRELATION PROJECT", 1994.
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.
REV. DATE DESCRIPTION BY CK. APP
SANDIA NATIONAL LABORATORIES
WIPP A/E SUPPORT
CONTRACT NO: AC-4908
WIPP SHAFT SEALING SYSTEM
NEAR-SURFACE/RUSTLER FORMATIONS
AIR INTAKE SHAFT
STRATIGRAPHY AND SEALING
SUBSYSTEM PROFILE
NAME DATE
BY
CK.
APP.
APP.
APP.
PARSONS BRINCKERHOFF ENERGY SERVICES, INC
SCALE:
SIZE B
SNL DWG. NO. 33-SNL-003
SHEET NO 1 OF 10

Figure 3-1.

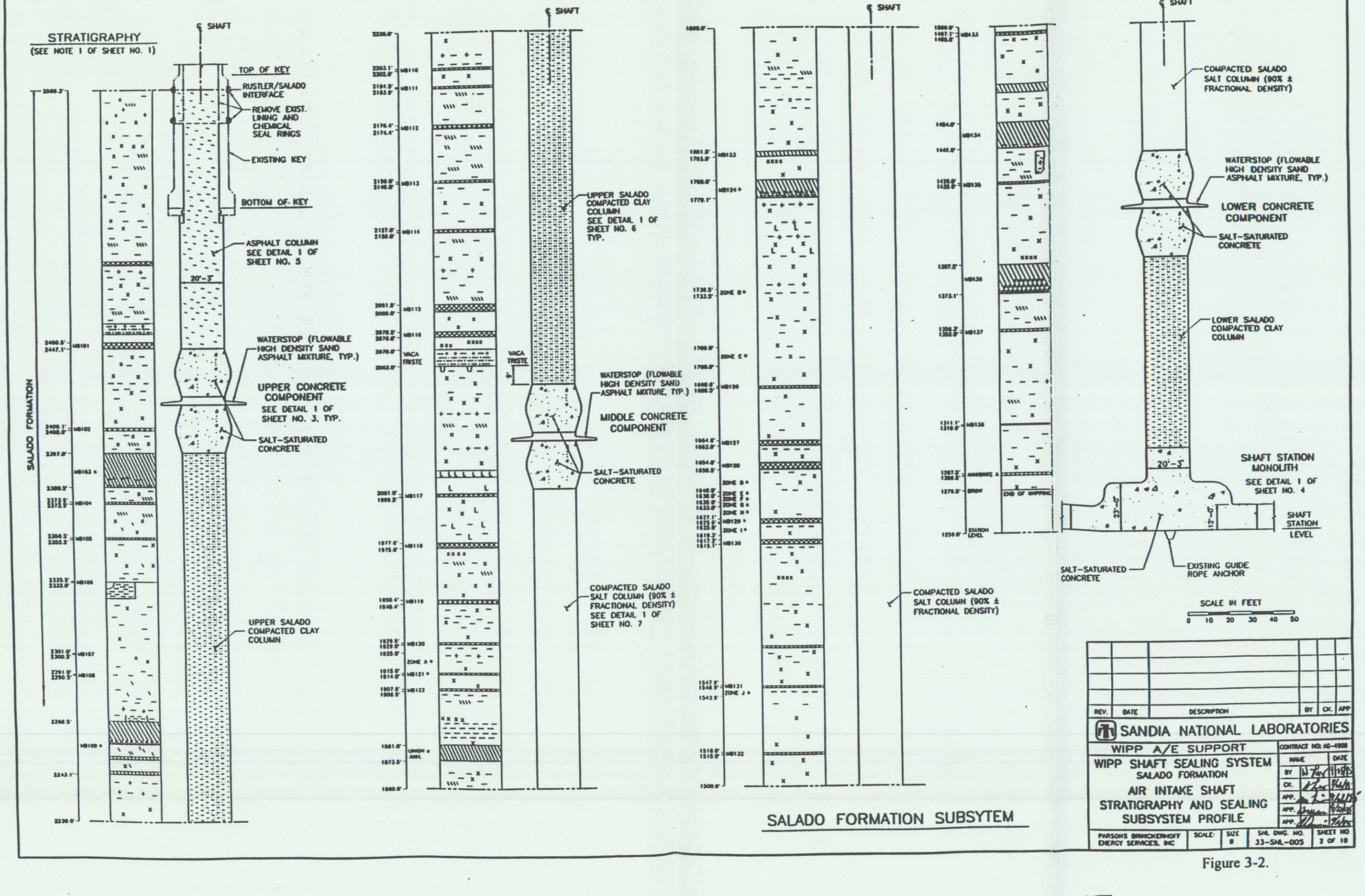

STRATIGRAPHY
(SEE NOTE 1 OF SHEET NO. 1)
SALADO FORMATION
℄ SHAFT
TOP OF KEY
RUSTLER/SALADO INTERFACE
REMOVE EXIST. LINING AND CHEMICAL SEAL RINGS
EXISTING KEY
BOTTOM OF KEY
ASPHALT COLUMN SEE DETAIL 1 OF SHEET NO. 5
20'-3"
WATERSTOP (FLOWABLE HIGH DENSITY SAND ASPHALT MIXTURE, TYP.)
UPPER CONCRETE COMPONENT
SEE DETAIL 1 OF SHEET NO. 3, TYP.
SALT-SATURATED CONCRETE
UPPER SALADO COMPACTED CLAY COLUMN
MIDDLE CONCRETE COMPONENT
UPPER SALADO COMPACTED CLAY COLUMN SEE DETAIL 1 OF SHEET NO. 6 TYP.
COMPACTED SALADO SALT COLUMN (90% ± FRACTIONAL DENSITY) SEE DETAIL 1 OF SHEET NO. 7
VACA TRISTE
COMPACTED SALADO SALT COLUMN (90% ± FRACTIONAL DENSITY)
COMPACTED SALADO SALT COLUMN (90% ± FRACTIONAL DENSITY)
LOWER CONCRETE COMPONENT
SALT-SATURATED CONCRETE
LOWER SALADO COMPACTED CLAY COLUMN
SHAFT STATION MONOLITH
SEE DETAIL 1 OF SHEET NO. 4
SHAFT STATION LEVEL
EXISTING GUIDE ROPE ANCHOR
SCALE IN FEET
0 10 20 30 40 50
SALADO FORMATION SUBSYTEM
REV. DATE DESCRIPTION BY CK. APP
SANDIA NATIONAL LABORATORIES
WIPP A/E SUPPORT
CONTRACT NO: AC-4908
WIPP SHAFT SEALING SYSTEM
SALADO FORMATION
AIR INTAKE SHAFT
STRATIGRAPHY AND SEALING
SUBSYSTEM PROFILE
NAME DATE
BY
CK.
APP.
PARSONS BRINCKERHOFF ENERGY SERVICES, INC
SCALE:
SIZE B
SNL DWG. NO. 33-SNL-005
SHEET NO. 2 OF 10

Figure 3-2.

the Salado Formation, Marker Bed 103, was found to be moist during a July 1994 inspection. Moisture was observed in the uppermost section of the Dewey Lake Red Beds. For design purposes the following assumptions were used:

- migration of brine into the shaft occurs only at the locations identified in the AIS mapping report, and
- MB 121, 124, and 129; Zones A through J; and the Union Anhydrite will not produce sufficient inflow to affect the consolidation of the compacted salt column.

c. **Potential Pathways for Groundwater Infiltration.** Three potential pathways for groundwater infiltration are addressed by the sealing system design:

1. the material sealing the shaft,
2. the interface between materials sealing the shaft and the surrounding rock, and
3. the DRZ surrounding the shaft.

d. **Design Approach.** Infiltration of groundwater is limited in the following ways:

- Rustler Brines. The shaft through the Rustler Formation will be sealed with compacted clay (Component 4 shown in Appendix B Dwg. 33-SNL-005, Sh. 9 of 10). This component is 235 ft long. The clay will be compacted using conventional methods. The existing shaft liner and shaft liner plate will be removed over the length of the Magenta and Culebra Members and over a portion of the aquitards above, between, and below these water bearing zones. Removal of the shaft liner in these regions permits the clay to seal the interface and interrupts pathways along or through the existing liner. The DRZ will be grouted in areas scheduled for liner removal before the existing liner and liner plate are removed to assure shaft wall stability. A concrete plug (Component 5 shown in Appendix B Dwg. 33-SNL-005, Sh. 8 of 10) will be installed below the compacted clay column to serve as a base for compaction of the clay. The concrete plug will be placed using standard construction methods, and the interface and DRZ will be grouted, if necessary.

  Brines passing through the compacted clay column and concrete plug will be intercepted by the sealing system located at and just below the Rustler-Salado Contact zone.

- Rustler-Salado Interface Brines. The shaft through the Rustler-Salado Contact and immediately below this contact will be filled with asphalt (Component 6 shown in Appendix B Dwg. 33-SNL-005, Sh. 5 of 10). To assure an interface seal through this zone, a portion of the existing shaft key (shown in Figure 3-2) will be removed. The asphalt column is 138 ft long. The asphalt is discussed in Section 4.5. The asphalt will provide a complete seal across the shaft and along the shaft interface. The shaft walls are unlined in the Salado Formation below the existing shaft key. Brines passing the asphalt column will be confined to the Salado DRZ.

  The shaft will be sealed by the upper concrete component (Component 7 shown in Appendix B Dwg. 33-SNL-005, Sh. 3 of 10), which will be located immediately below the asphalt column. This component is 50 ft long and will be composed of upper and lower salt-saturated concrete plugs and an asphalt waterstop located at its midpoint. This component will effect a DRZ seal through two mechanisms:

  1. Healing of the DRZ. The DRZ in the salt surrounding the concrete plugs will heal as its stress state approaches that of undisturbed salt. By resisting inward creep of the salt, the concrete plugs will help reestablish a more uniform stress field. As the deviatoric

portion of the stress tensor diminishes and the mean stress increases, damaged salt will begin to heal. The concrete plugs will promote rapid healing of the DRZ.

2. Asphalt. The asphalt waterstop (shown in Figure 3-3 and Appendix B, Drawing 33-SNL-005, Sh. 3 of 10) will effect a seal in the DRZ by interrupting the flow path through the DRZ. The waterstop consists of a tapered slot cut 10 ft beyond the existing shaft wall and filled with a flowable high density sand-asphalt mixture. The slot is 2-ft high at the shaft wall and tapers to 1-ft high at its tip. The slot will be cut using equipment similar to that used in coal mining to undercut coal seams. Upon excavation of the slot a DRZ will form around the slot. The DRZ beyond the tip of the slot will heal shortly after the slot is filled with the flowable sand-asphalt mixture and the upper element of the concrete plug is placed.

The sand-asphalt mixture will be continuous across the shaft cross section, the interface, and the slot. Thus, this component will effectively seal all brine migration pathways. The upper element of this concrete component also provides a base for the asphalt column.

Any brine passing this seal from above will encounter the upper Salado compacted clay column (Component 8) and the middle concrete component (Component 9) before it reaches the compacted salt column (Component 10).

- Marker Beds 103 and 109 and the Vaca Triste. The shaft through this region will be sealed by the upper Salado compacted clay column (Component 8 shown in Appendix B Dwg. 33-SNL-005, Sh. 6 of 10) and the middle concrete component (Component 9 shown in Appendix B Dwg. 33-SNL-005, Sh. 3 of 10). The clay column will be 344 ft long. The middle concrete component is identical to the upper concrete component (Component 7).

  MB 103 is the only unit within the Salado that is currently moist and therefore a potential source of groundwater within the Salado Formation. MB 109 and the Vaca Triste also intersect this component. These units were moist when the AIS was mapped, but did not appear moist when the shaft was inspected in 1994. The upper Salado compacted clay column will control inflow (if any) from these units. The upper Salado compacted clay column will be constructed in the same manner as the Rustler compacted clay column (Component 4). Because the shaft is not lined in the Salado, this component will seal both the shaft and the interface.

  Moisture in this location migrating downward through the DRZ will be controlled by the middle concrete component (Component 9).

- Marker Beds 121, 124, and 129; Zones A through J; and the Union Anhydrite. The shaft through this region will be sealed by the compacted salt column (Component 10 shown in Appendix B Dwg. 33-SNL-005, Sh. 7 of 10). The compacted salt column will be constructed to obtain approximately 90 percent of the density of the intact WIPP salt. The salt column will be approximately 564 ft long.

  Moisture was observed on the shaft wall at MB 121, 124, and 129; Zones A through J; and the Union Anhydrite when the shaft was mapped in 1989. Only salt encrustations were observed at these locations when the shaft was inspected in 1994. The absence of observable moisture indicates that either: (1) the moisture observed during shaft mapping resulted from limited area drainage of these units, which has ceased, or (2) the inflow is very low and evaporation prevents visible brine accumulation.

  The salt column will offer limited resistance to brine migration immediately after

emplacement, and become less permeable as creep closure further compacts the salt and induces healing. Because the shaft is not lined in the Salado, this component will seal both the shaft and the interface. The compacted salt does not provide sufficient initial stiffness to bring about early healing of the DRZ.

- Groundwaters Between the Compacted Salt Column and the Repository. No sources of groundwater were identified below Zone J in the AIS. Groundwater reaching this region must pass the lower concrete component (Component 11 shown in Appendix B Dwg. 33-SNL-005, Sh. 3 of 10) and the lower Salado clay column (Component 12 shown in Appendix B Dwg. 33-SNL-005, Sh. 6 of 10) before gaining access to the repository horizon.

  The lower concrete component is identical to the upper concrete component (Component 7). The lower concrete component provides a base for compaction of the compacted salt column.

  The lower Salado clay column is approximately 94 ft long. Because the shaft is not lined in the Salado, this component will seal both the shaft and the interface.

- Shaft Station Monolith. The shaft station monolith (Component 13 shown in Appendix B Dwg. 33-SNL-005, Sh. 4 of 10) is the bottom component of the AIS sealing system. Its function is to stabilize the shaft station area. The shaft station monolith also provides a base for compaction of the lower clay column. The shaft station monolith will completely fill the station area. The interface between the monolith and the surrounding rock will be grouted.

- Sumps. The Waste Shaft and Salt Handling Shaft have sumps that extend 126 ft. and 114 ft., respectively, below the shaft station level. The sumps will be filled prior to construction of the shaft station monoliths in these shafts. Seepage has been observed at MB 139 and MB 140 in the sumps of the Waste Shaft and Salt Handling Shaft.

e. **Design Uncertainties.** The design uncertainties fall into three categories:

1. Uncertainties associated with present conditions in the Salado Formation, for example: the current availability of groundwater for infiltration and the extent and permeability of the DRZ in the various units and marker beds penetrated by the shaft.
2. Uncertainties associated with future conditions, for example: the future availability of groundwater for infiltration and changes in the extent and permeability of the DRZ with time.
3. Uncertainties associated with the long-term properties of certain sealing materials, for example: the useful life of the concrete components and the permeability of compacted crushed salt as a function of time.

These design uncertainties are addressed in the design by:

1. using all available space in the shafts for sealing;
2. using multiple components so poor performance of a single component will not lead to system failure;
3. using different materials so poor performance of one material does not lead to system failure.

The performance of the shaft sealing system is discussed in Section 5, Evaluation of Shaft Sealing System Design.

3.2.2 Brine Reaching the Regulatory Boundaries

a. **Design Guidance.** The shaft sealing system shall limit the migration of radiological or other hazardous constituents from the repository horizon to the regulatory boundary during the 10,000-year regulatory period following closure.

b. **Source of Brine.** After brine has migrated into the repository disposal areas, they are then modeled as the source of the brine for regulatory concerns.

c. **Potential Pathways for Brine.** The pathways for brine forced upward from the repository level upward to the Culebra level (a vertical distance of approximately 1,370 ft) are the same as those for groundwater migration downward to the repository (i.e., the shaft, interface zone, and DRZ).

d. **Design Approach.** Migration of brine is limited in the following ways:

- MB 138. Brine entering the sealing system at and below MB 138 must pass through the lower clay column (Component 12). The lower clay column serves to limit migration of brine into the shaft and interface zone. The clay will be placed and compacted in a moist condition to assure good contact along the shaft walls and thus seal the interface zone. Brine migrating upward through this clay column, along the interface , and/or through the DRZ will be controlled by the lower concrete component (Component 11) during the first 100 years following closure.

- The Lower Concrete Component and Subsequent Components. The lower concrete component and the remaining components between this component and the Culebra Member will limit the upward flow of brine in the same manner that they limit the downward flow of groundwater.

e. **Design Uncertainties.** In addition to the design uncertainties identified in Section 3.3.1, uncertainties associated with the location of the entry point(s) and pressure history for brine into the sealing system have been identified.

This design uncertainty is addressed by placing sealing components with properties sufficient to resist fluid flow under WIPP conditions at and above MB 138.

3.2.3 Design Life

a. **Design Guidance.** The shaft sealing system shall limit chemical and mechanical incompatibility of sealing materials with the seal environment.

b. **Design Approach.** The design is composed of clay and salt components that will be stable throughout and beyond the 10,000-year regulatory period, asphalt components that may be stable throughout this period, and concrete components that are expected to degrade during this period. The design initially relies on the concrete, asphalt, and clay components to seal the shafts. After the first 100 years, the design relies on the clay and salt components to seal the shafts. The clay and salt shaft sealing system components are constructed of materials that are chemically compatible with the host rock and brine that may come in contact with them.

c. **Design Uncertainties.** The permeability-density relationship used to predict the permeability of the compacted salt column as a function of time is a major uncertainty associated with meeting this design guidance item. Other, lessor uncertainties are

associated with the prediction of the useful life of the concrete and asphalt components. These design uncertainties have been addressed by (1) replacing the upper and lower compacted salt columns used in previous designs with compacted clay columns and (2) restricting the design (required) life of the concrete and asphalt components to 100 years.

3.2.4 Structural Adequacy

a. **Design Guidance.** The shaft sealing system shall limit the possibility for structural failure of individual components of the sealing system.

b. **Design Approach.** The structural adequacy of the components will be demonstrated using standard approaches and techniques. Structural analysis of the upper, middle, and lower concrete components was performed. The analysis showed that these components are primarily subjected to compressive loads. The analysis of these concrete components included analysis of the surrounding salt and predicted both the initial increase in the extent of the DRZ surrounding the concrete components and waterstops, and the subsequent healing of this DRZ. These concrete components are structurally adequate. Analyses have also been performed to predict the consolidation of the compacted salt column and clay columns. These analyses show that the compacted salt column will consolidate sufficiently during the 100 years following closure to form a low permeability seal. Healing of the DRZ surrounding the lower portion of the compacted salt column and the lower clay column will also be accomplished during the 100 years following closure. Healing of the upper portion of the DRZ surrounding the compacted salt column and the upper clay column may not be completed during the 100 years following closure. A discussion of the mechanical response of the sealing system is presented in Section 5.2.2.

c. **Design Uncertainties.** The method used to address this design guidance item is the accepted approach where applicable codes and standards are not available. When uncertainties are identified by either design reviews or analyses, the design will be modified to reduce the uncertainties and to resolve issues of structural adequacy.

3.2.5 Subsidence and Accidental Entry

a. **Design Guidance.** The shaft sealing system shall limit the possibility for subsidence of the ground surface in the vicinity of the shafts and accidental entry after sealing.

b. **Design Approach.** The potential for subsidence is limited by complete filling of the shafts with low porosity materials. The potential for accidental entry is limited by installation of sealing system components whose removal would require construction activities similar to those used to sink the shaft.

c. **Design Uncertainties.** None identified.

3.2.6 Development of New Construction Technologies and/or Materials

a. **Design Guidance.** The shaft sealing system shall limit the need to develop new technologies or materials for construction of the shaft sealing system.

b. **Design Approach.** The sealing system can be constructed using currently available technologies and materials. Obviously, adapting these available technologies for use at the WIPP will require development of construction procedures specific to the WIPP shafts. Current construction practices will be employed to:

- prepare the shaft walls prior to emplacement of sealing components. For example, the shaft walls will be cleaned, scaled back to sound surfaces, and all loose materials and shaft fittings will be removed prior to emplacement of sealing components in the Salado Formation;
- grout the Rustler Formation and units above the Rustler to limit groundwater inflow and to assure shaft stability in those regions where the existing shaft liner will be removed prior to emplacing sealing materials;
- grout the interface between concrete components and surrounding rock;
- emplace asphalt and concrete and both compact clay and salt components.

c. **Design Uncertainties.** The following design uncertainty has been identified: The asphalt column may be subject to intrusion of brine from the Rustler-Salado contact zone.

When asphalt was used to seal the annulus between old leaking shaft linings and new shaft linings in Germany, the hydraulic head in the asphalt column was maintained at a higher level than the hydraulic head in the surrounding formation to prevent the displacement of asphalt by groundwater. The hydraulic head in the Rustler-Salado Interface is higher than that in the asphalt column. The higher hydraulic head in the Rustler-Salado brine may initially result in brine intrusion into the asphalt column. However, the asphalt column is completely contained and the asphalt is not free to displace either vertically or horizontally. Therefore, the asphalt in the column would quickly reach an equilibrium pressure with the brine if brine intrusion occurs.

This design uncertainty will be addressed by assessing the potential effect of brine intrusion into the asphalt column. If this uncertainty cannot be satisfactorily resolved, the design will be revised to place the top of the asphalt column below the Rustler-Salado contact zone.

3.3 Design Alternatives

During the course of the development of this design, a number of alternatives were considered. In this section a number of these design alternatives are presented and discussed. During final design, detailed analyses of the system and its components may identify the need to incorporate some of the alternatives presented below. The alternatives are presented for the components starting at the surface and proceeding downward. In each case the current component is identified and then alternatives are identified which could be used in place of the current component.

Component 1. Clay or earthen fill is used for Component 1. Alternatives considered were:

a. A concrete plug could be installed at the surface (e.g., in the AIS plenum) and the shaft could be filled below the plug. The plug design would be different for each shaft because each of the four shafts terminate differently at the surface.

b. The plenum could be dismantled and a cap could be placed over the shaft collar or a plug could be placed in the shaft collar area. For the purpose of this discussion, a cap is slab of concrete capable of supporting a specified superimposed load, and a plug is a mass of concrete that fills the shaft and whose thickness is equal to or greater than the shaft diameter. The collars of the Waste Shaft and AIS are located approximately 20 ft below the

ground surface, while the collars of the Salt Handling Shaft and Exhaust Shaft are located at the surface.

c. The clay or earthen fill could be replaced with compacted clay. This alternative would provide fill with higher density and lower permeability than that provided by clay or earthen fill.

d. The existing concrete shaft liner could be removed. (Note: This alternative applies to all components located in the lined portion of the shaft.) This alternative would eliminate any compromise of the sealing system integrity by liner condition.

Component 2. A concrete plug is used for Component 2. Alternatives considered were:

a. The existing shaft liner could be removed and the plug could be keyed into the surrounding rock. This alternative could be chosen at the time of shaft closure if the concrete shaft liner in this region is not sufficiently sound.

b. Compacted clay or earthen fill could be used instead of concrete. This alternative would be used if a concrete cap or plug is placed at or near the ground surface.

Component 3. Clay or earthen fill is used for Component 3. Alternatives considered were:

a. Compacted clay could be used instead of clay or earthen fill.

b. Asphalt could be used instead of compacted clay or earthen fill. In Germany, asphalt has been used to seal leaking shaft liners (Valk, 1989; Stoss and Braum, 1983). New steel liners were installed in the German shafts and asphalt was placed in the void between the new liners and the leaking liners. The asphalt effectively sealed the leaking liner and permitted continued use of the shaft. The hydrostatic pressure in the asphalt must exceed that of the groundwater to effectively exclude groundwater from a shaft. The specific density of the asphalt fill and the height of the asphalt column would be chosen so that the hydrostatic pressure in the asphalt is higher than that in the water bearing units of the Rustler Formation and the Rustler-Salado contact zone.

c. The existing concrete shaft liner could be removed. (See Component 1, Item d for discussion.)

Component 4. A compacted clay column is used for Component 4. Alternatives considered were:

a. Asphalt could be used instead of a compacted clay. (See Component 3, Item b for discussion.)

b. The existing concrete shaft liner could be removed. (See Component 1, Item d for discussion.)

Component 5. A freshwater concrete plug is used for Component 5. Alternatives considered were:

a. If asphalt is used for Component 4, the freshwater concrete plug would be deleted and replaced by asphalt.

b. The plug design could be modified so excavation is not required. The DRZ and interface would be grouted. The plug would develop resistance to displacement through mechanical

interlock with the surrounding rock. A longer plug may be required to assure adequate support, but there would be no need for excavation after removal of the existing shaft liner.

Component 6. An asphalt column is used for Component 6. Alternatives considered were:

a. A compacted clay column could be used instead of the asphalt column. Compacted clay would provide a shaft fill with low permeability. This low permeability material would limit migration of groundwater from the Rustler-Salado Interface into the shaft. If Component 5 were retained and a sodium bentonite clay (for example, American Colloid Co., type MX-80) was emplaced in this location the clay would be completely contained. If brine entered this region local swelling of the bentonite would occur, developing pressures that would seal the interface between the clay and the surrounding rock and force the clay into fissures in the surrounding rock (Pusch, 1982).

b. Pelletized dry bentonite could be placed in this region. The bentonite would be confined by the concrete plugs above and below the surrounding shaft wall. If brine entered this region local swelling of the bentonite would occur, sealing the region.

c. The freshwater concrete plug (Component 5) could be relocated below the existing key (a movement of approximately 80 ft downward) and the Rustler compacted clay column (Component 4) extended through the key. This would reduce the length of the asphalt column (Component 6) from 138 ft to 38 ft. An asphalt column 38 ft long would also effectively seal the shaft and interface.

Component 7. A concrete plug with an asphalt waterstop is used for Component 7. Alternatives considered were:

a. This component could be removed and replaced by either of the adjacent components. If a rigid plug is not emplaced, healing of the DRZ would take longer. The transition between the asphalt column and the clay column could be maintained by a concrete cap over the clay.

b. The plug design could be modified so excavation is not required. The plug would develop resistance to displacement through mechanical interlock with the surrounding salt rock. A longer plug may be required to assure adequate support, but there would be no need for additional excavation.

c. The waterstop could be eliminated or modified by not extending it into the surrounding salt rock. Upon installation, the asphalt provides assured sealing of the shaft cross section and interface. Sealing of the DRZ would be through creep closure and additional time would be required to achieve sealing of the DRZ.

Component 8. A compacted clay column is used for Component 8. The alternative considered was a compacted salt column.

Previous designs used a salt column in this region. The salt column was replaced by a clay column to (1) provide a medium that is less permeable during the 100 years following closure and (2) reduce the uncertainty associated with using the same material in each of the long-term seal components.

Component 9. A concrete plug with an asphalt waterstop is used for Component 9. The alternatives considered for this component are discussed under Component 7.

Component 10. A salt column is used for Component 10. Alternatives considered were:

a. This component could be replaced with a compacted clay column. Initially the compacted clay column would have a permeability lower than a compacted salt column. However, during the 100 years following closure, the salt column permeability is reduced by creep closure and by the end of the period the permeability of the salt column would be less than that of the clay column.

b. Compressed salt blocks or quarried salt blocks with salt-mortared joints could be used. The use of either of these materials would assure a salt column with a high value for its initial average density. Uncertainties exist with regard to the ability of the mortar joints to consolidate in a uniform manner.

Component 11. A concrete plug with an asphalt waterstop is used for Component 11. The alternatives considered for this component are discussed under Component 7.

Component 12. A compacted clay column is used for Component 12. The alternative for this component is discussed under Component 8.

Component 13. Shaft Station Monolith

This Component could be replaced by compacted crushed salt. Compacted crushed salt would be less rigid than the concrete and would therefore allow greater rock mass movement into the station area.

4.0 Materials

The basic design guidance for WIPP shaft seals is: prevent the shafts from becoming a pathway that compromises the repository's ability to meet performance objectives. Implicit in the fundamental design criteria is the assumption that if seal components are less permeable than the host rock, the sealing system will be adequate. This section discusses the materials used in the various seal components and explains why they are expected to function as intended. To return an open shaft to a state of low permeability, the seal design must account for three cross sectional elements:

1. the massive plug material that fills the opening,
2. the interface between the plug and the host rock, and
3. the disturbed rock around the shaft.

In this section pertinent material properties of the several seal elements are described. In general, the materials were selected for seal design elements because they are compatible with the stratigraphy, available, constructable, and have desired performance characteristics. The materials have been used widely or studied in detail to provide the basis for use within the WIPP sealing system. Material properties including permeability, strength, and mechanical constitutive response are given for each material as well as brief discussions of expected performance, construction techniques, longevity, and other characteristics relevant to the WIPP setting.

The terms "short-term" and "long-term" in this design report refer to the first 100 years after closure and from 100 to 10,000 years, respectively. The functional periods for some components such as concrete plugs, clay columns, and asphalt begin immediately upon construction. Each of these materials is expected not to degrade for very long periods; clay and asphalt are likely to be geochemically stable beyond the regulatory period of 10,000 years. Salt-saturated concrete within the Salado is likely to remain intact for hundreds of years, but guarantee of survival is more problematic. Nonetheless, design guidance for longevity of concrete, grout, and asphalt is for the first 100 years after closure. The crushed salt long-term component will become functional well within that period and will function in tandem with the clay column.

The seal materials include:

- Freshwater Portland cement concrete
- Salt-saturated concrete (Salado Mass Concrete)
- Compacted salt
- Compacted clay
- Asphalt
- Cementitious grout
- Clay or earthen fill.

Each material possesses particular favorable attributes. In the following discussion, all these materials except earthen fill, an optional material, will be examined with respect to their intended functions.

4.1 Freshwater Concrete

Concrete is perhaps the most common structural material used in the United States. For this seal design, freshwater concrete is differentiated from salt-saturated concrete. All good quality concrete possesses the highly desirable attributes of strength, ease of construction, rigidity, and a wide range of properties that can be tailored to specific functions. Concrete also has a very low permeability if it remains uncracked. These properties combine to make concrete the material of choice for hydraulic applications such as water storage tanks, water and sewer pipes, tunnel and shaft linings, massive dams, and countless other applications.

Use of concrete as a shaft seal component takes advantage of the exceptional performance of concrete in compressional states of stress. Reinforced concrete design is based on compressional volumes of concrete balanced by tensile stresses within reinforcing steel. Within the shaft setting, no tensile states of stress will exist, allowing use of unreinforced concrete. Vertical placement has the obvious advantage of no formwork and ready access during placement. In addition, concrete within the sealing system will not experience freeze-thaw cycles, which give rise to cracking in normal surface structural elements.

Freshwater concrete will be used within the non-Salado formations as a plug above the asphalt column straddling the Rustler/Salado contact (Component 5) and as a concrete plug near the top of the shaft (Component 2). These concrete plugs are designed to function as structural members possessing low permeability. Construction conditions are very favorable for a full face plug because hydration will be completed at 100% relative humidity. Preservation of water for hydration ensures a dense cementing paste. Well designed and properly cured mass concrete, as used in dams, typically will not achieve equilibrium pore pressure in its usual life (Neville, 1975), which is qualitative affirmation of extremely low permeability. The concrete elements of the seal design are expected to be structurally competent and much less permeable than the host rock.

4.2 Salt-Saturated Concrete

Salt-saturated concrete contains a sufficient amount of salt as an aggregate to saturate the water for hydration with respect to NaCl. Salt-saturated concrete will be used within the Salado Formation (Components 7, 9, 11, and 13) because freshwater concrete would dissolve part of the host rock. Dissolution would result in a poor bond or perhaps a more porous interface. Salt-saturated concrete, on the other hand, will bond tightly with the Salado host rock as it cures (Wakeley et al., 1993). Salt-saturated concrete has been used since the 1940s for completion of oil wells in salt domes and for decades in salt and potash mines. Use within these industries is quite wide but performance measures and properties of the salt-saturated concretes are not well published or documented. The salt-saturated concrete proposed for the WIPP sealing system (called Salado Mass Concrete, or SMC) is the result of several years of optimization and characterization of a preferred mix design. In addition, salt-saturated concrete has been used in experimental investigations at the WIPP. Therefore, the specification of SMC for WIPP seal components is well founded in experience and recent technical experimental results.

The Waterways Experiment Station (WES), operated by the US Army Corps of Engineers, has served the WIPP in concrete and grout development for about 20 years. Experience includes grout development and the grouting of a deep borehole in the Bell Canyon Formation (Gulick et al., 1980), a series of small-scale tests underground at the WIPP (Wakeley

et al., 1993; Finley and Tillerson, 1992) and recent optimization studies and mass concrete trial batches of SMC (Wakeley et al., 1995). In addition, the WES performed chemical degradation studies of cementitious materials including grouts, salt-saturated samples extracted from the WIPP horizon after several years in situ, and SMC. Some of the basic applicable results of these studies are given here.

Concrete permeability is an important design parameter. Studies show that the intrinsic permeability of SMC is extremely low, approaching 1×10^{-21} m^2 when 100-mm-diameter samples are tested with nitrogen and permeability decreases as a function of time. This measurement corroborates the results of the Small Scale Seal Performance Tests (SSSPTs), which used another mixture of salt-saturated concrete. The salt-saturated concrete plugs in the SSSPTs were situated horizontally in a pillar and vertically in the WIPP horizon floor. They were subjected to stress and associated deformation, including floor heave, for about 9 years between performance tests. The SSSPT permeabilities measured on 1-m concrete plugs ranged from 4×10^{-19} m^2 when initially tested in 1986 to less than 4×10^{-19} m^2 when retested in 1995. The permeabilities measured during the SSSPT are system values that include transmissivity of the concrete, the interface, and any DRZ around the seal.

A smaller database of structural material properties exists for salt-saturated concrete than for the well-documented normal freshwater concrete. However, SMC concrete is expected to perform (based on laboratory measurements) as well or better than freshwater concrete in the Salado section of the shaft seals. Strength and deformational characteristics of SMC are equivalent to a very good quality freshwater concrete, and the stress state is compression. When batched in bulk volumes, SMC has a strength around 6000 psi (40 MPa) and a modulus of elasticity of over 5×10^6 psi (35 GPa) (Wakeley et al., 1995). Volume stability was found to be excellent: -0.0002 to -0.0004 after about a year of testing at 50% relative humidity, following ASTM standard procedures. It is expected that SMC used in situ will not shrink because curing conditions will eliminate moisture loss (i.e., concrete hydration will occur at 100% relative humidity).

The constitutive model for concrete is integral to analysis of the shaft sealing system. It is expected that a rigid inclusion such as a massive plug of SMC will exert a backstress against the host salt formation. In turn, the reestablished state of stress will tightly compress the interface and close fractures and promote healing within the DRZ. For modeling purposes, SMC is assigned an isothermal creep law fit to long-term creep test data. The elastic modulus is time (age) dependent, but reaches a constant value after about a year.

Another consideration with respect to the use of concrete within the Salado Formation is the potential of degradation if the concrete is exposed to replenished supplies of caustic brines. Salt-saturated concretes have been shown to resist brine attack better than ordinary Portland cement concrete (Wakeley et al., 1994). Based on the most representative field examples to date (Wakeley et al., 1993), degradation of salt-saturated concrete exposed to natural WIPP brines for over six years was found to be insignificant. After six years in situ, the bond between the salt-saturated concrete and the host rock was excellent and the phase assemblages were unaffected by the brine. The specified SMC for seal components in the Salado Formation is also more resistant to degradation by brine than is freshwater concrete. In addition, sources of brine within the Salado are limited and exposure of massive concrete structures to brine would be limited. Degradation of cementitious materials and concrete structures in the Salado portion of the shaft seal design is most unlikely.

4.3 Compacted Salt

Reconstituted salt comprises a major seal element (Component 10) located between MSL 2002 and 1440 ft (170 m in length). The concept of using crushed salt as a seal material originated in the 1950s when the National Academy of Sciences originally proposed storage of nuclear waste material in salt formations. It was assumed that the shafts could be filled with crushed salt, which would then consolidate naturally into a nearly impermeable seal by creep of the host rock. Chemical, physical, and mechanical compatibility was intrinsically assured. Laboratory testing over the last decade has shown that pulverized salt can be compressed into very dense blocks possessing very low permeability. Demonstrations of large-scale dynamic compaction and associated laboratory testing have established construction feasibility and measured several crucial performance parameters. Recent data establish that compacted crushed salt is a viable seal material.

Crushed salt will provide a seal that will function essentially forever once it has consolidated. This is demonstrated by establishing initial conditions, a constitutive response of the crushed salt as it consolidates, and a permeability/density function for the consolidating salt. Initial characteristics of dynamically compacted salt have now been measured (Ahrens and Hansen, 1995). A full-scale demonstration successfully compacted mine-run WIPP salt to a uniform density of 90% of intact salt. Compaction was relatively simple and involved dropping a 9000-kg weight into a structural steel test chamber containing mine-run salt. The demonstration did not attempt to optimize control parameters by grinding or sizing the salt and/or by optimizing the initial moisture content. The compacted mass (40 m^3) was permeability tested using a borehole gas flow tool. The mass was determined to have an average nitrogen permeability of 9×10^{-14} m^2. This unique application of construction practices provides a baseline for predictions involving the shaft seal element comprising 170 m of compacted salt.

A significant effort has been made to establish a constitutive model for crushed salt because modeling of the sealing system is one means of evaluating performance through time. The model is used to predict performance of the salt after it is compacted in the open shaft. Initial technical evaluation of potential crushed salt constitutive models has been completed (Callahan et al., 1995). In this study, ten models with the potential to describe phenomenological and micromechanical processes of crushed salt were selected from a literature search. Three of the ten candidate models were screened for rigorous comparisons to a specially developed but somewhat limited database. The database contained hydrostatic consolidation tests, shear consolidation tests, and a combination of shear and hydrostatic tests. Based on the fitting statistics and the ability of the models to predict the test data, a model proposed by Spiers and coworkers (Spiers and Brzesowsky, 1993; Spiers and Schutjens, 1990; Spiers et al., 1989) was judged superior to other candidate models. The constitutive model work is fundamental to performance calculations of a crushed salt seal.

The constitutive model for consolidating crushed salt will be used in future calculations as part of seal design and system performance analysis. Conceptually, computer models will simulate the shaft after it has been filled with compacted salt. Constitutive relationships dictate how the host salt material creeps into the former shaft volume and how the crushed salt responds (i.e., by volume reduction and by change in the stress state). Volume reduction is accompanied by decreasing permeability within the salt component.

Other advancements in the basic understanding of crushed salt consolidation have occurred in the laboratory. This ongoing testing will develop a relationship between density and permeability as well as measure elastic constants. An initial test shows that permeability is reduced substantially and quickly at pressures ≤ 5 MPa. The experimental response of a sample of dynamically compacted salt is shown in Figure 4-1. A hydrostatic pressure of 2 MPa reduced permeability of the compacted salt sample by an order of magnitude. Further compression to 5 MPa reduced permeability to 3×10^{-18} m^2 and increased sample density to approximately 0.97 of the density of intact salt. Using these data to formulate a preliminary permeability/density function, together with the appropriate constitutive relationship, allow an estimation of the permeability of the compacted salt column as a function of time.

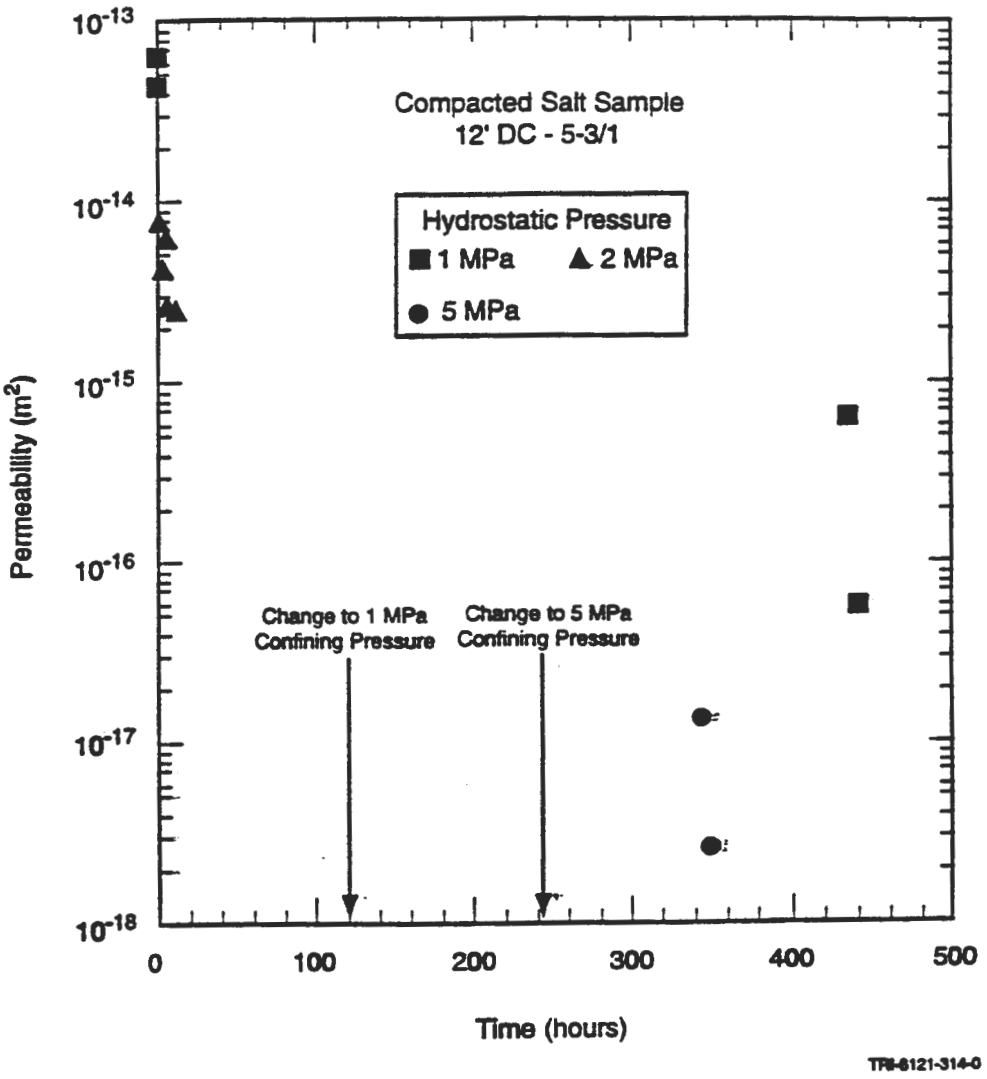


Figure 4-1. Permeability of compacted salt at low hydrostatic stresses.

Figure 4-2 plots the expected permeability range of the Salado salt column 100 years after placement at an initial density of 0.9 of intact salt. A range of values reflects differences between parameters for clean and argillaceous salt. This particular calculation includes the effect of backstress on the crushed salt. Under these modeling assumptions it is shown that 70 m of the salt column is tighter than 1×10^{-18} m^2 at 100 years. These magnitudes of permeability and effective lengths of salt column are consistent with those used for design evaluation (Appendix D). Tests currently being conducted will generate additional permeability data with stress path deviation to characterize elastic properties as a function of density. These additional calculations will refine the information plotted in Figure 4-2.

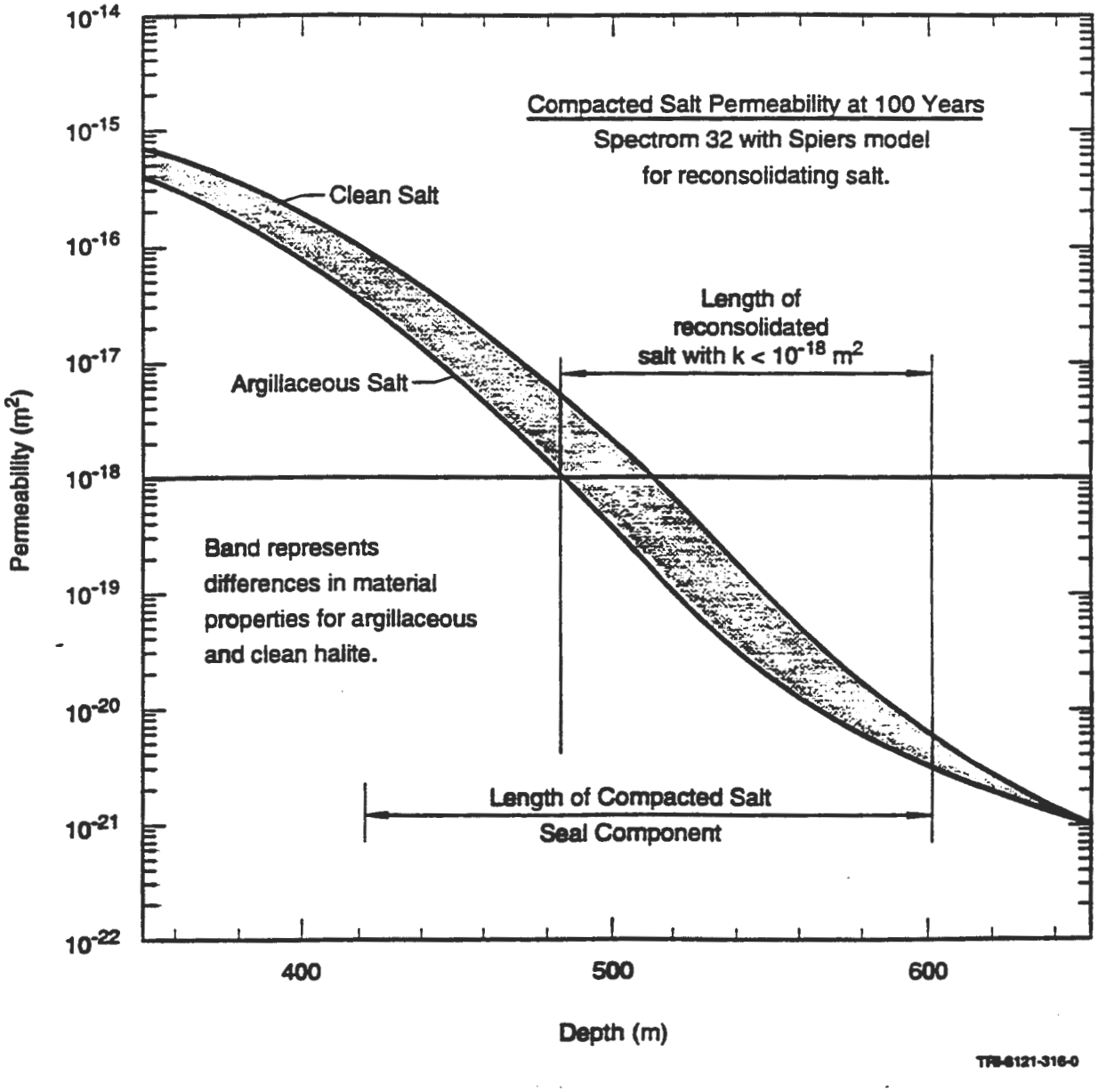


Figure 4-2. Estimated permeability of the Salado salt column at 100 years.

4.4 Compacted Clay

Clay comprises major components of the shaft sealing system at five locations: (1) near the surface between 3410 ft and 3353 ft MSL, (2) in the Dewey Lake between 3313 ft and 2840 ft MSL, (3) between 2840 ft and 2605 ft MSL in the Rustler, (4) between 2397 ft and 2053 ft MSL in the Salado Formation (Component 8), and (5) near the bottom of the shaft between 1340 ft and 1296 ft MSL (Component 12). Bentonite clay is chosen here because of its overwhelmingly positive sealing characteristics. Relative to other clay minerals, such as illite or kaolinite, bentonite is perhaps two orders of magnitude less permeable (see Section 4.5). Bentonite is widely used as a sealing component in a variety of geotechnical applications. In particular, bentonite is considered a primary sealing material in several international nuclear waste repository programs. Studies on sealing with bentonite have been conducted in Canada, England, France, Germany, Sweden, Switzerland, and the United States.

Bentonite is an excellent seal material because of its many positive attributes for the WIPP environment: low permeability, swelling potential, strength and mechanical properties, compatibility and longevity, as well as reasonable construction requirements. Generation of significant gas pressure (as much as 2 MPa) is not expected for the first several hundred years after waste emplacement. Nonetheless, the proposed design will quickly and effectively minimize gas migration. Compacted bentonite is an effective gas barrier because of a threshold pressure that is required to displace water in the larger pores. This performance characteristic coupled with the low permeability of the lower concrete component is sufficient to protect the consolidating salt column from gases generated by the repository.

In situ tests of bentonite at the WIPP, involving about a cubic meter of material, corroborate the expected sealing function. Blocks of bentonite were stacked in vertical and horizontal 1-m-diameter boreholes. Microdarcy permeability (1×10^{-18} m^2) was measured after about two months of brine testing. Subsequently, permeability continued to decrease. After 6 years of brine flow testing at 0.67 MPa (100 psi), no brine has been observed to have passed through the 1-m seal. A test of threshold pressure using gas and the same bentonite seal was completed in 1995. A pressure over 500 psi (>3 MPa) was required to initiate flow.

In addition to its inherent low permeability, clay can also be expected to resist creep of the host Salado Formation salt into the shaft. By resisting inward creep of the salt, the clay component will help reestablish a more uniform stress field. As the deviatoric portion of the stress tensor diminishes and the mean stress increases, damaged salt will begin to heal. The clay component near the bottom of the shaft will promote rapid healing of the DRZ. Compaction data from Lambe and Whitman (1969) was used to develop a density-dependent bulk modulus. When this material model is used to represent clay placed in the lower Salado compacted clay column, the DRZ over the length of the clay component is eliminated in less than 25 years after construction. Figure 4-3 is a plot of DRZ healing as a function of time for the shaft column filled with compacted clay. Based on the most recent creep and fracture finite-element model (Chan et al., 1995), if 50 years are assumed to elapse before construction of the shaft seals, the potential exists for a DRZ to develop up to 0.8 shaft radii into the rock mass. Rigidity of the clay is sufficient to heal the DRZ in salt between 10 and 25 years after construction of the seal component. Any stiff seal material, such as concrete, would likewise heal a DRZ in salt within the same period of time.

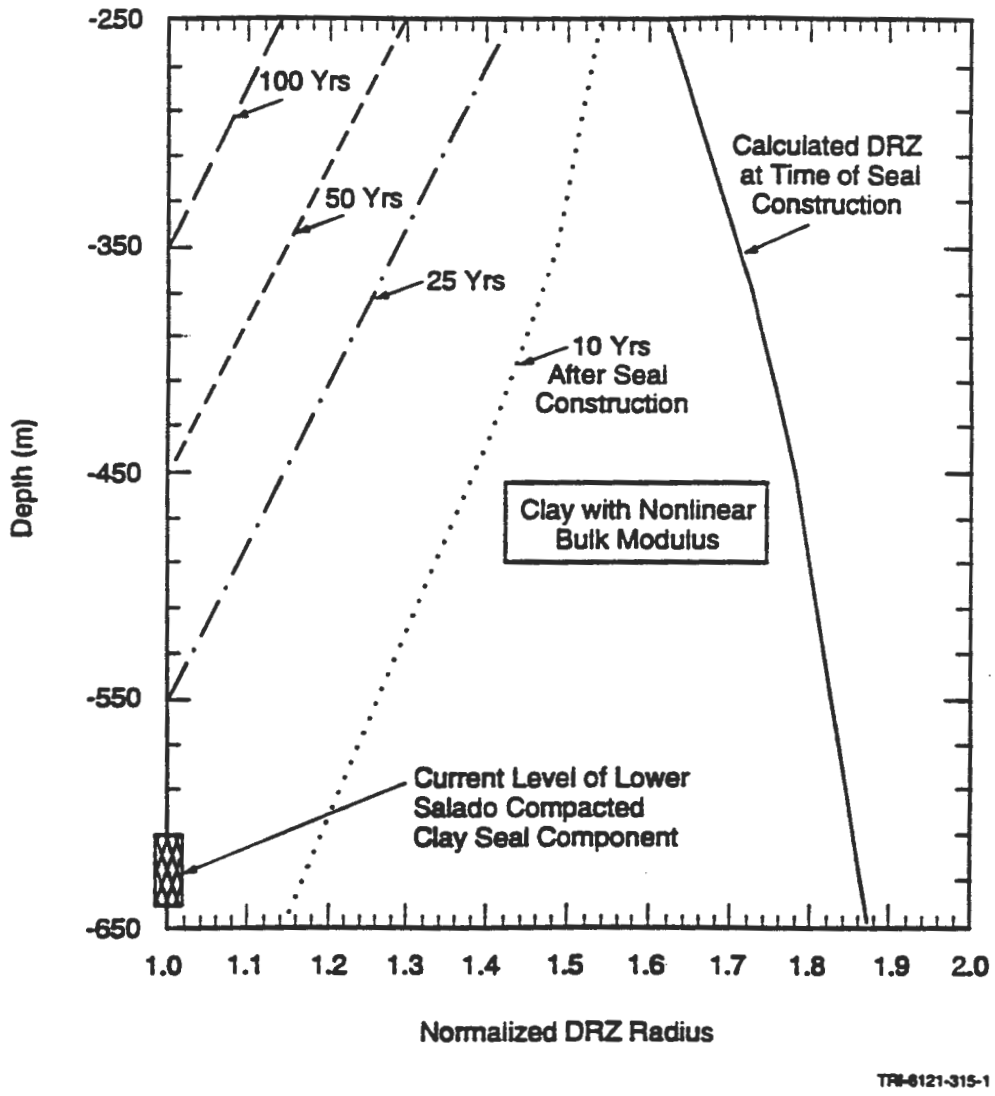


Figure 4-3. Extent of DRZ at various depths within the shaft.

Elsewhere in the seal column, clay can be expected to possess equally low permeability. Within the Rustler, the clay seal component will be less permeable than most of the surrounding rock no matter which clay mineralogy is selected. The anhydrite layers in the Rustler have very low permeabilities. The overall permeability of the Rustler is about 1×10^{-14} to 10^{-15} m^2 (Beauheim, 1987). As illustrated in Figure 4-4, clays can readily achieve permeabilities lower than 10^{-14} to 10^{-15} m^2. The compacted clay component within the upper Salado will inhibit fluid flow just like other clay components would, but the DRZ within the salt would not heal as quickly as around components at greater depth because of smaller stress magnitudes. Bentonite and other clays act as aquitards in the geologic setting. This means clay remains relatively impermeable over time periods far exceeding the regulatory period for the WIPP.

4.5 Asphalt

An asphalt column is proposed as an extensive seal component from MSL 2585 to 2447 ft (Component 6). In addition, asphalt is proposed to act as a waterstop between concrete members at three locations within the Salado Formation. Asphalt or bitumen is commonly used in Europe as a seal component around concrete shaft liners and is considered a viable seal material for radioactive waste programs in England and Germany. Asphalt has been considered as an alternative seal material within the WIPP seals program for several years. Asphalt has been added to the present shaft seal design to increase redundancy and confidence in performance of the system and to add assurance that transport of brine down the sealed shaft is precluded.

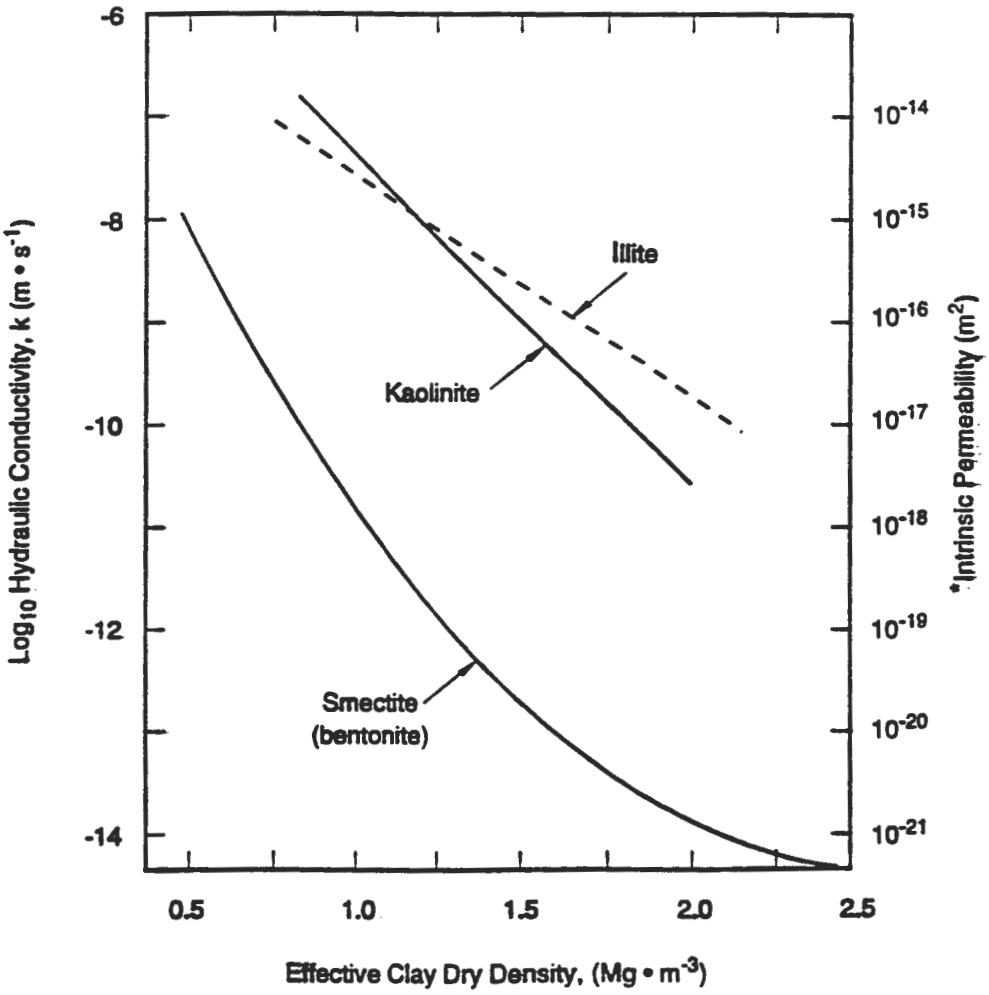


Figure 4-4. Relationship between hydraulic conductivity, intrinsic permeability, and effective clay dry density for selected clay minerals (from Johnson et al., 1994).

Technical specifications for asphaltic components have not yet been completed, but considerations center on use of an asphalt mastic mix (AMM) in contrast to hot-mix asphalt concrete or liquid asphalt options. AMMs for hydraulic structures are mixtures of asphalt, sand, and mineral filler. The asphalt content of AMM is much higher than that used in typical hot-mix asphalt concretes such as pavements.

High asphalt contents (10-20% by weight) and fine, well graded aggregate comprising sand and mineral fillers are used to minimize interconnected porosity. Equipment available from vertical barrier-construction and well-drilling technologies can be adopted to build an AMM seal successfully under WIPP construction conditions. In place densities should approach 98% of maximum theoretical density with a permeability of 1×10^{-21} m^2.

The viscosity of the AMM is an important physical property of the design specification. The AMM must be pourable at application temperatures, able to penetrate into voids or fractures, and viscous enough to control long-term flow. Hydrated lime is a possible additive to decrease moisture susceptibility and to act as an antimicrobial agent.

For calculations, asphalt in the shaft is assumed to behave elastically. Elastic properties of asphalt are sensitive to temperature, which is held constant at 27° C. Elastic properties for current analysis are taken from Yoder and Witczak (1975).

4.6 Cementitious Grout

Grouting is an option for sealing interfaces and the DRZs of nonsalt units within the Salado Formation. Portland cement is the most widely used grouting material because of its low cost, availability, engineering properties, and long history of use. Neat (without aggregate) cement grout consists of Portland cement and water, but admixtures are commonly employed to alter its characteristics. There are five types of Portland cement, and any may be used for grout. The choice of cement type depends on the application. Grout can be formulated to attain certain specific properties, such as low heat of hydration, chemical resistance, and high early strength.

Within the shaft sealing system, grout is proposed to seal interfaces and penetrate microfractures within the DRZ of nonsalt lithologies or other zones where microfractures are not expected to heal naturally. All cementitious grouts contain particles, so the maximum particle dimension should be no larger than one-third of the aperture of the microcracks. A cementitious grout has been developed at Sandia National Laboratories (Ahrens, 1995) and demonstrated to be suited for producing, mixing, and injecting at the WIPP. The grout, called "ultrafine," has 90% of its particles smaller than 6 microns. Ultrafine consists of Type V sulfate-resistant Portland cement, a pozzolan of amorphous silica, and superplasticizer. Pozzolan replaces much of the Portland cement, reducing heat of hydration. Ultrafine is the specified grout for the sealing system.

4.7 Materials Summary

A recap of the materials used in the seal design, the potential zones they treat, and their performance period are given in Table 4-1. The primary design function expected of the materials is to prevent the sealed shaft and the surrounding DRZ from becoming a preferred pathway for the transmission of fluids; therefore, Table 4-2 summarizes the permeabilities of the components.

Table 4-1. Seal Materials for the Salado Formation

Material	Short-term Period			Long-term Period		
	Cross Section	Interface	DRZ	Cross Section	Interface	DRZ
Concrete	X	X	X			X
Compacted Salt				X	X	X
Compacted Clay	X	X		X	X	X
Asphalt Column	X	X		X	X	
Asphalt Water Stop	X	X	X	X	X	X

Table 4-2. Material Permeabilities

Seal Material	Permeability (m^2)
Freshwater/Salt-Saturated Concrete	
0 to 100 years	5.0×10^{-19}
100 to 10,000 years	1.0×10^{-14}
Consolidated Salt	
0 years	9.0×10^{-14}
100 years	1.0×10^{-18}
100 to 10,000 years	$<1.0 \times 10^{-18}$
Clay/Compacted Clay	1.0×10^{-18}
Asphalt	1.0×10^{-21}
Cementitious Grout	3.0×10^{-17}
Earthen Fill	1.0×10^{-14}
Salado Halite	1.0×10^{-21}
Salado DRZ	1.0×10^{-16} to 1.0×10^{-21}

5.0 Evaluation of Shaft Sealing System Design

In this section, the performance of the shaft sealing system is compared to the design guidance presented in Section 2. The design is evaluated with respect to this comparison and also with respect to the functions of the shaft sealing system. The performance expectations for the shaft sealing system are discussed, as well as analyses conducted to evaluate the sealing system. This section presents a summary of the analyses which demonstrate that the sealing system meets the design guidance and performance expectations. Further evaluation of the sealing system with respect to fluid flow is currently under way using two-phase flow models. These analyses will be available for the compliance certification package.

In general, the sealing system is divided into two functional regions: the upper seal system and the lower seal system. The compacted salt column comprises a member of the lower seal system. Performance expectations of the upper seal system are to separate water bearing zones and to retard the downward migration of brine into the compacted salt column. Design performance of the lower seal system is divided into short-term and long-term functions. In the short-term, the lower concrete component (Component 11) and the lower Salado compacted clay column (Component 12) are expected to retard the flow of brine and gas from the repository into the compacted salt column. The compacted salt column will consolidate during the short-term and will act as a permanent barrier to the flow of brine or gas through the sealing system to the regulatory boundary during the long-term.

There are two major long-term seal materials for the WIPP shaft sealing system: the upper and lower clay columns (Components 8 and 12), and the compacted salt column (Component 10). Redundancy of function is incorporated into the system to assure the salt is adequately protected while it consolidates. From above, asphalt, concrete, and clay protect the salt column. From below, clay and concrete with an asphalt waterstop protect the salt. After the salt column consolidates, the clay and perhaps the asphalt will also continue to provide long-term performance redundancy.

5.1 Structural Performance

Analyses were performed to evaluate structural considerations for seal components in the Salado formation. Components comprising the WIPP sealing system will be subjected to favorable, compressive stress conditions. Uniform compressive stresses will decrease void space, tighten any interfaces, heal microfractures in salt, and reduce permeability of the entire seal system. At this point in the design process, structural properties are available for materials that will be used for evaluating the configuration and locations of each sealing component. The materials are discussed in Section 4.0, and the configurations are shown in Drawing 33-SNL-005, Sheets 1 through 10 (Appendix B). During the next phase of design, additional component analyses will be conducted to verify that they are adequate to withstand the forces expected from rock creep and hydraulic pressure. Analyses used in the design of components are discussed below.

The principal structural considerations associated with the compacted salt column are:

- the rate at which the compacted salt consolidates, and
- the ability of the consolidating salt to create a compressive load (backstress) on the shaft walls.

Both the consolidation rate and the backstress are dependent on the initial density of the compacted salt, depth of emplacement, and elapsed time after emplacement. As the density of the emplaced salt increases, the consolidation rate decreases and backstress increases. Increase in backstress is desirable because it promotes healing of the DRZ. Analysis showed that compacted salt emplaced at a density approaching 90 percent of intact salt would consolidate sufficiently to meet the quantitative design guidance for long-term seals. Examples of results from these analyses are presented in Appendix D and Section 4.

The principal structural consideration associated with the clay and asphalt components was the determination of the time necessary to heal a portion of the DRZ adjacent to the components. Figure 4-3 shows the extent of the DRZ as a function of depth and time when compacted clay is used as the sealing material. This particular analysis demonstrates that the DRZ is healed near the lower Salado clay component in less than 25 years. Similar rapid healing of the DRZ is expected for other rigid or relatively incompressible seal materials used in this design.

The principal structural considerations associated with the concrete components are:

- determination of the effects that notches excavated in the shaft wall have on DRZ,
- time (after installation) required to heal the DRZ around the waterstop,
- time (after installation) required to heal the DRZ around the concrete plugs, and
- ability of the concrete plugs and host rock to accommodate shear and bearing stress imposed by overlying fill materials and/or pressure that may be imposed by brine or gas.

These analyses were used to choose the sizes and shapes of the asphalt waterstop and the concrete plugs. The analyses also identified stress levels in the concrete plugs as a function of time.

5.2 Fluid Flow Evaluation

Qualitative guidance on the performance of the system indicates the need to limit brine flow down the shaft and limit brine or gas flow up the shaft. Both considerations have impact on the time necessary for consolidation of the compacted salt column (Component 10). This component is therefore used to evaluate the performance of the remaining components during the first 100 years. If the compacted salt column is protected from the flow of brine from above, then the repository will be isolated from that brine flow as well. Similarly, the consolidating salt must be protected from upward flow of brine or gas during that period. Limitation of fluid flow into the salt column inherently limits upward migration of brine or gas through those components that overlie the salt column and, consequently, to the regulatory boundary. Quantitative design guidance (Section 2) has provided estimates of seal properties required to limit the flow of fluids in the shaft sealing system, and Section 3 gives specific purposes of each design component.

A comparative analysis of flow potential is described in Appendix D. This analysis compares flow potential, as defined by hydraulic conductance for both the cross-sectional seal material and the expected disturbed rock zone (DRZ), to the quantitative design guidance. Details of the single-phase fluid flow analysis are described in section D.3 along with the analysis assumptions and the associated parameters. Tables D-1 and D-2 provide both the absolute and normalized hydraulic conductance values for the lower and upper seal system

components. Results in these tables allow an evaluation of the degree to which the sealing system meets the design guidance; the quantitative guidance is met if the sum of the normalized conductances for the components of a system exceed unity. The degree to which an individual component can meet the quantitative system requirement for that function by itself can also be evaluated. Readers should not necessarily draw the conclusion (based solely on a low normalized conductance) that a particular component/material is ineffective because component length and the extent of the DRZ are both included in the conductance values, as discussed in Appendix D.

5.2.1 Upper Seal System

This section summarizes an evaluation of the upper seal system as compared to the design guidance for flow. A scoping analysis will also be provided in this section on the expected brine flow into the compacted salt column from the Rustler formation.

Both the qualitative and the quantitative design guidance for the upper seal system given in Section 2 are met at all times. Additionally, system confidence is very high because, at emplacement, two components meet the design guidance for the system and, within 50 years after emplacement, all components meet the design guidance by themselves. The total normalized conductance for the upper seal system is greater than 4.0 immediately after installation and improves with time because of DRZ healing. This result is not surprising because extensive lengths of very low permeability materials are used, and the permeability of the DRZ is not much higher than the needed system permeability. The upper seal system therefore meets the design guidance and offers redundancy for the regulatory period.

The following discussion presents a conservative approximation of brine flow down to the compacted salt column. Using Darcy's Law and assuming that the shaft above the upper compacted clay (Component 8) is filled with water, the predicted flow is:

$$\text{flow} = (\text{conductance}) \times (\text{height of water column}) \qquad (5\text{-}1)$$

The conductance for the clay seal material and surrounding DRZ is, from Table D-1, time-dependent for the first 100 years. Using the appropriate conductance at times 0, 10, and 50 years, a conservative calculation predicts a maximum of 30 m^3 of brine can flow through the clay column in 100 years (it is assumed that the conductance remains constant for the period between 50 and 100 years). The initial pore volume of the compacted salt column is approximately 500 m^3. As the salt consolidates, the pore volume is reduced. Brine saturation of the available pore volume will impede the consolidation rate. From Figure D-3 it is seen that, at 100 years, the fractional density at the midpoint of the salt column is approximately 95% of the density of intact halite. Based on this figure, a first-order approximation of the available pore volume at 100 years is 150 m^3. This pore volume is significantly greater than 30 m^3. This quantity of brine is not sufficient to impede consolidation of the salt column. This analysis takes no credit for seal components that overlie the clay seal material or the concrete component with an asphalt waterstop, which underlies the compacted clay. Therefore, it can be concluded that the upper seal system will meet the performance expectation of limitation of brine flow down into the salt column.

5.2.2 Lower Seal System

This section summarizes an evaluation of the lower seal system as compared to the design guidance for gas flow. Table D-1 identifies the effective conductance of various components that can limit gas or brine flow. With the exception of initial emplacement (t = 0), the system is effective at all times in meeting the quantitative design guidance for this system. The lower seal components comprising concrete with a water stop (Component 11) and compacted clay (Component 12) do not need to immediately meet the quantitative design guidance because gas pressure is expected to be minimal in the first few years after repository closure.

The lower compacted clay column will be capable of providing an effective gas seal. Two-phase flow dynamics are not considered in these calculations. The compacted clay column will be moist when emplaced. The current design specifies a gas threshold pressure of 2 MPa. Three physical characteristics of the sealing system control the flow of gas. These are the difference in fluid pore pressures across the seal (driving force), the gas threshold pressure of the seal, and the relative permeability of the seal (gas permeability). Because the clay column will be emplaced at a brine saturation approaching unity, the gas permeability of the clay seal will approach zero and at most will be one-tenth or one-hundredth of the intrinsic permeability of the clay (intrinsic permeability is used in the analyses presented in Appendix D). Substituting an intrinsic permeability one order of magnitude smaller than the one used for the clay column reveals that the normalized hydraulic conductance for the clay column and DRZ would be greater than 1 and would meet the guidance. For the seal to be an ineffective gas barrier at early times, the gas pressures at the base of the shaft would have to increase to pressures exceeding the pore pressure in the seal plus the gas threshold pressure of the seal material. Gas threshold pressure can be related to permeability (Davies, 1991). For a seal with a permeability of 1×10^{-18} m^2, the gas threshold pressure could be several MPa. Therefore, even though the single-phase calculations show that the lower seal does not meet the quantitative design guidance at closure, two-phase flow dynamics will result in an effective gas seal.

6.0 Conclusions

The WIPP shaft sealing system design documented in this report is an effective, implementable design concept. The design concepts were developed through an interactive process involving technical specialists in the design and construction of underground facilities, materials behavior, rock mechanics analysis, and fluid flow analysis. The design uses (1) a variety of common materials that have very low permeability, (2) demonstrated technologies for construction processes, (3) multiple components to perform each intended function, and (4) the entire length of the shafts to effect a sealing system. In addition, the design incorporates recent developments related to:

- successful demonstrations of compaction technology for salt compaction;
- attainment of high densities and accompanying low permeabilities in consolidating crushed salt;
- development of a constitutive model for crushed salt consolidation;
- design guidance that better quantify performance goals for, and the importance of, seal permeability;
- design guidance on functional requirements for seal components;
- development of improved capabilities for simulating WIPP salt creep behavior and potential DRZ development and healing;
- successful retesting (~10 years after emplacement) of WIPP small-scale concrete seal performance, which shows permeability ~10^{-20} m^2; and
- additional information from WIPP studies, international studies, and construction experience related to the very low permeabilities of salt-saturated concrete, asphalt, and clay.

The designers have provided a shaft sealing system that is an effective barrier to brine and gas flow. For the permanent or long-term seal that resists both gas and brine flow, robustness is achieved by providing more than 500 ft of a highly-compacted crushed salt barrier in series with more than 400 ft of clay barriers. The design retards gas flow in the short-term using a redundant combination of a rigid concrete barrier (enhanced by an asphalt waterstop included as an additional DRZ barrier) and a compacted clay barrier approximately 100 ft in length. Finally, short-term brine flow down the shaft is limited by a clay barrier within the Rustler Formation and by a combined length of more than 500 ft of asphalt, clay, and concrete barriers within the Salado Formation. These design concepts form the basis for No-Migration Variance Petition modeling, initiation of the detailed design development, and evaluations that will be completed in 1996 for incorporation, as appropriate, into the Compliance Certification Application.

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Appendix A:
Results of the Shaft Stratigraphy and Geohydrology Evaluation

Appendix A:
Results of the Shaft Stratigraphy and Geohydrology Evaluation

The purpose of evaluating the shaft stratigraphy and geohydrology at the Waste Isolation Pilot Plant (WIPP) is to establish the geologic and hydrologic information base required for design of the WIPP Facility Shaft Sealing System. The evaluation was completed in two phases. Phase I included:

- Confirmation of previously determined elevations of named stratigraphic unit contacts and marker beds from surface to total depth of the shafts, as ascertained from geotechnical reports on geologic mapping of each shaft during construction.
- Summary of regional groundwater occurrence intervals, as well as intervals of groundwater/ brine seeps logged during the geologic mapping of each shaft.
- Summary of clay presence in marker beds as logged during the geologic mapping of each shaft.
- Compilation of the stratigraphic data into a data base of named stratigraphic unit contacts and their mean sea level (MSL) elevations that intersect all four WIPP shafts.
- Construction of geologic structural cross-sections through the excavated shafts utilizing the compiled stratigraphic data base (SDB).

Phase II focused on further evaluation of brine occurrence within the exposed Salado Formation section and survey control for determining a reference point for use when determining subsurface depths. The Phase II evaluation of each shaft included:

1. Detailed correlation and projection of brine seepage intervals between the shafts, which was accomplished by compiling and evaluating data from available geotechnical shaft inspection reports, shaft geotechnical reports, and recently published groundwater reports to identify additional intervals of brine seepage that were not analyzed in previous shaft design studies.
2. Research of survey information to secure copies of the original survey plats, which document ground surface elevation for each shaft.
3. Review of shaft as-built diagrams to determine
   - a consistent surveyed datum, based on mean sea level (MSL), for reference when computing below-surface depths of named stratigraphic unit contacts and other relevant intervals of engineering design interest and
   - consistency between elevations of engineering and lithologic features in the shafts recorded on as-built drawings and shaft geotechnical reports.

A.1 Stratigraphic Evaluation

A.1.1 Correlation of Stratigraphic Contacts

Correlated stratigraphic unit contacts presented in the four shafts are expressed in MSL elevations. Figures 1 and 2 are geologic structural cross-sections based on MSL elevations. It

should be noted that there is a 400 ft (122 m) north-south offset between the Salt Handling shaft and the Waste Shaft as indicated on the figure legends. The cross-sections are presented here in a straight line format for ease of comparing stratigraphic consistency between adjacent shafts. These figures illustrate that the stratigraphic unit contacts are consistent both vertically and horizontally between the shafts. Some stratigraphic contact elevations vary because of regional structure and the stratigraphic thinning and thickening of units. However, the majority of the stratigraphic contacts used to date are suitable for the shaft stratigraphy correlation project because they intersect all four shafts. The exceptions are the following marker beds, listed in Table 1, which (1) do not correlate among all four shafts because of localized thinning and pinch-outs, (2) are erosional surfaces, or (3) simply were not recorded during the geologic mapping of the shaft wall.

Table 1. Marker beds unsuitable for correlation

Stratigraphic Contact	Comment
Mescalero Caliche	Not mapped in air intake and waste shafts.
Gatuña Formation	Not mapped in waste shaft.
Dewey Lake Red Beds	Erosional contact - highly irregular upper surface.
MB-100	Not present in all four shafts.
MB-119	Not present in all four shafts.
MB-120	Not present in all four shafts.
MB-125	Not present in all four shafts.
MB-133	Not present in all four shafts.
MB-137	Not present in all four shafts.
Anhydrite b	Not present in all four shafts.
MB-139	Not penetrated by all four shafts.

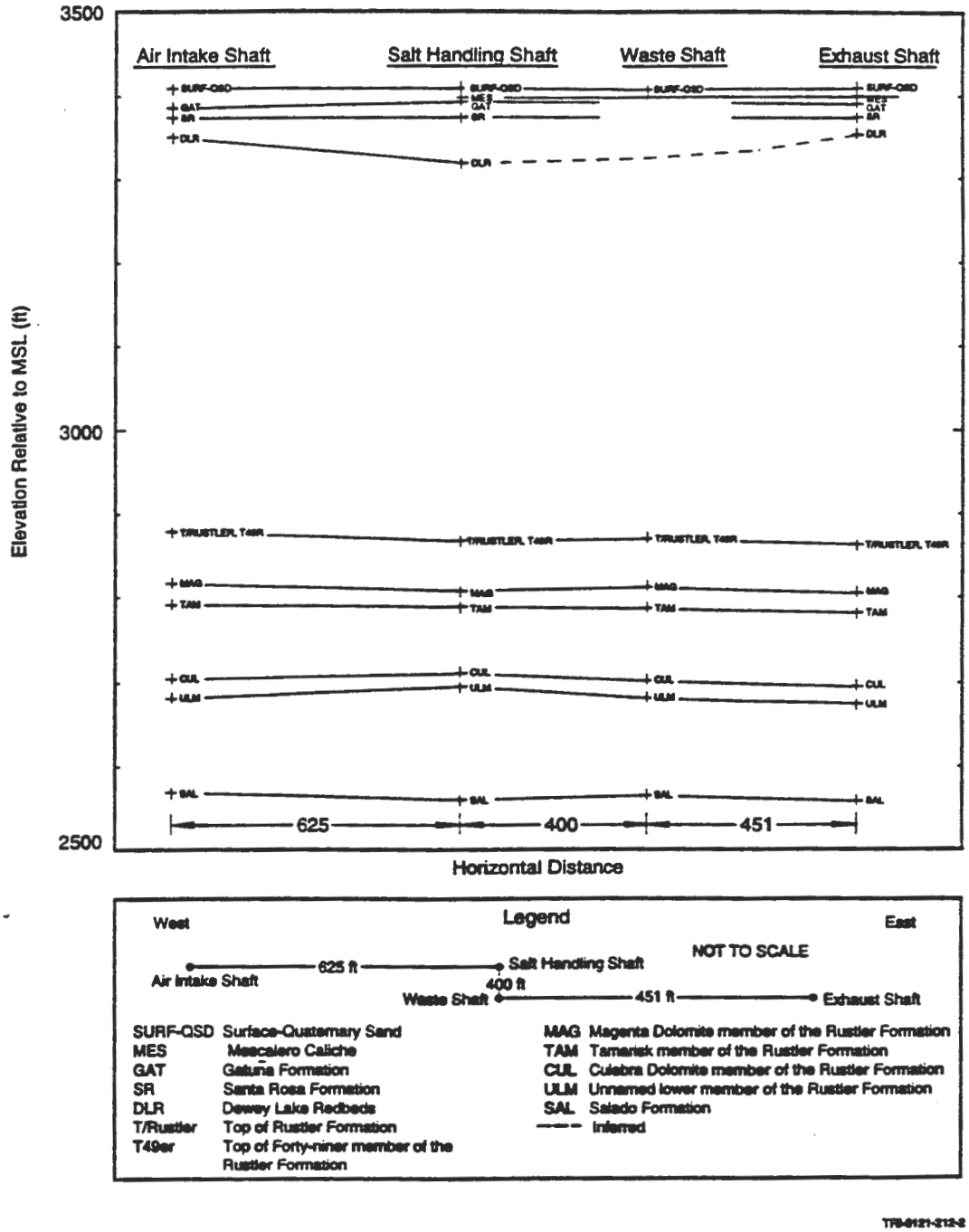

Figure 1. Structural Cross-section through excavated shafts, ground surface to top of Salado Formation.

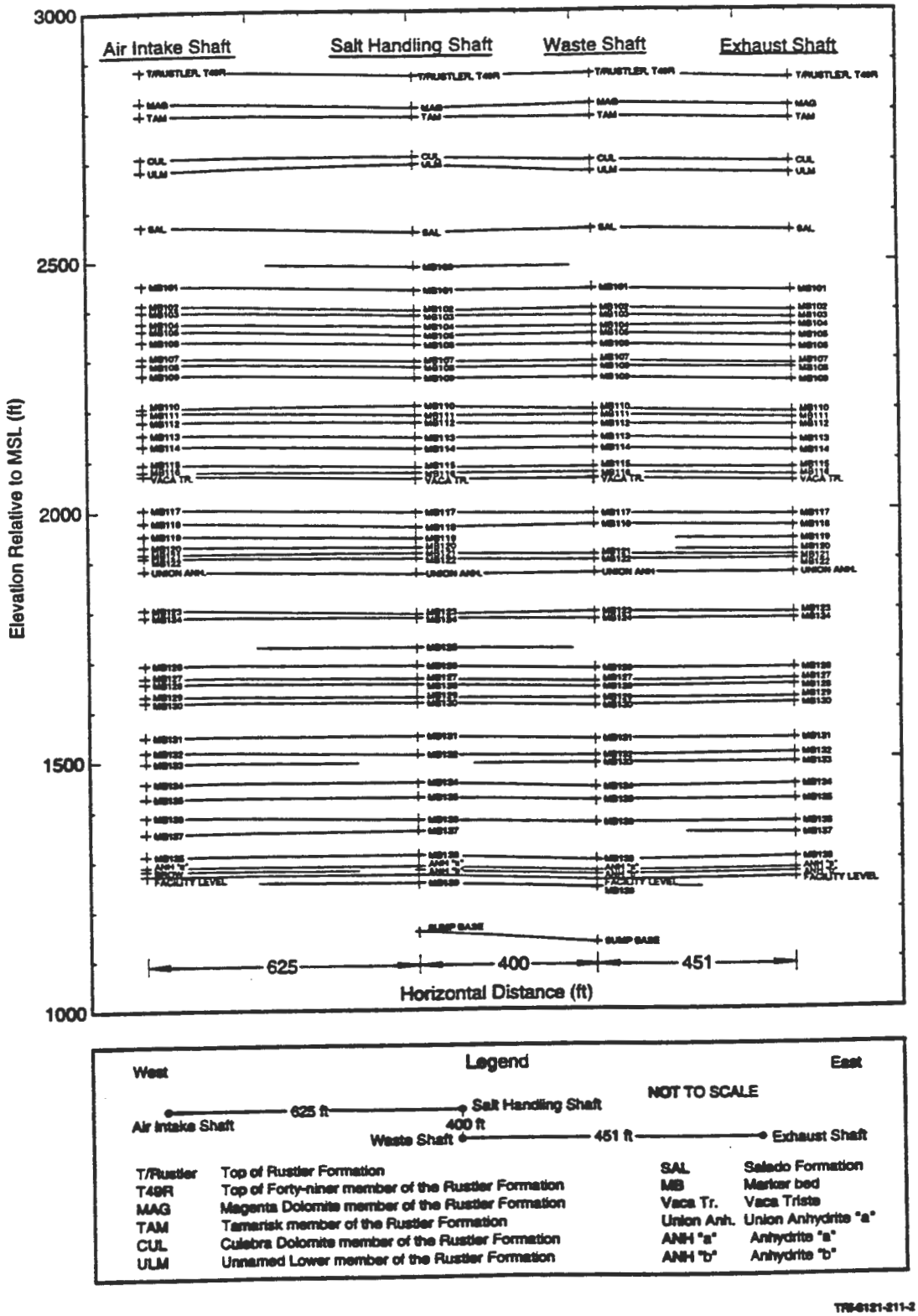

Figure 2. Structural Cross-section through excavated shafts, top of Rustler Formation to total depth.

A.1.2 Sources of Information/Methodology of Stratigraphic Correlations

Lithologic logs, surface elevation references, and previous stratigraphic interpretation were secured from the sources listed in Table 2. It should be noted that, since its construction, the Salt Handling Shaft has had several names. At various times it has been called the *Exploratory Shaft*, the *Construction and Salt Handling Shaft*, and the *Salt Handling Shaft*. Currently, and therefore in this report, it is called the Salt Handling Shaft. Also note that the Waste Shaft was called the *Ventilation Shaft* during the initial phases of its construction.

Table 2. Stratigraphic information sources

Shaft	Document Number (Author)	Document Title
Exhaust	DOE-WIPP-86-008 (Holt and Powers, 1986)	Geotechnical Activities in the Exhaust Shaft
	DACW47-83-B-0010	Contract Drawings-CCP-1F6/1D Underground Experimental Areas/Waste Shaft and Exhaust Shaft (Drawing 35-R-004-O1D)
Waste (formerly called Ventilation Shaft)	WTSD-TME-038(Holt and Powers, 1984)	Geotechnical Activities in the Waste Handling Shaft
	(TSC-D'Appolonia, 1983) GFDR No. 4	Geologic Mapping and Water Inflow Testing in the SPDV Ventilation Shaft
	WTSD-TME-3179 (Jarolimek et al., 1983b)	Correlation of Drillhole and Shaft Logs Waste Isolation Pilot Plant (WIPP) Project Southeastern New Mexico
Salt Handling (formerly called Exploratory or Construction & Salt Handling)	TME 3178 (Jarolimek, Timmer, and McKinney, 1983a)	Geotechnical Activities in the Exploratory Shaft-Selection of the Facility Interval
	WTSD-TME-3179 (Jarolimek, Timmer, and Powers, 1983b)	Correlation of Drillhole and Shaft Logs Waste Isolation Pilot Plant (WIPP) Project Southeastern New Mexico
	DOE-WIPP-86-010 (US DOE, 1986)	Waste Isolation Pilot Plant Design Validation Final Report Appendices
Air Intake	DOE-WIPP-90-051 (Holt and Powers, 1990)	Geologic Mapping of the Air Intake Shaft at the Waste Isolation Pilot Plant
	DACW47-83-B-0010	Contract Drawings - CCP-1F6/1D Underground Experimental Areas/Waste Shaft and Exhaust Shaft (Drawing 35-R-004-01D)

To confirm previous correlations, each shaft lithologic log was enlarged or reduced to a consistent scale of 1 in. = 10 ft. The lithologic log from the Air Intake Shaft (AIS) was used as the control log for correlations because it recorded the vertical occurrence of named stratigraphic unit contacts from ground surface to total depth at the facility level.

Correlation of the shaft logs required a side-by-side comparison with the AIS log. The tops and bases of the stratigraphic units were marked or confirmed and recorded as elevations relative to MSL. Several named stratigraphic unit contacts were not recorded on all four shaft logs during the original mapping program. Unrecorded named stratigraphic units were correlated with adjacent shaft logs. The newly correlated named stratigraphic unit contacts are listed in Table 3.

Table 3. Newly correlated named stratigraphic unit contacts

Shaft	**Stratigraphic Unit**	**Unit Top** (ft-MSL)
Exhaust	MB-125	Not Present (Pinched out)
Waste	MB-119	Not Present (Pinched out)
	MB-120	Not Present (Pinched out)
	MB-125	Not Present (Pinched out)
Salt Handling	MB-130	1613.5
	MB-133	Not Present (Pinched out)
Air Intake	MB-106	2335.5
	MB-113	2150.0
	MB-114	2127.0
	MB-125	Not Present (Pinched out)
	Anhydrite a	1287.5

Ground surface (finished grade) MSL elevations and the survey control were recorded and evaluated for reliability. The surveyed ground surface (finished grade) MSL evaluations and reference sources are listed in Table 4.

A.1.3 Clay Associated with Marker Beds

Clay layers, when continuous, often form impermeable seams upon which water will migrate. When shafts are excavated, seeps or increased moisture content are often observed immediately above a clay layer. In some instances, if the clay was buried prior to dewatering, the clay layer can yield some water as it dewaters and consolidates after being exposed subsequent to shaft construction (Deal et al., 1995).

Clay was observed in association with a majority of the designated marker beds; it was located typically at the marker bed base and ranged from thin clay blebs (small, usually rounded inclusions of clay) to thicknesses of 1 ft. Most clay layers fall into a thickness range between 1 and 6 in. Occurrence of clay related to marker beds has been entered into the shaft SDB. Information relating to clay occurrence was secured from the lithologic logs in the following

reports: Holt and Powers, 1986; Holt and Powers, 1984; Jarolimek et al., 1983b; Holt and Powers, 1990.

Table 4. Surveyed ground surface (finished grade) MSL evaluations and reference sources

Shaft	Ground Surface (Elevation: ft-MSL)	Information Source
Exhaust	3410.0	Contract Drawings - CCP-1F6/1D;/ Drawing 35-R-004-01D. Based on USGS Survey Reference.
Waste	3407.5	Construction Survey; Table 1 WTSD-TME-038 (Holt and Powers, 1984) and Waste Shaft 311 General Arrangement Plans and Sections: Bechtel Job No. 12484 Drawing 31-R-013-01D Revision A
Salt Handling	3410.5	Surveyed Elevation tied to CWI Benchmark No. CW-1. DOE-WIPP 86-010 (US DOE, 1986)
Air Intake	3409.0	Contract Drawings CCP-1F6/1D:/ Drawing 35-R-004-01D based on USGS Survey Reference.

Although benchmark references were not noted for each shaft, each survey referenced a USGS Survey Reference.

A.1.4 Shaft Stratigraphic Data Base

The stratigraphic unit top and bottom MSL surface elevation, ground surface elevation (finished grade), and elevations of selected engineering features were recorded in a spreadsheet-based data base, the SDB. The SDB records the following information for each shaft:

- Engineering features (top of concrete, base of key, and station level)
- Ground Surface (finished grade)
- Stratigraphic unit contact name
- Unit top MSL elevation
- Unit bottom MSL elevation
- Groundwater/brine observance
- Clay observance
- Comments relating to the stratigraphic unit or engineering feature.

The MSL elevations were rounded to the nearest 0.10 ft. Values from 0.05 to 0.09 were rounded up, and values less than 0.05 were rounded down. SDB summaries for each shaft are provided in Section A4.0 of this appendix.

A.2 Groundwater / Brine Occurrence

A.2.1 Regional Groundwater Occurrence Intervals within the Shafts

A review of the regional geohydrology of the WIPP site and surrounding area identified six regional intervals of groundwater occurrence (Beauheim and Holt, 1990). These intervals are listed in Table 6.

Table 6. Regional Intervals of Groundwater Occurrence

Stratigraphic Unit	Remarks
Rustler Formation	
Forty-niner Member	Aquitard; water producing unit is a claystone interbedded with andhydrite and or gypsum units.
Magenta Dolomite Member	Regional aquifer; consists of fine grained gypsiferous arenaceous dolomite.
Tamarisk Member	Aquitard; consists of claystone sandwiched between two anhydrites.
Culebra Dolomite Member	Regional aquifer; consists of a finely crystalline, locally argillaceous and arenaceous, vuggy dolomite.
Unnamed Lower Member	Aquitard; consists of interbedded siltstone, sandstone, halite, and anhydrite. Regionally has two water producing units; however only one is present at the WIPP site. It is characterized by low permeability.
Rustler/Salado Formation Contact	Groundwater seeps at formation contact; general area of "brine aquifer" at Nash Draw

A.2.2 Groundwater / Brine Occurrence in the Salado Formation

A literature and data search was performed to identify groundwater/brine occurrence intervals in the Salado Formation. This search included review of geotechnical shaft reports, geotechnical shaft inspection reports, and WIPP site-specific published hydrologic/groundwater reports. Groundwater encountered in the Salado Formation appears in the form of seeps and weeps (i.e. small volumes of water oozing from the rock that produce a damp, moist, or wet surface). There has been no quantification of fluid flow associated with weeps or seeps. The groundwater is salt saturated and is identified in the literature as brine.

The geotechnical reports and associated lithologic logs for the Salt Handling, Waste, and Exhaust shafts did not include notations of observed brine seepage intervals within the Salado Formation section. The AIS geotechnical report (Holt and Powers, 1990), documenting the geologic mapping of the shaft, provided excellent data for identifying brine seepage intervals occurring within the Salado Formation section.

Within the AIS, seventeen intervals (excluding the potential seepage interval at the Rustler/Salado interface) are identified as producing brine seepage. The extent of seepage varied from the mention of recent weeps to abundant weeps. Two other zones of seepage below the repository (MB 139 and MB 140) that intersect shaft sumps in the waste and salt handling shafts were identified through personal communications with experimenters at Sandia National Laboratories for a total of 19 seepage intervals within the Salado Formation. The intervals located above the repository are listed in Table 7. Seepage intervals that did not correspond to a previously named lithologic unit were assigned zone designations for the purpose of conveying information in this report.

There were no notations indicating volume quantities of brine seepage from the identified seepage intervals. Four of the seventeen intervals observed in the AIS (MB 103, MB 124, Vaca

Triste siltstone, and Union Anhydrite) were identified during the AIS mapping as primary brine-producing intervals in the Salado Formation (Holt and Powers, 1990). Quantities of seepage observed in the AIS can be placed into perspective by contrasting the Salado Formation seepage notations with the recorded water-inflow data from the Rustler Formation aquifers in the Salt Handling Shaft. The Rustler Formation aquifers flowed less than a total of 1.5 gallons per minute into the shaft prior to liner installation. After liner installation, the inflow rate dropped to less than 0.1 gallons per minute (Jarolimek et al., 1983a). The Geotechnical Shaft reports for the Exhaust, Waste, and Salt Handling shafts did not indicate intervals of brine seepage deeper than the Rustler/Salado Formation interface; however, Saulnier and Avis (1988) conducted pulse injection tests using a multipacker tool at the 850 ft and the 1320 ft intervals within the Waste Handling Shaft. Within these intervals hydraulic conductivity values for halite, polyhalite, and anhydrite were determined. The hydraulic conductivities and associated derived intrinsic permeabilities (in parentheses) are recorded as follows:

- Halite: 1.0E-13 to 3.0E-14 m/s (1×10^{-20} m^2 to 4×10^{-21} m^2)
- Polyhalite: 2.0E-14 m/s (3×10^{-21} m^2)
- Anhydrite: 3.0E-14 m/s (4×10^{-21} m^2).

To anticipate that the brine seepage intervals documented in the AIS have lateral extent and potentially intersect all four shafts, these intervals were projected through correlation of the shaft lithologic logs, from the AIS to the other four shafts, as illustrated in Figure 3. The cross-sections in Figures 4 through 7 illustrate the relationship of the newly designated brine seepage intervals (seepage zones) to the identified marker beds. These identified brine seepage intervals are recorded in the SDB for each shaft which is presented in Section A4.0 of this appendix.

Table 7. Brine seepage intervals occurring within the Salado Formation section

Marker Bed/Zone	Unit Top (ft-MSL)	Unit Bottom (ft-MSL)
MB103	2397.0	2380.5
MB109	2268.5	2243.1
Vaca Triste	2070.0	2062.0
Zone A	1925.0	1915.5
MB121	1915.5	1914.0
Union Anhydrite	1881.0	1873.5
MB124	1788.0	1779.1
Zone B	1736.5	1733.5
Zone C	1709.0	1700.0
Zone D	1650.5	1640.0
Zone E	1640.0	1638.0
Zone F	1638.0	1635.0
Zone G	1635.0	1633.0
Zone H	1633.0	1627.1
MB129	1627.1	1625.6
Zone I	1625.0	1619.3
Zone J	1546.9	1542.9

Note: Zones E through H are identified separately because of variable lithologies within that section of the AIS.

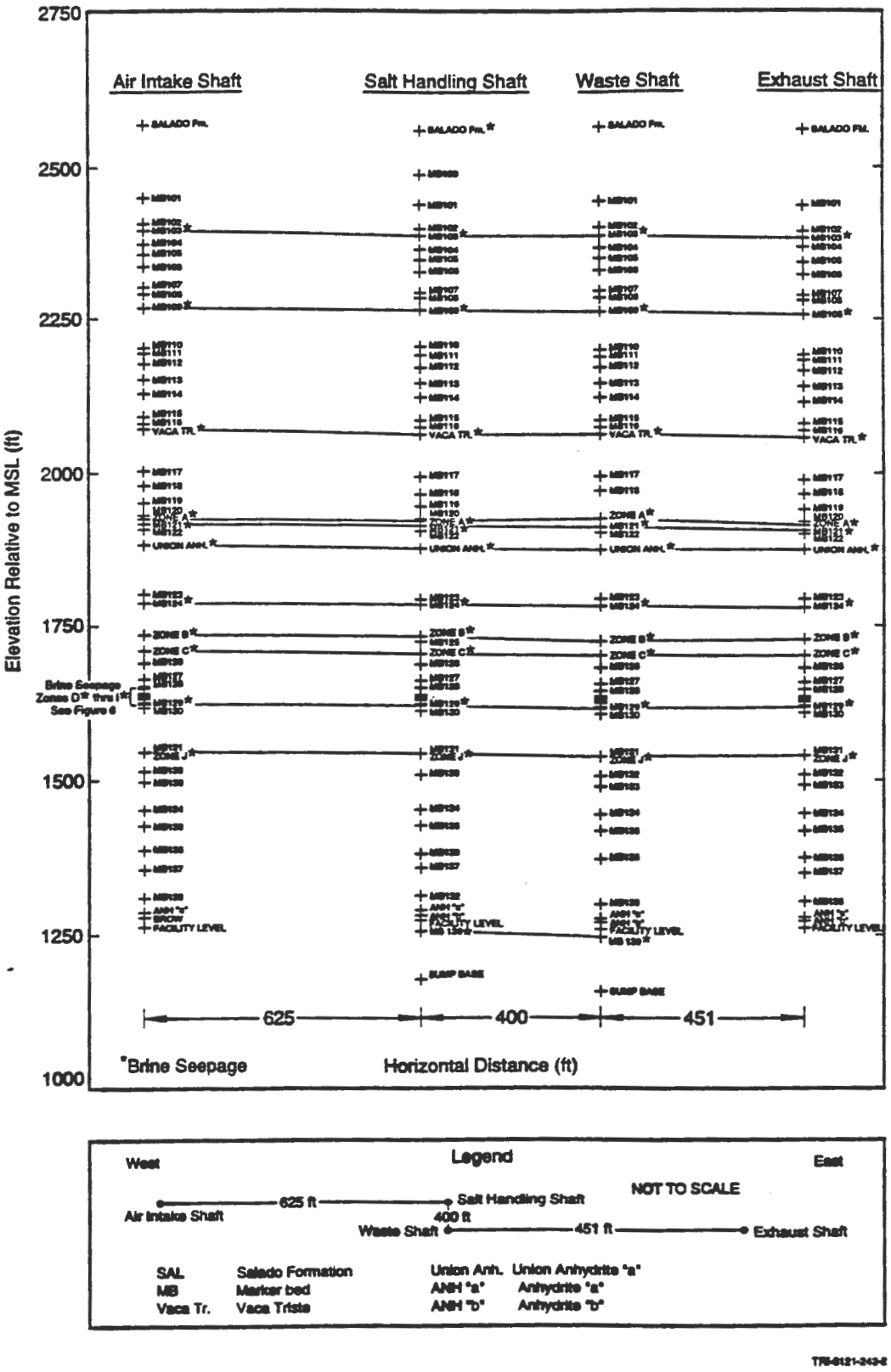

Figure 3. Structural Cross-section through excavated shafts, showing correlation of mapped brine seepage intervals, top of Salado Formation to total depth.

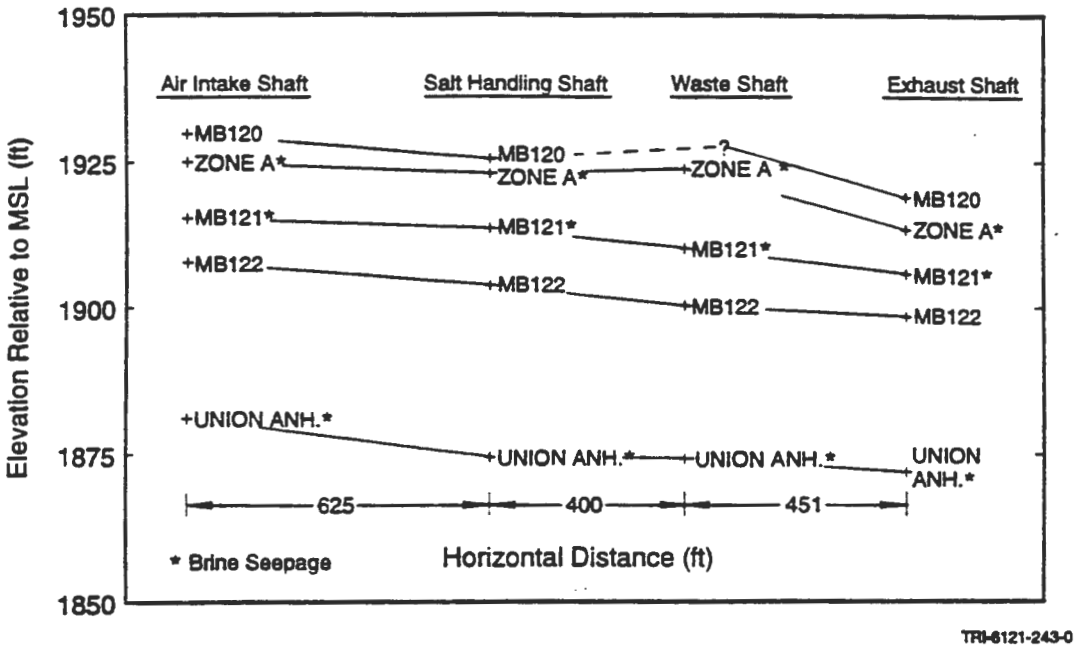

Figure 4. Brine seepage zone A.

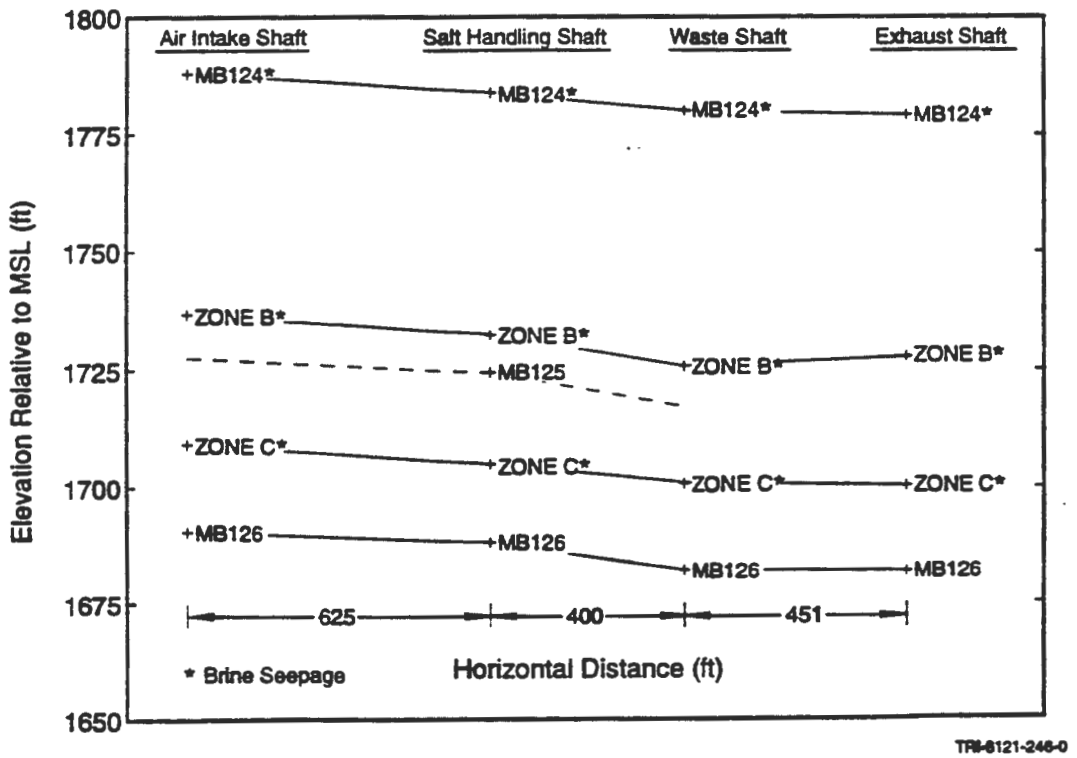

Figure 5. Brine seepage zones B and C.

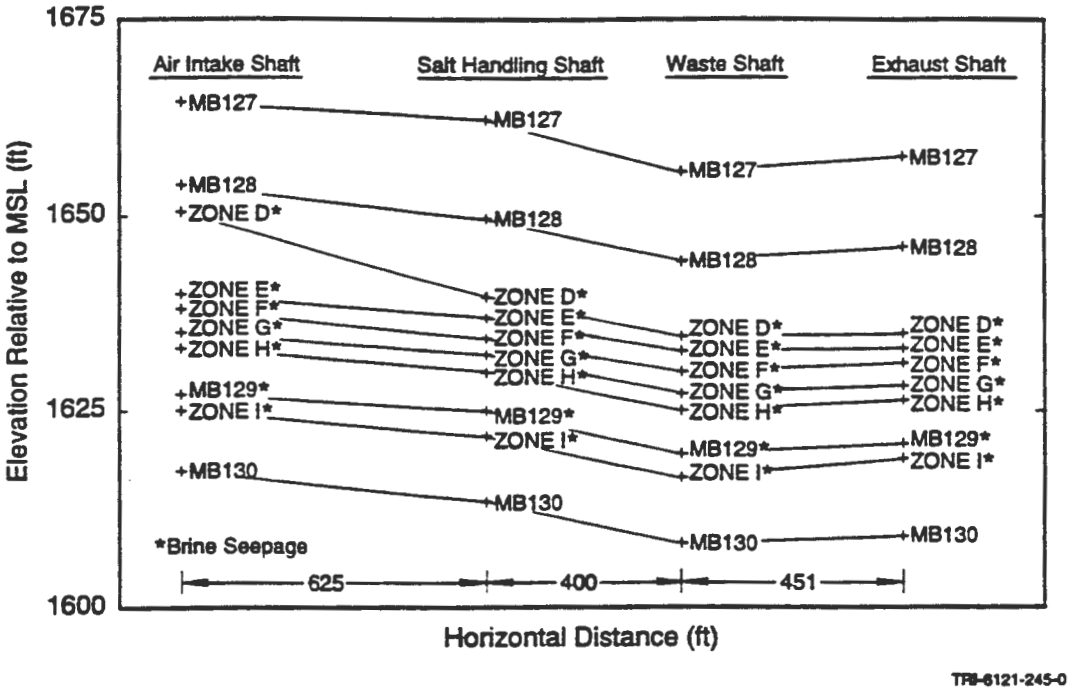

Figure 6. Brine seepage zones D through I.

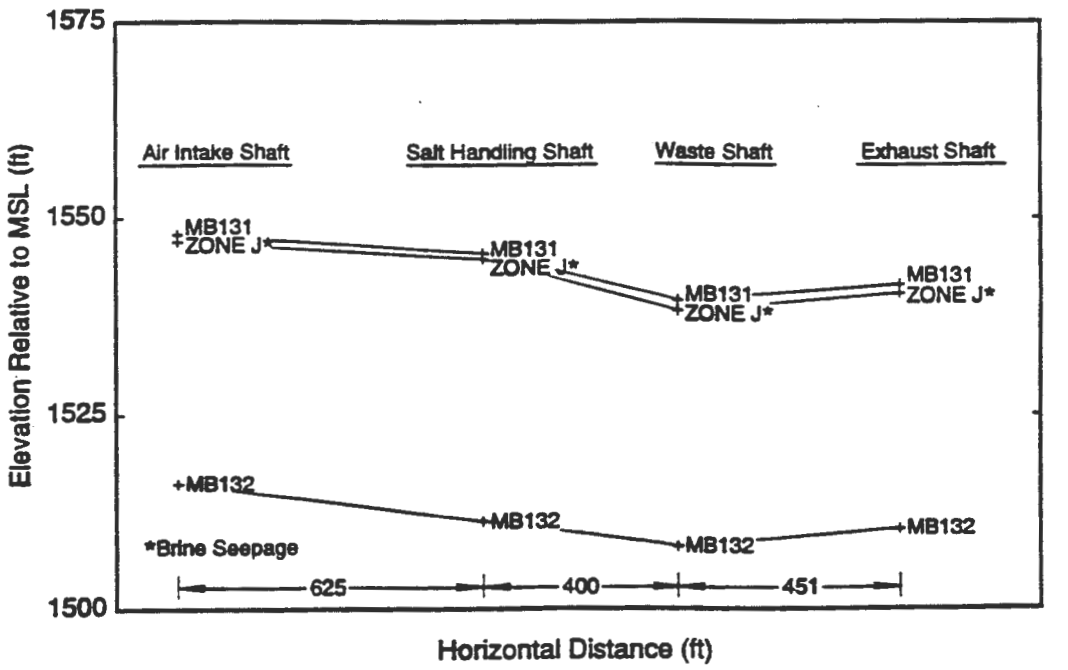

Figure 7. Brine seepage zone J.

To evaluate current brine seepage conditions, Westinghouse Waste Isolation Division staff were contacted in January of 1994 concerning the availability of the shaft geotechnical inspection reports for each shaft. Staff members indicated that the reports are available for review; however, these inspection reports concentrate on groundwater conditions within the Rustler Formation (Lower Seal System) and that the reports do not denote brine seepage intervals in the Salado Formation (Salado Salt Column). During trips in and out of the shafts, some damp clay seams within the Salado Formation have been observed (conversation with Westinghouse engineering staff; January 1994). These intervals have not been logged in the shaft inspection reports. Westinghouse staff mentioned that the best records of brine seepage intervals in the Salado Formation are the lithologic logs that were assembled during the lithologic mapping of each shaft (Jarolimek et al., 1983b; Holt and Powers, 1984; Holt and Powers, 1990; Holt and Powers, 1986). These reports were obtained and used to assemble the SDB. Copies of the shaft inspection records were not requested because they do not note the brine seepage intervals in the Salado Formation penetrated by the shafts.

Subsequent to contacting Westinghouse Waste Isolation Division staff concerning availability of recent geotechnical inspection reports, an inspection— which emphasized observance of brine seepage and associated salt encrustations— was performed in the AIS (Deal et al., 1995). This inspection was conducted during July 1994 as part of the Brine Sampling and Evaluation Program (BSEP). As reported in Deal et al. (1995), the AIS observations were made from the shaft man cage which moves vertically approximately 9 feet from the shaft wall. The Salado section was initially observed on the way down to the repository level. A more detailed inspection was conducted during the ascent. On the ascent salt encrustations, indicating seepage when moist or previous seepage when dry, were marked according to their location on the lithologic log developed during shaft mapping (Holt and Powers, 1990). Seventy-three salt encrustations were logged during the observation. The encrustations observed were related to rock bolts, thin localized argillaceous (clayey) intervals and previously identified seepage intervals. Pictures taken of significant salt encrustations during the observations indicate that seepage associated with the encrustations was primarily localized (i.e. point source) with the exception being encrustations located in zones that were originally mapped as producing brine. MB 103 was the only encrustation interval that was observed to be wet indicating active brine seepage. From the man cage it was not possible to determine if there was moisture present beneath encrustations observed to be dry at the exposed surface. Most of the sulfate beds (anhydrite and polyhalite) and especially the polyhalite units showed no weeps or encrustations (Deal et al., 1995).

Observations were also conducted in the Waste and Salt Handling shafts (Deal et al., 1995). In these shafts the Salado section above the shaft sump was obscured primarily by grout spillage from shaft key and liner installation. Observations in the sump of the Waste and Salt Handling Shafts did not show moisture at the surface or in the open fractures of Marker Bed 139 (Deal et al., 1995).

A.2.3 Typical Rustler and Salado Formation Hydraulic Conductivity/Transmissivity Values

The literature was searched for hydraulic conductivity values associated with different lithologies encountered within the Salado Formation (Salado Salt Column Interval), as well as transmissivity data for water bearing units of the Rustler Formation. Such values will assist in relating the documented occurrences of brine seepage to potential fluid (brine) inflow to the

Salado Formation Subsystem. The hydraulic conductivity data for various lithologies encountered within the Salado Formation, and the transmissivity data for water bearing units encountered in the Rustler Formation (Forty-niner Member, Magenta Dolomite Member, Tamarisk Member, Culebra Dolomite Member, and the unnamed lower member), are profiled in Table 8.

Table 8. Typical Rustler and Salado Formation hydraulic conductivity/transmissivity values

Stratigraphic Unit	Lithology	Hydraulic Conductivity (m/day)	Transmissivity (m^2/day)	Relevant Reports/ Comments
Forty-niner Member	Claystone Clay		1.73E-05 to 3.46E-04	SAND87-0039 (Beauheim, 1987)
Magenta Dolomite Member	dolomite		9.23E-03 or less up to 9.29E-02	SAND90-2035J (Beauheim and Holt, 1990)
Tamarisk Member	claystone		9.29E-05 or less	SAND90-2035J (Beauheim and Holt, 1990)
Culebra Dolomite Member	dolomite		Less than 3.72E-04 to 1.16E+02	SAND90-2035J (Beauheim and Holt, 1990)
Unnamed Lower Member	silty claystone		9.29E-06 to 5.75E-05	SAND90-2035J (Beauheim and Holt, 1990); Potential communicator with Culebra. Three zones compose this unit; however, only zone 1 is present within the WIPP boundary.
Salado Formation	halite, argillacious	1.22E-09 to 2.13E-08		SAND90-2035J (Beauheim and Holt, 1990)
	halite	Less than 3.05E-11		SAND90-2035J (Beauheim and Holt, 1990)
		10.0E-14 to 2.59E-09		SAND88-7001 (Saulnier and Avis, 1988)
	polyhalite	1.82E-09		SAND89-0462 (Lappin et al., 1989); Table 3-2 Waste Shaft
		1.73E-09		SAND88-7001 (Saulnier and Avis, 1988)
	anhydrite	3.05E-08 to 6.09E-07		SAND90-2035J (Beauheim and Holt, 1990); MB139, approximately 3 ft thick. Hydraulic conductivity depends on the amount of fracturing present. Pore pressures show distinct gradient towards the underground facility. Pressures as high as 1700 psi have been measured at distances of 35 ft from excavations.
		2.59E-09		SAND88-7001 (Saulnier and Avis, 1988)

*Note: Salado brines which flow into the WIPP Facility are not derived from fluid inclusions, but instead are grain boundary fluids with residence times of at least several million years (Stein and Krumhansl, 1986).

*Note: Permeability increases around the facility within 5 to 10 ft because of fracturing and possible matrix dilation (Beauheim and Holt, 1990).

A.3 Shaft Survey Data

A.3.1 Original Survey Coordinates and Surface Elevations

Westinghouse staff were contacted concerning the availability of the original survey plats that show the coordinates and the surface elevation of each shaft location prior to shaft construction. The original survey plats are not available; however, the shaft coordinates and surface elevations are recorded on the as-builts for each shaft. A comparison was made between the ground surface (finished grade) elevations secured from the Bechtel and Westinghouse as-built drawings for each shaft and those recorded in the SDB. Results of the comparison are presented in Table 9.

Table 9. Comparison between ground surface (finished grade) elevations secured from Bechtel and Westinghouse as-built drawings and those recorded in the SDB

Shaft	Ground Surface Elevation (Finished Grade) SDB (ft-MSL)	Surface Elevation Bechtel/Westinghouse As-Built (ft-MSL)	Difference In Elevation Data (SDB less As-Built) (ft)
Air Intake	3409.0	3409.0	0.0
Exhaust	3410.0	3409.9	0.1
Salt Handling	3410.5	3411.0	-0.5
Waste	3407.5	3407.5	0.0

The comparison of surface elevation data illustrates relative consistency between (1) surface elevations reported in geotechnical reports and working drawings, and (2) the data recorded on the Bechtel/Westinghouse as-built drawings for each shaft. The two minor discrepancies noted are in the Exhaust Shaft and the Salt Handling Shaft, which reflected differences of 0.1 ft and 0.5 ft respectively.

A.3.2 Review of Shaft As-Built Drawings to Determine a Consistent Surveyed Datum

Current shaft as-built drawings were secured from Westinghouse. These drawings were reviewed to determine a consistent surveyed datum, based on MSL, for reference when computing below-surface depths of named stratigraphic unit contacts and other relevant intervals of engineering design interest. The shaft as-built drawings for each of the shafts utilized a surveyed reference datum elevation of 3409.0 ft MSL based on the 1927 USGS North American Datum. For computing below-surface depths in the shafts, the reference datum of 3409.0 ft MSL is equated to a reference level 0'-0" (i.e., reference level 0'-0" = 3409.0 ft-MSL based on the USGS North American Datum). Elevations of selected features and/or objects within each shaft, and the reference drawings used to determine these elevations, are incorporated into the SDB (Attachment 1). The as-built drawings reviewed for each shaft and general survey information are marked "Info Only" and are current to February 18, 1994. The survey information and shaft as-built drawings reviewed are outlined in Tables 10 through 14.

Table 10. Site Work/Site development overall plans

Drawing Number	Title
24-C-053-005 Rev. B Sheet 1/2 and 2/2	Site Work, Site Development Overall Plan. (Inactivated per ECO#5667)
24-C-060-005 Rev. A Sheet 1/2 and 2/2	Site Work – Rough Grading Plan. (Inactivated per ECO#5567)
24-C-075-005 Rev. B. Sheet 1/2 and 2/2	Site Work – Rough Grading Plan and Sections. (Inactivated per ECO#5567)
24-C-078-005 Rev. B Sheet 1/2 and 2/2	Site Work – Rough Grading Sections.
21-C-011-SF9 Rev. 10	Base Line Monuments Plans & Sections.
21-V-002-W Rev. B	WIPP Site Surveys and Subsidence Monuments.
21-C-0012-SF9 Rev. 6	Subsidence Monuments Plans and Details.

Table 11. Air Intake Shaft as-builts reviewed

Drawing Number	Title
33-R-001-34A Rev. 4	Air Intake Shaft 331 General Arrangement Plans and Sections.
33-D-002-W	Air Intake Shaft 331 Shaft Collar/Air Intake Platform Plan, Sections and Details (new).
33-C-001-W	Air Intake Shaft 331 Shaft Collar/Air Intake Platform Plan, Sections and Details (new).
33-C-004-W1 and W2	Air Intake Shaft 331 Shaft Key Plan, Sections and Details (new).
33-D-008-W	Air Intake Shaft 331 General Arrangement (new).
51-W-212-W	Air Intake Shaft 331 Shaft Station Plans, Sections and Details.

Table 12. Salt Handling (Exploratory Shaft) as-builts reviewed

Drawing Number	Title
37-R-010 Rev. A	Key and Shaft Station Location Section.
37-R-023 Rev. A	General Arrangement at Surface Plan and Section.
37-R-012 Rev. A	Key Sections and Details.
24-C-202-05A Rev. A	C&SH Shaft Collar Modification Plan Sections & Details.
24-C-202-1Fc-4 Rev. G p.7	C&SH Shaft Collar Area. C&SH Shaft Collar Modification Plan Section & Details.
37-R-019 Rev. A	Station Develop. - Experimental Level Plan and Sections.
37-R-010 Rev. A	Key and Shaft Station Location Section.

Table 13. Waste Shaft as-builts reviewed

Drawing Number	Title
31-R-001-01D Rev. B	Waste Shaft 311 Shaft Development Sections.
31-R-002-01D Rev. A	Waste Shaft 311 Shaft Lining and Key Section and Details.
31-R-013-01D Rev. B	Waste Shaft 311 General Arrangement Plans and Sections.
A-0001	As-Built for Waste Shaft Collar.

Table 14. Exhaust Shaft as-builts reviewed

Drawing Number	Title
S-020	Exhaust Shaft with Collar Layout.
S-024	Detail Exhaust Shaft Layout.
35-R-004-01D Rev. B	Exhaust Shaft 351 General Arrangement Plans and Sections.
35-R-002-01D Rev A.	Exhaust Shaft 351 Shaft Living and Key Section and Details.
35-R-004-01D Rev. A	Exhaust Shaft 351 General Arrangement Plans and Sections.

A.3.3 Designation of Surface Reference Point

A physical surface reference point needs to be designated for the shafts to facilitate completion of the sealing system design drawings and final seal emplacement. It was recommended that the designated surface reference point elevation chosen for the shaft seal design drawings be the "top of concrete" for each shaft. "Top of concrete" is defined as the top of the collar for the Waste and Exhaust shafts, and the top of the existing shaft for the Salt Handling Shaft. "Top of concrete" for the AIS is defined as the top of the plenum. Table 15 identifies the designated surface reference, surface reference elevation (ft-MSL), and the distance above or below the current WIPP reference level 0'-0" (3409.0 ft MSL).

Table 15. Designated surface reference, surface reference elevation (ft-MSL), and distance above or below current WIPP reference level 0'-0" (3409.0 ft MSL).

Shaft	0'-0" Designated Surface Reference	Designated Surface Reference Elevation (ft-MSL)	Distance (ft) Above or Below Current WIPP Reference Level 0'-0" (3409.0 ft-MSL)
AIS	Top of Plenum	3410.0	1.0 Above
Waste	Top of Pad	3408.5	0.5 Below
Exhaust	Top of Collar	3411.5	2.5 Above
Salt Handling	Top of Existing Shaft	3411.5	2.5 Above

Designating the surface references as outlined in Table 15 will:

1. allow shaft seal designs to be developed with depth measurements measured from a consistent reference point that is specific to each shaft,
2. provide an easily identifiable reference that should still be in existence at the time the shafts are sealed, and
3. avoid the confusion created during shaft sealing operations that can arise from taking measurements from a reference level that is not tied to a physical shaft object.

To avoid future confusion when comparing existing shaft as-builts and final shaft seal design drawings, the seal design drawing notes should clearly identify the designated surface reference point and its relationship to the WIPP Standard Reference Level 0'-0" at 3409.0 ft-MSL.

A.3.4 Comparison of Stratigraphic Data Base and As-Built Elevations

Information from the SDB and the shaft as-built drawings were compared to determine discrepancies that may exist between the geologic data secured from the lithologic logs and the geologic data recorded on the shaft as-built drawings.

Elevation comparisons were made for select shaft and geologic features that were identified in both data sources. Features compared are specifically outlined for each shaft in Sections 3.4.1 through 3.4.4 and their associated tables.

In general, elevations were compared for the following geologic/shaft features:

- Ground surface (finished grade)
- Mescalero caliche

- Gatuña Formation
- Magenta Dolomite Member
- Culebra Dolomite Member
- Salado Formation
- Base of Key
- Shaft Station level.

If the feature and associated MSL elevation were identified in both data sources, the feature will be included in the comparison table for that specific shaft. Comparisons of elevations from both data sources showed differences varying from a minimum of 0.0 ft to a maximum of 9.0 ft as outlined in the following sections. The major discrepancies between the two data sources are found in the comparisons of the AIS and the Salt Handling Shaft. None of the data discrepancies in any single shaft was consistent enough to suggest that application of a single correction factor to either data set would reconcile the data.

Identifying lithologic contacts, especially when the contacts are gradational, can be a highly interpretive process. The difference in elevation values between the data sets (approximately ft or less) indicates a general consensus about the locations of the geologic features/objects relative to MSL. The as-built drawings should reflect the lithologic contacts mapped after the construction of each shaft. These differences in elevation indicate that some of the as-built lithologic contact elevations may have been transferred from preconstruction shaft design drawings to the final as-built drawings.

A.3.4.1 Air Intake Shaft

Ground surface (finished grade) elevations are consistent between the two data sources. The as-built elevations for the Magenta Dolomite Member, Salado Formation, and the base of the Shaft Key are consistent to within 0.3 ft relative to elevations secured from the shaft lithologic log. The Culebra Dolomite Member elevation recorded on the as-builts is 9.0 ft low relative to elevations secured from the shaft lithologic log. Conversation with Westinghouse staff revealed that the elevation for the as-built elevation for the Culebra Dolomite member should reference the elevation recorded in Holt & Powers (1990). By referencing this report and placing the unit in its proper scaled position on the drawing this discrepancy is eliminated. Table 16 compares the AIS lithologic log to the as-built elevations.

Table 16. Air Intake Shaft lithologic log versus as-built elevations

Geologic Feature/Object	Lithologic Log Elevation (ft-MSL)	As-built Elevation (ft-MSL)	Difference in Elevation: Lithologic Log less As-built (ft MSL)
Ground surface (finished grade)	3409.0	3409.0	0.0
Magenta Dolomite Member	2817.6	2817.6	0.0
Culebra Dolomite Member	2705.0	2696.0	9.0
Salado Formation	2569.3	2569.0	0.3
Base of Key	2513.0	2513.0	0.0

A.4.4.2 Exhaust Shaft

The ground surface (finished grade) elevation and the elevations of the Magenta Dolomite Member and Culebra Dolomite Member are consistent to within 0.1 ft. The Mescalero Caliche and the Gatuña Member elevations differ by 2.5 ft and 2.0 ft respectively. Table 17 compares the Exhaust Shaft lithologic log to the as-built elevations.

Table 17. Exhaust Shaft lithologic log versus as-built elevations

Geologic Feature/Object	Lithologic Log Elevation (ft-MSL)	As-built Elevation (ft-MSL)	Difference in Elevation: Lithologic Log less As-built (ft-MSL)
Ground surface (finished grade)	3410.0	3409.9	0.1
Mescalero Caliche	3401.5	3399.0	2.5
Gatuña Formation	3391.9	3389.9	2.0
Magenta Dolomite Member	2806.4	2806.5	-0.1
Culebra Dolomite Member	2695.4	2695.5	-0.1
Salado Formation	2558.5	2558.5	0.0

A.3.4.3 Waste Shaft

The ground surface (finished grade) elevation and the elevations of the Magenta Dolomite Member and the Culebra Dolomite Member are consistent. Elevations for the Salado Formation and the Shaft Station Level differ by 0.3 ft and 2.0 ft respectively. Table 18 compares the Waste Shaft lithologic log to the as-built elevations.

Table 18. Waste Shaft lithologic log versus as-built elevations

Geologic Feature/Object	Lithologic Log Elevation (ft-MSL)	As-built Elevation (ft-MSL)	Difference in Elevation: Lithologic Log less As-built (ft MSL)
Ground surface (finished grade)	3407.5	3407.5	0.0
Magenta Dolomite Member	2813.0	2813.0	0.0
Culebra Dolomite Member	2702.5	2702.5	0.0
Salado Formation	2565.3	2565.0	0.3
Shaft Station Level	1247.0	1249.0	-2.0

A.3.4.4 Salt Handling Shaft

Ground surface (finished grade) elevations are consistent to within 6 in. The Magenta Dolomite Member, Culebra Dolomite Member, and the Salado Formation elevations vary from 2 to 8 ft. Discrepancies in data result from recording as-built lithologic data from borehole ERDA-9 (see note on drawing 37-R-010, Rev. 7), which is an offset to the shaft. Table 19 compares the Salt Handling Shaft lithologic log to the as-built elevations.

Table 19. Salt Handling Shaft lithologic log versus as-built elevations

Geologic Feature/Object	Lithologic Log Elevation (ft-MSL)	As-built Elevation (ft-MSL)	Difference in Elevation: Lithologic Log less As-built (ft MSL)
Ground surface (finished grade)	3410.5	3411.0	-0.5
Magenta Dolomite Member	2808.0	2816.0	-8.0
Culebra Dolomite Member	2711.0	2705.0	6.0
Salado Formation	2560.0	2558.0	2.0

A.4 Stratigraphic Database

The Stratigraphic database presents geologic and hydrogeologic information for each individual shaft along with select engineering features (i.e., top of concrete, base of key, and station level). Specifically, information recorded for each shaft includes:

- Engineering features (top of concrete, base of key, and station level)
- Ground Surface (finished grade)
- Stratigraphic unit contact name
- Unit top and bottom MSL elevation
- Groundwater/brine observance
- Clay observance
- Comments relating to stratigraphic unit or engineering features.

A.4.1 Air Intake Shaft Stratigraphic Database

Stratigraphic Unit/Engineering Feature	Unit/ feature Top (ft-msl)	Unit/ Feature Bottom (ft-msl)	Water/ Brine Obs.	Clay Obs.	Comments
Top of Concrete	3410.0				Bechtel Drawing 33-R-001-34A Rev. 4, Air Intake Shaft 331 General Arrangement Plans and Sections and 33-R-012-34A Rev. 5, Air Intake Shaft 331 Shaft Development 16'-0" Diameter Shaft Sections
Ground Surface (SURF) /Finished Grade	3409.0				Ground surface (finished grade): 3409.00 ft msl based on USGS survey Marker; Shaft Development Drawing # 33R-012-34A. Stratigraphic contacts are from lithologic log; DOE-WIPP-90-051
Quaternary Sd. (QSD)	3409.0	Not mapped			
Mescalero Caliche (MES)	Not mapped	Not mapped			
Gatuna Fm. (GAT)	3387.5	3378.5			
Santa Rosa Fm. (SR)	3378.5	3353.1			
Dewey Lk Rb. (DLR)	3353.1	2878.7			Top contact is an erosional surface
Rustler Fm. (RUS)	2878.7	2569.3			
49-er mbr (49R)	2878.7	2817.6	x		Groundwater, regional aquitard; at some locations a thin claystone has a transmissivity comparable to the Magenta. SAND90-2035J
Magenta D. mbr (MAG)	2817.6	2792.0	x		Groundwater, regional; SAND90-2035J & DOE-WIPP 90-051
Tamarisk mbr (TAM)	2792.0	2705.0	x		Groundwater, regional aquitard; SAND90-2035J
Culebra D. mbr (CUL)	2705.0	2681.1	x		Groundwater, regional; SAND90-2035J & DOE-WIPP 90-051
Unnamed L. mbr (ULM)	2681.1	2569.3	x		Groundwater, regional aquitard (siltstone unit at H-16); SAND90-2035J
Salado Fm. (SAL)	2569.3	Did not penetrate	x		Regional potential for Groundwater (brine) occurrence at the Rustler /Salado Fm. contact; SAND90-2035J. No Groundwater at Fm. contact noted on lithologic log. Shaft did not penetrate base of unit.

Stratigraphic Unit/Engineering Feature	Unit/ feature Top (ft-msl)	Unit/ Feature Bottom (ft-msl)	Water/ Brine Obs.	Clay Obs.	Comments
Key (See Comments)		2513.0			Elevation 2513.0 ft.-msl from Westinghouse Isolation Division (WID) Drawing 33-C-004-W1, Air Intake Shaft 331 Shaft Key Plan, Sections and Details. This elevation is seven (7) feet higher than the base of Key concrete reported on the AIS lithologic log.
MB 100	*	*			Not marked on log
MB 101	2450.5	2447.1			
MB 102	2409.1	2408.0			
MB 103	2397.0	2380.5	x		Brine; Weeps - moist surface in lower 4ft; DOE-WIPP-90-051; Anhydridic dolomite overlying claystone where weeps occur.
MB 104	2373.5	2372.5			
MB 105	2356.6	2355.5			
MB 106	2335.5	2335.0			Correlated with exploration shaft.
MB 107	2301.0	2300.5			
MB 108	2291.1	2290.5			
MB 109	2268.5	2243.1	x		Brine; Weeps: DOE-WIPP-90-051, weep symbol on log with no weep description. Weeps occur in mudstone with anhydrite nodules.
MB 110	2203.1	2202.0			
MB 111	2194.5	2193.9			
MB 112	2176.4	2174.4		x	Thin laminae.
MB 113	2150.0	2149.0			Correlated with exploration shaft.
MB 114	2127.0	2126.0			Correlated with exploration shaft.
MB 115	2091.5	2088.0			
MB 116	2078.5	2076.0			
Vaca Triste (VACA TR)	2070.0	2062.0	x		Brine; DOE-WIPP-90-051. Composed of halitic siltstone and mudstone.
MB 117	2001.0	1999.5			
MB 118	1977.6	1975.0			
MB 119	1950.4	1948.4			
MB 120	1929.9	1929.0		x	Thin clay layers/blebs.
Zone A	1925.0	1915.5	x		Brine; Some weeps, halite with a trace of polyhalite: DOE-WIPP-90-051 - AIS log

Stratigraphic Unit/Engineering Feature	Unit/ feature Top (ft-msl)	Unit/ Feature Bottom (ft-msl)	Water/ Brine Obs.	Clay Obs.	Comments
MB 121	1915.5	1914.0	x	x	Brine; Weeps: DOE-WIPP-90-051 - AIS log. Weep symbol on log near base of unit (polyhalite) - no description. 2-3" clay at base.
MB 122	1907.9	1906.9			
Union Ahh.	1881.0	1873.5	x		Brine; Unit as a whole bears fluid. Weeps parallel to strata are very common around zones with clastic halite. Weeps occur also around fractures and contacts. DOE-WIPP-90-051 - AIS log
MB 123	1801.5	1795.0			
MB 124	1788.0	1779.1	x		Brine; Recent weeps parallel to fractures and bedding planes in anhydrite: DOE-WIPP-90-051 - AIS log
Zone B	1736.5	1733.5	x		Brine; Abundant weeps, halite argillaceous to trace clay: DOE-WIPP-90-051 - AIS log
Zone C	1709.0	1700.0	x		Brine; Modest amount of weeps, halite, trace clay and polyhalite: DOE-WIPP-90-051 - AIS log
MB 125	Absent	Absent			Section absent (Pinched out).
MB 126	1690.6	1689.5			
MB 127	1664.6	1662.0		x	Thin clay layers/blebs in upper 1 ft.
MB 128	1654.0	1650.5		x	Thin clay layers at base.
Zone D	1650.5	1640.0	x		Brine; Weeps in lower most part, interbedded polyhalite and argillaceous halite: DOE-WIPP-90-051 - AIS log
Zone E	1640.0	1638.0	x		Brine: Weeps in pits, argillaceous halite: DOE-WIPP-90-051 - AIS log
Zone F	1638.0	1635.0	x		Brine; Moderate weeps in unit, halite with trace polyhalite and clay: DOE-WIPP-90-051 - AIS log
Zone G	1635.0	1633.0	x	x	Brine; Abundant weeps from pits, argillaceous halite and halitic claystone: DOE-WIPP-90-051 - AIS log
Zone H	1633.0	1627.1	x		Brine; Moderate weeps, halite and polyhalite: DOE-WIPP-90-051 - AIS log
MB 129	1627.1	1625.6	x		Brine; Abundant weeps: DOE-WIPP-90-051 - AIS log
Zone I	1625.0	1619.3	x	x	Brine; Weeps, halite with polyhalite and claystone interbeds: DOE-WIPP-90-051 - AIS log

Stratigraphic Unit/Engineering Feature	Unit/ feature Top (ft-msl)	Unit/ Feature Bottom (ft-msl)	Water/ Brine Obs.	Clay Obs.	Comments
MB 130	1617.2	1615.1		x	Thin clay layers/blebs at base.
MB 131	1547.9	1546.9			
Zone J	1546.9	1542.9	x		Brine; Abundant weeps, halite trace to some clay and polyhalite: DOE-WIPP-90-051 - AIS log
MB 132	1516.0	1515.0			
MB 133	1497.1	1495.6			
MB 134	1454.0	1441.9			
MB 135	1426.0	1425.0			
MB 136	1387.2	1373.1			
MB 137	1356.3	1355.0			
MB 138	1311.1	1310.6			
Anhydrite "a" (ANH "a")	1287.5	1286.5			
Anhydrite "b" (ANH "b")	Not mapped	Not mapped			
Brow	1279.5				Excavated brow at facility level. MB-139 thru 142 were not penetrated by the shaft.
Station Level		1259.0			Westinghouse Isolation Division (WID) DWG. 33-D-008-W Air Intake Shaft 331 General Arrangement and WID DWG. 51-W-212-W Air Intake Shaft Station Plans, Sections and Details. Station level not on lithologic log.
					MB-139 thru 142 were not penetrated by the Air Intake Shaft.

A.4.2 Exhaust Shaft Stratigraphic Database

Stratigraphic Unit/Engineering Feature	Unit/ feature Top (ft-msl)	Unit/ Feature Bottom (ft-msl)	Water/ Brine Obs.	Clay Obs.	Comments
Top of Concrete	3411.5				Bechtel Drawing 35-R-001-01D Rev. B, Exhaust Shaft 351 Development Plan Sections and Detail
Ground Surface (SURF) /Finished Grade	3410.0				Ground Surface (finished grade) 3410 ft. MSL. Based on survey-USGS 1927 North American datum.
					Contract Drawings-CCP1Fb/1D, Underground Experimental Areas/Waste Shaft and Exhaust Shaft. Drawing 35-R-004-01D. Stratigraphic contacts from lithologic log; DOE-WIPP-86-008.
Quaternary Sd (QSD)	3410.0	3401.5			
Mescalero Caliche (MES)	3401.5	3391.9			
Gatuna Fm. (GAT)	3391.9	3375.0			
Santa Rosa Fm. (SR)	3375.0	3355.4			
Dewey Lk. Rb. (DLR)	3355.4	2862.5		x	Top contact is an erosional surface. Occasional thin clay layers (<6" thick)
Rustler FM. (RUS)	2862.5	2558.5			
49-er mbr (49R)	2862.5	2806.4	x		Groundwater, regional aquitard; at some locations a thin claystone has a transmissivity comparable to the Magenta. SAND90-2035J
Magenta mbr (MAG)	2806.4	2782.0	x		Groundwater, regional; Sand90-2035J; DOE-WIPP-86-008
Tamarisk mbr (TAM)	2782.0	2695.4	x	x	Groundwater, regional aquitard; SAND90-2035J. Occasional thin clay layers < 6" thick.
Culebra D mbr (CUL)	2695.4	2673.0	x		Groundwater, regional; SAND90-2035J; DOE-WIPP-86-008
Unnamed L mbr (ULM)	2673.0	2558.5	x	x	Groundwater, regional aquitard (siltstone unit at H-16); SAND90-2035J. Occasional thin clay layers (< 6" thick)
Salado Fm. (SAL)	2558.5	Did not penetrate	x		Regional potential for Groundwater (brine) occurrence at the Rustler /Salado Fm. contact; SAND90-2035J. No Groundwater at Fm. contact noted on lithologic log. Shaft did not penetrate base of unit.

Stratigraphic Unit/Engineering Feature	Unit/ feature Top (ft-msl)	Unit/ Feature Bottom (ft-msl)	Water/ Brine Obs.	Clay Obs.	Comments
Key (See Comments)		2502.0			Elevation 2502 ft.-msl (level 907.00) calculated from Bechtel Drawing 35-R-002-01D Rev. A, and Exhaust Shaft 351 Shaft Lining and Key Section and Detail.
MB 100	*	*			Not marked on log
MB 101	2436.5	2433.5			
MB 102	2394.8	2393.6		x	Clay near base (3" thick)
MB 103	2382.0	2367.0			Potential brine seepage interval-inferred from AIS brine seepage conditions
MB 104	2359.0	2358.7			
MB 105	2342.9	2341.8		x	Clay at base
MB 106	2322.5	2321.8		x	Clay at base (1" thick)
MB 107	2289.0	2288.5			
MB 108	2279.7	2277.5		x	Clay at base (2" thick)
MB 109	2256.0	2230.5			Potential brine seepage interval-inferred from AIS brine seepage conditions
MB 110	2191.8	2189.6		x	Clay at base
MB 111	2181.8	2181.4			
MB 112	2164.2	2161.9		x	Clay at base (1" - 2.5" thick)
MB 113	2137.8	2136.4		x	Clay at base (2" thick)
MB 114	2114.6	2113.8			
MB 115	2078.9	2075.5		x	Clay at base (1" thick)
MB 116	2066.3	2064.0		x	Clay at base (1" thick)
Vaca Triste (VACA TR)	2055.3	2051.0			Potential brine seepage interval-inferred from AIS brine seepage conditions
MB 117	1988.6	1987.3			
MB 118	1965.0	1962.7		x	Clay (1" - 2" thick)
MB 119	1938.9	1937.0			
MB 120	1919.0	1918.3			
Zone A	1913.5	1905.6			Potential brine seepage interval-inferred from AIS brine seepage conditions
MB 121	1913.5	1905.6			Potential brine seepage interval-inferred from AIS brine seepage conditions
MB 122	1898.5	1897.0			
Union Anhydrite	1872.0	1866.0			Potential brine seepage interval-inferred from AIS brine seepage conditions
MB 123	1793.0	1786.0			

Stratigraphic Unit/Engineering Feature	Unit/ feature Top (ft-msl)	Unit/ Feature Bottom (ft-msl)	Water/ Brine Obs.	Clay Obs.	Comments
MB 124	1779.3	1770.0		x	Potential brine seepage interval- inferred from AIS brine seepage conditions. Clay (1" - 2" thick)
Zone B	1727.8	1724.3			Potential brine seepage interval-inferred from AIS brine seepage conditions
Zone C	1700.3	1690.8			Potential brine seepage interval-inferred from AIS brine seepage conditions
MB 125	Absent	Absent			Section absent (Pinched out).
MB 126	1682.0	1681.5			
MB 127	1657.5	1655.3			
MB 128	1646.0	1644.3			
Zone D	1634.8	1633.0			Potential brine seepage interval-inferred from AIS brine seepage conditions
Zone E	1633.0	1631.0			Potential brine seepage interval-inferred from AIS brine seepage conditions
Zone F	1631.0	1628.3			Potential brine seepage interval–inferred from AIS brine seepage conditions
Zone G	1628.3	1626.3			Potential brine seepage interval-inferred from AIS brine seepage conditions
Zone H	1626.3	1620.8			Potential brine seepage interval-inferred from AIS brine seepage conditions
MB 129	1620.8	1619.0		x	Potential brine seepage interval- inferred from AIS seepage conditions. Clay at base (1/4" thick)
Zone I	1619.0	1614.0			Potential brine seepage interval-inferred from AIS brine seepage conditions
MB 130	1609.0	1608.3		x	Clay at base (1" thick)
MB 131	1541.5	1540.3			
Zone J	1540.3	1536.0			Potential brine seepage interval–inferred from AIS brine seepage conditions
MB 132	1510.2	1509.4			
MB 133	1491.9	1488.6			
MB 134	1446.5	1434.7			
MB 135	1419.0	1418.2			
MB 136	1374.3	1363.4			
MB 137	1349.8	1348.9			
MB 138	1302.6	1302.1			
Anhydrite "a" (ANH "a")	1279.6	1278.9			

Stratigraphic Unit/Engineering Feature	Unit/ feature Top (ft-msl)	Unit/ Feature Bottom (ft-msl)	Water/ Brine Obs.	Clay Obs.	Comments
Anhydrite "b" (ANH "b")	1272.1	1271.8			
Station Level	1262.5	1252.0			Elevation 1252.00 ft-msl calculated from Bechtel drawings (level 2157.00 ft) Approximate-Bechtel Drawing 35-R-001-01D Rev. B, Exhaust Shaft 351 Development Plan Sections & Detail.
					MB-139 thru 142 were not penetrated by the exhaust shaft.

A.4.3 Salt Handling Shaft Stratigraphic Database

Stratigraphic Unit/Engineering Feature	Unit/ Feature Top (ft-msl)	Unit/ Feature Bottom (ft-msl)	Water/ Brine Obs.	Clay Obs.	Comments
Top of Concrete	3411.5				Bechtel Drawing 37-R-010 Rev. A, Exploratory Shaft Key and Shaft Station Location Section (Top of Existing Shaft)
Ground Surface (SURF)/Finished Grade	3410.5				Ground surface (finished grade) elevation is tied to CWI benchmark No. CW-1 outside the exploratory shaft at an elevation of 3410.080 ft MSL; DOE-WIPP 86-010. Stratigraphic contacts are from lithologic log; TME 3178.
Quaternary Sd (QSD)	3410.5	3399.0			Stratigraphic units behind casing were not mapped. Mapping started in the basal portion of the Santa Rosa Fm. . Unit tops behind casing are secured from gamma ray log interpretation and the Bechtel drill log. DOE- WIPP-86-010.
Mescalero Caliche (MES)	3399.0	3394.5			
Gatuna Fm. (GAT)	3394.5	3374.0			
Santa Rosa Fm. (SR)	3374.0	3319.0			
Dewey Lk. Rb. (DLR)	3319.0	2868.0			Top contact is an erosional surface. Contact secured through gamma ray log interpretation.
Rustler Fm. (RUS)	2868.0	2560.0			Total inflow from rustler aquifers was less than 1.5 gallons per minute prior to liner installation. Subsequent to liner installation inflow rate dropped to less than 0.1 gallon per minute. TME 3178
49-er mbr (49R)	2868.0	2808.0	x		Groundwater, regional aquitard; at some locations a thin claystone has a transmissivity comparable to the Magenta. SAND90-2035J
Magenta mbr (MAG)	2808.0	2789.0	x		Groundwater, regional; SAND90-2035J
Tamarisk mbr (TAM)	2789.0	2711.0	x		Groundwater, regional aquitard; SAND90-2035J
Culebra D mbr (CUL)	2711.0	2694.0	x		Groundwater, regional; SAND90-2035J
Unnamed L mbr (ULM)	2694.0	2560.0	x		Groundwater, regional aquitard (siltstone unit at H-16); SAND90-2035J

Stratigraphic Unit/Engineering Feature	Unit/ Feature Top (ft-msl)	Unit/ Feature Bottom (ft-msl)	Water/ Brine Obs.	Clay Obs.	Comments
Salado Fm. (SAL)	2560.0	*	x		Regional potential for Groundwater (brine) occurrence at the Rustler /Salado Fm. contact; SAND90-2035J. Groundwater seeps at Fm. contact noted on lithologic log; TME-3178. Shaft did not penetrate base of unit.
Key (See Comments)		2529.0			Elevation 2529.00 ft.-msl calculated from level 880.00 ft. Bechtel Drawing 37-R-012 Rev. A, Exploratory Shaft Key Sections and Details
MB 100	2488.0	*			Top from stratigraphic survey ; WTSD-TME-3179
MB 101	2439.1	2435.1			
MB 102	2400.0	2398.7		x	Clay at base
MB 103	2386.4	2372.6		x	Potential brine seepage interval-inferred from AIS brine seepage conditions. Clay at base.
MB 104	2364.6	2363.9			
MB 105	2348.2	2347.8		x	Clay at base
MB 106	2328.7	2327.3		x	Clay at base
MB 107	2294.0	2293.3		x	Clay at base
MB 108	2284.8	2283.9		x	Clay at base
MB 109	2263.5	2237.0		x	Potential brine seepage interval-inferred from AIS brine seepage conditions. Interbedded Clay
MB 110	2205.4	2204.3		x	Clay at base
MB 111	2189.1	2188.2			
MB 112	2171.6	2168.9		x	Clay at base
MB 113	2144.4	2142.6		x	Clay at base
MB 114	2120.7	2120.0			
MB 115	2084.5	2081.8		x	Clay at base
MB 116	2073.5	2071.0		x	Clay at base
Vaca Triste (VACA TR.)	2061.8	2060.0			Potential brine seepage interval-inferred from AIS brine seepage conditions
MB 117	1994.2	1993.3		x	Clay at base
MB 118	1965.5	1963.0			
MB 119	1945.1	1943.3		x	
MB 120	1925.5	1924.4		x	Clay at base

Stratigraphic Unit/Engineering Feature	Unit/ Feature Top (ft-msl)	Unit/ Feature Bottom (ft-msl)	Water/ Brine Obs.	Clay Obs.	Comments
Zone A	1923.0	1913.8			Potential brine seepage interval-inferred from AIS brine seepage conditions
MB 121	1913.7	1911.5		x	Potential brine seepage interval-inferred from AIS brine seepage conditions. Clay at base.
MB 122	1903.7	1902.4			
Union Anhydrite	1874.5	1870.5			Potential brine seepage interval-inferred from AIS brine seepage conditions
MB 123	1791.8	1789.6			
MB 124	1783.8	1776.4		x	Potential brine seepage interval-inferred from AIS brine seepage conditions. Clay at base.
Zone B	1732.5	1729.3			Potential brine seepage interval-inferred from AIS brine seepage conditions
Zone C	1705.0	1696.3			Potential brine seepage interval-inferred from AIS brine seepage conditions
MB 125	1724.6	1722.9		x	Clay at base
MB 126	1688.2	1687.1		x	Clay - total section
MB 127	1662.3	1659.3		x	Clay at base
MB 128	1649.6	1648.2		x	Clay at base
Zone D	1639.5	1637.0			Potential brine seepage interval-inferred from AIS brine seepage conditions
Zone E	1637.0	1634.3			Potential brine seepage interval-inferred from AIS brine seepage conditions
Zone F	1634.3	1632.1			Potential brine seepage interval-inferred from AIS brine seepage conditions
Zone G	1632.1	1630.0			Potential brine seepage interval-inferred from AIS brine seepage conditions
Zone H	1630.0	1625.0			Potential brine seepage interval-inferred from AIS brine seepage conditions
MB 129	1625.0	1622.9		x	Clay at base
Zone I	1621.8	1613.0			Potential brine seepage interval-inferred from AIS brine seepage conditions
MB 130	1613.5	1612.5			Correlated with Air Intake and Exhaust Shafts.
MB 131	1545.5	1544.6			
Zone J	1544.6	1540.0			Potential brine seepage interval-inferred from AIS brine seepage conditions
MB 132	1511.1	1510.7		x	Clay - total section

Stratigraphic Unit/Engineering Feature	Unit/ Feature Top (ft-msl)	Unit/ Feature Bottom (ft-msl)	Water/ Brine Obs.	Clay Obs.	Comments
MB 133	Absent	Absent			Pinched out.
MB 134	1453.7	1442.3		x	Clay at base
MB 135	1425.7	1424.2		x	Clay at top
MB 136	1382.3	1374.4		x	Clay at base
MB 137	1358.7	1357.5			
MB 138	1311.8	1311.1		x	Clay at base
Anhydrite "a" (ANH "a")	1288.4	1287.1		x	Clay at base
Anhydrite "b" (ANH "b")	1281.6	1280.7		x	Clay at base
Station Level		1247.0			Elevation 1247.00 ft.-msl calculated from level 2162.00 ft. (approximate) - Bechtel Drawing 37-R-010 Rev. A, Exploratory Shaft Key and Shaft Station Location Section. This level measurement needs to be confirmed with new measurement
					as it locates the station level below Marker Bed 139.
MB 139	1254.3	1252.3		x	Potential brine seepage interval - Anhydrite. Clay at base.
					Base of lithologic log terminates above MB 140. Total depth elevation is 1105.0 ft. msl.
MB 140					Potential brine seepage interval - Anhydrite

A.4.4 Waste Shaft Stratigraphic Database

Stratigraphic Unit/Engineering Feature	Unit/ feature Top (ft-msl)	Unit/ Feature Bottom (ft-msl)	Water/ Brine Obs.	Clay Obs.	Comments
Top of Concrete	3408.5				Bechtel drawing 31-R-001-01D Rev. B, Waste Shaft 311 Development Sections (Top of Pad)
Ground Surface (SURF) /Finished Grade	3407.5				Ground surface (finish grade) elevation 3407.5 ft MSL, surveyed. Upper section of the shaft was not logged lithologically. Logging started at 3310.2 ft msl in the Dewey Lake Red Beds. Stratigraphic contacts are from lithologic log; WTSD-TME-038
Quaternary Sd (QSD)	3407.5				
Mescalero Caliche (MES)	Not mapped	Not mapped			
Gatuna Fm. (GAT)	Not mapped	Not mapped			
Santa Rosa Fm. (SR)	Not mapped	Not mapped			
Dewey Lk. Rb. (DLR)		2871.5		x	Top contact is an erosional surface. Clay (<6" thick)
Rustler Fm. (RUS)	2871.5	2565.3			
49-er mbr (49R)	2871.5	2813.0	x		Groundwater, regional aquitard; at some locations a thin claystone has a transmissivity comparable to the Magenta. SAND90-2035J
Magenta D mbr (MAG)	2813.0	2788.0	x		Groundwater; SAND90-2035J. Weeps WTSD - TME - 038
Tamarisk mbr (TAM)	2788.0	2702.5	x	x	Groundwater, regional aquitard; SAND90-2035J Thin clay layers (< 6" thick)
Culebra D mbr (CUL)	2702.5	2680.7	x		Groundwater, regional; DOE-WIPP 90-051
Unnamed L mbr (ULM)	2680.7	2565.3	x	x	Groundwater, regional aquitard (siltstone unit at H-16); SAND90-2035J, Thin clay layers (< 6" thick)
Salado Fm. (SAL)	2565.3	Did not penetrate	x		Regional potential for Groundwater (brine) occurrence at the Rustler /Salado Fm. contact; SAND90-2035J. No Groundwater at Fm. contact noted on lithologic log. Shaft did not penetrate base of unit.

Stratigraphic Unit/Engineering Feature	Unit/ feature Top (ft-msl)	Unit/ Feature Bottom (ft-msl)	Water/ Brine Obs.	Clay Obs.	Comments
Key (See Comments)		2509.0			Elevation 2509.00 ft.-msl calculated from level 900.00 ft. Bechtel drawing 31-R-001-01D Rev. B, Waste Shaft 311 Development Sections and 31-R-002-01D Rev. A, Waste shaft 311 Shaft Lining and Key Section and Details
MB 100	*	*			Not marked on log
MB 101	2444.0	2442.0			
MB 102	2402.0	2401.0		x	Thin clay (<6" thick)
MB 103	2389.0	2374.0			Potential brine seepage interval-inferred from AIS brine seepage conditions
MB 104	2367.0	2366.0			
MB 105	2350.1	2349.0		x	Clay at base (<1" thick)
MB 106	2329.3	2328.5		x	Clay at base (<2" thick)
MB 107	2295.5	2295.0			
MB 108	2285.9	2285.3		x	Clay at base (<0.5" thick)
MB 109	2262.9	2236.9		x	Potential brine seepage interval–inferred from AIS brine seepage conditions. 1 ft. clay in middle of section
MB 110	2199.3	2196.0			
MB 111	2188.3	2188.0			
MB 112	2170.8	2168.5		x	Clay at base (<2" thick)
MB 113	2144.0	2142.3		x	Clay at base (<0.5" thick)
MB 114	2120.5	2119.5			
MB 115	2084.8	2081.5			
MB 116	2071.8	2069.0		x	Clay at base (<0.5" thick)
Vaca Triste (VACA TR.)	2060.5	2052.5			Potential brine seepage interval–inferred from AIS brine seepage conditions
MB 117	1993.2	1992.0		x	Clay at base (<3" thick)
MB 118	1969.8	1967.5		x	Clay at base (<0.5" thick)
MB 119	Absent	Absent			Section absent (pinched out).
MB 120	Absent	Absent			Section absent (pinched out).
Zone A	1923.8	1910.0			Potential brine seepage interval-inferred from AIS brine seepage conditions
MB 121	1910.0	1907.1		x	Potential brine seepage interval-inferred from AIS brine seepage conditions
MB 122	1900.3	1899.0			
Union Anhydrite	1874.3	1867.0			Potential brine seepage interval-inferred from AIS brine seepage conditions

Stratigraphic Unit/Engineering Feature	Unit/ feature Top (ft-msl)	Unit/ Feature Bottom (ft-msl)	Water/ Brine Obs.	Clay Obs.	Comments
MB 123	1794.0	1787.0			
MB 124	1780.2	1771.5		x	Potential brine seepage interval - inferred from AIS brine seepage conditions. Clay at base (< 0.5' thick)
Zone B	1725.8	1720.3			Potential brine seepage interval-inferred from AIS brine seepage conditions
Zone C	1701.0	1691.0			Potential brine seepage interval-inferred from AIS brine seepage conditions
MB 125	Absent	Absent			Section absent (pinched out).
MB 126	1682.2	1681.2		x	Clay at base (<4" thick)
MB 127	1655.7	1653.5			
MB 128	1644.2	1642.2			
Zone D	1634.5	1632.5			Potential brine seepage interval-inferred from AIS brine seepage conditions
Zone E	1632.5	1630.0			Potential brine seepage interval-inferred from AIS brine seepage conditions
Zone F	1630.0	1627.0			Potential brine seepage interval-inferred from AIS brine seepage conditions
Zone G	1627.0	1625.0			Potential brine seepage interval-inferred from AIS brine seepage conditions
Zone H	1625.0	1619.5			Potential brine seepage interval-inferred from AIS brine seepage conditions
MB 129	1619.5	1617.7		x	Clay at base (1 ft. thick)
Zone I	1616.5	1612.3			Potential brine seepage interval-inferred from AIS brine seepage conditions
MB 130	1608.1	1606.9			
MB 131	1539.3	1538.5		x	Thin clay layer at base.
Zone J	1538.0	1531.0			Potential brine seepage interval-inferred from AIS brine seepage conditions
MB 132	1508.0	1507.0		x	Clay at base (<0.5" thick)
MB 133	1489.8	1487.7		x	Thin clay layer at base.
MB 134	1445.3	1433.5		x	Clay at base (<4" thick)
MB 135	1417.2	1411.5			
MB 136	1373.3	1362.1		x	Thin clay layer at base.
MB 137	Absent	Absent			Section absent (pinched out).
MB 138	1299.5	1289.9		x	Clay at base (<1.5" thick)
Anhydrite "a" (ANH "a")	1276.1	1275.3		x	Clay at base (<0.25" thick)

Stratigraphic Unit/Engineering Feature	Unit/ feature Top (ft-msl)	Unit/ Feature Bottom (ft-msl)	Water/ Brine Obs.	Clay Obs.	Comments
Anhydrite "b" (ANH "b")	1268.6	1268.4		x	Clay at base (<0.25" thick)
Station Level	1259.0	1249.0			Elevation 1249.0 ft.-msl calculated from level 2160.0 ft. Bechtel drawing 31-R-001-01D Rev. B, Waste Shaft 311 Development Sections
					MB-139 thru 142 were not noted on lithologic log.
MB 139					Potential brine seepage interval - Anhydrite
MB 140					Potential brine seepage interval - Anhydrite

A.5 Conclusions

The evaluation of shaft stratigraphy and geohydrology at the WIPP has provided extensive information about shaft stratigraphy, shaft groundwater/brine occurrence, and shaft survey data. This information is outlined as follows:

A.5.1 Shaft Stratigraphy

- The SDB records the following information relevant to each shaft:
  - Engineering features (top of concrete, base of key, and station level)
  - Ground Surface (finished grade)
  - Stratigraphic unit contact name
  - Unit top MSL elevation
  - Unit bottom MSL elevation
  - Groundwater/brine observance
  - Clay observance
  - Comments relating to stratigraphic unit or engineering features.

The evaluation has

- confirmed the vertical and lateral continuity of the majority of the named stratigraphic units among the four shafts;
- identified occurrences of clay in marker beds (as logged during the geologic mapping of each shaft) that could serve as impermeable layers upon which brine may migrate, or in some instances, if the clay was buried prior to dewatering, the clay layer can yield some water as it dewaters and consolidates after being exposed subsequent to shaft construction (Deal et al., 1995).
- provided a graphical display in the form of structural cross sections, derived from the compiled data base, that illustrate the horizontal and vertical relationships of named stratigraphic units among the WIPP shafts.

A.5.2 Shaft Groundwater / Brine Occurrence

The evaluation of WIPP geohydrology performed to identify regional intervals of groundwater occurrence in the Rustler Formation and shallower stratigraphic units, as well as brine seepage intervals in the Salado Formation penetrated by the shafts

- identified regional groundwater occurrence intervals in the Rustler Formation as well as 19 intervals of brine seepage within the Salado Formation penetrated by the four shafts;
- identified intervals of brine seepage through recent observations (July 1994) of the Salado Formation in the AIS. Currently, the surface Marker Bed 103 is the only seepage interval where the salt encrustations are visibly wet;
- identified typical hydraulic conductivity values for the primary lithologies encountered in the Salado Formation section penetrated by the shafts;
- provided a graphical display in the form of structural cross sections, derived from the compiled data in the SDB, that illustrate the vertical and potential lateral distribution of brine seepage intervals within the Salado Formation.

A.5.3 Shaft Survey Data

The shaft survey data were reviewed to evaluate the MSL elevations secured from the shaft as-built drawings relative to those recorded in the SDB and to determine a surface reference point to facilitate completion of sealing system design drawings and final seal emplacement. This review

- demonstrated relative consistency (within 6 in.) between surface elevations reported in geotechnical reports and working drawings and the data recorded on the Bechtel and Westinghouse as-built drawings for each shaft;
- identified the WIPP surveyed reference level 0'-0" (elevation of 3409.0 ft-MSL) used for computing below-surface depths (i.e., 3409.0 ft-MSL = Reference level 0'-0");
- identified the "top of concrete" for each shaft as a consistent surface reference point to be utilized for the development of the shaft seal design drawings;
- identified discrepancies between lithologic data obtained from geotechnical shaft reports and as-built data, by comparing the shaft SDB elevations to shaft as-built drawing elevations.

A.6 References

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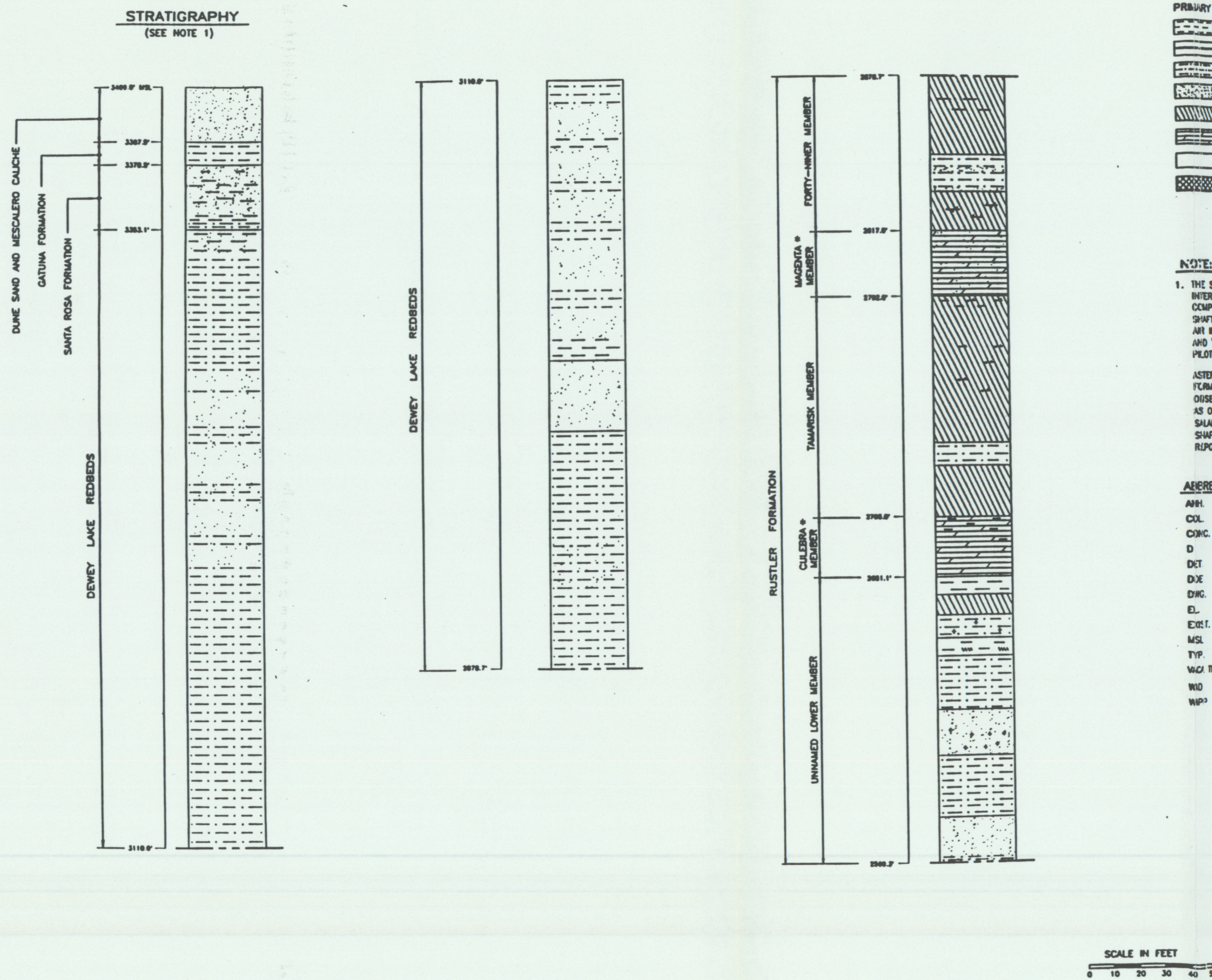
Appendix B:
Shaft Sealing System Drawings



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

NOTE:

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 "LETTER REPORT ON THE RESULTS OF THE WASTE ISOLATION PILOT PLANT SHAFT STRATIGRAPHY CORRELATION PROJECT", 1994.

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.

ABBREVIATION:

ANH.	ANHYDRITE
COL.	COLUMN
CONC.	CONCRETE
D	DIAMETER
DET	DETAIL
DOE	DEPARTMENT OF ENERGY
DWG.	DRAWING
EL.	ELEVATION
EXIST.	EXISTING
MSL	MEAN SEA LEVEL
TYP.	TYPICAL
VACA TR.	VACA TRISTE
WID	WESTINGHOUSE WASTE ISOLATION DIVISION
WIPP	WASTE ISOLATION PILOT PLANT

REV.	DATE	DESCRIPTION	BY	CK.	APP

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

WIPP SHAFT SEALING SYSTEM
NEAR-SURFACE/RUSTLER FORMATIONS

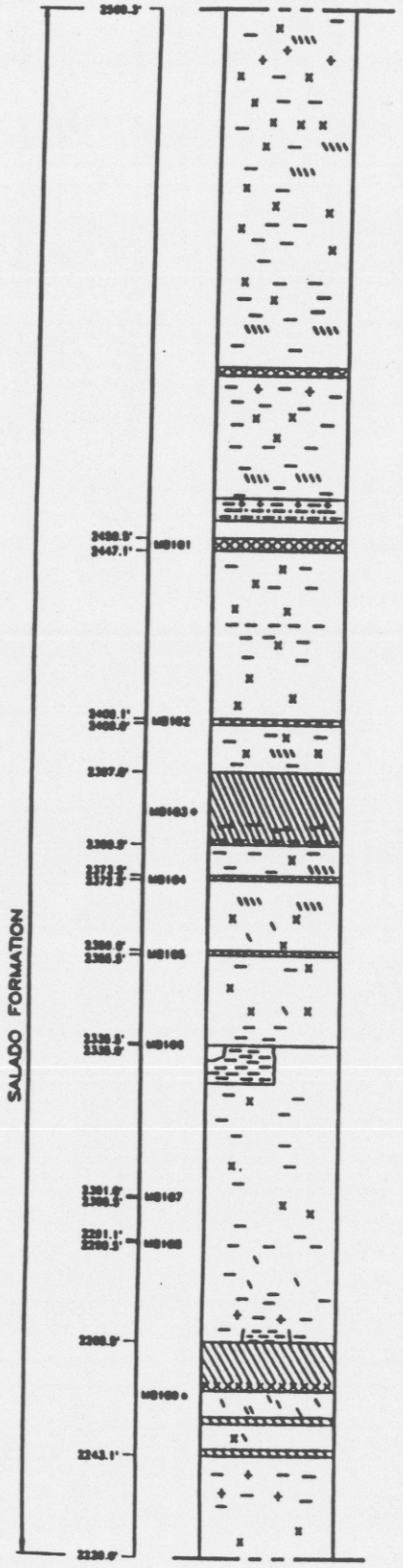
AIR INTAKE SHAFT
STRATIGRAPHIC PROFILE

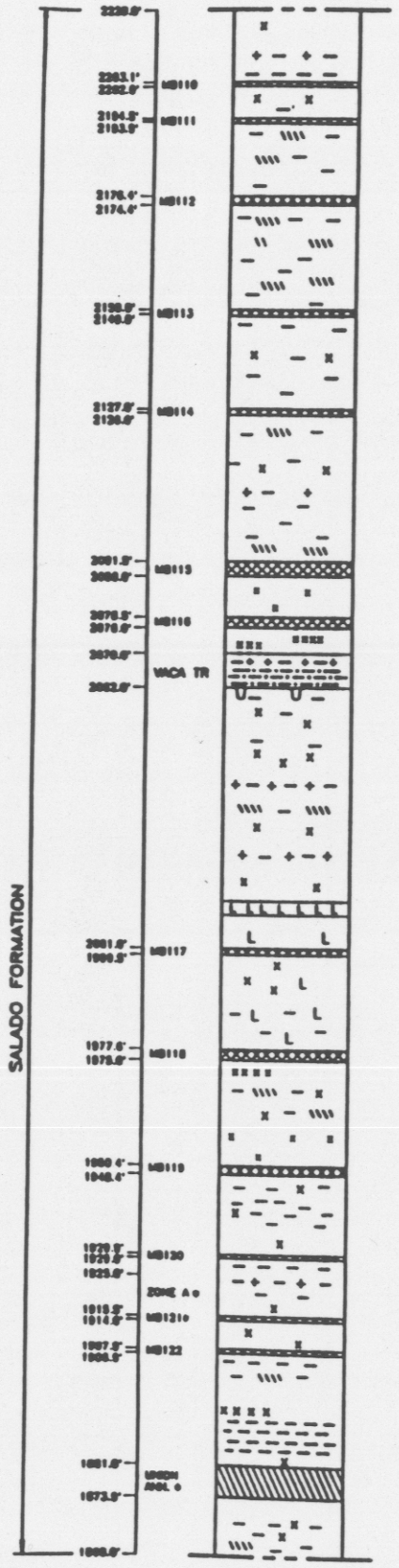
CONTRACT NO: AG-

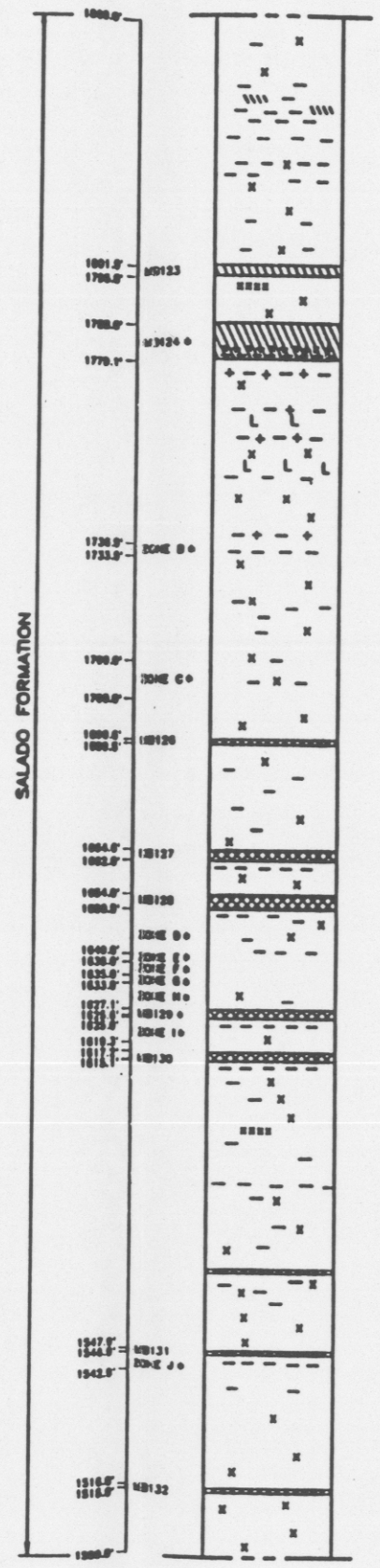
PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO. 33-SNL-003	SHEET NO. 1 OF 2

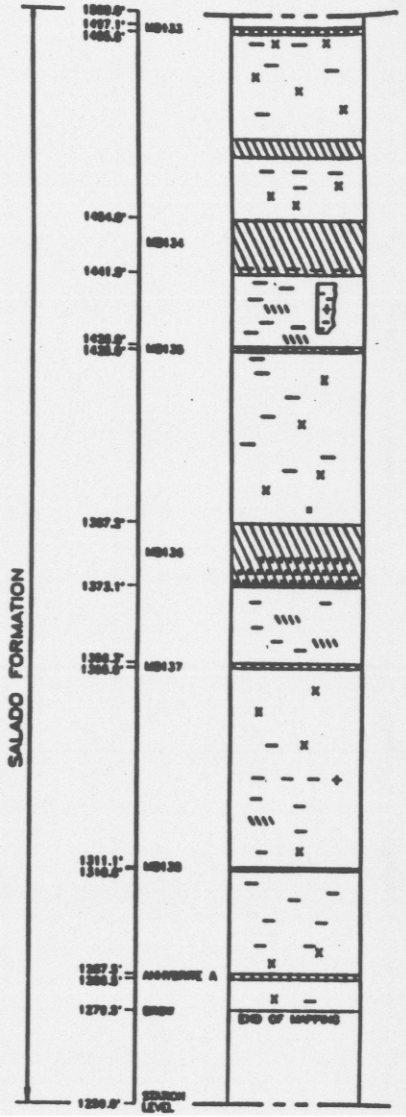
Figure B-1.

STRATIGRAPHY
(SEE NOTE 1 OF SHEET NO. 1)









LITHOLOGY:

PRIMARY ROCK/SEDIMENT TYPES

- MUDSTONE/CLAYSTONE
- CLAYSTONE BED
- SILTSTONE
- SANDSTONE
- ANHYDRITE/GYPSUM
- DOLOMITE
- HALITE
- POLYHALITE

SECONDARY CONSTITUENTS

- ARGILLACEOUS
- SILTY
- SANDY
- SULFATIC
- DOLOMITIC
- CALCAREOUS
- HALITIC
- POLYHALITIC
- LANGBEINITE

SCALE IN FEET
0 10 20 30 40 50

REV.	DATE	DESCRIPTION	BY	CK.	APP

SANDIA NATIONAL LABORATORIES

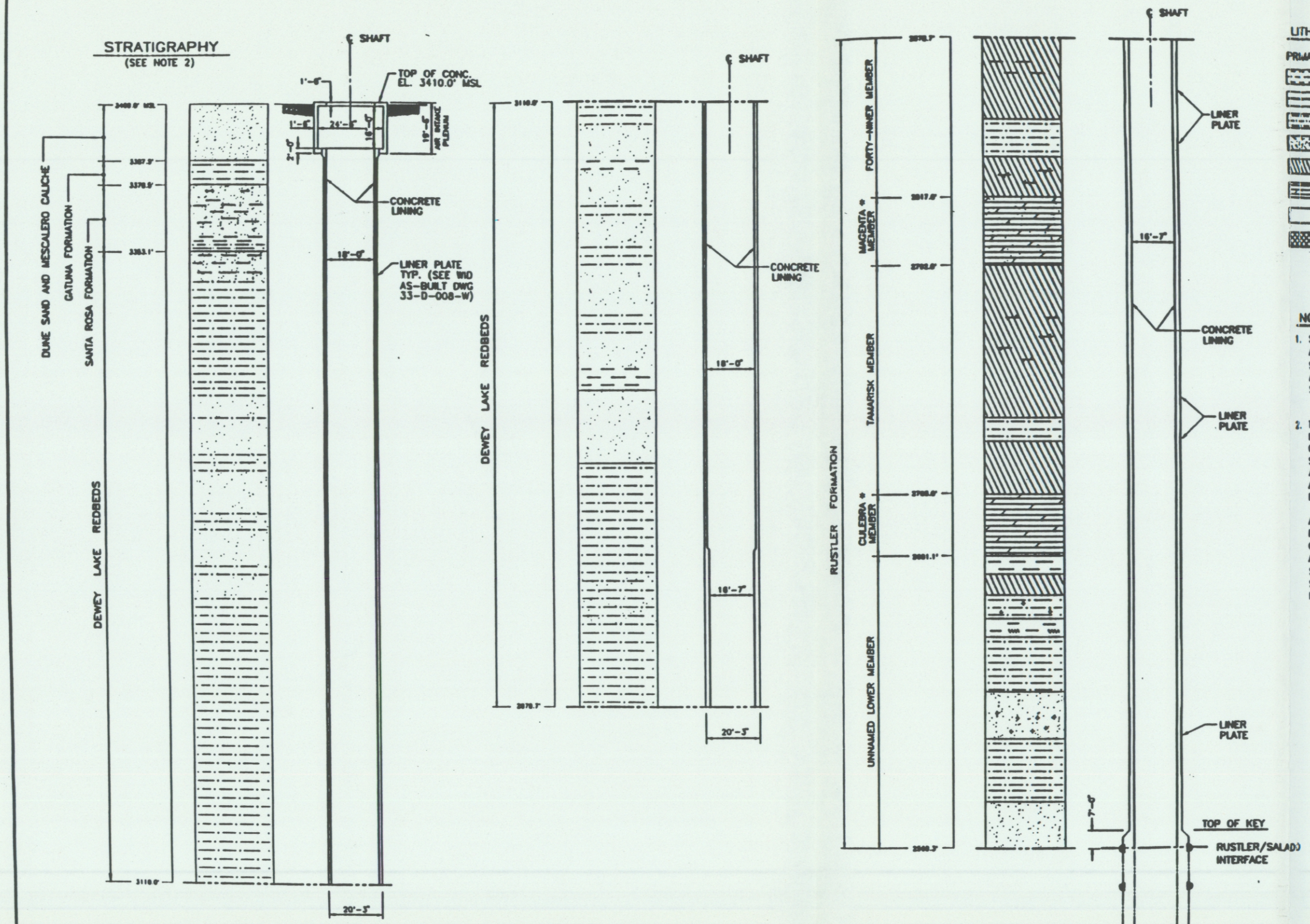
WIPP A/E SUPPORT — CONTRACT NO: AC-4000

WIPP SHAFT SEALING SYSTEM
SALADO FORMATION

AIR INTAKE SHAFT
STRATIGRAPHIC PROFILE

	NAME	DATE
BY	[illegible]	9-15-95
CK.	[illegible]	9/15/95
APP.	[illegible]	9/15/95
APP.	[illegible]	9/15/95
APP.	[illegible]	9/15/95

PARSONS BRINCKERHOFF ENERGY SERVICES, INC | SCALE: | SIZE B | SNL DWG. NO. 33-SNL-003 | SHEET NO. 2 OF 2



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

NOTE:

1. SHAFT COLLAR DETAILS BASED ON WESTINGHOUSE (WID) AS-BUILT DWGS. 33-C-001-W, DATED 1/22/93. AIR INTAKE SHAFT 331 SHAFT COLLAR/AIR INTAKE PLENUM PLAN, SECTIONS AND DETAILS AND 33-D-008-W, DATED 11/6/92, AIR INTAKE SHAFT 331 GENERAL ARRANGEMENT.

2. 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 "LETTER REPORT ON THE RESULTS OF THE WASTE ISOLATION PILOT PLANT SHAFT STRATIGRAPHY CORRELATION PROJECT", 1994.

   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.

SCALE IN FEET
0 10 20 30 40 50

REV.	DATE	DESCRIPTION	BY	CK.	APP

SANDIA NATIONAL LABORATORIES
WIPP A/E SUPPORT
CONTRACT NO: AC-4008

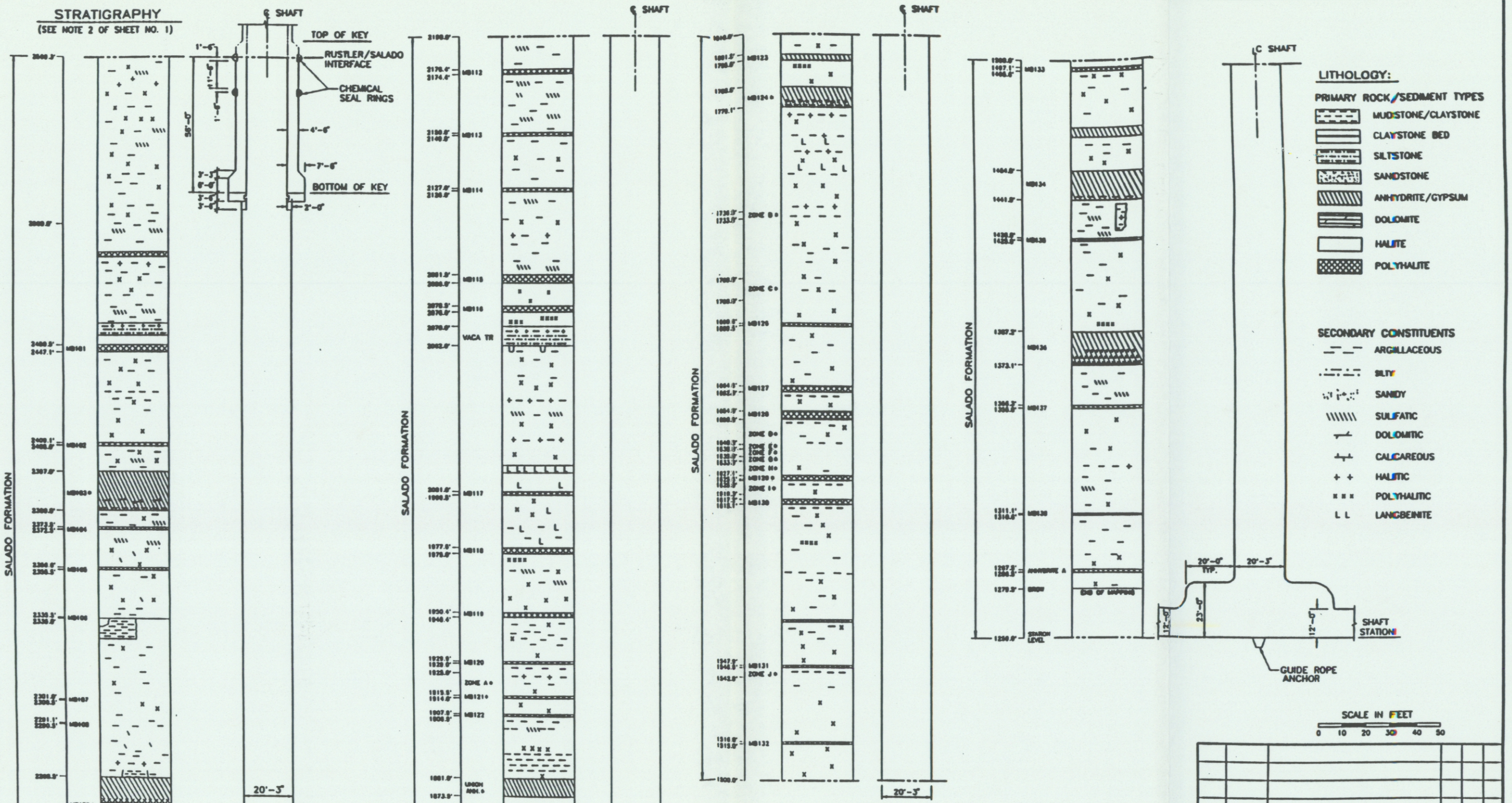
WIPP SHAFT SEALING SYSTEM
NEAR-SURFACE/RUSTLER FORMATIONS
AIR INTAKE SHAFT
STRATIGRAPHY &
AS-BUILT ELEMENTS

	NAME	DATE
BY		
CK.		
APP.		
APP.		
APP.		

PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO. 33-SNL-004	SHEET NO 1 OF 2

Figure B-3.

STRATIGRAPHY
(SEE NOTE 2 OF SHEET NO. 1)



LITHOLOGY:

PRIMARY ROCK/SEDIMENT TYPES
- MUDSTONE/CLAYSTONE
- CLAYSTONE BED
- SILTSTONE
- SANDSTONE
- ANHYDRITE/GYPSUM
- DOLOMITE
- HALITE
- POLYHALITE

SECONDARY CONSTITUENTS
- ARGILLACEOUS
- SILTY
- SANDY
- SULFATIC
- DOLOMITIC
- CALCAREOUS
- HALITIC
- POLYHALITIC
- LANGBEINITE

SCALE IN FEET
0 10 20 30 40 50

NOTES:

1. SHAFT KEY DETAILS BASED ON WESTINGHOUSE (WID) DWG. NO. 33-C-004-W1 AIR INTAKE SHAFT 331 SHAFT KEY PLAN, SECTIONS AND DETAILS. DATED 1/22/93 AND DWG. NO. 33-D-008-W AIR INTAKE SHAFT 331 GENERAL ARRANGEMENT. DATED 11/6/92.
2. SHAFT STATION DETAILS BASED ON WESTINGHOUSE (WID) AS-BUILT DWG. 51-W-212-W. DATED 1/22/93, AIR INTAKE SHAFT 331 SHAFT STATION PLANS, SECTIONS AND DETAILS.

REV.	DATE	DESCRIPTION	BY	CK.	APP

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

CONTRACT NO: AC-4000

WIPP SHAFT SEALING SYSTEM
SALADO FORMATION
AIR INTAKE SHAFT
STRATIGRAPHY &
AS-BUILT ELEMENT

	NAME	DATE
BY		
CK.		
APP.		
APP.		
APP.		

PARSONS BRINCKERHOFF ENERGY SERVICES, INC | SCALE: | SIZE B | SNL DWG. NO. 33-SNL-004 | SHEET NO. 2 OF 2

Figure B-4.

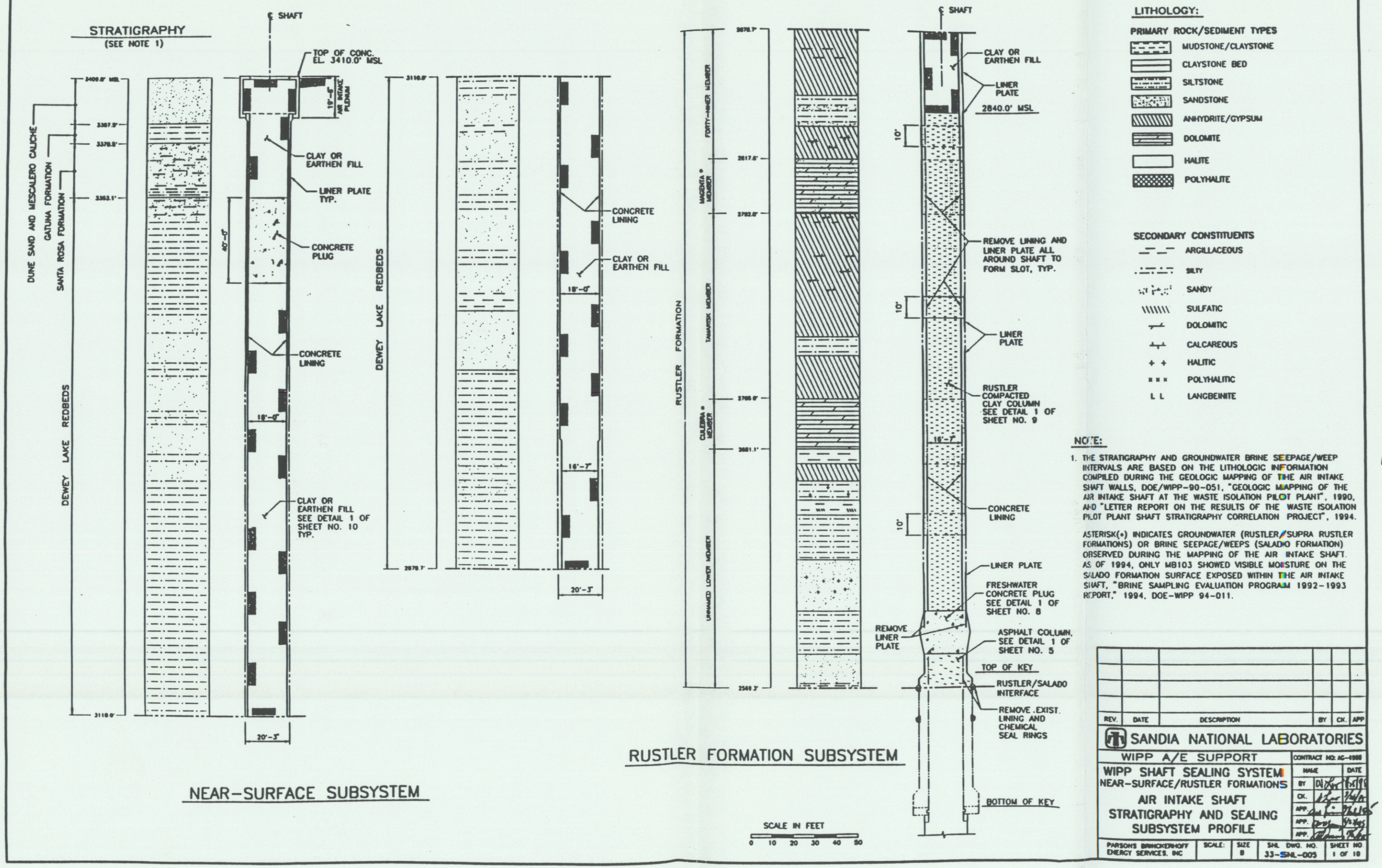

STRATIGRAPHY
(SEE NOTE 1)
DUNE SAND AND MESCALERO CALICHE
CAPTAIN FORMATION
SANTA ROSA FORMATION
DEWEY LAKE REDBEDS
3400.0' MSL
3387.5'
3378.0'
3363.1'
3110.0'
℄ SHAFT
TOP OF CONC. EL. 3410.0' MSL
19'-6" AIR INTAKE PLENUM
CLAY OR EARTHEN FILL
LINER PLATE TYP.
40'-0"
CONCRETE PLUG
CONCRETE LINING
18'-0"
CLAY OR EARTHEN FILL SEE DETAIL 1 OF SHEET NO. 10 TYP.
20'-3"
DEWEY LAKE REDBEDS
3110.0'
2978.7'
CONCRETE LINING
CLAY OR EARTHEN FILL
18'-0"
16'-7"
20'-3"
NEAR-SURFACE SUBSYSTEM
RUSTLER FORMATION
FORTY-NINER MEMBER
MAGENTA* MEMBER
TAMARISK MEMBER
CULEBRA* MEMBER
UNNAMED LOWER MEMBER
3678.7'
3617.6'
3792.0'
3705.0'
3681.1'
2540.3'
℄ SHAFT
CLAY OR EARTHEN FILL
LINER PLATE
2840.0' MSL
10'
REMOVE LINING AND LINER PLATE ALL AROUND SHAFT TO FORM SLOT, TYP.
LINER PLATE
RUSTLER COMPACTED CLAY COLUMN SEE DETAIL 1 OF SHEET NO. 9
16'-7"
CONCRETE LINING
LINER PLATE
FRESHWATER CONCRETE PLUG SEE DETAIL 1 OF SHEET NO. 8
REMOVE LINER PLATE
ASPHALT COLUMN, SEE DETAIL 1 OF SHEET NO. 5
TOP OF KEY
RUSTLER/SALADO INTERFACE
REMOVE EXIST. LINING AND CHEMICAL SEAL RINGS
BOTTOM OF KEY
RUSTLER FORMATION SUBSYSTEM
SCALE IN FEET
0 10 20 30 40 50
LITHOLOGY:
PRIMARY ROCK/SEDIMENT TYPES
MUDSTONE/CLAYSTONE
CLAYSTONE BED
SILTSTONE
SANDSTONE
ANHYDRITE/GYPSUM
DOLOMITE
HALITE
POLYHALITE
SECONDARY CONSTITUENTS
ARGILLACEOUS
SILTY
SANDY
SULFATIC
DOLOMITIC
CALCAREOUS
HALITIC
POLYHALITIC
LANGBEINITE
NOTE:
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 "LETTER REPORT ON THE RESULTS OF THE WASTE ISOLATION PILOT PLANT SHAFT STRATIGRAPHY CORRELATION PROJECT", 1994.
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.
REV. DATE DESCRIPTION BY CK. APP
SANDIA NATIONAL LABORATORIES
WIPP A/E SUPPORT
CONTRACT NO: AG-4988
WIPP SHAFT SEALING SYSTEM
NEAR-SURFACE/RUSTLER FORMATIONS
AIR INTAKE SHAFT
STRATIGRAPHY AND SEALING
SUBSYSTEM PROFILE
NAME DATE
BY
CK.
APP.
APP.
APP.
PARSONS BRINCKERHOFF ENERGY SERVICES, INC
SCALE:
SIZE B
SNL DWG. NO. 33-SNL-005
SHEET NO 1 OF 10

Figure B-5.

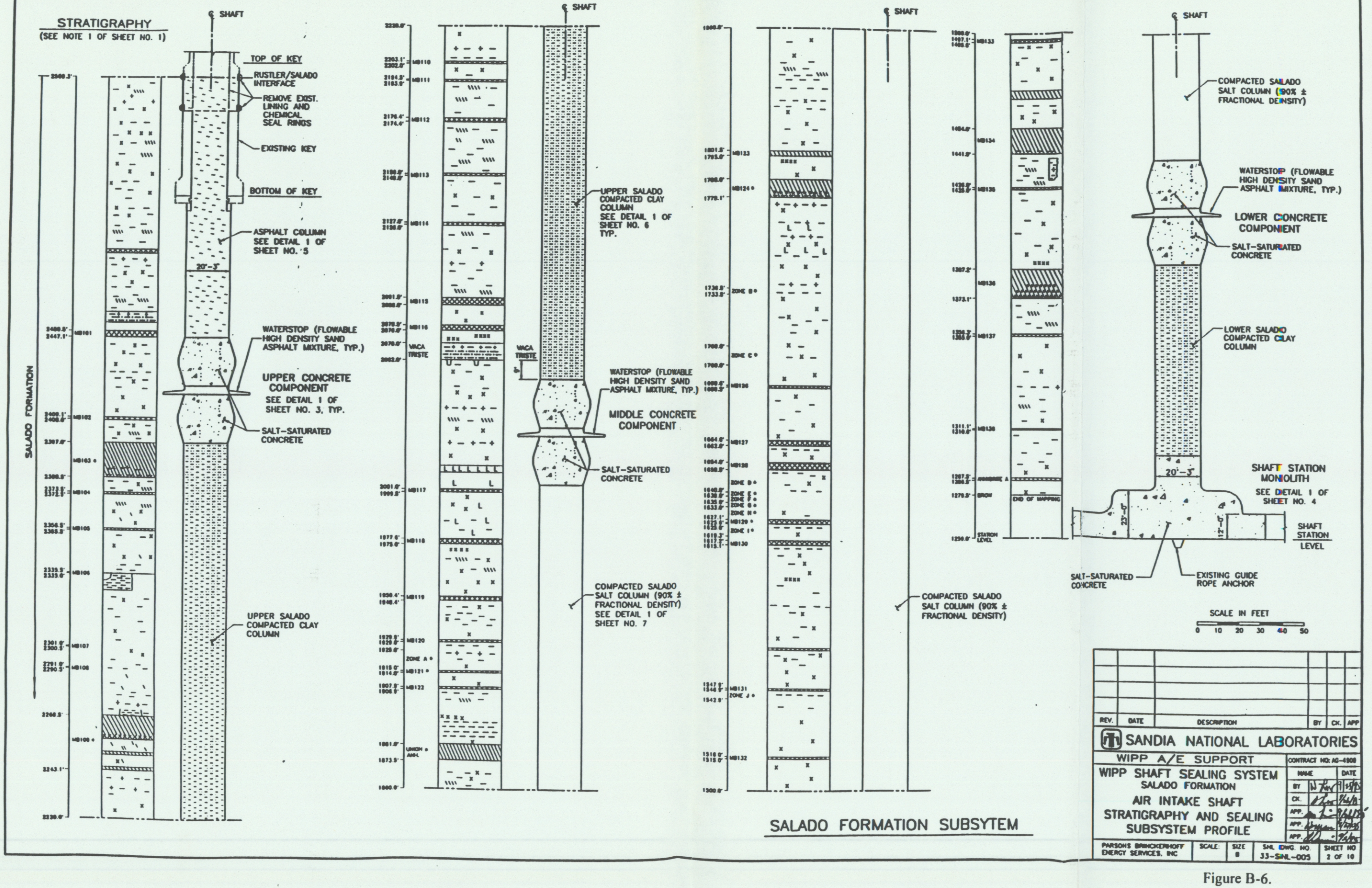
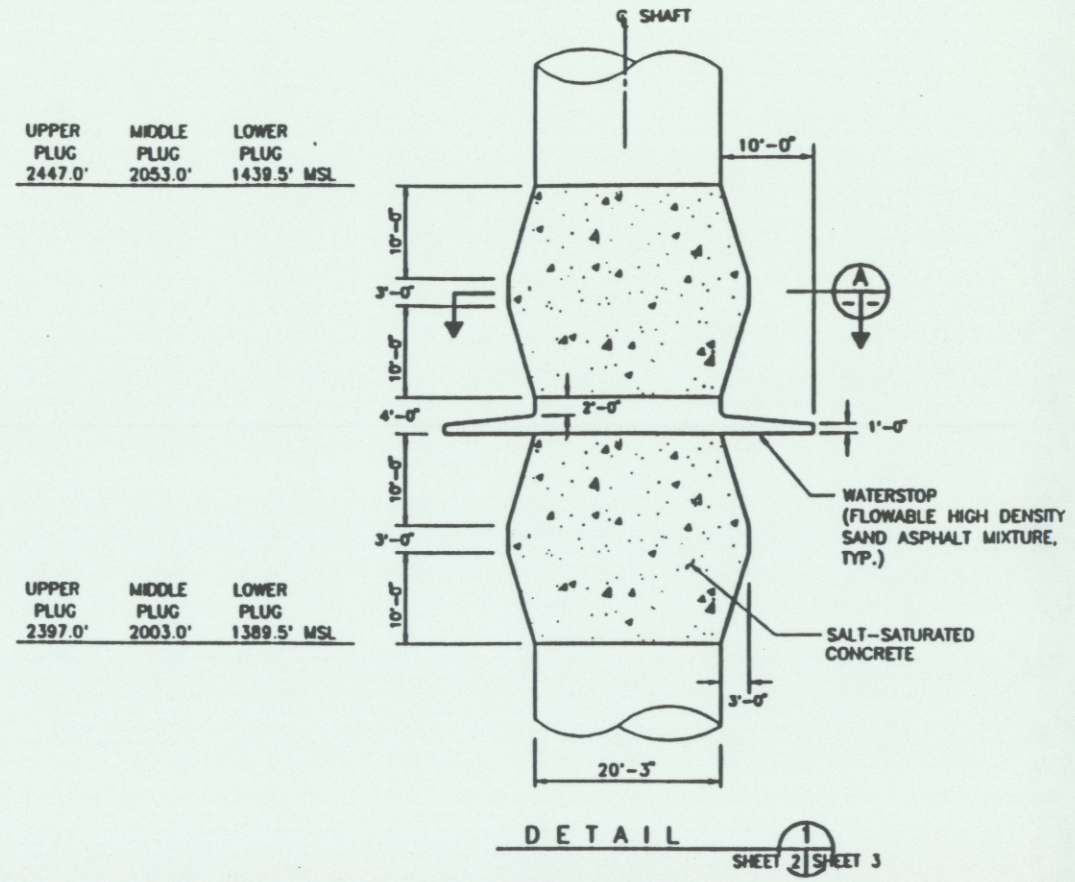
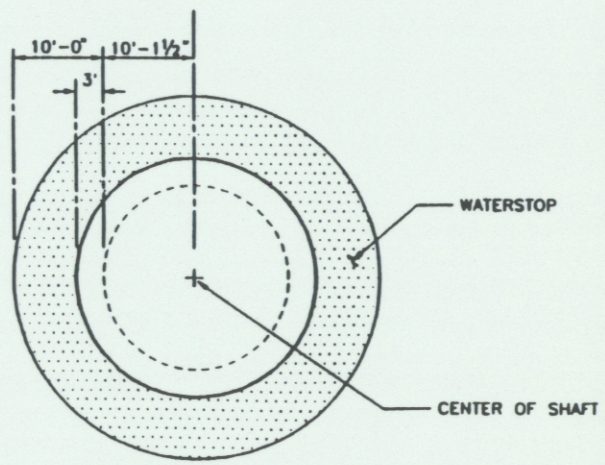

STRATIGRAPHY
(SEE NOTE 1 OF SHEET NO. 1)
SALADO FORMATION
℄ SHAFT
TOP OF KEY
RUSTLER/SALADO INTERFACE
REMOVE EXIST. LINING AND CHEMICAL SEAL RINGS
EXISTING KEY
BOTTOM OF KEY
ASPHALT COLUMN SEE DETAIL 1 OF SHEET NO. 5
20'-3"
WATERSTOP (FLOWABLE HIGH DENSITY SAND ASPHALT MIXTURE, TYP.)
UPPER CONCRETE COMPONENT
SEE DETAIL 1 OF SHEET NO. 3, TYP.
SALT-SATURATED CONCRETE
UPPER SALADO COMPACTED CLAY COLUMN
UPPER SALADO COMPACTED CLAY COLUMN SEE DETAIL 1 OF SHEET NO. 6 TYP.
VACA TRISTE
WATERSTOP (FLOWABLE HIGH DENSITY SAND ASPHALT MIXTURE, TYP.)
MIDDLE CONCRETE COMPONENT
SALT-SATURATED CONCRETE
COMPACTED SALADO SALT COLUMN (90% ± FRACTIONAL DENSITY) SEE DETAIL 1 OF SHEET NO. 7
COMPACTED SALADO SALT COLUMN (90% ± FRACTIONAL DENSITY)
COMPACTED SALADO SALT COLUMN (90% ± FRACTIONAL DENSITY)
WATERSTOP (FLOWABLE HIGH DENSITY SAND ASPHALT MIXTURE, TYP.)
LOWER CONCRETE COMPONENT
SALT-SATURATED CONCRETE
LOWER SALADO COMPACTED CLAY COLUMN
SHAFT STATION MONOLITH
SEE DETAIL 1 OF SHEET NO. 4
20'-3"
23'-0"
12'-0"
SHAFT STATION LEVEL
SALT-SATURATED CONCRETE
EXISTING GUIDE ROPE ANCHOR
SALADO FORMATION SUBSYTEM
SCALE IN FEET
0 10 20 30 40 50
REV. DATE DESCRIPTION BY CK. APP
SANDIA NATIONAL LABORATORIES
WIPP A/E SUPPORT
CONTRACT NO: AG-4908
WIPP SHAFT SEALING SYSTEM
SALADO FORMATION
AIR INTAKE SHAFT
STRATIGRAPHY AND SEALING SUBSYSTEM PROFILE
NAME DATE
BY
CK.
APP.
APP.
APP.
PARSONS BRINCKERHOFF ENERGY SERVICES, INC
SCALE:
SIZE B
SNL DWG. NO. 33-SNL-005
SHEET NO 2 OF 10

Figure B-6.





TYPICAL SALADO MASS CONCRETE PLUG
WITH WATERSTOP (3 LOCATIONS)

SCALE IN FEET
0 5 10 15 20 25

REV.	DATE	DESCRIPTION	BY	CK.	APP

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT — CONTRACT NO: AC-4908

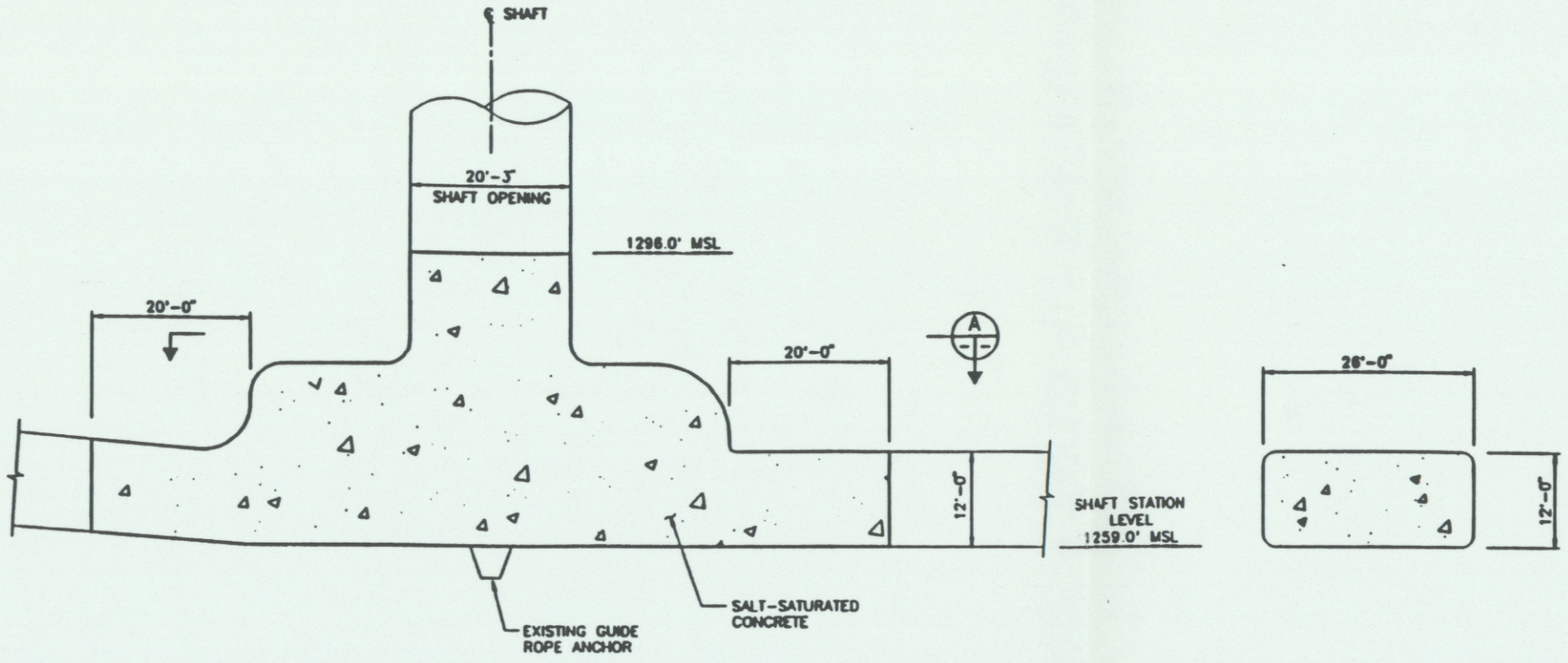
WIPP SHAFT SEALING SYSTEM

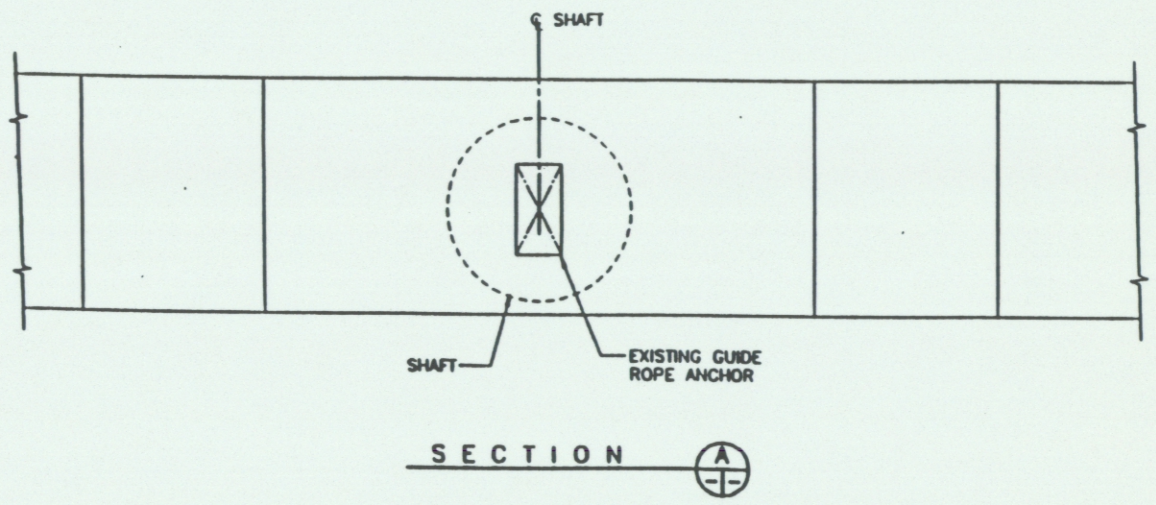
AIR INTAKE SHAFT CONCRETE COMPONENT IN SALADO FORMATION

	NAME	DATE
BY		
CK.		
APP.		
APP.		
APP		

PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO 33-SNL-005	SHEET NO 3 OF 10

Figure B-7.





SHAFT STATION MONOLITH

SCALE IN FEET
0 10 20 30 40 50

REV.	DATE	DESCRIPTION	BY	CK.	APP

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

CONTRACT NO: AC-4800

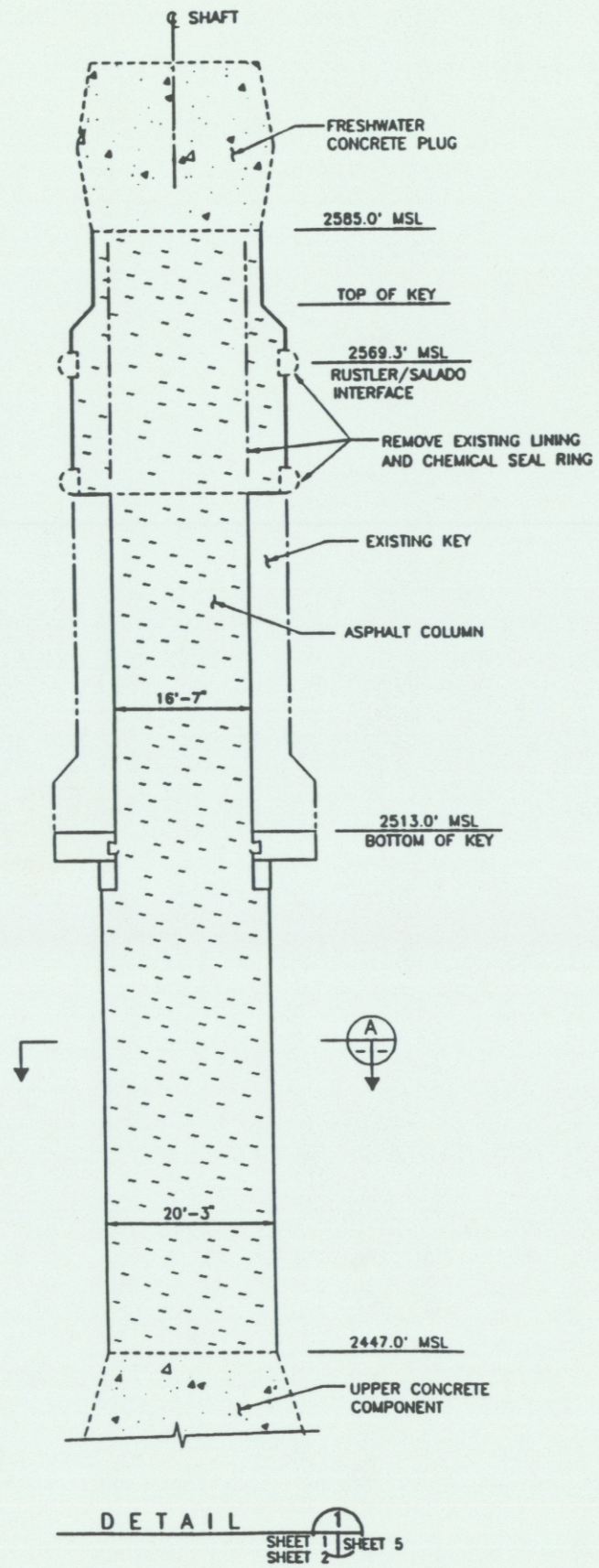
WIPP SHAFT SEALING SYSTEM

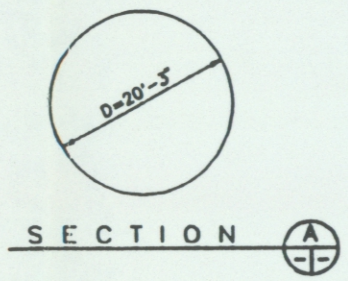
AIR INTAKE SHAFT
SHAFT STATION MONOLITH

	NAME	DATE
BY		
CK.		
APP.		
APP.		
APP.		

PARSONS BRINCKERHOFF ENERGY SERVICES, INC | SCALE: | SIZE B | SNL DWG. NO. 33-SNL-005 | SHEET NO. 4 OF 10

Figure B-8.





ASPHALT COLUMN
(2447' TO 2585' MSL)

SCALE IN FEET
0 10 20 30 40 50

REV.	DATE	DESCRIPTION	BY	CK.	APP

SANDIA NATIONAL LABORATORIES
WIPP A/E SUPPORT
CONTRACT NO: AC-4908

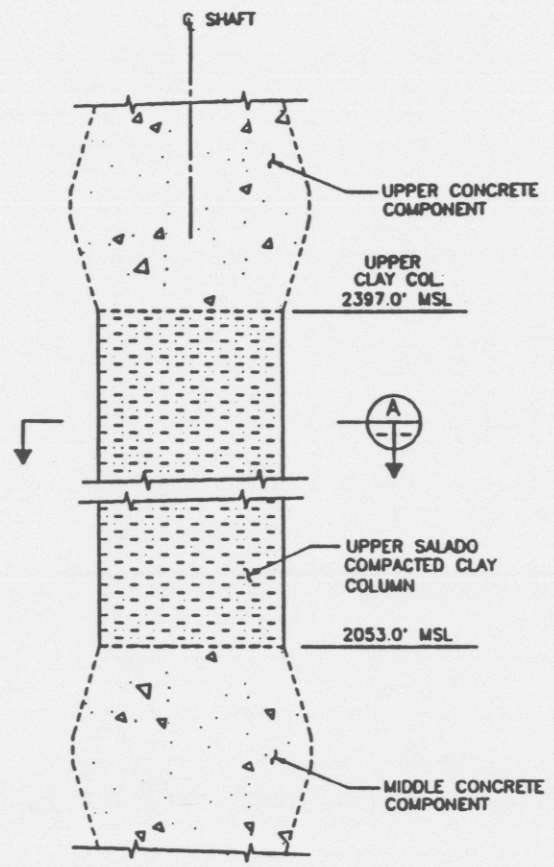
WIPP SHAFT SEALING SYSTEM

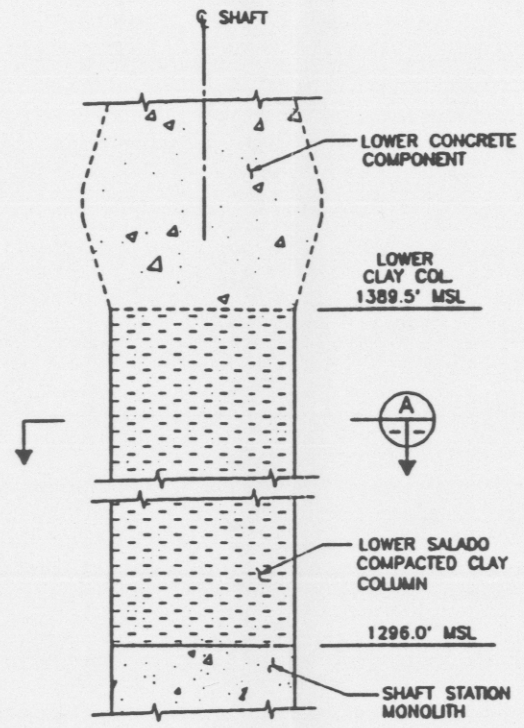
AIR INTAKE SHAFT
ASPHALT COLUMN
(2447' MSL TO 2585' MSL)

	NAME	DATE
BY	W Fox	9/25/95
CK.	[illegible]	9/26/95
APP.	[illegible]	9/26/95
APP.	[illegible]	9/26/95
APP.	[illegible]	9/26/95

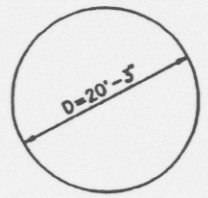
PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO. 33-SNL-005	SHEET NO 5 OF 10

Figure B-9.





DETAIL 1 — SHEET 2 | SHEET 6



SECTION A

SALADO CLAY COLUMNS

(2 LOCATIONS)

SCALE IN FEET

0 10 20 30 40 50

REV.	DATE	DESCRIPTION	BY	CK.	APP

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

CONTRACT NO: AC-4909

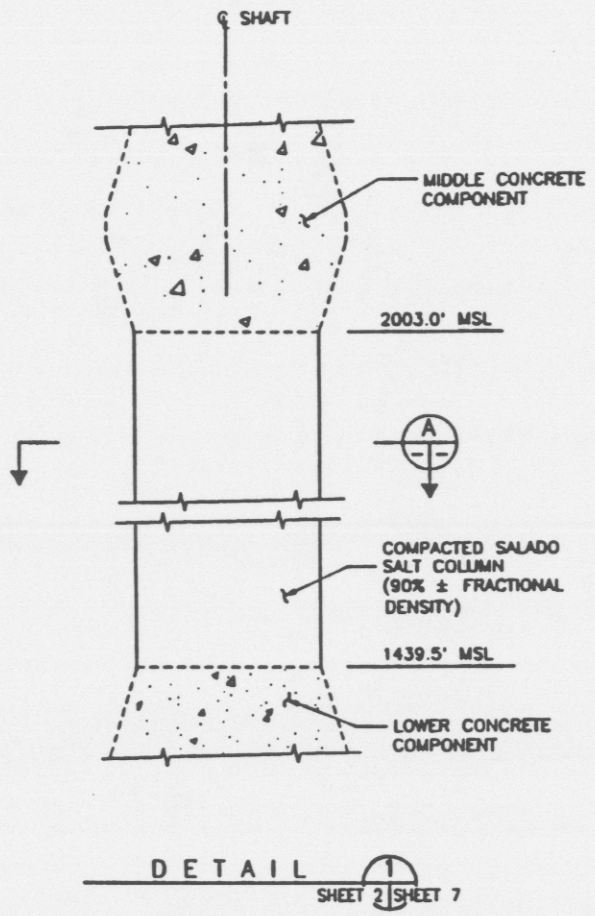
WIPP SHAFT SEALING SYSTEM

AIR INTAKE SHAFT
UPPER AND LOWER
SALADO CLAY COLUMNS

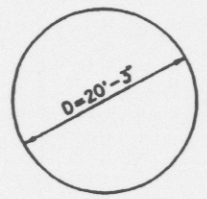
	NAME	DATE
BY	W Kerr	9/15/95
CK.	[illegible]	9/15/95
APP.	[illegible]	9/15/95
APP.	[illegible]	9/15/95
APP.	[illegible]	9/15/95

PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO. 33-SNL-005	SHEET NO. 6 OF 10

Figure B-10.



DETAIL 1 — SHEET 2 | SHEET 7



SECTION A — A

SALADO SALT COLUMN

SCALE IN FEET
0 10 20 30 40 50

REV.	DATE	DESCRIPTION	BY	CK.	APP

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT — CONTRACT NO: AG-4908

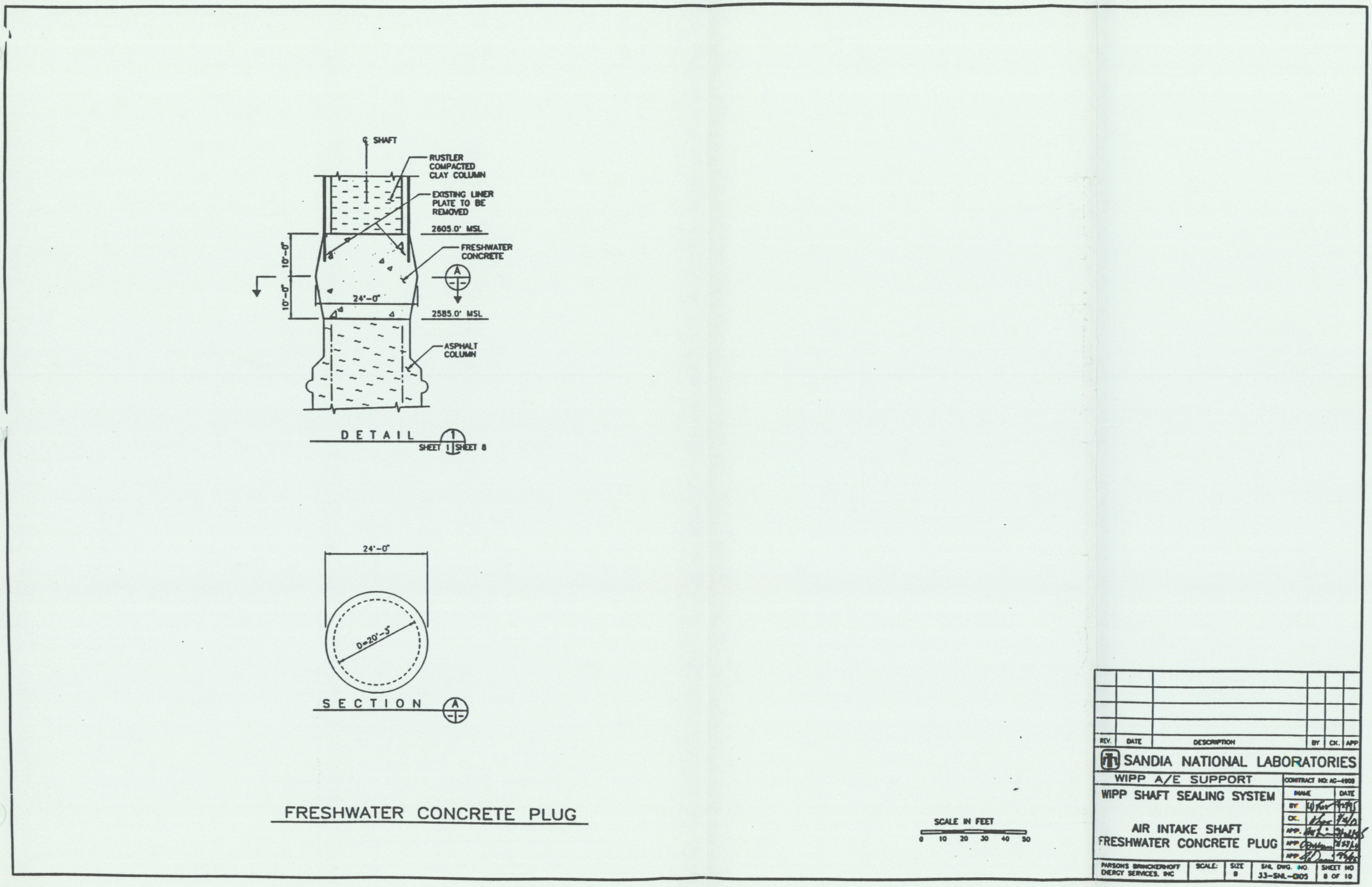
WIPP SHAFT SEALING SYSTEM

AIR INTAKE SHAFT
SALADO SALT COLUMN

	NAME	DATE
BY		
CK.		
APP.		
APP.		
APP.		

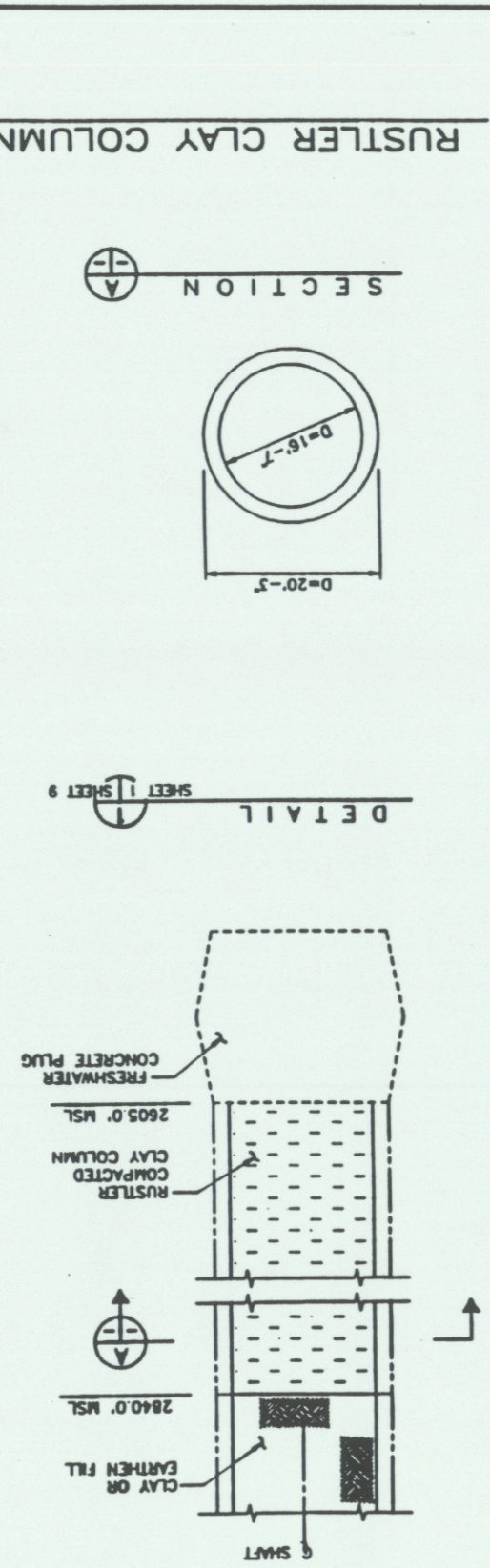
PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO. 33-SNL-005	SHEET NO. 7 OF 10

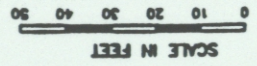
Figure B-11.



℄ SHAFT
RUSTLER COMPACTED CLAY COLUMN
EXISTING LINER PLATE TO BE REMOVED
2605.0' MSL
FRESHWATER CONCRETE
10'-0"
10'-0"
24'-0"
2585.0' MSL
ASPHALT COLUMN
DETAIL
SHEET 1 SHEET 8
24'-0"
D=20'-5"
SECTION
A
FRESHWATER CONCRETE PLUG
SCALE IN FEET
0 10 20 30 40 50
REV.
DATE
DESCRIPTION
BY
CK.
APP
SANDIA NATIONAL LABORATORIES
WIPP A/E SUPPORT
CONTRACT NO: AC-4908
WIPP SHAFT SEALING SYSTEM
NAME
DATE
BY
CK.
APP.
APP.
APP.
AIR INTAKE SHAFT
FRESHWATER CONCRETE PLUG
PARSONS BRINCKERHOFF ENERGY SERVICES, INC
SCALE:
SIZE
B
SNL DWG. NO.
33-SNL-005
SHEET NO
8 OF 10

Figure B-12.





REV.	DATE	DESCRIPTION	BY	CK.	APP.

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

CONTRACT NO. AC-4800

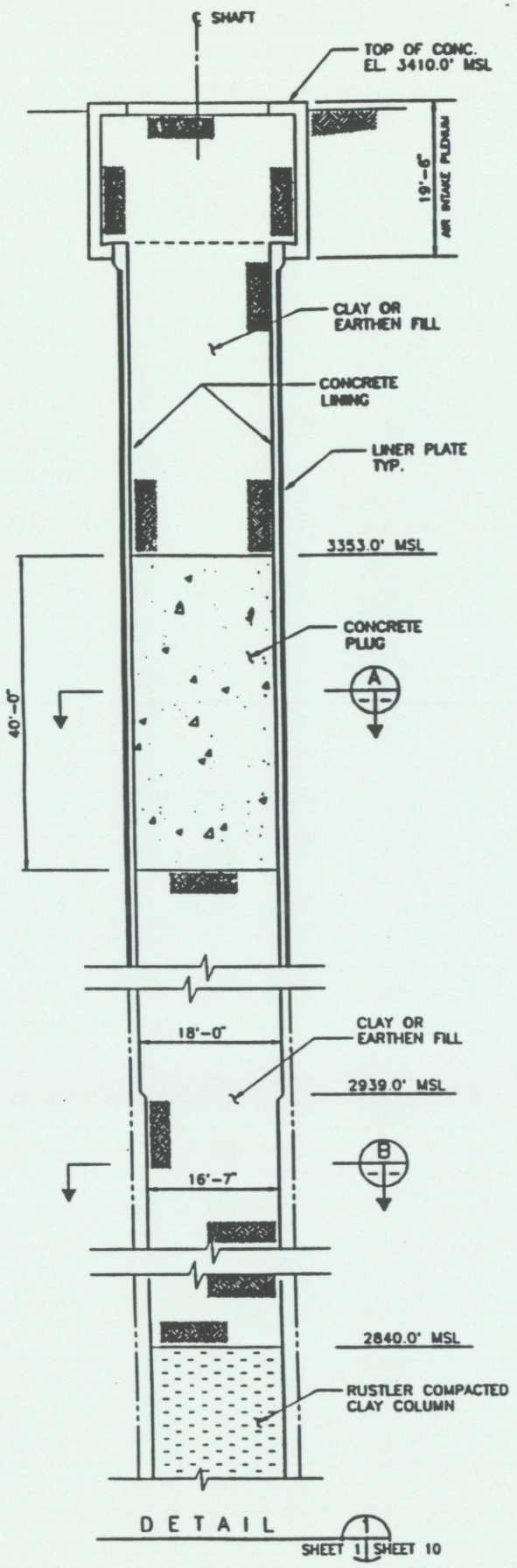
WIPP SHAFT SEALING SYSTEM

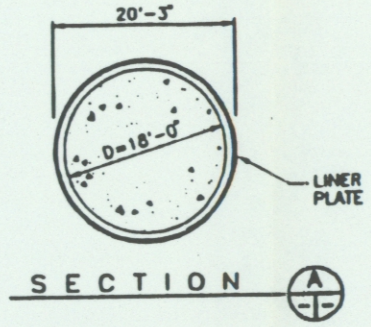
	NAME	DATE
BY		
CK.		
APP.		
APP.		
APP.		

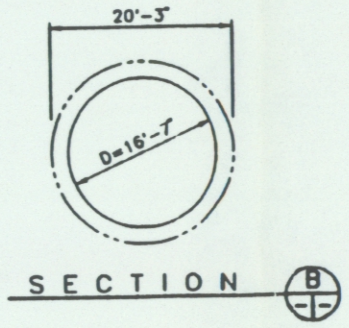
AIR INTAKE SHAFT
RUSTLER CLAY COLUMN

PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SAL DWG. NO 23-SNL-003	SHEET NO 9 OF 10

Figure B-13.







DEWEY LAKE CLAY/EARTHEN FILL
COLUMN AND CAP

SCALE IN FEET
0 10 20 30 40 50

REV.	DATE	DESCRIPTION	BY	CK.	APP

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

CONTRACT NO: AG-4909

WIPP SHAFT SEALING SYSTEM

AIR INTAKE SHAFT
DEWEY LAKE CLAY/EARTHEN
FILL COLUMN AND CAP

	NAME	DATE
BY		
CK.		
APP.		
APP		
APP.		

PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO. 33-SNL-005	SHEET NO 10 OF 10

Figure B-14.

Appendix C:
A Modeling Study on Shaft Seal Permeability

Appendix C:
A Modeling Study on Shaft Seal Permeability

This appendix summarizes a modeling study conducted to evaluate the sensitivity of repository performance to permeability of the shaft seal system. The simulations as discussed here show that, for a composite shaft of 100 m length:

- to limit brine flow, a seal permeability of about 1×10^{-16} m^2 is sufficient and
- reduction of gas flow requires a seal permeability on the order of 1×10^{-18} m^2 or tighter.

C.1 Conceptual Models

A conceptual model of the repository comprises a tool used to evaluate the repository, the enclosed waste, and the surrounding geologic media. A conceptual model is the aggregate of processes, properties, and geometries considered within an analysis. It encompasses process models, which are verbal or mathematical descriptions of the conceptual model, a numerical model consisting of the computer code used to conduct simulations of the process model, and parameters. Parameters required for this conceptual model consist of data derived from field and laboratory experiments, and numerical quantities necessary for computer code implementation. The following sections identify the computer codes used for the simulations and briefly discuss the process models and parameter derivations for this study.

C.2 Computer Codes

All simulations were performed using BRAGFLO, a two-phase flow simulator developed by SNL. It has been designed to accommodate conceptual model changes and to be robust and numerically stable over a wide range of flow conditions. BRAGFLO is used by the WIPP Performance Assessment Group in the conduct of assessments for the program.

Fluid flow processes at the WIPP horizon are physically coupled to the creep closure of the surrounding salt. Implementation of a fully coupled system results in significant technical difficulties that cannot be practically overcome at the present time. A simplified approach has been used in this modeling study. The principal effects of disposal room closure on two-phase flow are captured through the use of a separate calculation for the effective porosity of a waste-filled room as a function of time and total moles of gas generated. The computer code SANCHO was used for the calculation. Results of the calculation are implemented in BRAGFLO through the use of a "look-up" table of porosity values.

C.3 Parameter Values

The calculations presented in this appendix were conducted to provide a baseline for a subsequent set of simulations used in a Systems Prioritization study. Parameter values and ranges were derived from the Position Papers and elicitation interviews with WIPP Principal Investigators. The parameter ranges used for the simulations incorporated both conservative and optimistic estimates of parameter values. Within the context of a sensitivity study, this parameter variation provides an excellent opportunity to investigate the system response to a wide range of inputs.

The physical properties for the geologic media, as well as those parameters governing gas generation, have significant quantitative variation. This variation is addressed through the use of a probabilistic, Latin Hypercube Sampling (LHS) method. The LHS approach generates a set of input vectors from the distribution of input parameters, which cover the space of parameter variation.

The sensitivity study presented here used a total of 75 input vectors, with seal permeabilities ranging from 10^{-13} to 10^{-19} m^2. The equivalent shaft region is subdivided into upper and lower regions. Each region consists of a Seal element and a Shaft element. These simulations assumed that only the Lower Seal element (length of 100 m) functioned as a fluid flow barrier. The remainder of the shaft regions were assumed to consist of a permeable fill (intrinsic permeability of 10^{-12} m^2) material.

C.4 Simulation Results

The performance measures used to assess the sensitivity of the system to material permeabilities are: (1) brine flow up or down the shaft and (2) gas flow up the shaft. These measures are consistent with design guidance that the shafts limit flow to acceptable levels. A scatter plot of the cumulative brine flow through the shaft is illustrated in Figure C-1. Results for all 75 input vectors are depicted on this plot. The cumulative brine flow was calculated at the top of the lower seal element. These results show that brine flows through the seal are not significantly reduced until the Lower Shaft permeability is reduced to 10^{-16} m^2. Zero brine flow is achieved with a permeability of 10^{-17} m^2. The cumulative gas flow for all input vectors is shown in Figure C-2. These results show that a reduction of gas flow up the shaft does not begin until the lower shaft permeability is reduced to 10^{-18} m^2.

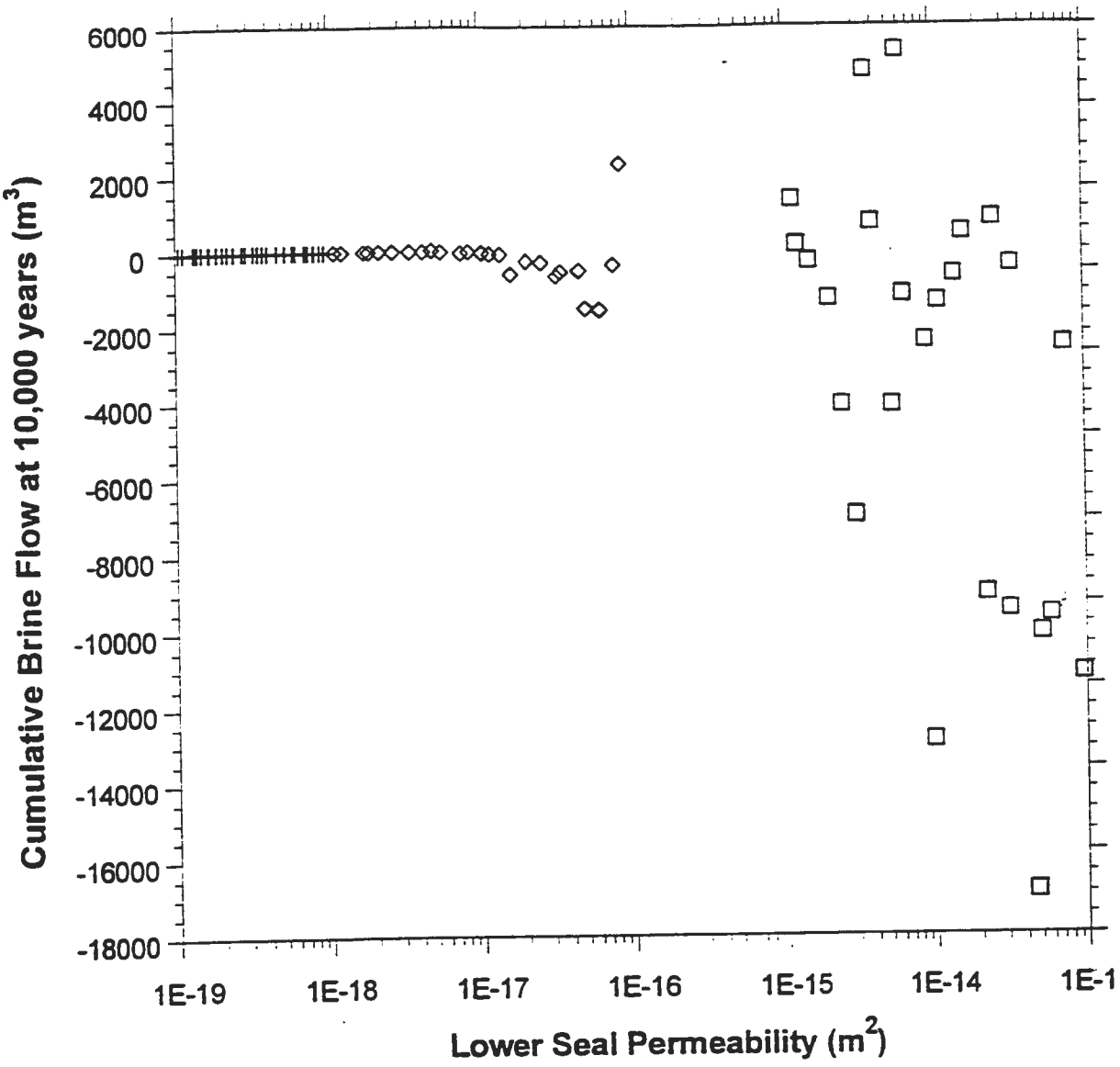


Figure C-1. Predicted cumulative brine flow through lower seal.

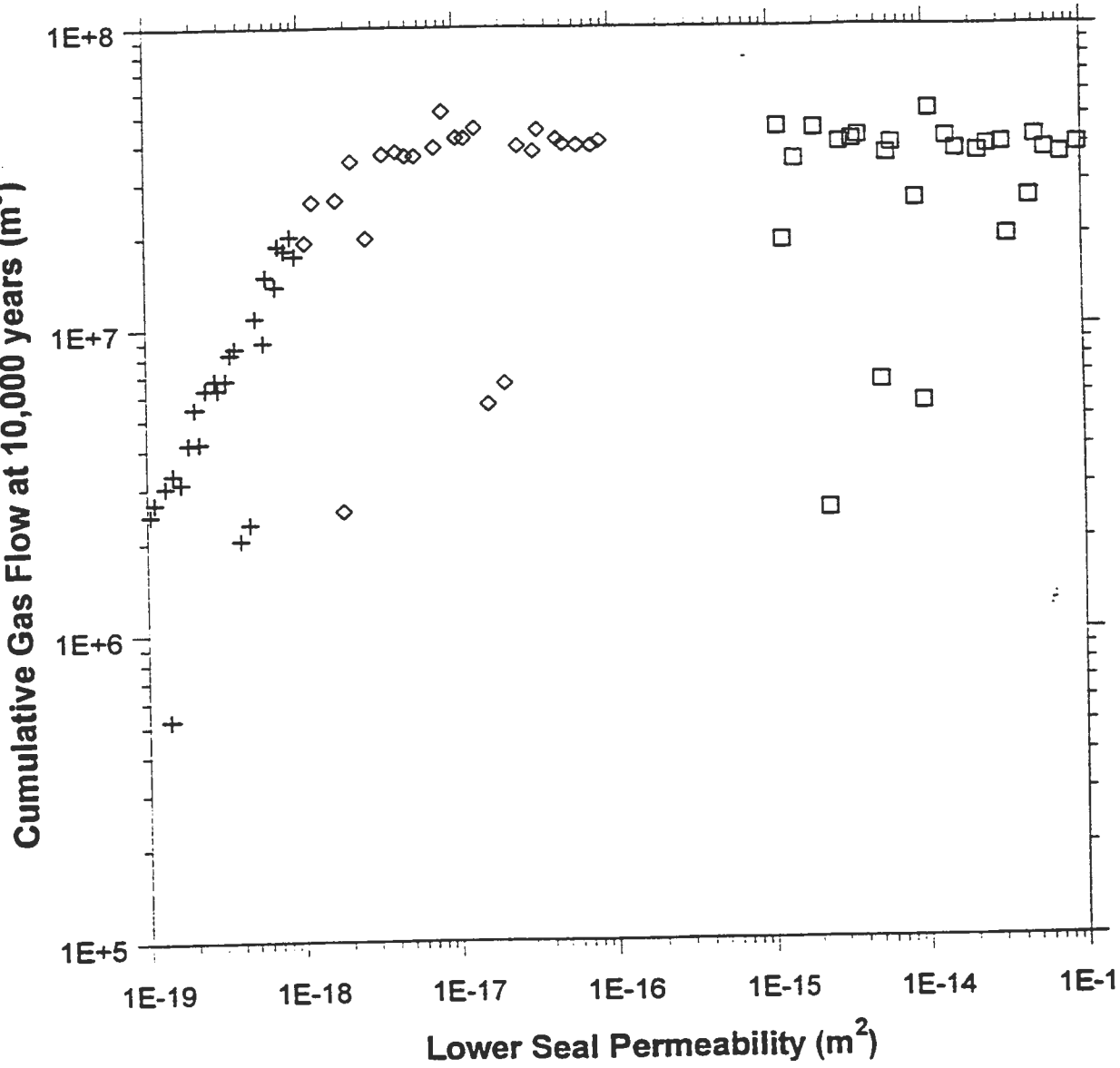


Figure C-2. Predicted cumulative gas flow through lower seal.

Appendix D:
Comparative Analysis of the Seal System Design

APPENDIX D:
Comparative Analysis of the Seal System Design

D.1 Introduction

The calculations presented in this appendix are scoping in nature. Verification of the performance of the seal system is currently being performed through detailed multi-phase flow simulations which model the dominant flow processes expected in the seal system. The comparison presented in this appendix provides evidence that the seal system described in this report meets the design guidance described in Section 2.

This appendix is organized into four sections in addition to the introduction. Section D.2 presents the quantitative design guidance for the WIPP shaft seal system as provided by modeling studies of the seal system. Section D.3 provides the specifics behind the analysis approach applied, as well as a discussion of analysis assumptions and inputs. Section D.4 presents the comparison of the design relative to the design guidance.

D.2 Design Guidance

The general requirement of limiting fluid flow through the seal system can be divided into specific functions based on the physical characteristics of the WIPP shaft sealing system and the surrounding media. The Rustler Formation is considered the primary source of brine to the shaft sealing system. The Salado Formation, although saturated, has a very low permeability and thus a low potential as a significant brine source. As currently conceptualized, the repository will produce significant quantities of gas capable of inducing significant pressure build-up at the base of the shaft over time. The WIPP shaft sealing system is designed to restrict the flow of gas at pressures less than lithostatic.

The primary source of significant groundwater flow to the shaft sealing system is the Rustler Formation. The upper shaft seal system must limit Rustler brine migrating down the shaft. The reasons for limiting brine migration in the seal system from the Rustler are: (1) to block water from reaching the repository; and (2) to limit the development of significant pore pressures in the compacted salt column.

The lower shaft seal system must also limit fluid flow. The lower seal system must limit gas or brine released from the repository horizon from migrating up the seal system. The reasons for limiting gas and brine from migrating up the shaft from the repository are: (1) to prevent the release of radionuclides or hazardous constituents; (2) to prevent significant pore pressures from building up in the compacted salt column during the 100 years following closure; and (3) to

prevent possible seal degradation from active circulation of fluids. The release of gas from the repository horizon through the shaft may not directly influence compliance. However, because gas has the potential to impede consolidation of the compacted salt column, the lower seal will need to prevent significant gas pressures from building in the compacted salt column for a period of 100 years.

Sensitivity modeling has recently been performed with the objective of determining the sensitivity of brine and gas flow within the WIPP shaft sealing system to shaft seal permeability. This sensitivity study has provided preliminary design guidance for the shaft sealing system. The sensitivity study modeled the four existing WIPP shafts as one equivalent shaft with an area equal to that of the four shafts. Results from the sensitivity study determined that, for a shaft seal to limit migration of brine, the seal must have an intrinsic permeability of less than or equal to 1 x 10^{-16} m^2 over an effective seal length of 100 m or greater. The simulation results also showed that to significantly impede gas migration from the repository, the lower seal must have an intrinsic permeability less than or equal to 10^{-18} m^2 over an effective seal length of 100 m or greater.

In this appendix, a comparative analysis will be performed based on the quantitative design guidance provided by the sensitivity analyses. This analysis does not represent a hydraulic analysis and seal system flow rates are not calculated. The analysis will compare each component of the seal system to the quantatative design guidance described above. This analysis will provide a method to determine if the sealing system design provides adequate sealing properties as compared to the design guidance.

D.3 Analysis Approach

The analysis compares flow potential as defined by hydraulic conductance for both the design cross-sectional seal and the expected disturbed rock zone (DRZ) and compares this to the quantitative design guidance. Seal material and rock permeabilities are also required as input. This section will define the analytical approach used, the analysis inputs, and the assumptions.

D.3.1 Analysis Methodology

Single-phase fluid flow through a porous medium is governed by Darcy's Law. Darcy's Law for steady-state flow can be expressed as:

$$Q = -KA\frac{dh}{dl} \qquad \text{(D-1)}$$

where Q is the volumetric flow rate (m^3/s), K is the hydraulic conductivity of the porous medium (m/s), dh is the difference in hydraulic head across the porous medium (m), dl is the length across which dh is measured (m), and A is the cross-sectional area normal to the flow direction (m^2). The hydraulic conductivity is a property of the porous medium and of the fluid saturating

the pore space. Hydraulic conductivity is equal to:

$$K = \frac{k\rho g}{\mu} \qquad \text{(D-2)}$$

where k is the intrinsic permeability of the porous medium (m^2), ρ is the fluid density (kg/m^3), g is the acceleration of gravity (m/s^2), and μ is the fluid viscosity (Pa • s). Using WIPP reference values for a brine, hydraulic conductivity is equal to intrinsic permeability multiplied by a factor equal to 6.69×10^6.

The design guidance for seal permeability and seal length resulting from model sensitivity calculations cannot be directly compared to the seal design for the Air Intake Shaft (AIS). The model combines all four WIPP shafts as one equivalent shaft with an area of 100 m^2. To compare sensitivity results to the seal design, one must consider permeabilities, lengths, and areas, which are different between the seal design and the model. The AIS has an area of approximately 30 m^2, which is approximately 30% of the shaft area modeled in the simulations.

Therefore, a method of couching the results from modeling (design guidance) into a form which can be compared to a seal design with variable length, permeability, and area relative to the model seal guidance is required. The term which allows this is the hydraulic conductance. The hydraulic conductance is a measure of a system's ability to transmit water and is equivalent to thermal conductance in heat flow problems. The hydraulic conductance of a porous medium is derived from area, length, and hydraulic conductivity, and is the inverse of the hydraulic resistance. The hydraulic conductance, defined in terms of intrinsic permeability, can be expressed as:

$$C = \frac{kA}{L}\frac{\rho g}{\mu} = \frac{KA}{L} \qquad \text{(D-3)}$$

where C is the hydraulic conductance (m^2/s), k is the intrinsic permeability (m^2), A is the area (m^2), L is the component length (m), ρ is the fluid density (kg/m^3), g is the acceleration of gravity (m/s^2), and μ is the fluid viscosity (Pa • s).

By using equation D-3, the design guidance for the upper and lower seals can be expressed as hydraulic conductance and can be used for direct comparison with the seal design presented in this report. To limit brine flow in the shaft, modeling indicated that a seal length of 100 m, permeability of 1×10^{-16} m^2, and area of 100 m^2 must exist in the shaft. Assuming a viscosity of 0.0018 Pa • s, a fluid density of 1230 kg/m^3, and an acceleration of gravity constant of 9.792 m/s^2, the brine seal guidance translates into a hydraulic conductance equal to 6.7×10^{-10} m^2/s. For limiting gas flow in the shaft, modeling indicated that a seal length of 100 m, permeability of 1×10^{-18} m^2, and area of 100 m^2 must exist in the shaft. Assuming fluid properties representative of a WIPP brine (see above), the gas seal guidance translates into a hydraulic conductance equal to 6.7×10^{-12} m^2/s. Because the AIS contributes 30% of the area of

the equivalent shaft, these hydraulic conductances should be reduced to 30% for comparison to the AIS seal dimensions. This results in a brine seal guidance hydraulic conductance of 2.0×10^{-10} m^2/s and a gas seal guidance hydraulic conductance of 2.0×10^{-12} m^2/s. In the calculation of hydraulic conductance, brine properties are assumed for both brine and gas. This assumption is justified because the analysis is comparative and the physical properties of the permeating fluid are unimportant as long as they are the same as those used to calculate the design guidance hydraulic conductance. Calculations predicting performance of the shaft sealing system require rigorous application of multiphase properties and are beyond the scope of this appendix.

To determine if the seal design meets the design guidance provided by modeling results, the hydraulic conductance of the AIS seal design is computed and compared to the design guidance. The computation of seal hydraulic conductance is based on a component-by-component basis consistent with the seal design description found in Section 3 of this report.

The hydraulic analysis considers the cross-sectional area of the seal for flow plus the cross-sectional area of the DRZ normal to the axis of the shaft. The hydraulic conductance of the cross-sectional seal and the DRZ are added to get the total hydraulic conductance of a specific component of the seal design, as illustrated in Figure D-1. For parallel flow, the appropriate law of composition is simply to add the hydraulic conductances of the seal and the DRZ. The zone with the largest hydraulic conductance dominates the total hydraulic conductance. The total seal system (seal plus DRZ) hydraulic conductance is then compared to the guidance hydraulic conductance.

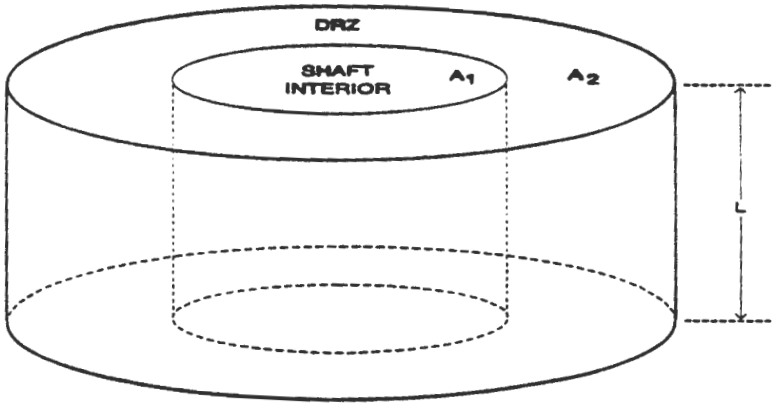


Figure D-1. Schematic of Seal System and Definition of Hydraulic Conductance

The determination of the DRZ hydraulic conductance is based on the assumption that the permeability is greatest in the DRZ near the excavation face and decreases log-linearly as one approaches the outer extent of the DRZ. Figure D-2 shows a schematic of a shaft with a DRZ of inner radius r_i and outer radius r_o. It is assumed that the permeability k_i at r_i is several orders of magnitude higher than the intact undisturbed permeability defined at r_o. The functional relationship between the variation in permeability as a function of radius is unknown. The calculations in this appendix assume that the change in permeability within the DRZ can be described by a linear change in log permeability. Therefore, for a given r_i, k_i, r_o, and k_o, an effective DRZ permeability is calculated which accounts for both the decrease in DRZ permeability and the increase in flow area as a function of radius away from the excavation. The equation for the effective DRZ permeability is

$$k_{DRZ} = \frac{2}{r_o + r_i}\left[\left(\frac{r_o(\ln(k_o) - \ln(k_i)) - \Delta r}{(\ln(k_o) - \ln(k_i))^2}\right) k_o - \left(\frac{r_i(\ln(k_o) - \ln(k_i)) - \Delta r}{(\ln(k_o) - \ln(k_i))^2}\right) k_i\right]$$

where Δr is equal to the outer DRZ radius minus the inner DRZ radius.

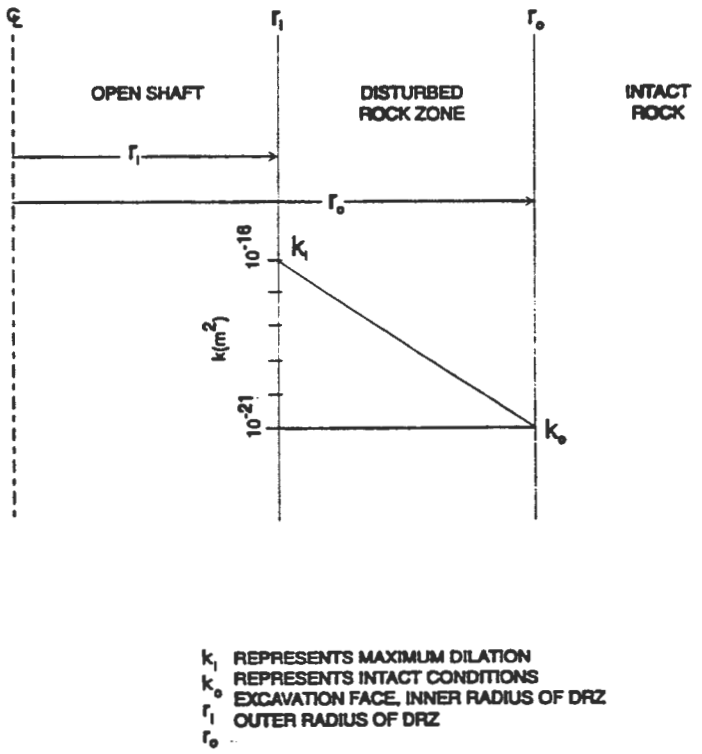


Figure D-2. Log-linear model for the calculation of an effective permeabillity of the DRZ.

D.3.2 Analysis Assumptions

There are several assumptions inherent in the calculation of hydraulic conductance. These assumptions are listed below.

- Reference fluid properties representative of WIPP brine are used in calculations of hydraulic conductance. Because the analysis is a comparative study, these properties are unimportant to the analysis.

- Flow through the seal system is limited to the cross-sectional seal and the DRZ. Interface flow is not considered; therefore the hydraulic conductance is calculated for the seal plus the DRZ only.

- The comparative analysis is performed for the AIS. The dimensions of the seal components and the DRZ components are representative of the AIS.

- Properties of the seal materials are described in Section 4. Transient seal permeabilities are used for concrete and for the compacted salt column. The concrete components are not assigned a sealing function after 100 years. They are replaced by a silty sand with a permeability of 1×10^{-14} m^2. The consolidated salt permeability varies as a function of relative density according to the Knowles-Hansen (Figure D-8) functional relationship;

- The Salado is modeled as argillaceous;

- Salt creep can be defined by the modified Munson-Dawson (M-D) creep material model (Munson et al., 1989). The salt DRZ can be described by the Multi-Deformation Coupled-Fracture (MDCF) material constitutive model which provides a continuum description of the response and the associated damage evolution of rock salt;

- Asphalt, for purposes of these calculations, is considered a porous medium. This is necessitated by the assumptions of the hydraulic evaluation. It is understood that asphalt is a separate phase from water or gas. The water permeability of asphalt liquid is effectively zero; therefore, this assumption is considered conservative;

- The seal system is evaluated at 0, 10, 50, and 100 years. In this analysis, hydraulic properties of the seal and DRZ are considered constant beyond 100 years.

D.3.3 Analysis Parameters

Several analysis inputs are required for the hydraulic conductance calculations. These include: (1) compacted salt column fractional density as a function of time; (2) DRZ radius as a function of time, depth, and sealing material; and (3) the intrinsic permeability of the seal materials and the Salado DRZ. These parameters are discussed below.

D.3.3.1 Reconsolidated Salt Fractional Density

The salt in the compacted salt column will continue to consolidate after emplacement in the shaft as a result of salt creep. RE/SPEC (1995) calculated the fractional density of a salt column in the Salado for various depths over a 1,000 year time period. The calculations were performed with a series of "pineapple slice" models at depths of 250 m, 350 m, 450 m, 550 m, and 650 m. These five depths were considered adequate to define the functional relationship between salt fractional density, depth, and time. The primary assumptions of the analysis are:

- The calculations are based upon finite deformation solutions;
- The initial fractional densities of the salt are 0.80, 0.85, 0.90, and 0.95;
- The stratigraphy of the Salado is not considered; instead the Salado is considered homogeneous as a clean or argillaceous halite;
- The shaft has a uniform diameter of 6.1 m;
- The initial stress state prior to excavation is lithostatic;
- The excavation occurs at -50 years and remains open for 50 years until time zero, when the salt seal material is emplaced instantaneously.

The crushed salt consolidation is governed by the constitutive model described by Callahan and DeVries (1991) and Callahan (1993). For the calculations presented in this appendix, the initial emplacement fractional density is 0.90. Using calculations presented in RE/SPEC (1995), the fractional density as a function of depth and time was determined for an initial fractional density of 0.90 through linear interpolation. Figure D-3 provides the fractional density relationship based on an initial emplacement density of 0.90 and the salt is argillaceous. These parameters are used to estimate the compacted salt column fractional density. Fractional density is then used to define the permeability of the salt seal (see Section D.3.3.3).

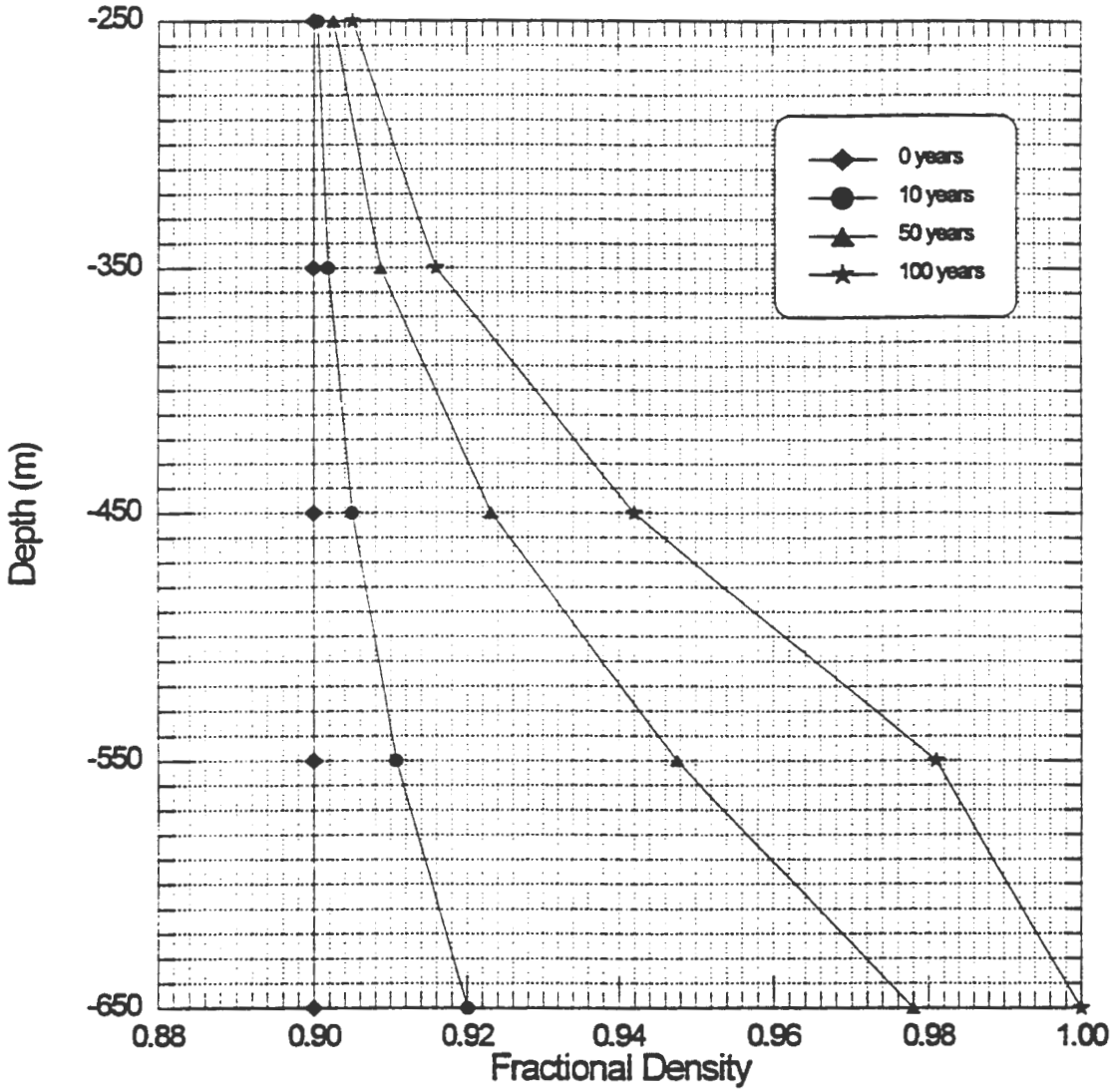


Figure D-3. Fractional density of reconsolidated salt for argillaceous salt.

D.3.3.2 Disturbed Rock Zone (DRZ) Definition

The Salado Formation between the depths of approximately 250 m to 650 m is primarily composed of halite, which exhibits time-dependent deformation. A DRZ develops around an excavation in response to the stress relief provided by the excavation. The extent of the DRZ will be reduced in halite as the salt creeps in on the sealing material creating back stresses on the shaft wall. The extent of the DRZ is a function of the type of halite surrounding the shaft, time, depth, and the stiffness of the sealing material. RE/SPEC, Inc. calculated the radial extent of the DRZ for times 0, 10, 25, 50, and 100 years after seal emplacement. The seal materials

considered in the RE/SPEC analysis are asphalt, compacted clay, crushed salt, asphalt concrete, and salt-saturated concrete. Asphalt concrete is not used in the shaft sealing system.

The calculations were performed with the finite-element program SPECTROM-32. The calculations assume that a material model describing salt creep can be defined by the Multi-Deformation, Coupled-Fracture (MDCF) material constitutive model, which provides a continuum description of the response and the associated damage evolution of rock salt. This model gives a measure (i.e., the damage stress) of the shear- and tensile-induced damage. The damage stress measure can be used as an indicator of the potential for damage, although it is not actual damage. These calculations indicate that the initial DRZ may extend as much as 80% of the shaft radius into the surrounding argillaceous salt, or may be nonexistent if the shaft is surrounded by clean salt. The healing of the DRZ is directly related to the stiffness of the material filling the shaft. The stiffer the material, the quicker the DRZ heals. In the Dewey Lake Redbeds and the Rustler Formation, the DRZ is not expected to heal since the rock types found in these formations do not exhibit time-dependent behavior. The assumptions of the analysis are:

- The calculations are based upon finite deformation solutions;
- The stratigraphy of the Salado is considered homogeneous as either a clean or an argillaceous halite;
- The initial stress state prior to excavation is lithostatic;
- Permeability changes in the salt DRZ are conservatively assumed to extend as far as the damage;
- The excavation occurs at -50 years and remains open for 50 years, when the salt seal material is emplaced instantaneously;
- The calculations were performed with a series of pineapple-slice models at depths of 250 m, 350 m, 450 m, 550 m, and 650 m.

Figures D-4 through D-7 show the DRZ extent (expressed as a multiple of the shaft radius) as a function of depth and as a function of backfill material for times 0, 10, 50, and 100 years after closure, respectively. At time zero, the DRZ is independent of backfill. Also at time zero, the asphalt waterstop DRZ radii are considered to be equivalent to the excavation radii plus 0.5 m. After 10 years, the DRZ is considered to have healed against the waterstops, and the DRZ radii will be equal to zero.

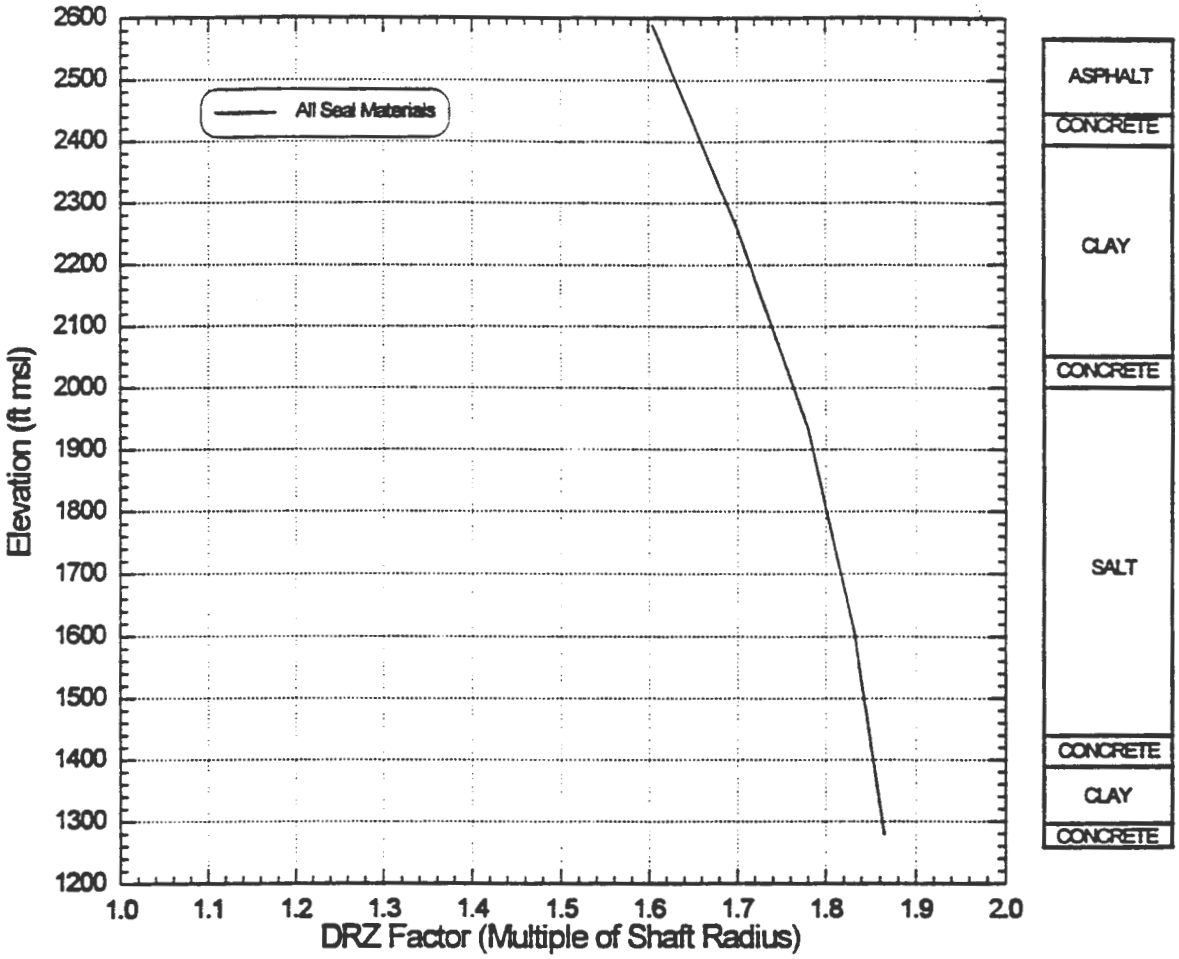


Figure D-4. Maximum DRZ extent at 0 years after closure.

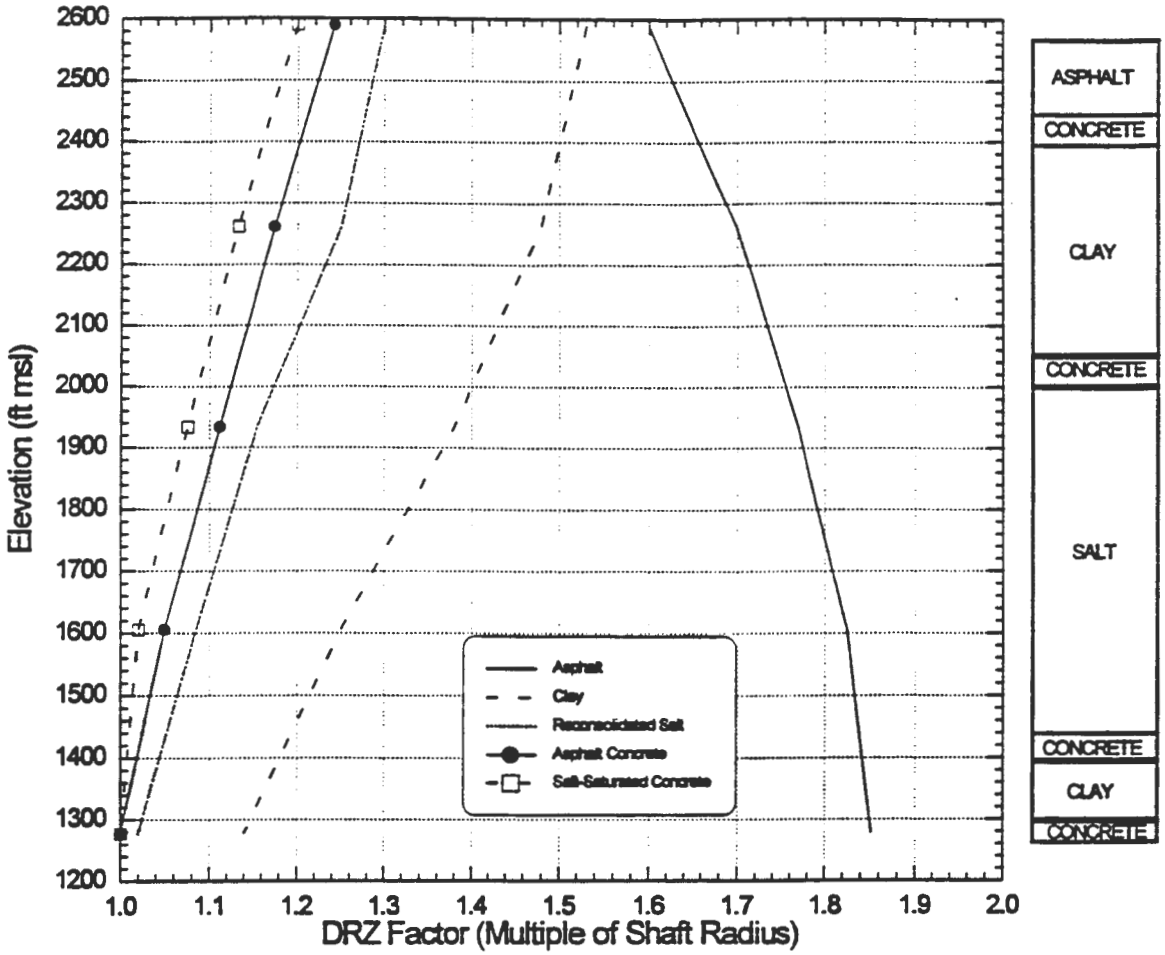


Figure D-5. Maximum DRZ extent at 10 years after closure.

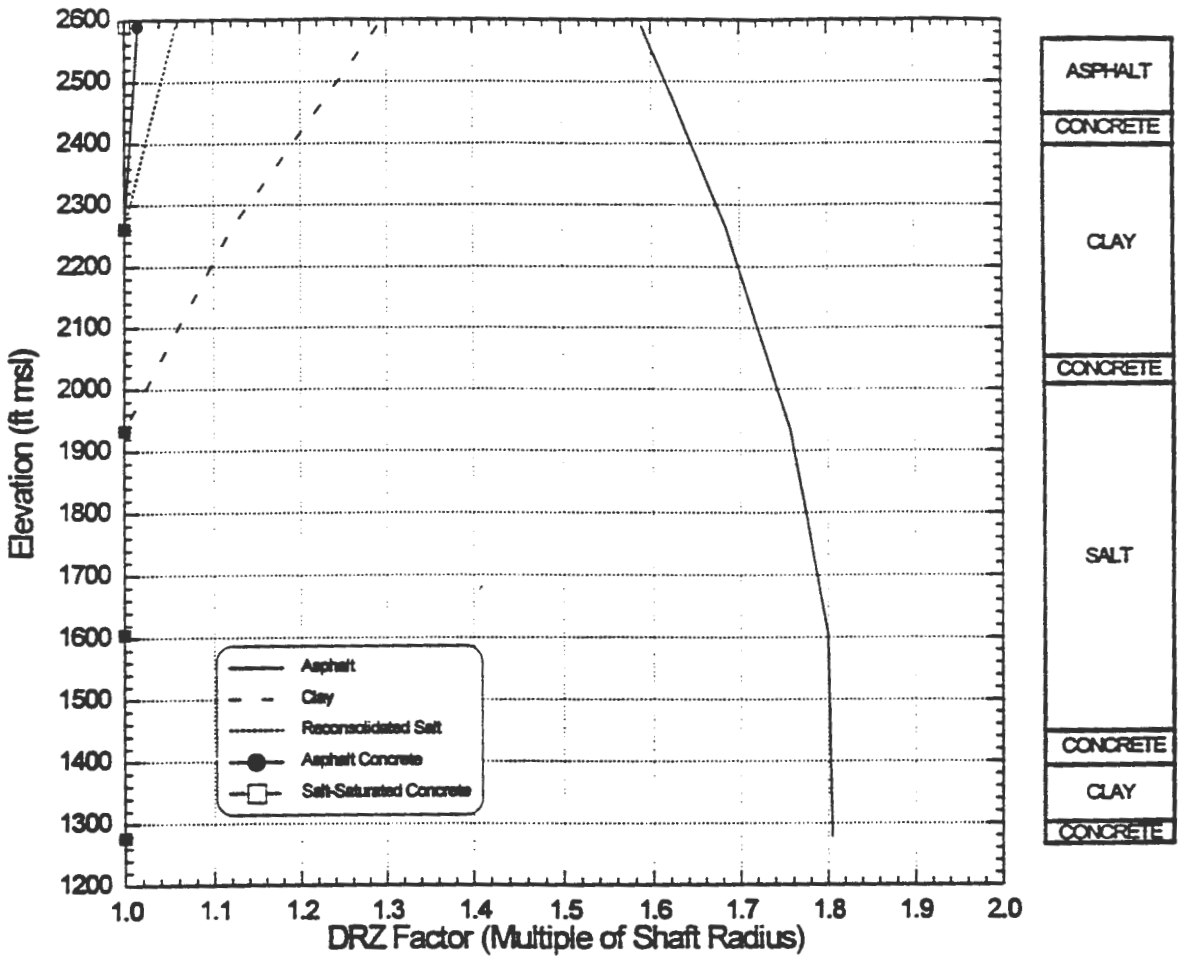


Figure D-6. Maximum DRZ extent at 50 years after closure.

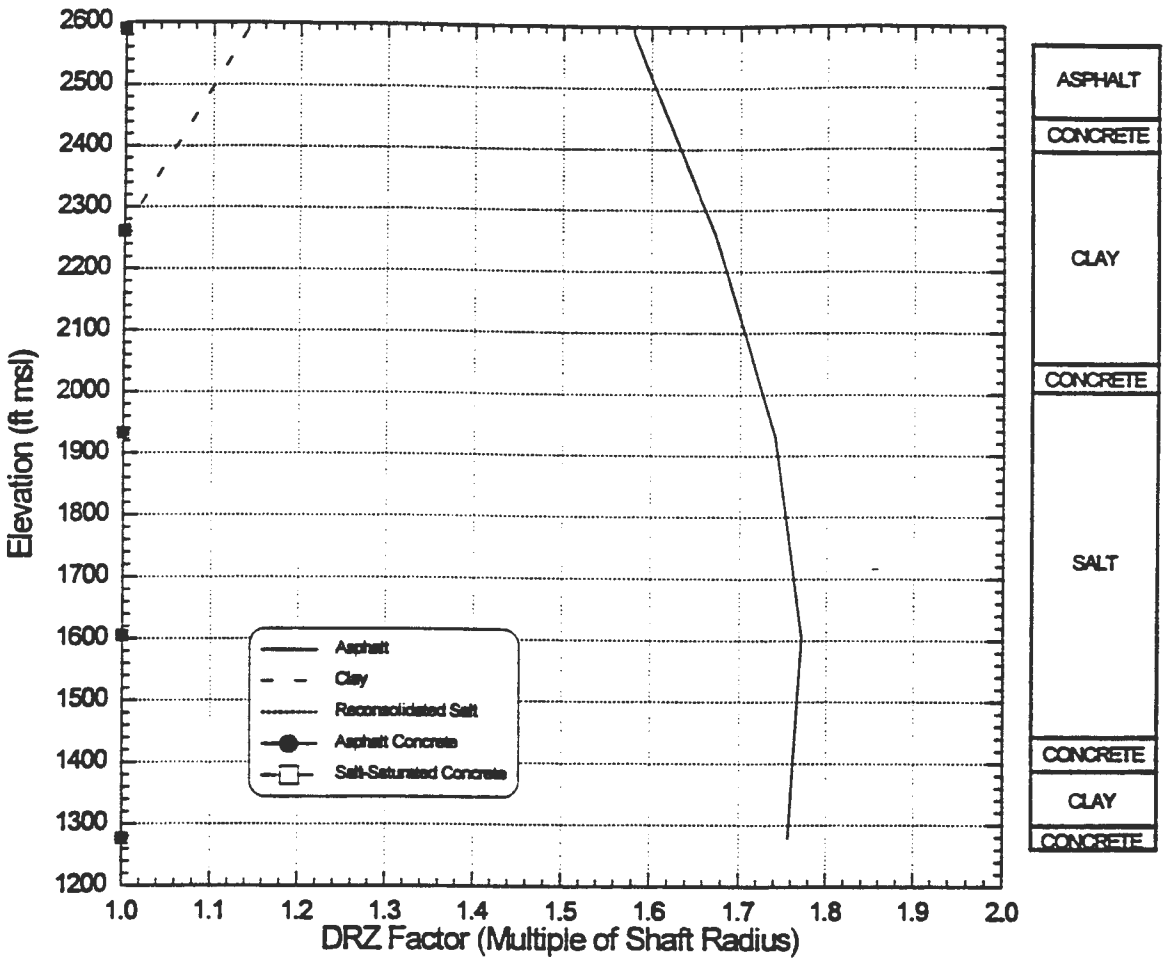


Figure D-7. Maximum DRZ extent at 100 years after closure.

D.3.3.3 Permeability

The permeability (also referred to as the intrinsic permeability) is required for all sealing materials and for the DRZ. The intrinsic permeability of a material is only a property of the pore geometry of a material and, unlike hydraulic conductivity, is not a function of properties of the permeating fluid. The materials and their associated physical properties are described in Section 4 of this report. For a complete listing of the seal material permeabilities, see Table 4-2.

The permeability of the compacted salt column is transient. As the salt consolidates, it

increases in density and decreases in permeability. Permeability measurements have been made for several samples of WIPP crushed salt at various fractional densities to describe the relationship between fractional density and permeability (Brodsky, 1994). The fractional density-permeability relationship used in these calculations is the Knowles-Hansen relationship which is shown in Figure D-8. This relationship is linear for argillaceous crushed salt at fractional densities from 0.88 to 1.0. The permeability varies from 1×10^{-11} m^2 at 0.85 to 1×10^{-21} m^2 at 1.0. The relationship is considered conservative in that it would over-predict permeability more often than under-predict permeability of WIPP crushed salt samples.

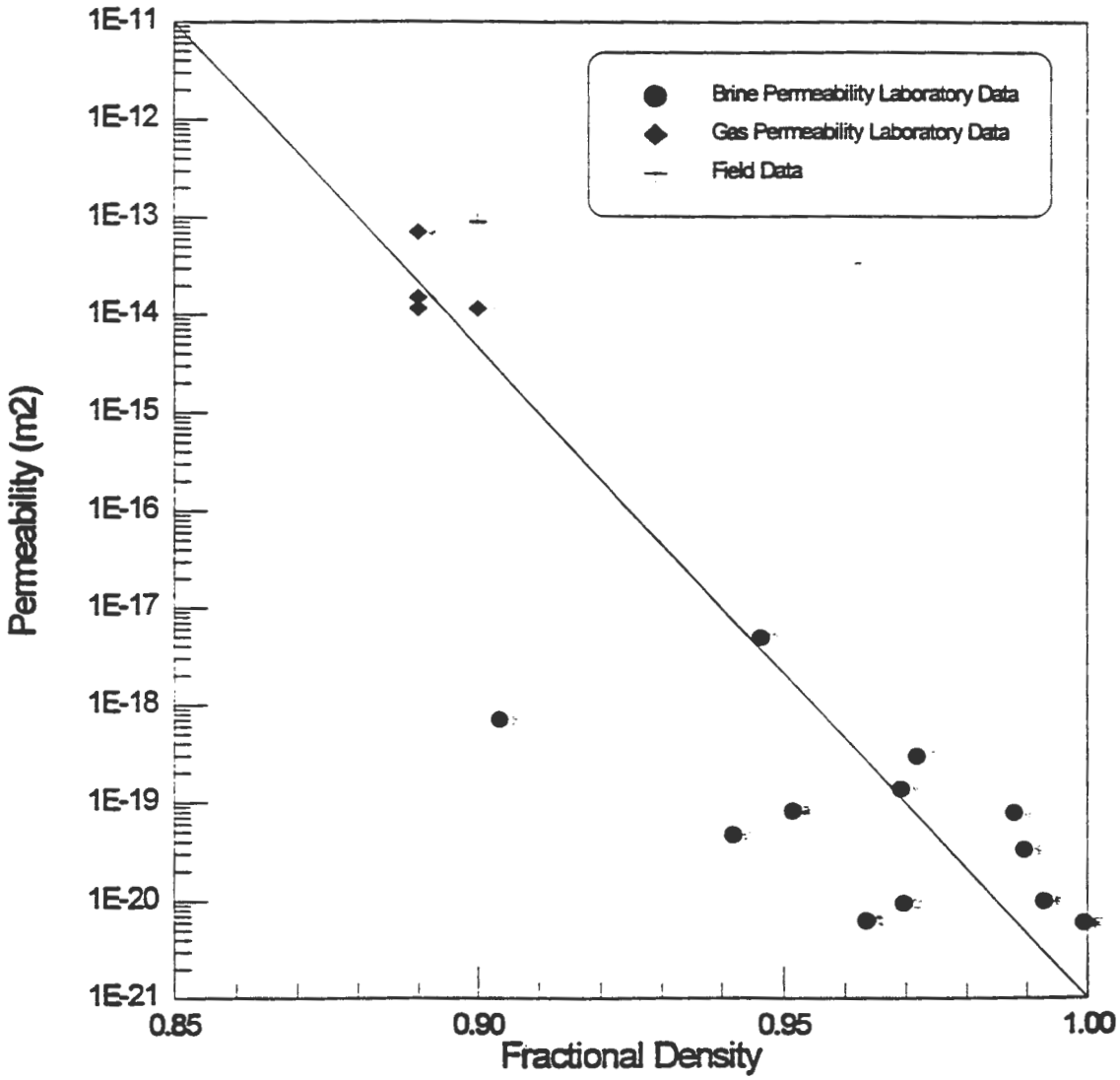


Figure D-8. Knowles-Hansen fractional density versus permeability relationship for WIPP crushed salt.

The effective DRZ permeability is estimated from the maximum disturbed permeability and the intact (undisturbed) rock permeability which can be found listed in Table 4-2. The effective DRZ permeability accounts for the decreasing DRZ permeability and the increasing flow area as a function of radius away from the excavation or into the DRZ.

D.4 Comparative Analysis of Seal System Design

The following sections discuss the current seal system design in regards to the design guidance. Because uncertainty is inherent in any engineered system, the design takes advantage of redundancy to minimize overall system uncertainty and to require multiple failure modes. As will be demonstrated, the current seal design offers redundancy in meeting the design guidance for seal hydraulic conductance.

The comparison to the design guidance is discussed in terms of an upper seal and a lower seal consistent with the functional needs of the sealing system. For purposes of this comparative analysis, the upper Salado seal is defined as the seal system between the Rustler-Salado interface and the bottom of the upper Salado compacted clay column. The lower Salado seal is defined as the seal system between the top of the compacted salt column and the bottom of the lower Salado compacted clay column.

D.4.1 Lower Salado Seal Components

The hydraulic conductance for each component comprising the lower seal was calculated. The hydraulic conductance for each component accounts for both the capacity for flow through the cross-sectional seal and the adjacent DRZ (if there is one predicted for the seal material at the time of interest). Table D-1 presents the hydraulic conductance calculated for each seal component comprising the lower seal at 0, 10, 50 and 100 years after closure. Hydraulic conductance is calculated for the cross-sectional seal, the DRZ, and the combination of the two (referred to as the total). In order to make comparisons to the design guidance easier, Table D-1 also contains the hydraulic conductance normalized to the lower seal guidance value of 2.0×10^{-12} m^2. The normalized hydraulic conductance is defined as the guidance hydraulic conductance divided by the calculated hydraulic conductance for the specific seal component. A calculated normalized hydraulic conductance with a value greater than or equal to unity indicates the guidance criteria are satisfied.

After 100 years, it is assumed that the concrete components fully degrade to the permeability of a silt to silty sand (1×10^{-14} m^2). This is considered a conservative assumption. By 100 years, the compacted salt column has healed to a permeability which provides a hydraulic conductance which by itself meets the lower seal criteria by a factor of 13. From 100 to 10,000 years, the permeability (i.e. hydraulic conductance) of the compacted salt column will continue to decrease approaching an intact salt magnitude. The clay will be stable in the WIPP environment and will maintain its sealing properties throughout the 10,000-year time frame. The asphalt may also be stable in the WIPP environment throughout the regulatory period. However, either the clay or consolidated salt components are sufficient to meet the design guidance.

Table D-1. Absolute and Normalized Hydraulic Conductance - Lower Seal Component

Element I	Material Type	Seal Component KA/L (m^2/s)	Normalized Seal Component (KA/L)	DRZ KA/L (m^2/s)	Normalized DRZ KA/L	Total KA/L (m^2/s)	Normalized Total KA/L
TIME = 0 YEARS							
9a	salt-saturated concrete	3.28E-11	0.061	2.50E-09	0.001	2.53E-09	0.001
9b	asphalt	4.26E-13	4.69	1.68E-09	0.001	1.68E-09	0.001
9c	salt-saturated concrete	2.47E-11	0.081	1.90E-09	0.001	1.92E-09	0.001
10	reconsolidated salt	5.19E-09	0.0004	4.62E-11	0.043	5.24E-09	0.0004
11a	salt-saturated concrete	3.28E-11	0.061	2.84E-09	0.001	2.87E-09	0.001
11b	asphalt	4.26E-13	4.69	1.68E-09	0.001	1.68E-09	0.001
11c	salt-saturated concrete	2.47E-11	0.081	2.15E-09	0.001	2.17E-09	0.001
12	compacted clay	7.30E-12	0.274	3.19E-10	0.006	3.26E-10	0.006
TIME = 10 YEARS							
9a	salt-saturated concrete	3.28E-11	0.061	2.99E-10	0.007	3.32E-10	0.006
9b	asphalt	4.26E-13	4.69	—	—	4.26E-13	4.69
9c	salt-saturated concrete	2.47E-11	0.081	2.13E-10	0.009	2.38E-10	0.008
10	reconsolidated salt	1.30E-09	0.0015	5.91E-12	0.339	1.31E-09	0.0015
11a	salt-saturated concrete	3.28E-11	0.061	3.13E-11	0.064	6.41E-11	0.031
11b	asphalt	4.26E-13	4.69	—	—	4.26E-13	4.69
11c	salt-saturated concrete	2.47E-11	0.081	1.18E-11	0.170	3.65E-11	0.055
12	compacted clay	7.30E-12	0.274	5.63E-11	0.036	6.36E-11	0.031
TIME = 50 YEARS							
9a	salt-saturated concrete	3.28E-11	0.061	—	—	3.28E-11	0.061
9b	asphalt	4.26E-13	4.69	—	—	4.26E-13	4.69
9c	salt-saturated concrete	2.47E-11	0.081	—	—	2.47E-11	0.081
10	reconsolidated salt	1.30E-11	0.153	—	—	1.30E-11	0.153
11a	salt-saturated concrete	3.28E-11	0.061	—	—	3.28E-11	0.061
11b	asphalt	4.26E-13	4.69	—	—	4.26E-13	4.69
11c	salt-saturated concrete	2.47E-11	0.081	—	—	2.47E-11	0.081
12	compacted clay	7.30E-12	0.274	—	—	7.30E-12	0.274
TIME = 100 YEARS							
9a	salt-saturated concrete	3.28E-11	0.061	—	—	3.28E-11	0.061
9b	asphalt	4.26E-13	4.69	—	—	4.26E-13	4.69
9c	salt-saturated concrete	2.47E-11	0.081	—	—	2.47E-11	0.081
10	reconsolidated salt	1.77E-13	11.3	—	—	1.77E-13	11.3
11a	salt-saturated concrete	3.28E-11	0.061	—	—	3.28E-11	0.061
11b	asphalt	4.26E-13	4.69	—	—	4.26E-13	4.69
11c	salt-saturated concrete	2.47E-11	0.081	—	—	2.47E-11	0.081
12	compacted clay	7.30E-12	0.274	—	—	7.30E-12	0.274

Note: Design guidance hydraulic conductance is equal to 2.0E-12 m^2/s

Table D-1. Absolute and Normalized Hydraulic Conductance - Lower Seal Component (concluded)

Element I	Material Type	Seal Component KA/L (m^2/s)	Normalized Seal Component (KA/L)	DRZ KA/L (m^2/s)	Normalized DRZ KA/L	Total KA/L (m^2/s)	Normalized Total KA/L
TIME > 100 YEARS							
9a	salt-saturated concrete	6.57E-07	0	—	—	6.57E-07	0
9b	asphalt	4.26E-13	4.69	—	—	4.26E-13	4.69
9c	salt-saturated concrete	4.95E-07	0	—	—	4.95E-07	0
10	reconsolidated salt	1.77E-13	11.3	—	—	1.77E-13	11.3
11a	salt-saturated concrete	6.57E-07	0	—	—	6.57E-07	0
11b	asphalt	4.26E-13	4.69	—	—	4.26E-13	4.69
11c	salt-saturated concrete	4.95E-07	0	—	—	4.95E-07	0
12	compacted clay	7.30E-12	0.274	—	—	7.30E-12	0.274

Note: Design guidance hydraulic conductance is equal to 2.0E-12 m^2/s

D.4.2 Upper Salado Seal Components

The hydraulic conductance for each material comprising the upper seal component was calculated. The hydraulic conductance for each component accounts for both the capacity for flow through the cross-sectional seal and the adjacent DRZ (if there is one predicted for the seal material at the time of interest).

Table D-2 presents the hydraulic conductance calculated for each seal material comprising the upper seal at 0, 10, 50 and 100 years after closure. Hydraulic conductance is calculated for the cross-sectional seal, the DRZ, and the combination of the two. In order to make comparison to the PA guidance easier, Table D-2 also contains the hydraulic conductance normalized to the guidance value of 2.0×10^{-10} m^2.

Table D-2. Absolute and Normalized Hydraulic Conductance - Upper Seal Component

Element I	Material Type	Seal Component KA/L (m^2/s)	Normalized Seal Component (KA/L)	DRZ KA/L (m^2/s)	Normalized DRZ KA/L	Total KA/L (m^2/s)	Normalized Total KA/L
TIME = 0 YEARS							
6	asphalt	5.52E-15	36200	1.74E-10	1.15	1.74E-10	1.15
7a	salt-saturated concrete	3.28E-11	6.09	2.14E-09	0.094	2.17E-09	0.092
7b	asphalt	4.26E-13	469	1.68E-09	0.119	1.68E-09	0.119
7c	salt-saturated concrete	2.47E-11	8.088	1.62E-09	0.123	1.65e-09	0.122
8	compacted clay	1.84E-12	109	6.56E-11	3.05	6.75E-11	2.96
TIME = 10 YEARS							
6	asphalt	5.52E-15	36200	1.72E-10	1.16	1.72E-10	1.16
7a	salt-saturated concrete	3.28E-11	6.09	5.38E-10	0.371	5.71E-10	0.350
7b	asphalt	4.26E-13	469	—	—	4.26E-13	469
7c	salt-saturated concrete	2.47E-11	8.09	3.93E-10	0.508	4.18E-10	0.478
8	compacted clay	1.84E-12	109	4.27E-11	4.69	4.45E-11	4.49
TIME = 50 YEARS							
6	asphalt	5.52E-15	36200	1.69E-10	1.18	1.69E-10	1.18
7a	salt-saturated concrete	3.28E-11	6.09	—	—	3.28E-11	6.09
7b	asphalt	4.26E-13	469	—	—	4.26E-13	469
7c	salt-saturated concrete	2.47E-11	8.09	—	—	2.47E-11	8.09
8	compacted clay	1.84E-12	109	9.71E-12	20.6	1.16E-11	17.3
TIME = 100 YEARS							
6	asphalt	5.52E-15	36200	1.69E-10	1.18	1.69E-10	1.18
7a	salt-saturated concrete	3.28E-11	6.09	—	—	3.28E-11	6.09
7b	asphalt	4.26E-13	469	—	—	4.26E-13	469
7c	salt-saturated concrete	2.47E-11	8.09	—	—	2.47E-11	8.09
8	compacted clay	1.84E-12	109	9.71E-12	20.6	1.16E-11	17.3
TIME > 100 YEARS							
6	asphalt	5.52E-15	36200	1.65E-10	1.21	1.65E-10	1.21
7a	salt-saturated concrete	6.57E-07	0	—	—	6.57E-07	0
7b	asphalt	4.26E-13	469	—	—	4.26E-13	469
7c	salt-saturated concrete	4.95E-07	0	—	—	4.95E-07	0
8	compacted clay	1.84E-12	109	—	—	1.84E-12	109

Note: Design guidance hydraulic conductance is equal to 2.0E-10 m^2/s

D.5 References

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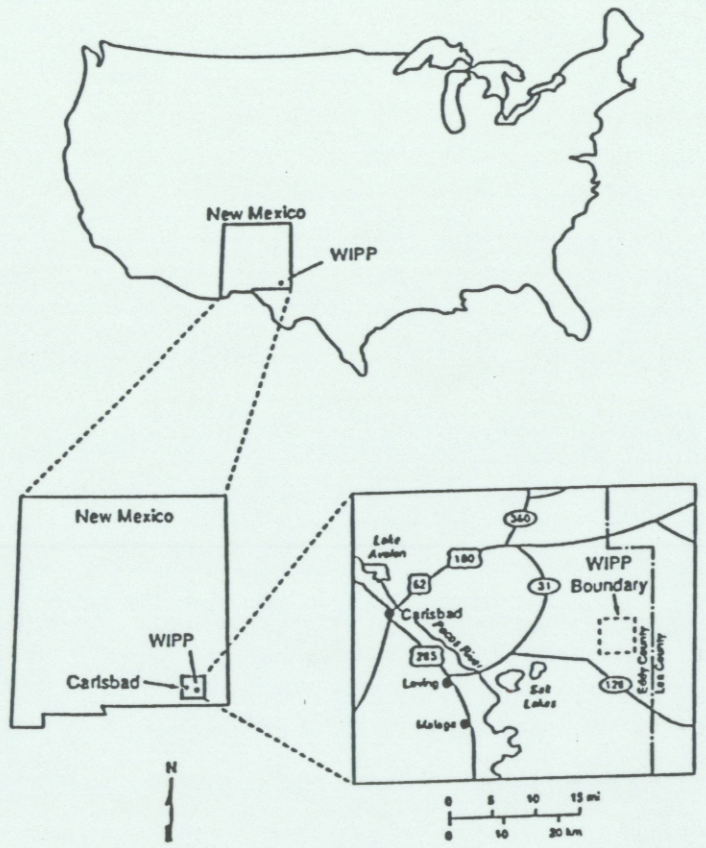
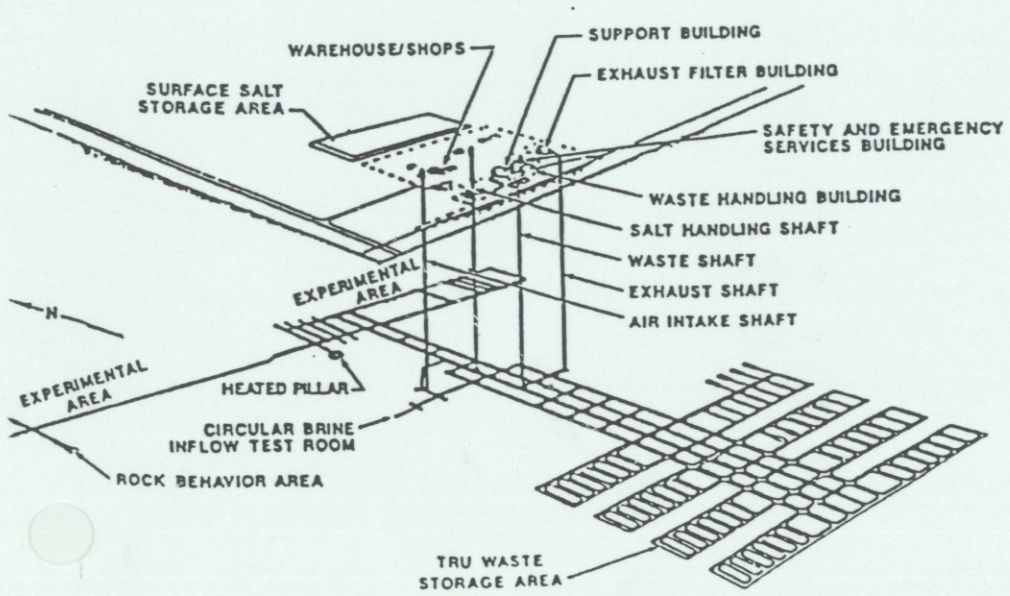


WIPP LAYOUT



WASTE ISOLATION PILOT PLANT

CARLSBAD, NM

SHAFT SEALING SYSTEM DESIGN

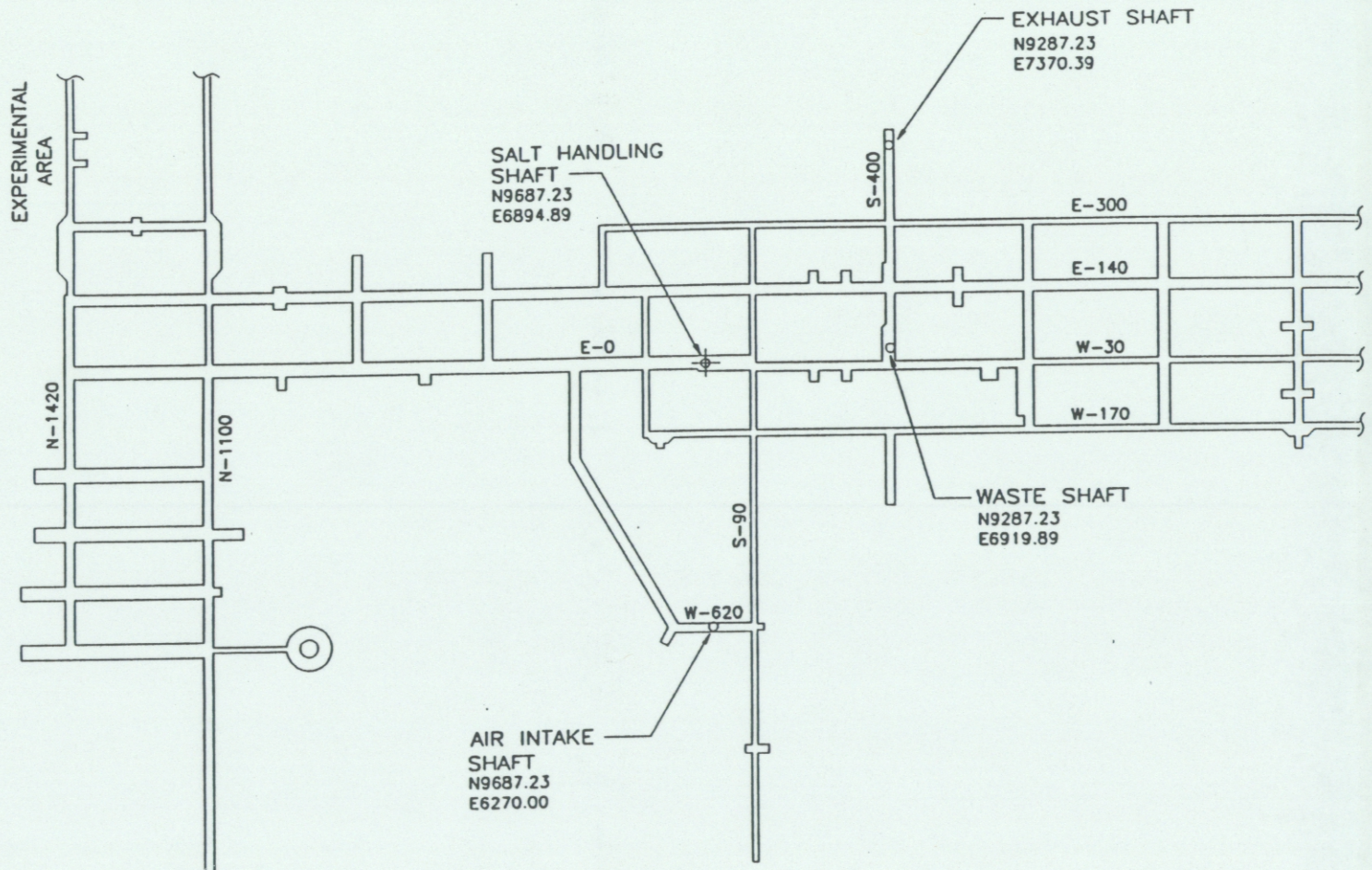
DESIGN DRAWINGS

DRAWING NUMBER	TITLE
09-CS-00-G01	WIPP SHAFT SEALING SYSTEM SHAFT LOCATION PLAN, ABBREVIATIONS, GENERAL NOTES AND LEGEND
09-CS-31-G01	WIPP SHAFT SEALING SYSTEM NEAR-SURFACE/RUSTLER FORMATIONS WASTE SHAFT STRATIGRAPHY & AS-BUILT ELEMENTS
09-CS-31-G02	WIPP SHAFT SEALING SYSTEM SALADO FORMATION WASTE SHAFT STRATIGRAPHY & AS-BUILT ELEMENTS
09-CS-31-L01	WIPP SHAFT SEALING SYSTEM NEAR-SURFACE/RUSTLER FORMATIONS WASTE SHAFT STRATIGRAPHY & SEALING SUBSYSTEM PROFILE
09-CS-31-L02	WIPP SHAFT SEALING SYSTEM SALADO FORMATION WASTE SHAFT STRATIGRAPHY & SEALING SUBSYSTEM PROFILE
09-CS-31-S01	WIPP SHAFT SEALING SYSTEM WASTE SHAFT SHAFT STATION MONOLITH
09-CS-33-G01	WIPP SHAFT SEALING SYSTEM NEAR-SURFACE/RUSTLER FORMATIONS AIR INTAKE SHAFT STRATIGRAPHY & AS-BUILT ELEMENTS
09-CS-33-G02	WIPP SHAFT SEALING SYSTEM SALADO FORMATION AIR INTAKE SHAFT STRATIGRAPHY & AS-BUILT ELEMENTS
09-CS-33-L01	WIPP SHAFT SEALING SYSTEM NEAR-SURFACE/RUSTLER FORMATIONS AIR INTAKE SHAFT STRATIGRAPHY & SEALING SUBSYSTEM PROFILE

DRAWING NUMBER	TITLE
09-CS-33-L02	WIPP SHAFT SEALING SYSTEM SALADO FORMATION AIR INTAKE SHAFT STRATIGRAPHY & SEALING SUBSYSTEM PROFILE
09-CS-33-S01	WIPP SHAFT SEALING SYSTEM AIR INTAKE SHAFT SHAFT STATION MONOLITH
09-CS-35-G01	WIPP SHAFT SEALING SYSTEM NEAR-SURFACE/RUSTLER FORMATIONS EXHAUST SHAFT STRATIGRAPHY & AS-BUILT ELEMENTS
09-CS-35-G02	WIPP SHAFT SEALING SYSTEM SALADO FORMATION EXHAUST SHAFT STRATIGRAPHY & AS-BUILT ELEMENTS
09-CS-35-L01	WIPP SHAFT SEALING SYSTEM NEAR-SURFACE/RUSTLER FORMATIONS EXHAUST SHAFT STRATIGRAPHY & SEALING SUBSYSTEM PROFILE
09-CS-35-L02	WIPP SHAFT SEALING SYSTEM SALADO FORMATION EXHAUST SHAFT STRATIGRAPHY & SEALING SUBSYSTEM PROFILE
09-CS-35-S01	WIPP SHAFT SEALING SYSTEM EXHAUST SHAFT SHAFT STATION MONOLITH
09-CS-37-G01	WIPP SHAFT SEALING SYSTEM NEAR-SURFACE/RUSTLER FORMATIONS SALT HANDLING SHAFT STRATIGRAPHY & AS-BUILT ELEMENTS
09-CS-37-G02	WIPP SHAFT SEALING SYSTEM SALADO FORMATION SALT HANDLING SHAFT STRATIGRAPHY & AS-BUILT ELEMENTS

DRAWING NUMBER	TITLE
09-CS-37-L01	WIPP SHAFT SEALING SYSTEM NEAR-SURFACE/RUSTLER FORMATIONS SALT HANDLING SHAFT STRATIGRAPHY & SEALING SUBSYSTEM PROFILE
09-CS-37-L02	WIPP SHAFT SEALING SYSTEM SALADO FORMATION SALT HANDLING SHAFT STRATIGRAPHY & SEALING SUBSYSTEM PROFILE
09-CS-37-S01	WIPP SHAFT SEALING SYSTEM SALT HANDLING SHAFT SHAFT STATION MONOLITH
09-CS-00-S02	WIPP SHAFT SEALING SYSTEM CONCRETE COMPONENT IN SALADO FORMATION
09-CS-00-S03	WIPP SHAFT SEALING SYSTEM ASPHALT COLUMN
09-CS-00-S04	WIPP SHAFT SEALING SYSTEM UPPER AND LOWER SALADO COMPACTED CLAY COLUMNS
09-CS-00-S05	WIPP SHAFT SEALING SYSTEM COMPACTED SALT COLUMN
09-CS-00-S06	WIPP SHAFT SEALING SYSTEM CONCRETE PLUG
09-CS-00-S07	WIPP SHAFT SEALING SYSTEM RUSTLER COMPACTED CLAY COLUMN
09-CS-00-S08	WIPP SHAFT SEALING SYSTEM COMPACTED EARTHEN FILL AND CONCRETE PLUG

PRELIMINARY



SHAFT SEALS LOCATION PLAN

N

SCALE IN FEET

0 100 200 300 400 500

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.

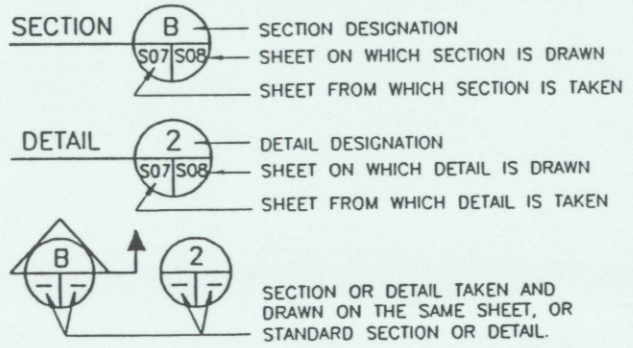
2. THE AS-BUILT DIMENSIONS AND DEPTHS AND/OR ELEVATIONS SHOWN IN THESE DRAWINGS ARE NOMINAL IN THAT DIMENSIONS MAY CHANGE DUE TO LOCAL VARIANCE OF THE STRATIFICATION, OPERATIONAL MODIFICATIONS MADE TO SUIT THE CREEP CLOSURE OF THE HALITE, AND OTHER OPERATIONAL REQUIREMENTS. THEREFORE THE AS-BUILT DIMENSIONS 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.

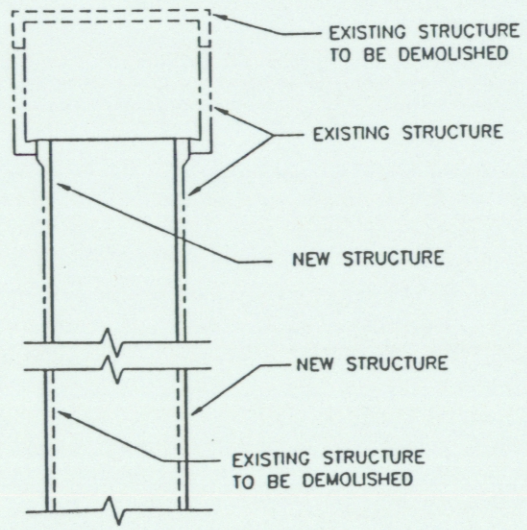
3. *FOR MATERIAL SPEC. SEE REPORT* ***XXXXX****, T.B.D.*

4. DRAWING NUMBERS:
   DRAWING NUMBERS ARE ASSIGNED AS FOLLOWS:
   09-CS-XX-AYY (XX-AYY),
   WHERE:
   - 09 = PB PROJECT NO. 13411A TASK NO 09,
   - CS = CIVIL AND STRUCTURAL
   - XX = 00 ..... GENERAL DRAWING
   - = 31 ..... WASTE HANDLING SHAFT
   - = 33 ..... AIR INTAKE SHAFT
   - = 35 ..... EXHAUST SHAFT
   - = 37 ..... SALT HANDLING SHAFT
   - AYY = DRAWING NUMBER

   FOR CLARITY ON DETAIL AND SECTION DESIGNATIONS, AND NOTES, THE "09-CS-" IS NOT SHOWN.

LEGEND FOR PROPOSED SHAFT SEALING SYSTEM:





ABBREVIATIONS:

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

PRELIMINARY

REV.	DATE	DESCRIPTION	BY	CK.	APP

SANDIA NATIONAL LABORATORIES

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

WIPP SHAFT SEALING SYSTEM

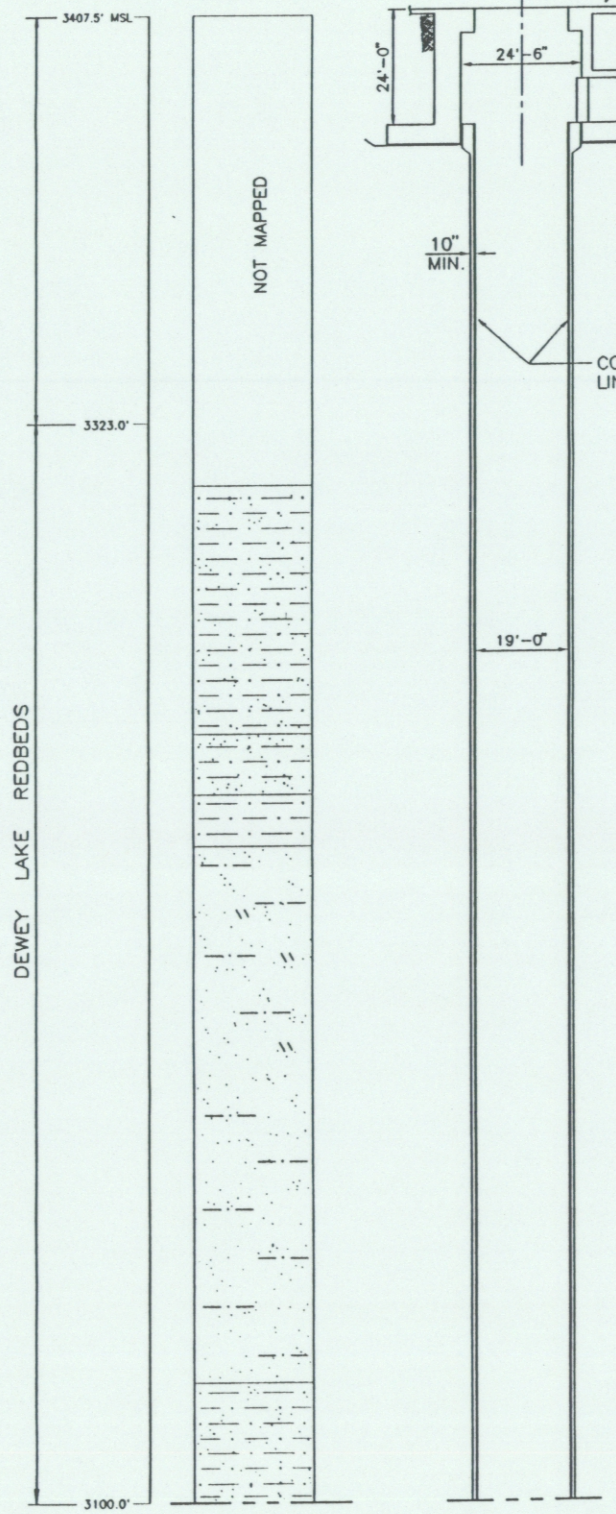
SHAFT LOCATION PLAN, ABBREVIATIONS, GENERAL NOTES AND LEGEND

	NAME	DATE
BY	DL	
CK.	SAR	
APP.		
APP.		
APP.		

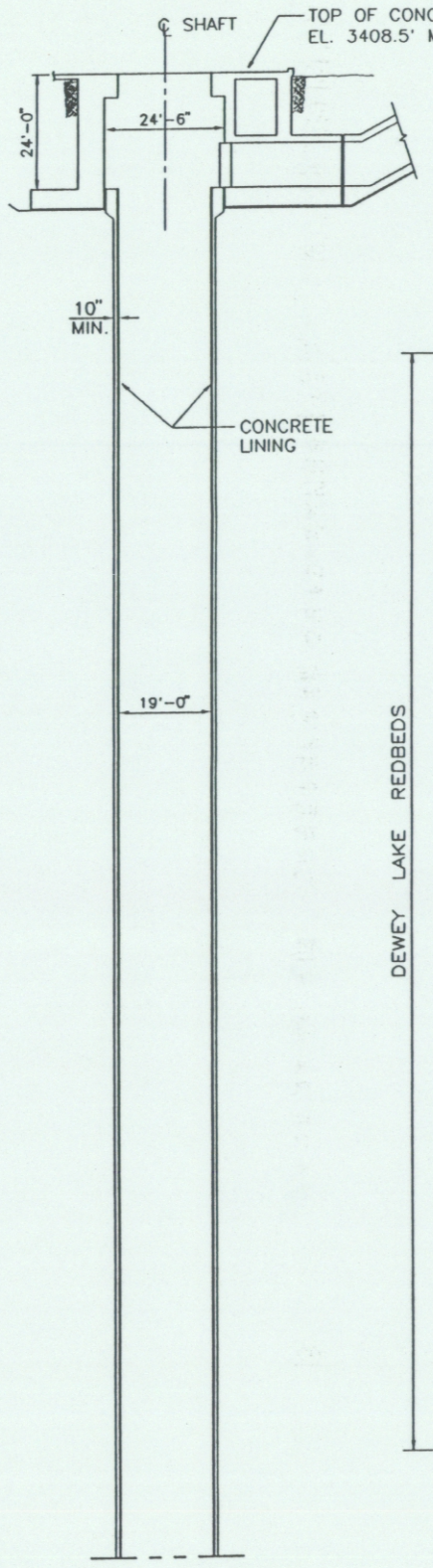
PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO.	SHEET NO.

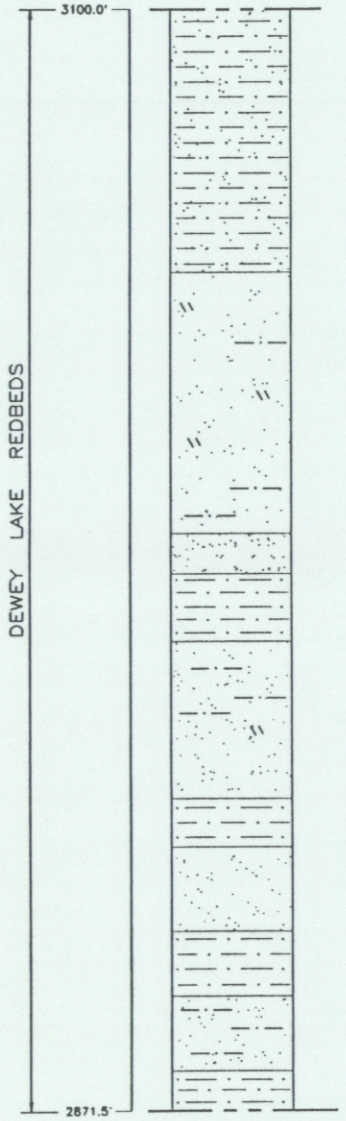
09-CS-00-G01

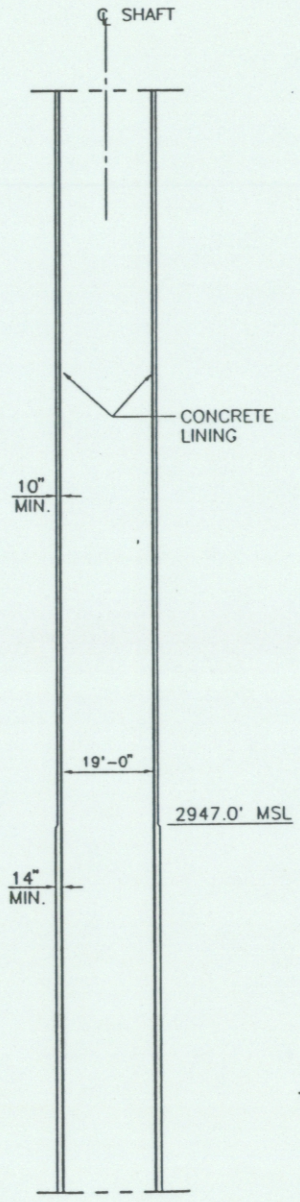
STRATIGRAPHY
(SEE NOTE 1)

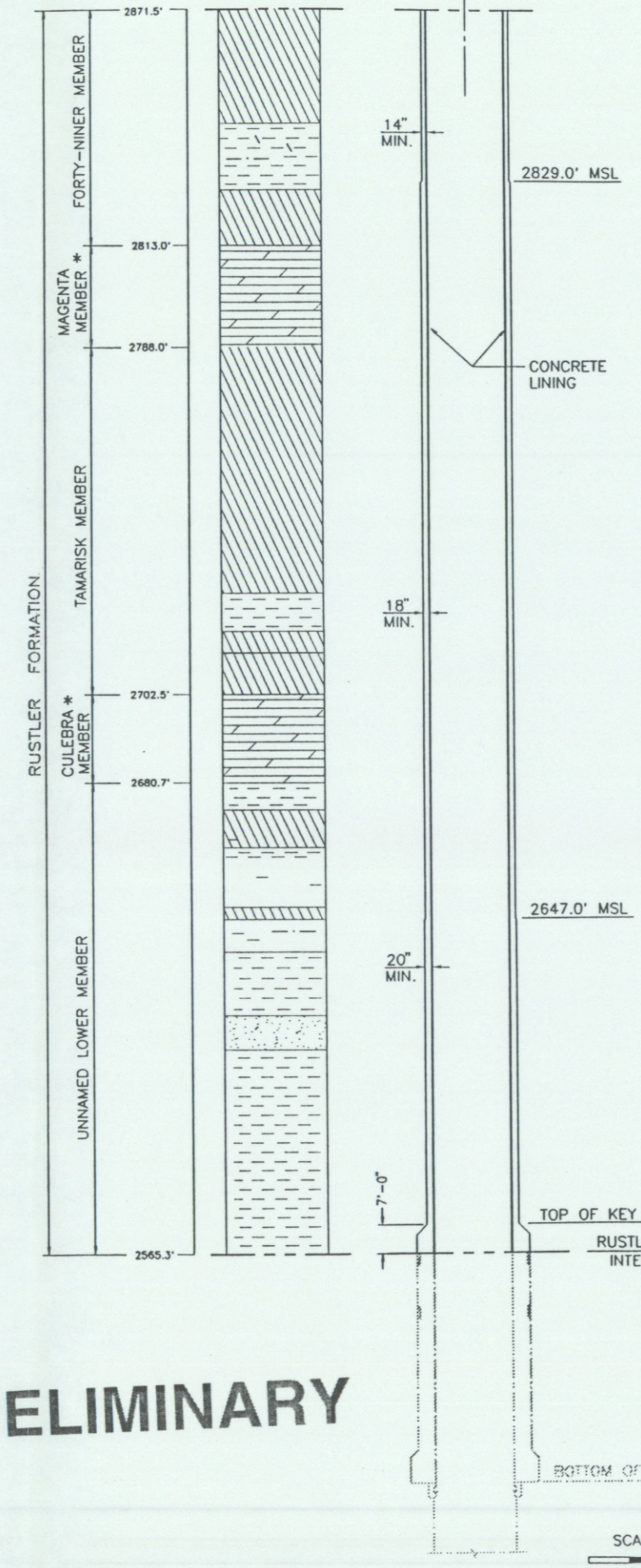


SHAFT









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

SCALE IN FEET
0 10 20 30 40 50

PRELIMINARY

REV.	DATE	DESCRIPTION	BY	CK.	APP

SANDIA NATIONAL LABORATORIES

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

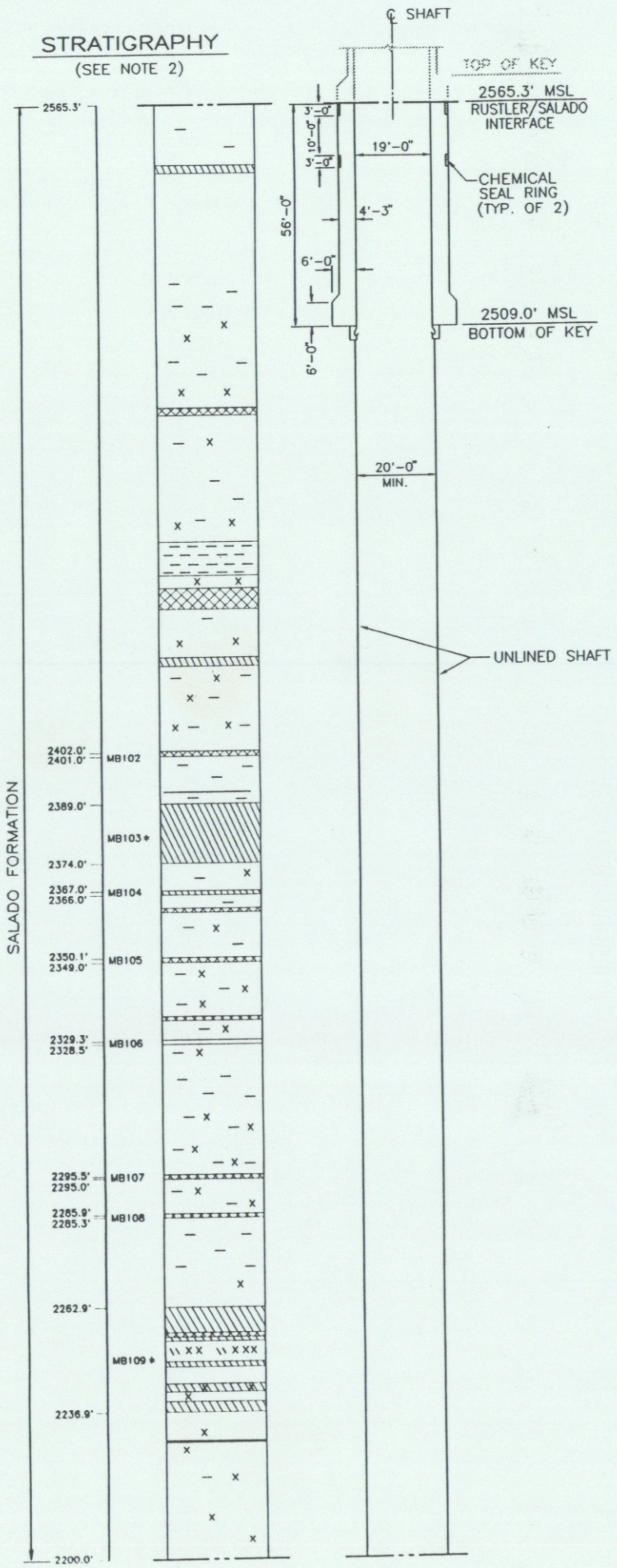
WIPP SHAFT SEALING SYSTEM
NEAR-SURFACE/RUSTLER FORMATIONS
WASTE SHAFT
STRATIGRAPHY &
AS-BUILT ELEMENTS

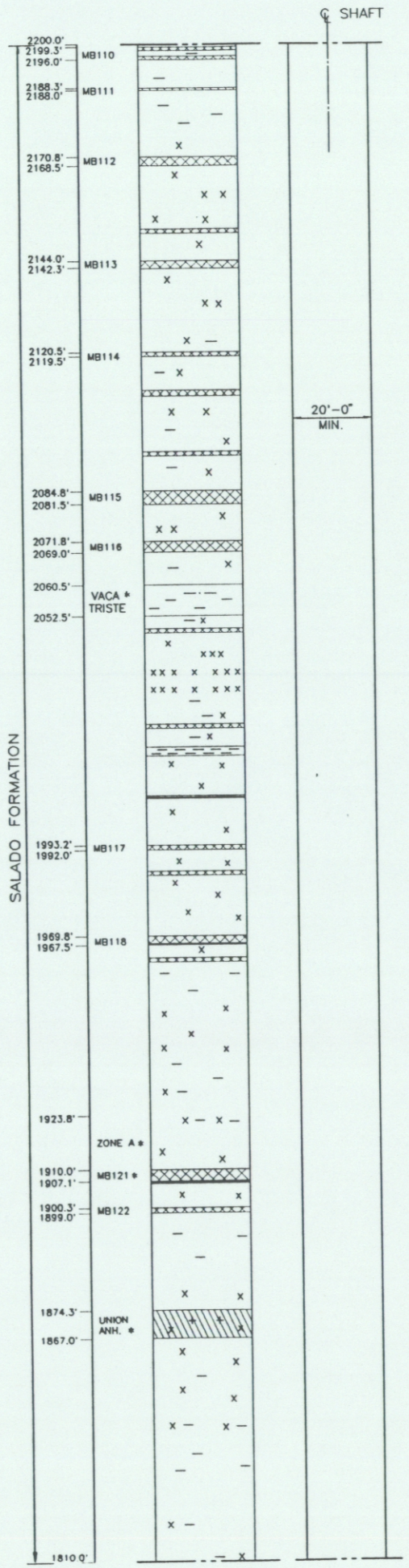
	NAME	DATE
BY	DL	
CK.	SAR	
APP.		
APP.		
APP.		

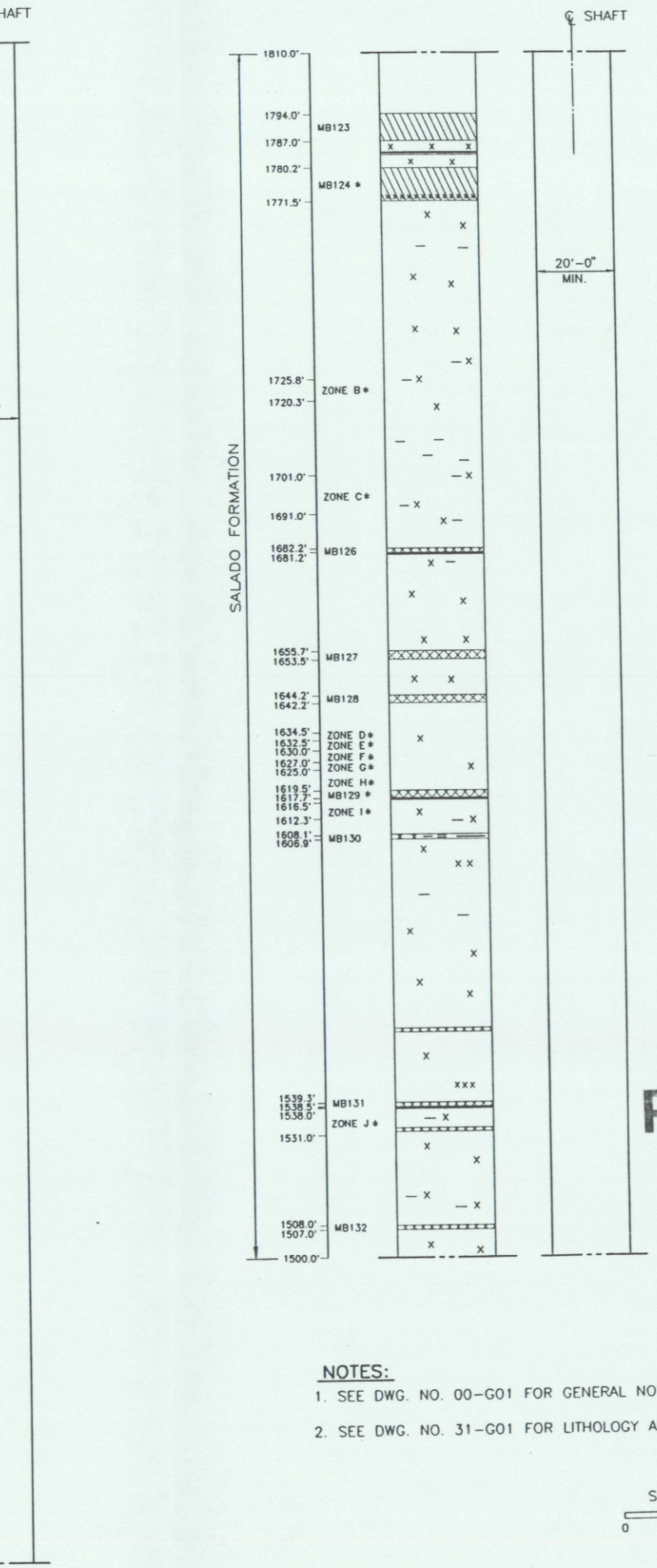
PARSONS BRINCKERHOFF ENERGY SERVICES, INC. | SCALE: | SIZE B | SNL DWG. NO. | SHEET NO.

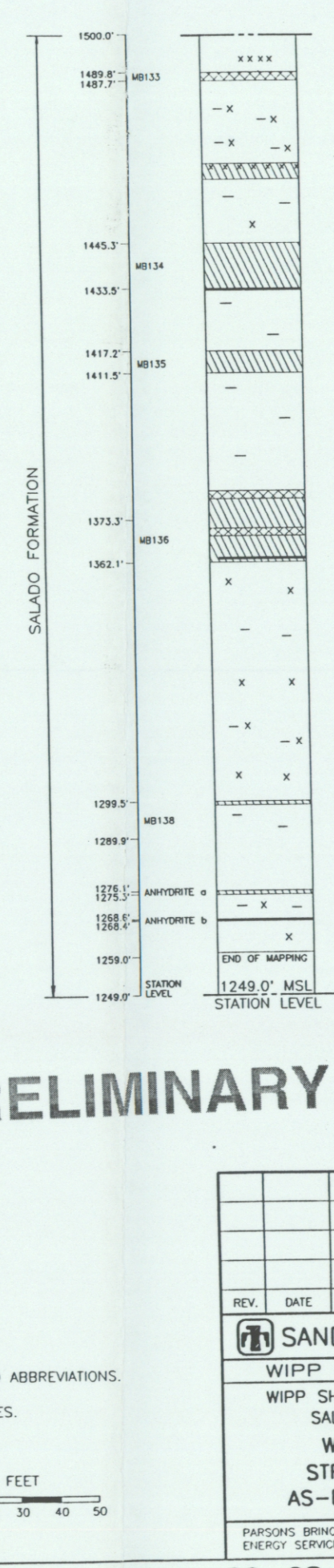
09-CS-31-G01

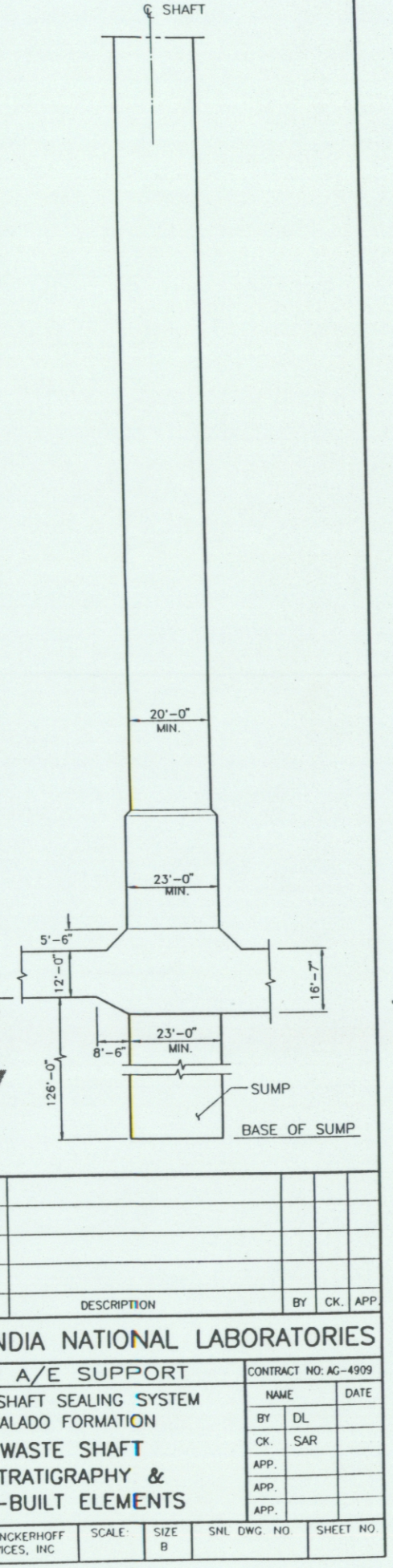
STRATIGRAPHY
(SEE NOTE 2)











PRELIMINARY

NOTES:
1. SEE DWG. NO. 00-G01 FOR GENERAL NOTES AND ABBREVIATIONS.
2. SEE DWG. NO. 31-G01 FOR LITHOLOGY AND NOTES.

SCALE IN FEET
0 10 20 30 40 50

REV.	DATE	DESCRIPTION	BY	CK.	APP.

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

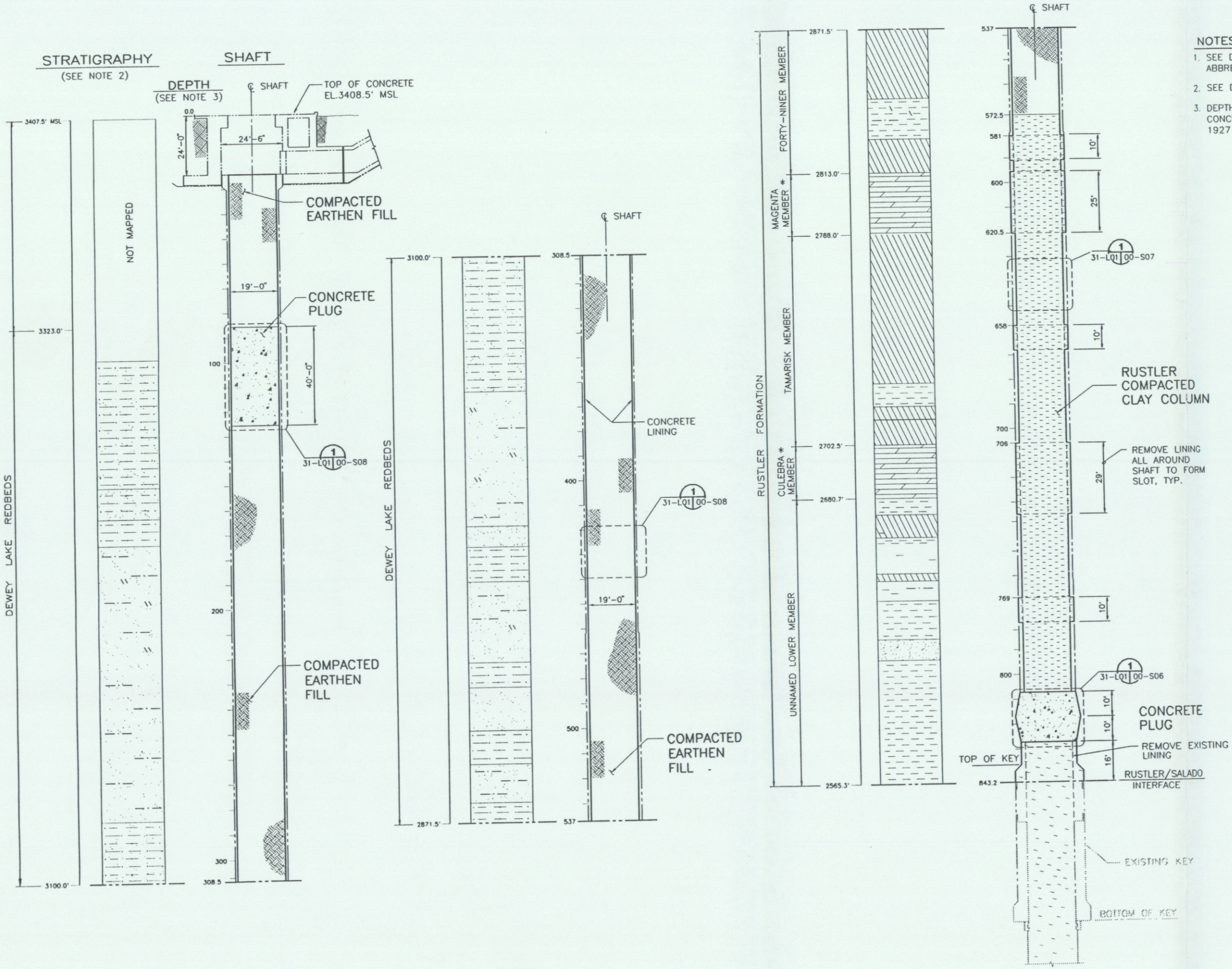
CONTRACT NO: AG-4909

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

	NAME	DATE
BY	DL	
CK.	SAR	
APP.		
APP.		
APP.		

PARSONS BRINCKERHOFF ENERGY SERVICES, INC | SCALE: | SIZE B | SNL DWG. NO. | SHEET NO.

09-CS-31-G02



NOTES:

1. SEE DWG. 00-G01 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS.
2. SEE DWG. 31-G01 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.

PRELIMINARY

SCALE IN FEET
0 10 20 30 40 50

REV.	DATE	DESCRIPTION	BY	CK.	APP.

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

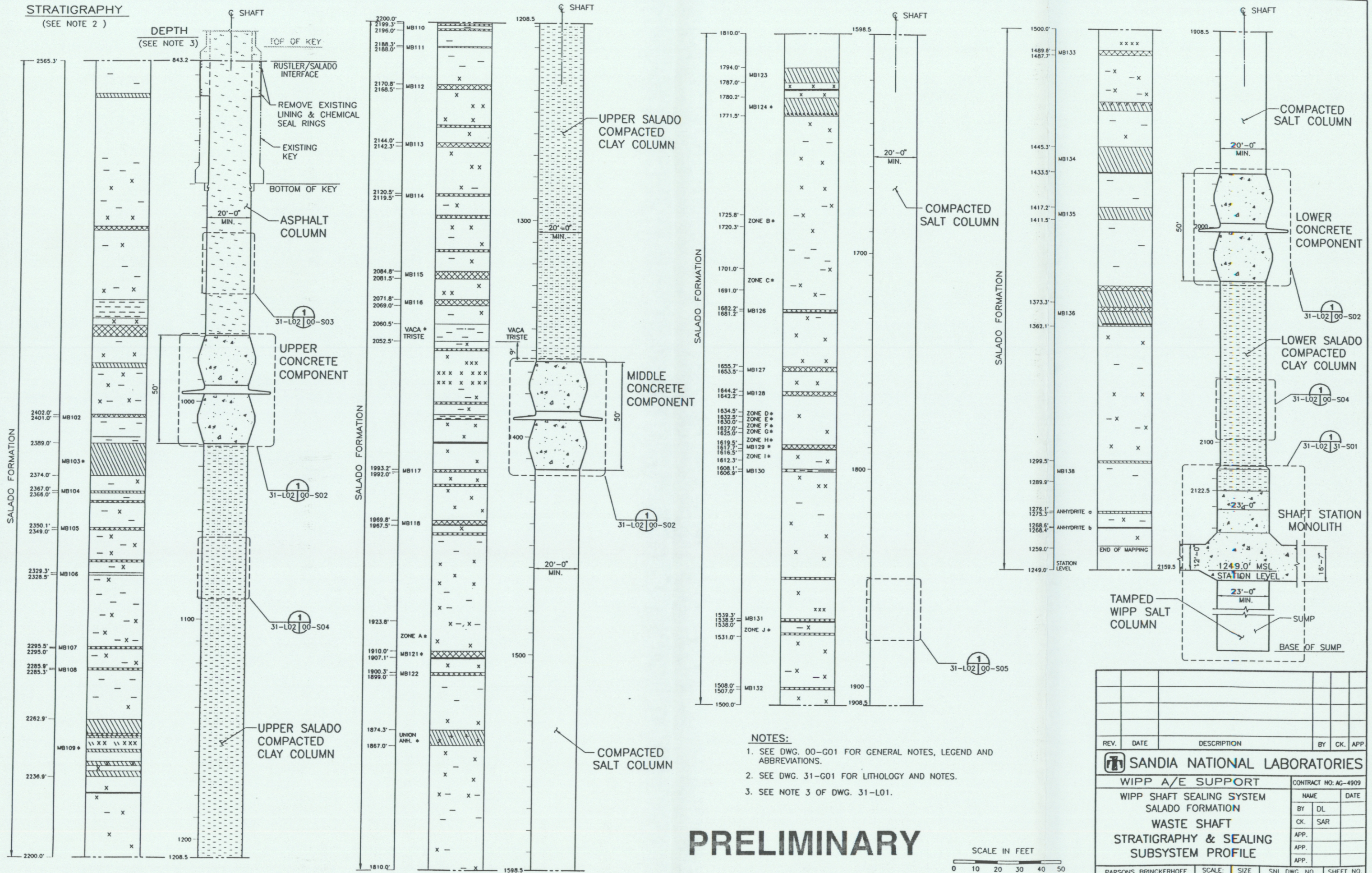
CONTRACT NO: AG-4909

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

	NAME	DATE
BY	DL	
CK.	SAR	
APP.		
APP.		
APP.		

PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO.	SHEET NO.

09-CS-31-L01



NOTES:

1. SEE DWG. 00-G01 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS.
2. SEE DWG. 31-G01 FOR LITHOLOGY AND NOTES.
3. SEE NOTE 3 OF DWG. 31-L01.

PRELIMINARY

SCALE IN FEET
0 10 20 30 40 50

REV.	DATE	DESCRIPTION	BY	CK.	APP.

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

CONTRACT NO: AG-4909

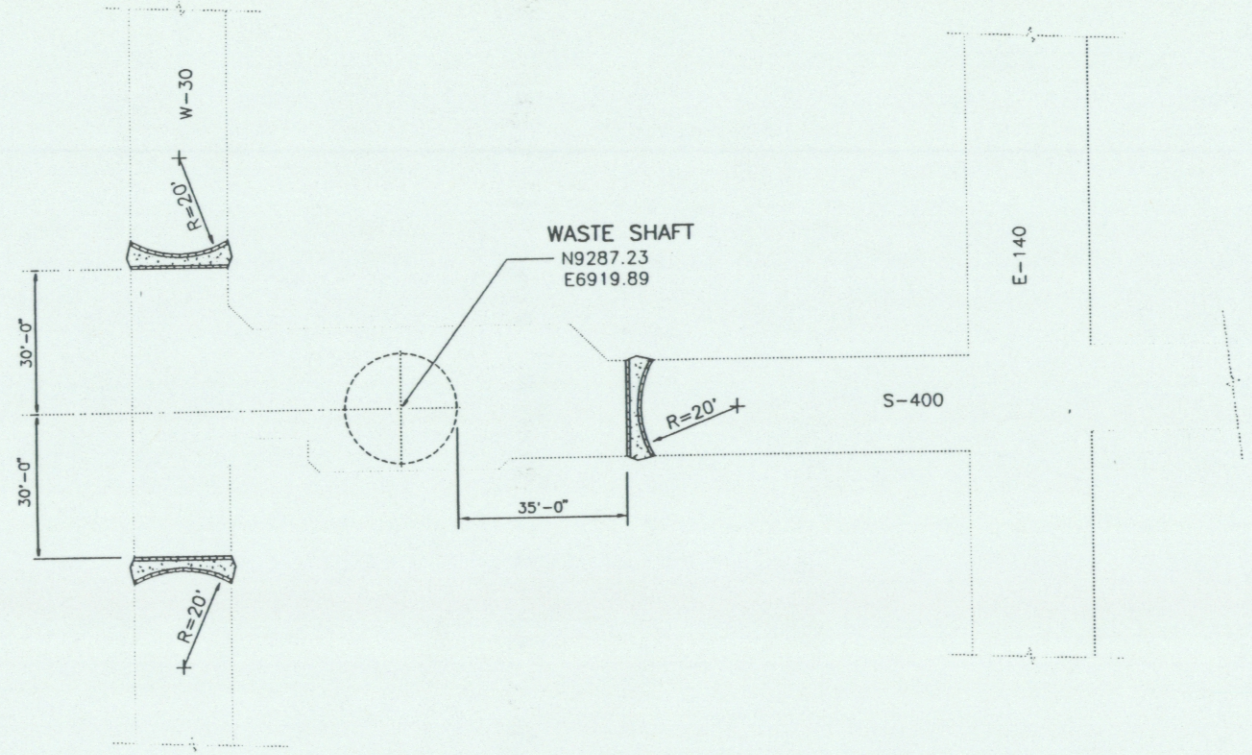
WIPP SHAFT SEALING SYSTEM
SALADO FORMATION
WASTE SHAFT
STRATIGRAPHY & SEALING
SUBSYSTEM PROFILE

	NAME	DATE
BY	DL	
CK.	SAR	
APP.		
APP.		
APP.		

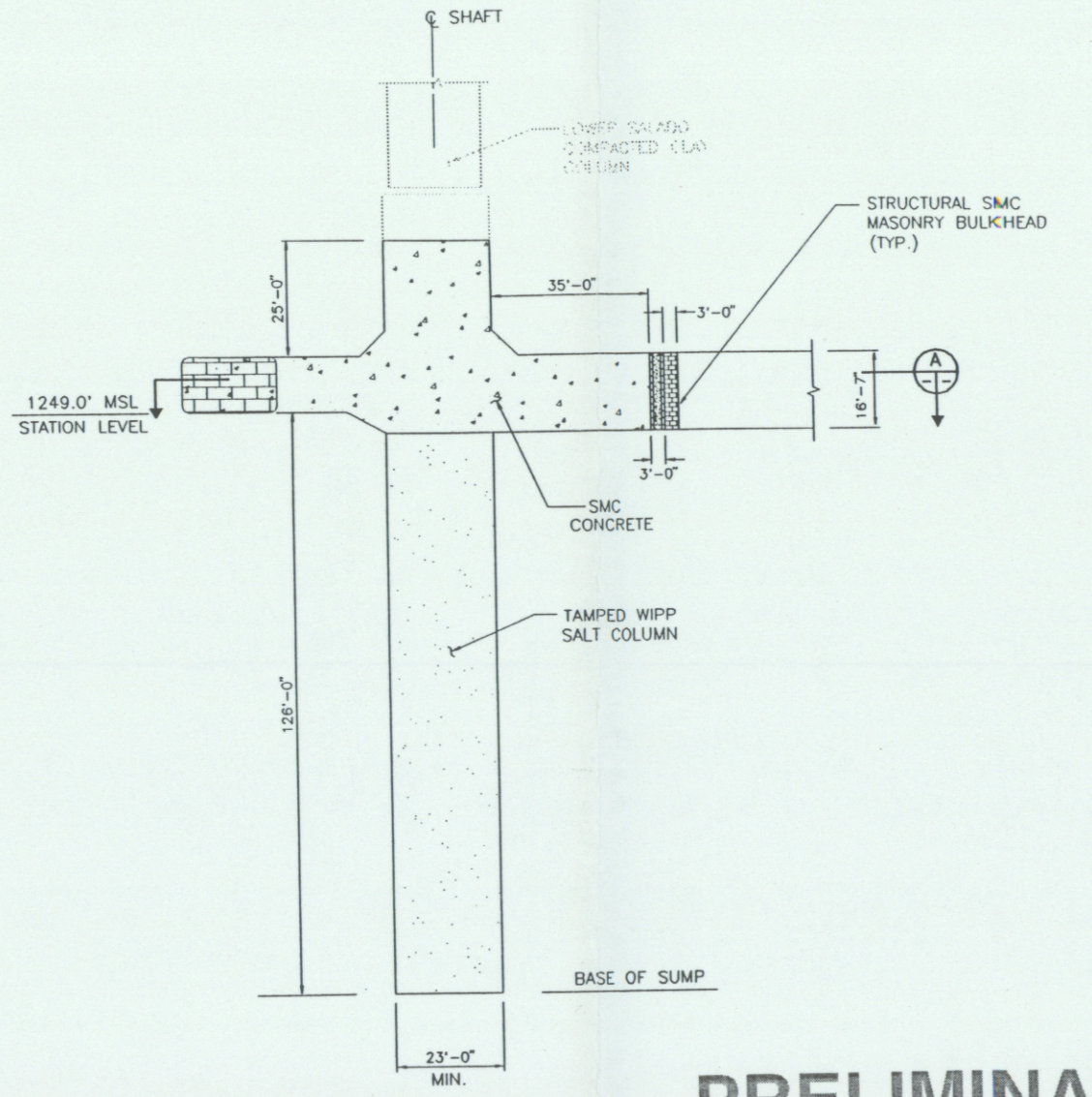
PARSONS BRINCKERHOFF ENERGY SERVICES, INC | SCALE: | SIZE B | SNL DWG. NO. | SHEET NO.

NAME: C:\A\WIPP\9\CS\CS31-L02.DWG DATE: NOVEMBER 29, 1995 TIME: 10:14 AM

09-CS-31-L02



SECTION A



DETAIL 1 (31-L02 | 31-S01)

PRELIMINARY

NOTES:

1. SEE DWG. NO. 00-G01 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS.

SCALE IN FEET
0 10 20 30 40 50

REV.	DATE	DESCRIPTION	BY	CK.	APP

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

WIPP SHAFT SEALING SYSTEM

WASTE SHAFT
SHAFT STATION MONOLITH

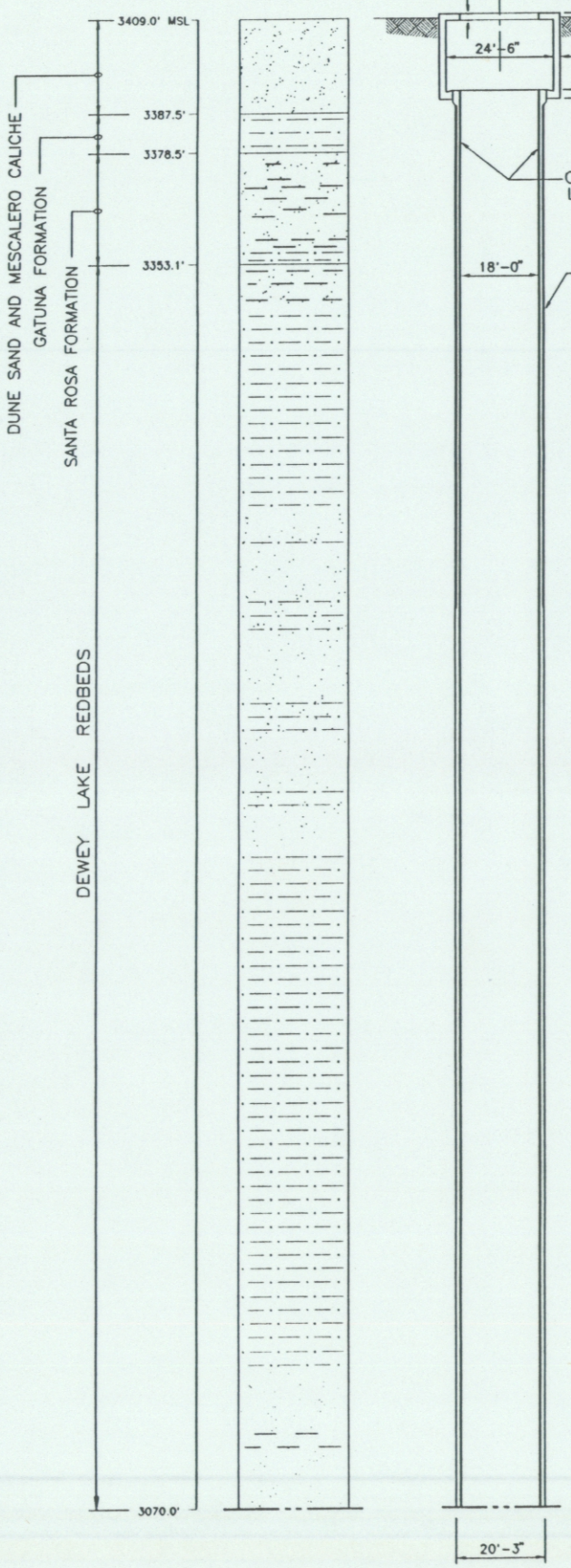
CONTRACT NO: AC-4909

	NAME	DATE
BY	DL	
CK.	SAR	
APP.		
APP.		
APP.		

PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO.	SHEET NO.

09-CS-31-S01

STRATIGRAPHY
(SEE NOTE 1)



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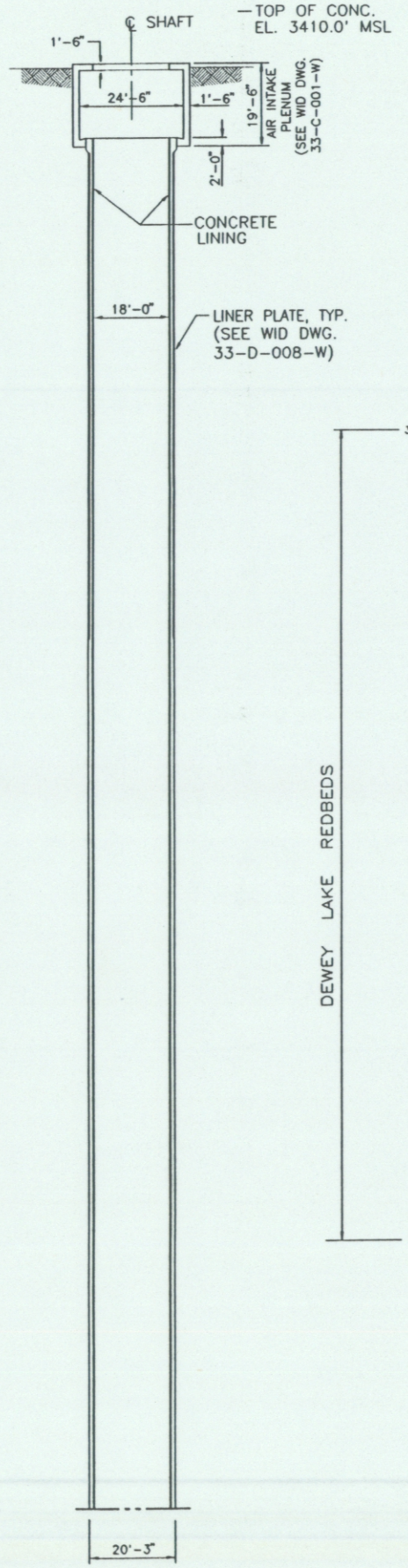
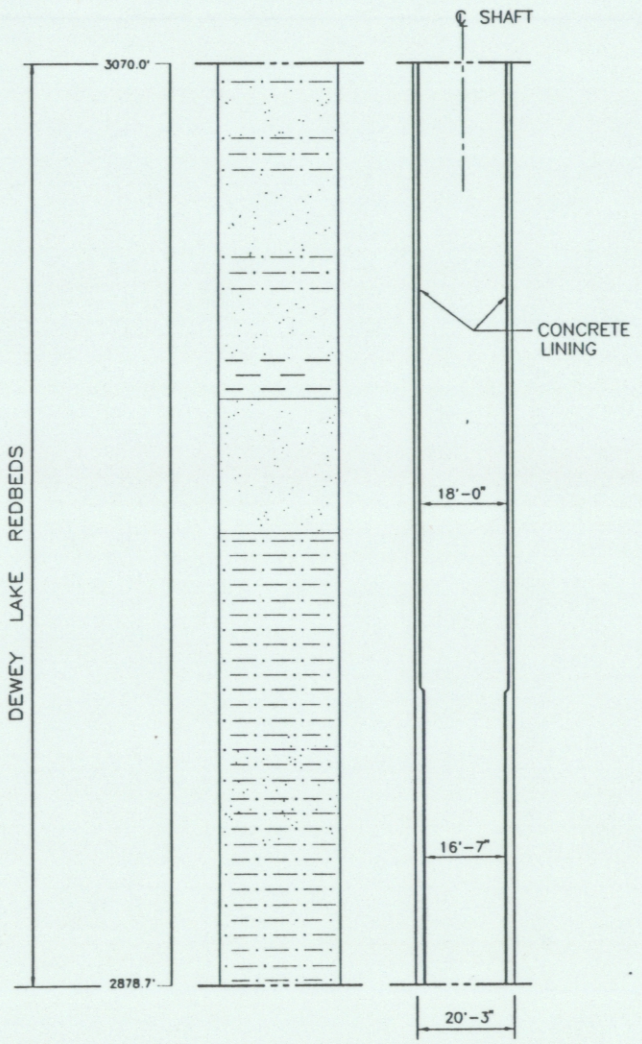
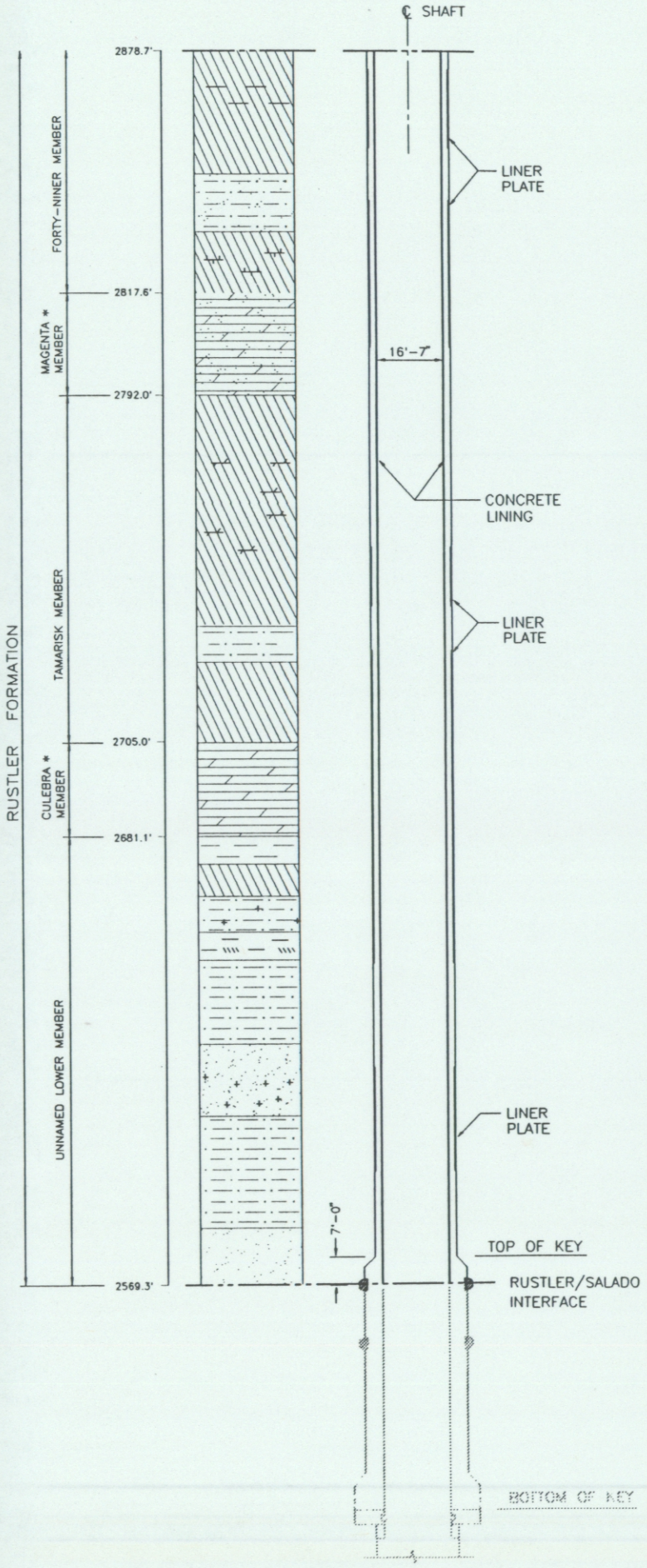






LITHOLOGY:

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
	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

PRELIMINARY

SCALE IN FEET
0 10 20 30 40 50

REV.	DATE	DESCRIPTION	BY	CK.	APP.

SANDIA NATIONAL LABORATORIES

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

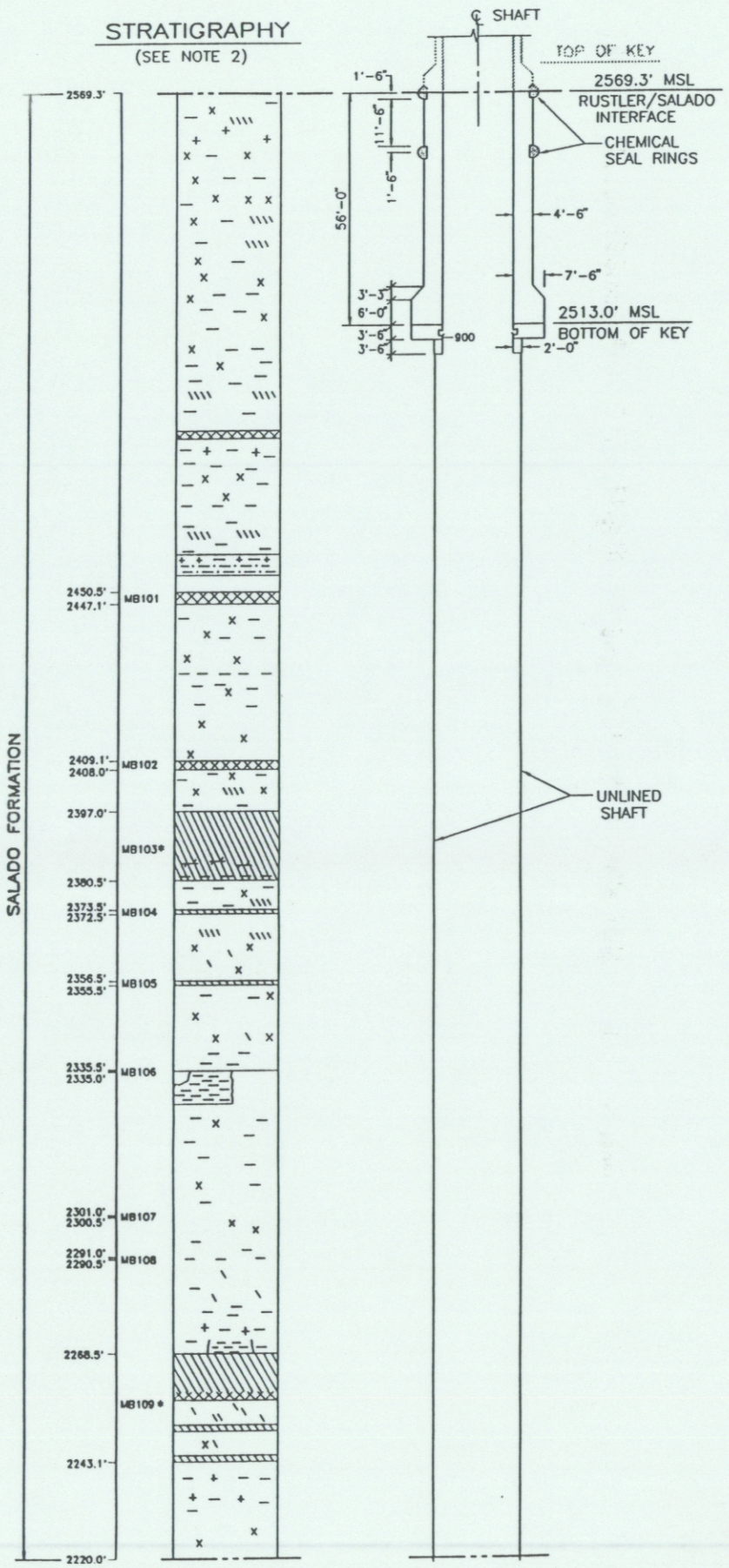
WIPP SHAFT SEALING SYSTEM
NEAR-SURFACE/RUSTLER FORMATIONS
AIR INTAKE SHAFT
STRATIGRAPHY &
AS-BUILT ELEMENTS

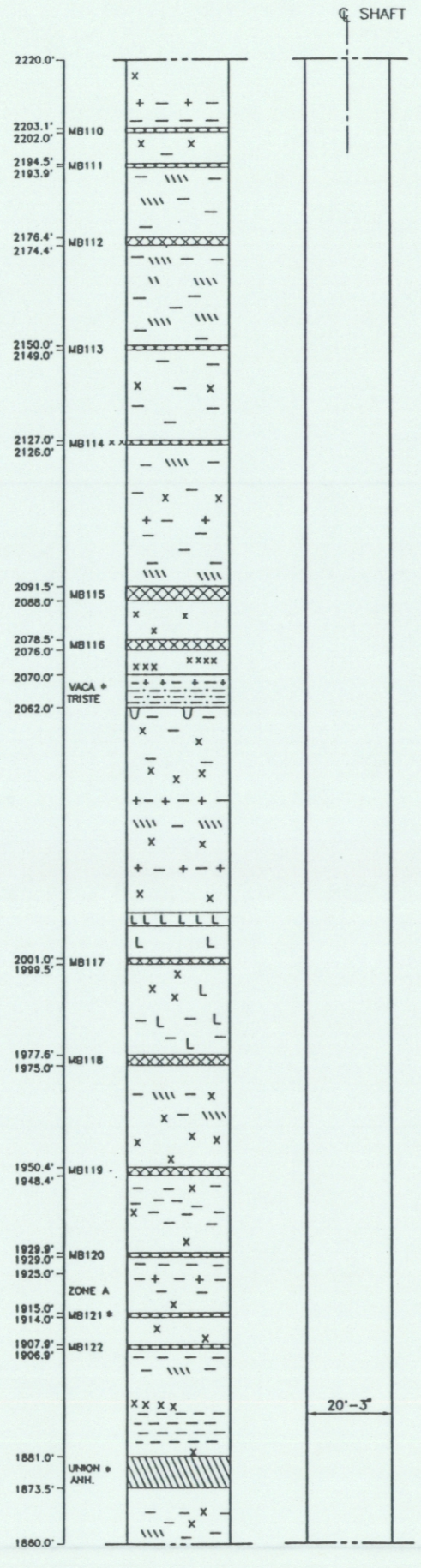
	NAME	DATE
BY	DL	
CK.	SAR	
APP.		
APP.		
APP.		

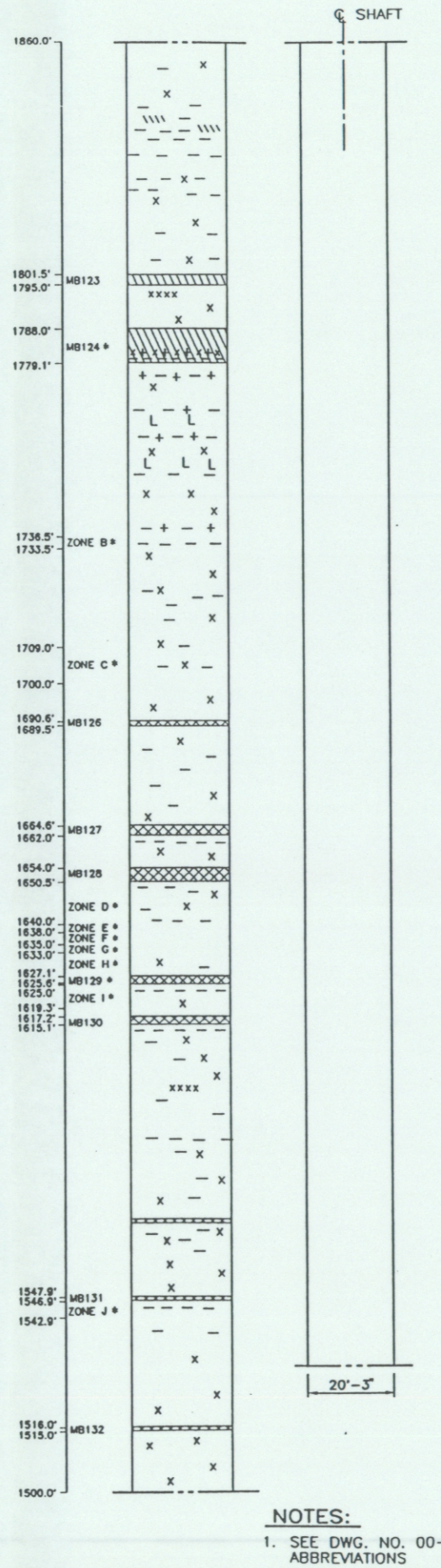
PARSONS BRINCKERHOFF ENERGY SERVICES, INC | SCALE: | SIZE B | SNL DWG. NO. | SHEET NO

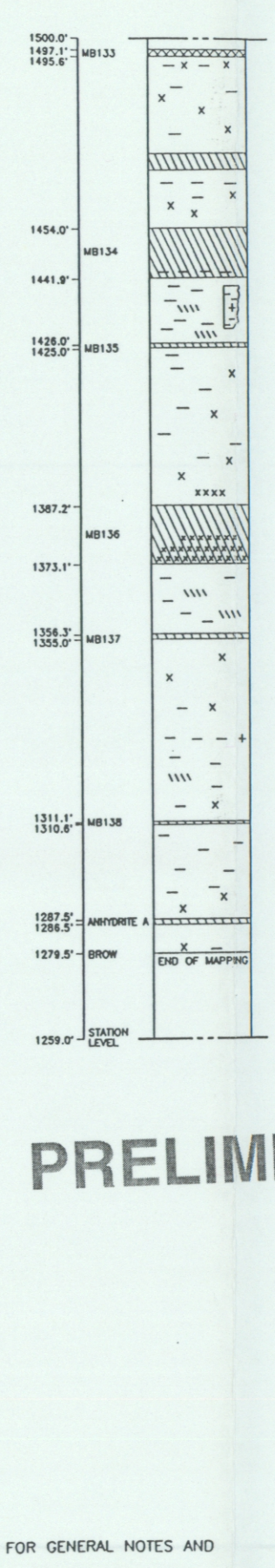
09-CS-33-G01

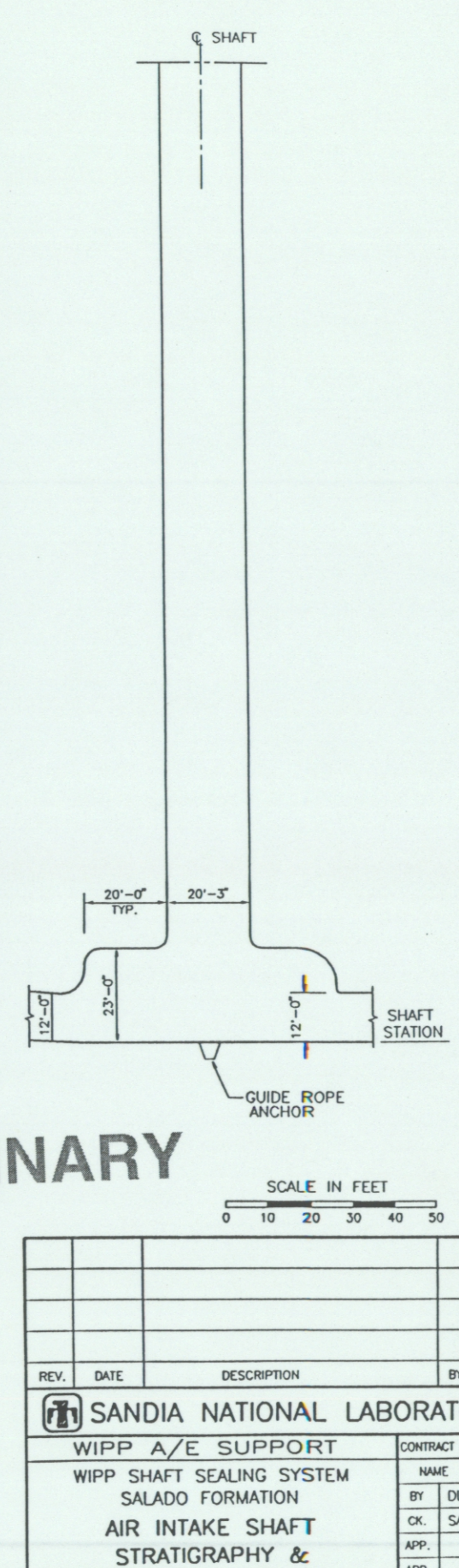
STRATIGRAPHY
(SEE NOTE 2)











PRELIMINARY

SCALE IN FEET
0 10 20 30 40 50

NOTES:
1. SEE DWG. NO. 00-G01 FOR GENERAL NOTES AND ABBREVIATIONS
2. SEE DWG. NO. 33-G01 FOR LITHOLOGY AND NOTES.

REV.	DATE	DESCRIPTION	BY	CK.	APP.

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

CONTRACT NO: AG-4909

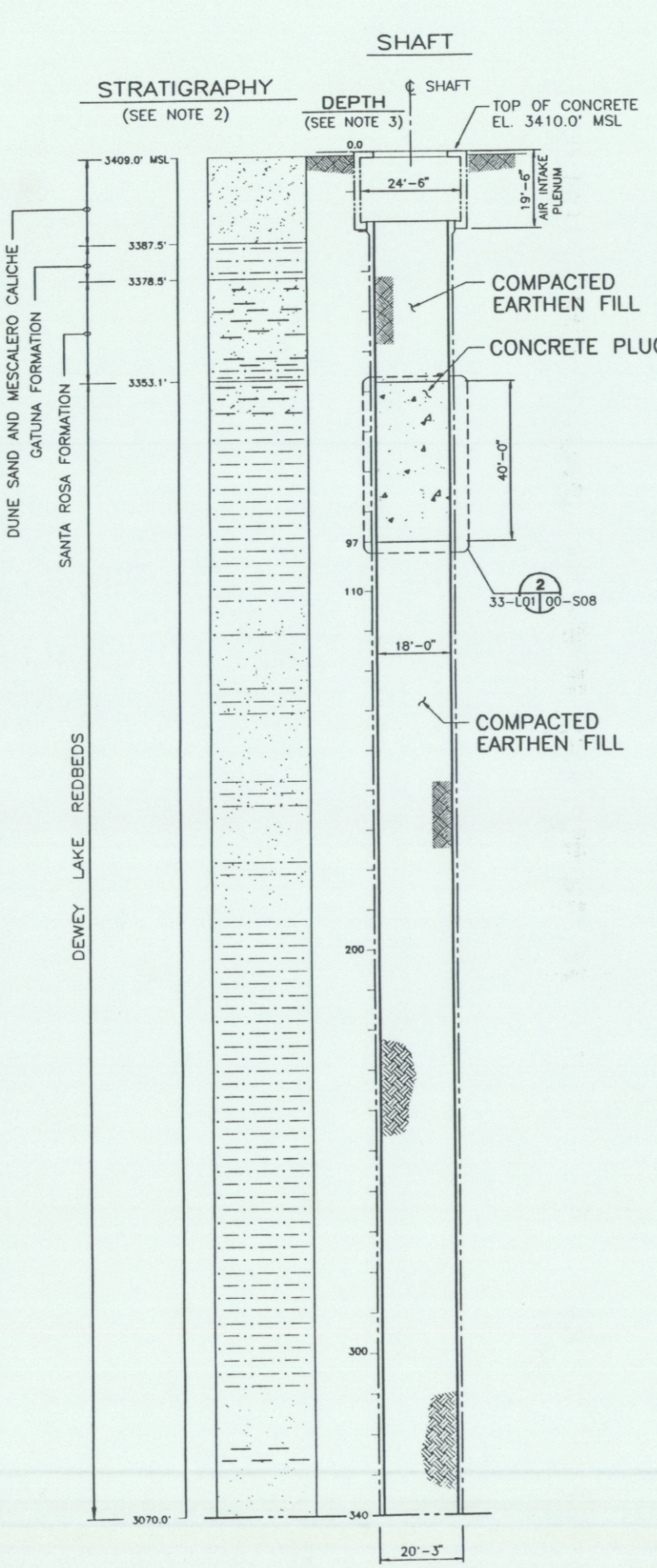
WIPP SHAFT SEALING SYSTEM
SALADO FORMATION
AIR INTAKE SHAFT
STRATIGRAPHY &
AS-BUILT ELEMENTS

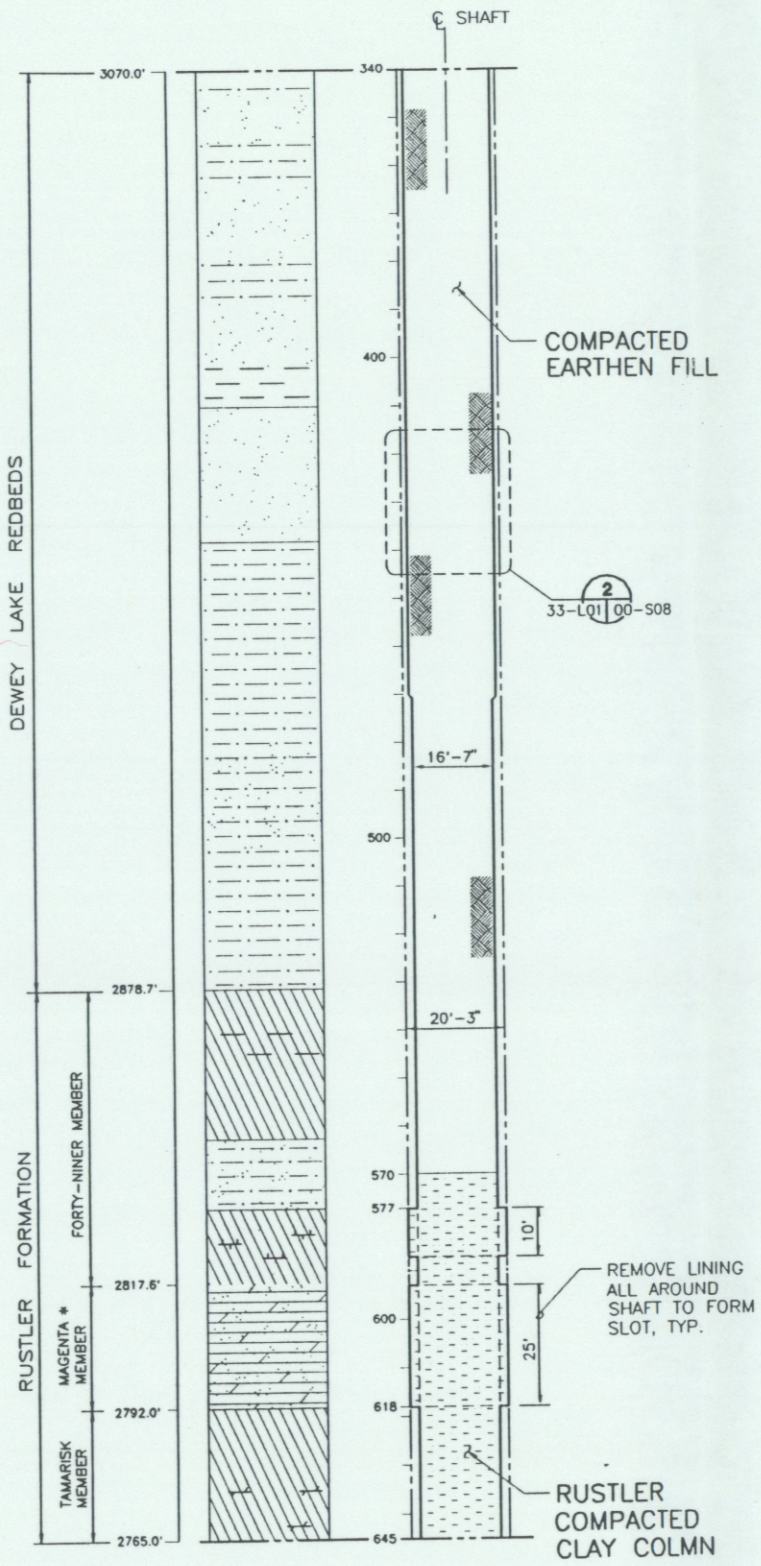
	NAME	DATE
BY	DL	
CK.	SAR	
APP.		
APP.		
APP.		

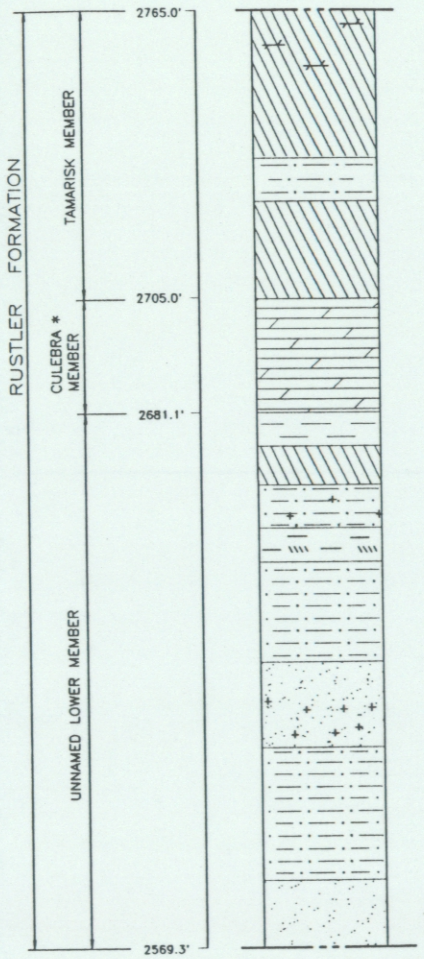
PARSONS BRINCKERHOFF ENERGY SERVICES, INC | SCALE: | SIZE B | SNL DWG. NO. | SHEET NO.

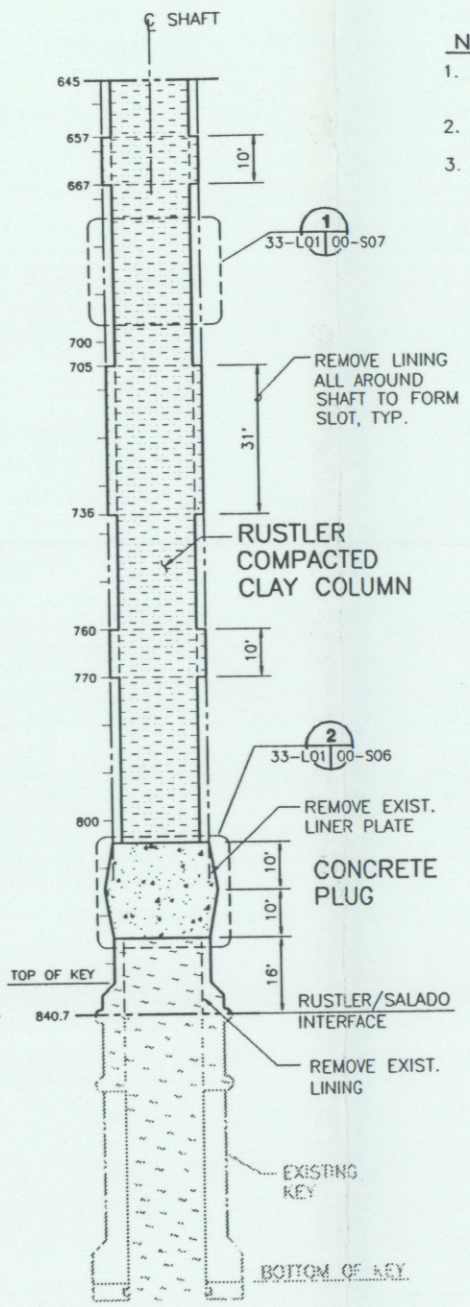
09-CS-33-G02

NAME: [illegible] DATE: DECEMBER 11 1995 TIME: 8:56 AM









NOTES:

1. SEE DWG. NO. 00-G01 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS
2. SEE DWG. NO. 33-G01 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.

PRELIMINARY

SCALE IN FEET
0 10 20 30 40 50

REV.	DATE	DESCRIPTION	BY	CK.	APP.

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

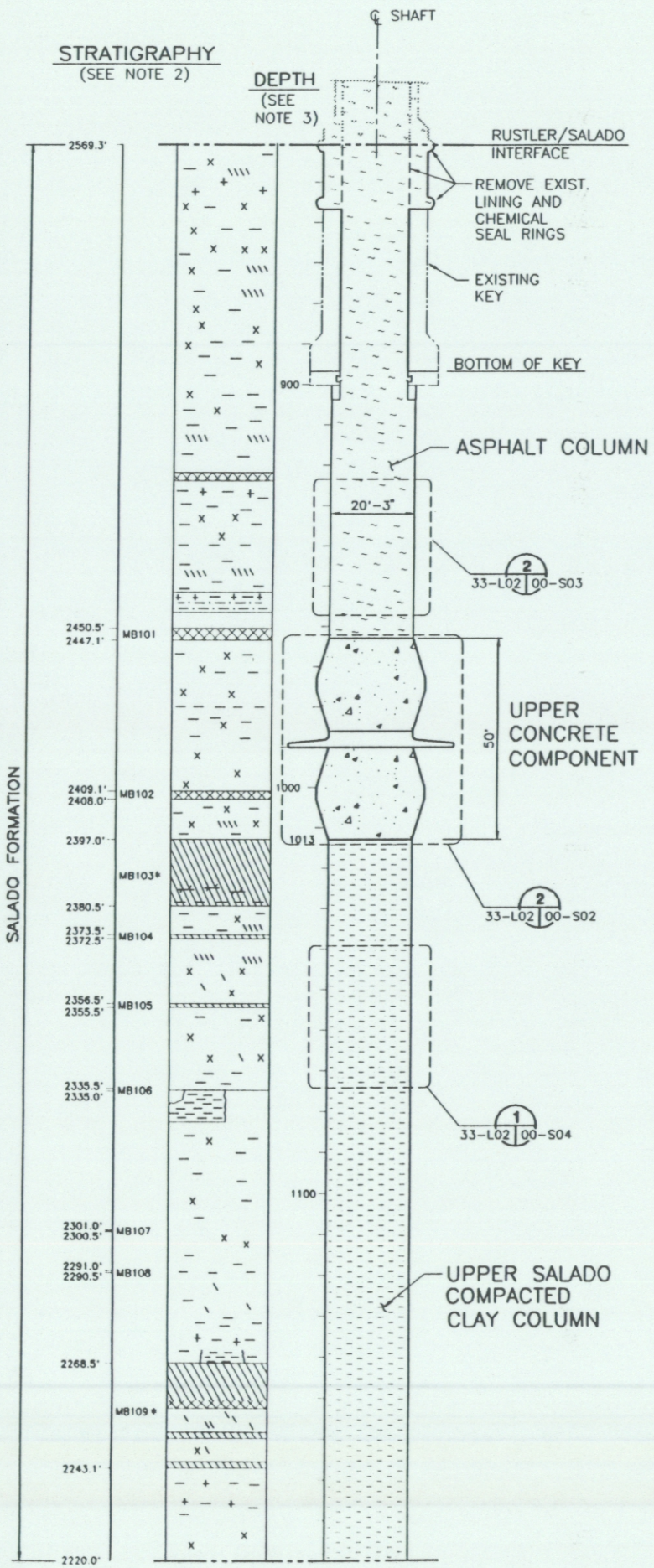
CONTRACT NO: AG-4909

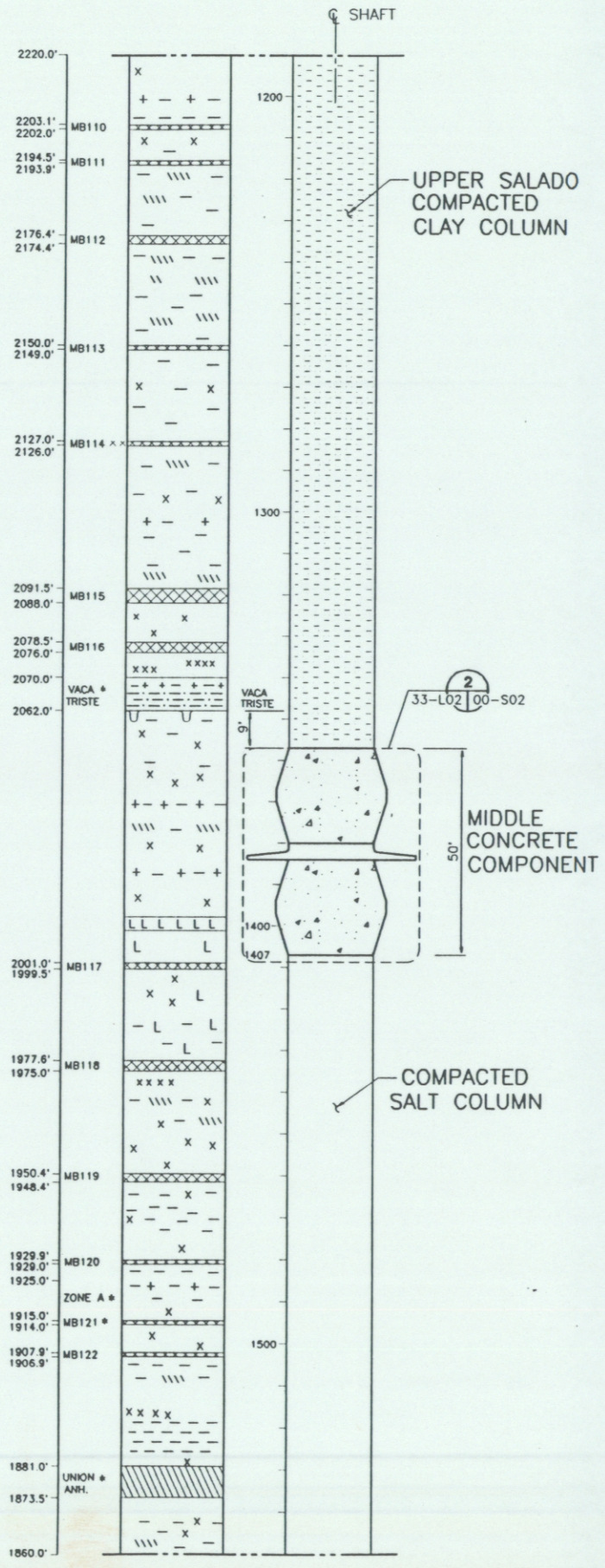
WIPP SHAFT SEALING SYSTEM
NEAR-SURFACE/RUSTLER FORMATIONS
AIR INTAKE SHAFT
STRATIGRAPHY AND SEALING SUBSYSTEM PROFILE

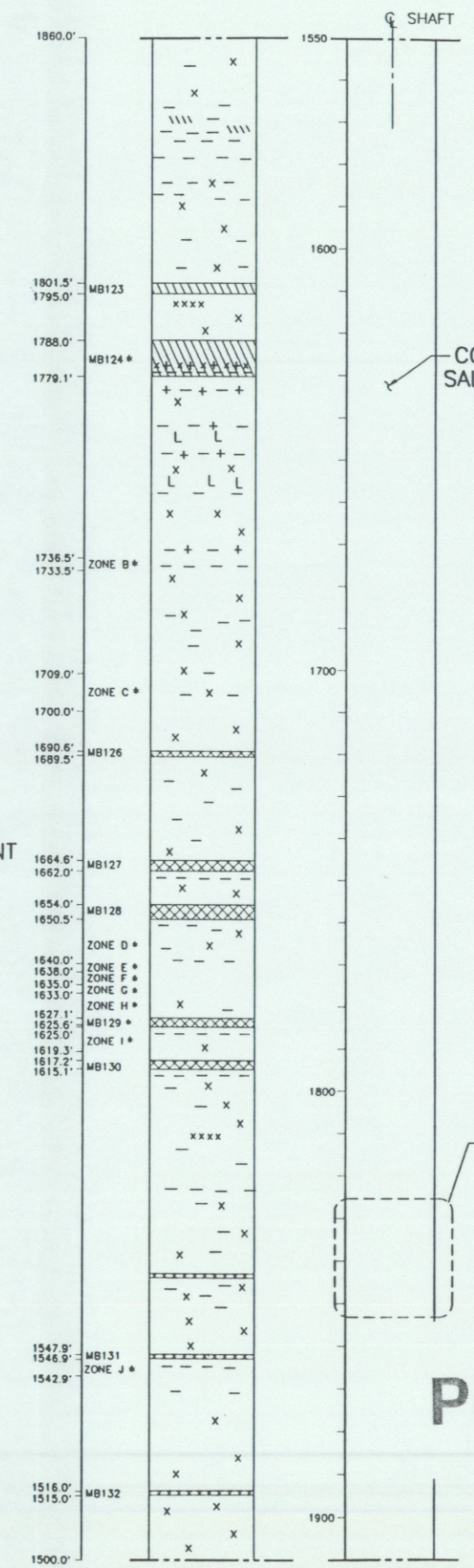
	NAME	DATE
BY	DL	
CK.	SAR	
APP.		
APP.		
APP.		

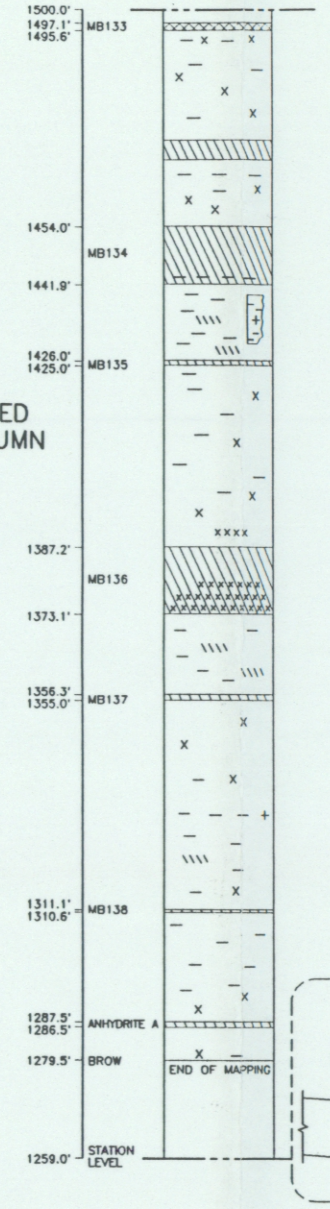
PARSONS BRINCKERHOFF ENERGY SERVICES, INC | SCALE: | SIZE B | SNL DWG. NO. | SHEET NO.

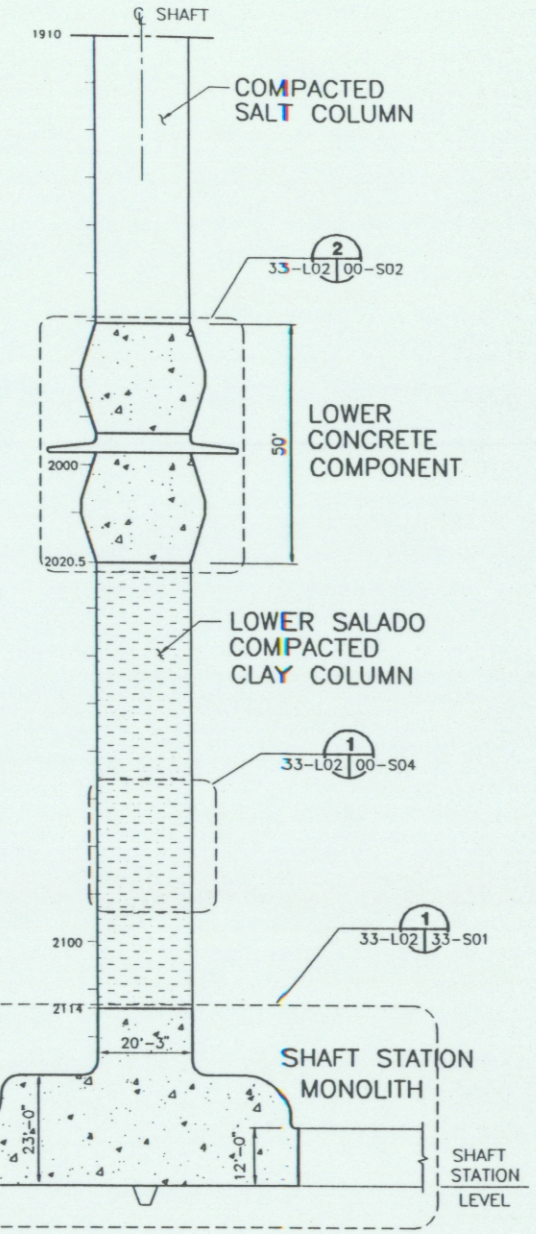
09-CS-33-101











NOTES:

1. SEE DWG. NO. 00-G01 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS
2. SEE DWG. NO. 33-G01 FOR LITHOLOGY AND NOTES.
3. SEE NOTE 3 OF DWG. 33-L01.

SALADO FORMATION SUBSYTEM

SCALE IN FEET
0 10 20 30 40 50

PRELIMINARY

DATE	DESCRIPTION	BY	CK.	APP.

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

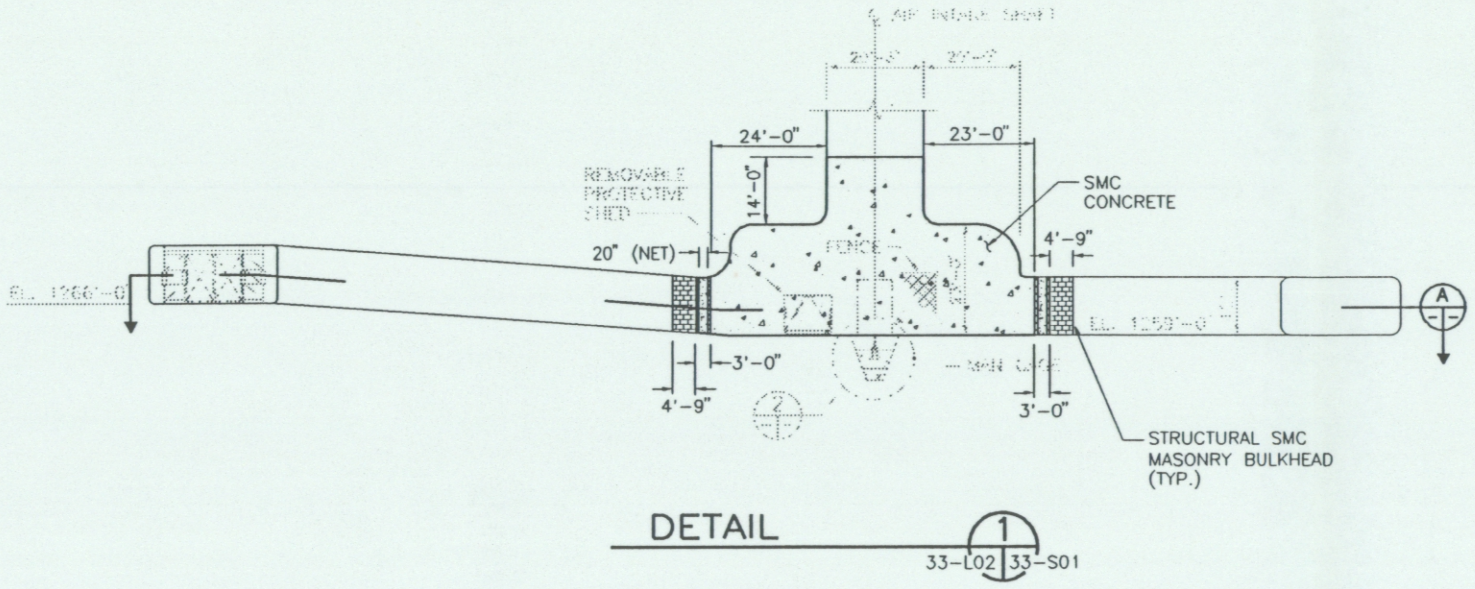
CONTRACT NO: AG-4909

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

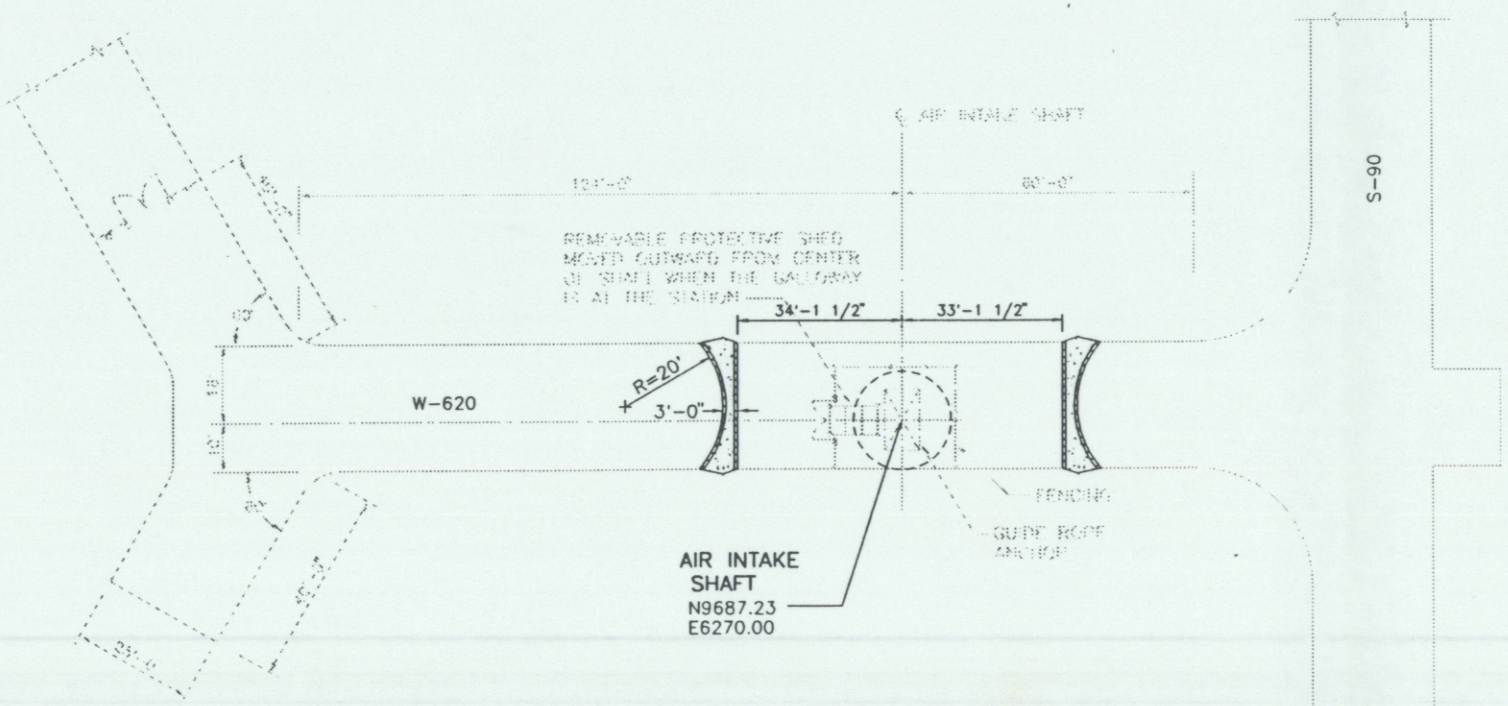
	NAME	DATE
BY	DL	
CK.	SAR	
APP.		
APP.		
APP.		

PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO.	SHEET NO.

09-CS-33-L02



DETAIL 1 — 33-L02 | 33-S01



SECTION A — N

SCALE IN FEET
0 10 20 30 40 50

PRELIMINARY

NOTES:

1. SEE DWG. NO. 00-G01 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS.

REV.	DATE	DESCRIPTION	BY	CK.	APP.

SANDIA NATIONAL LABORATORIES

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

WIPP SHAFT SEALING SYSTEM

AIR INTAKE SHAFT
SHAFT STATION MONOLITH

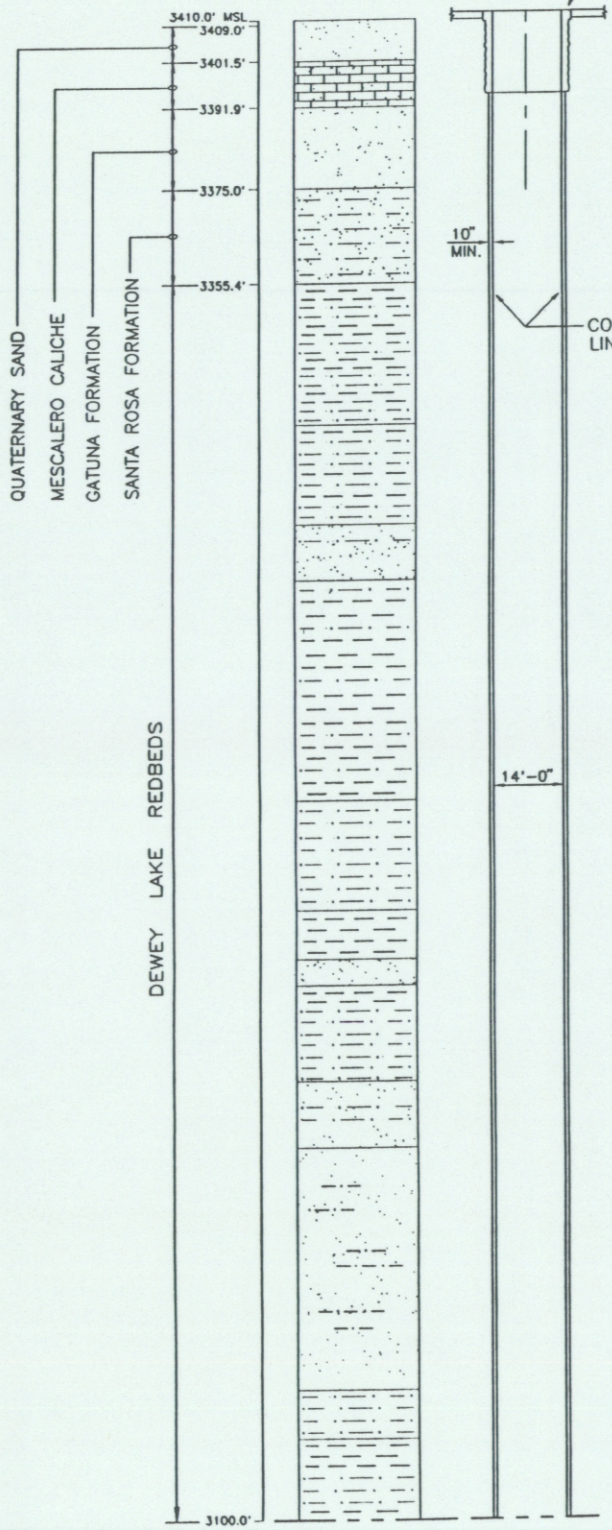
	NAME	DATE
BY	DL	
CK.	SAR	
APP.		
APP.		
APP.		

PARSONS BRINCKERHOFF ENERGY SERVICES, INC.	SCALE	SIZE B	SNL DWG. NO.	SHEET NO.

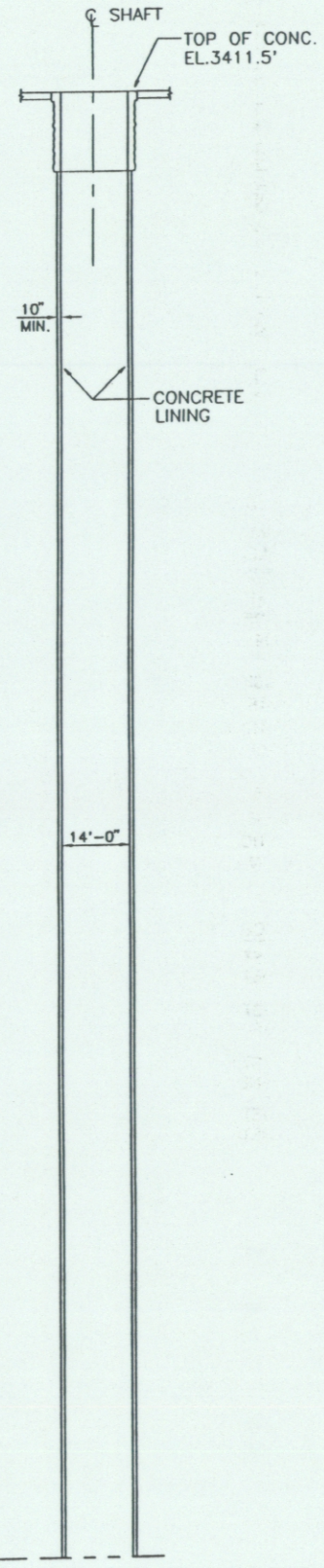
09-CS-33-S01

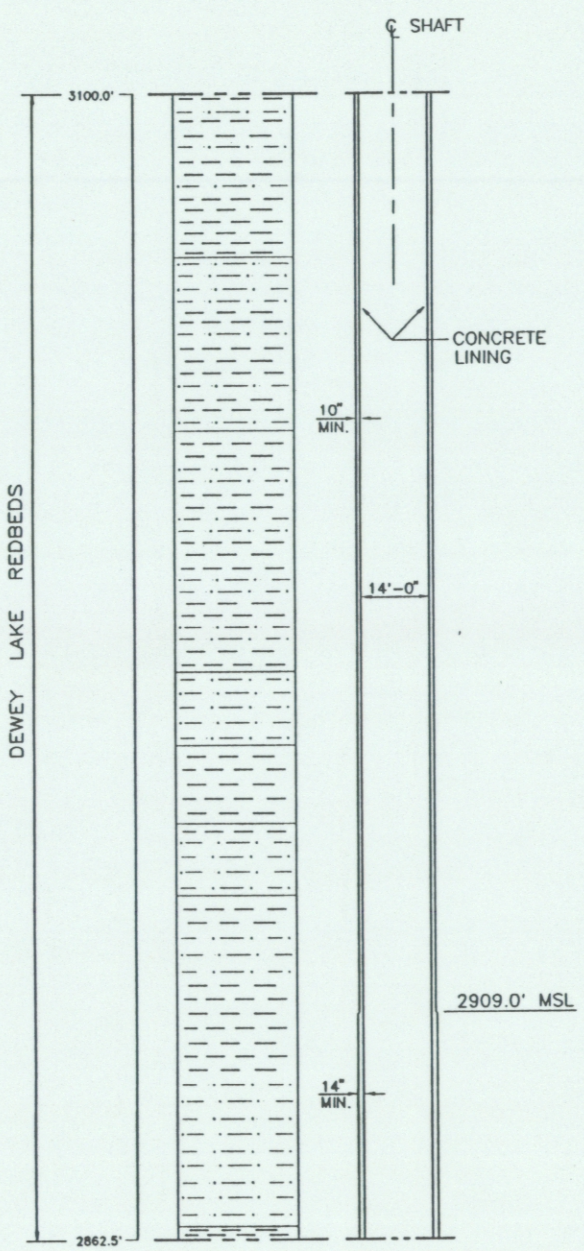
STRATIGRAPHY

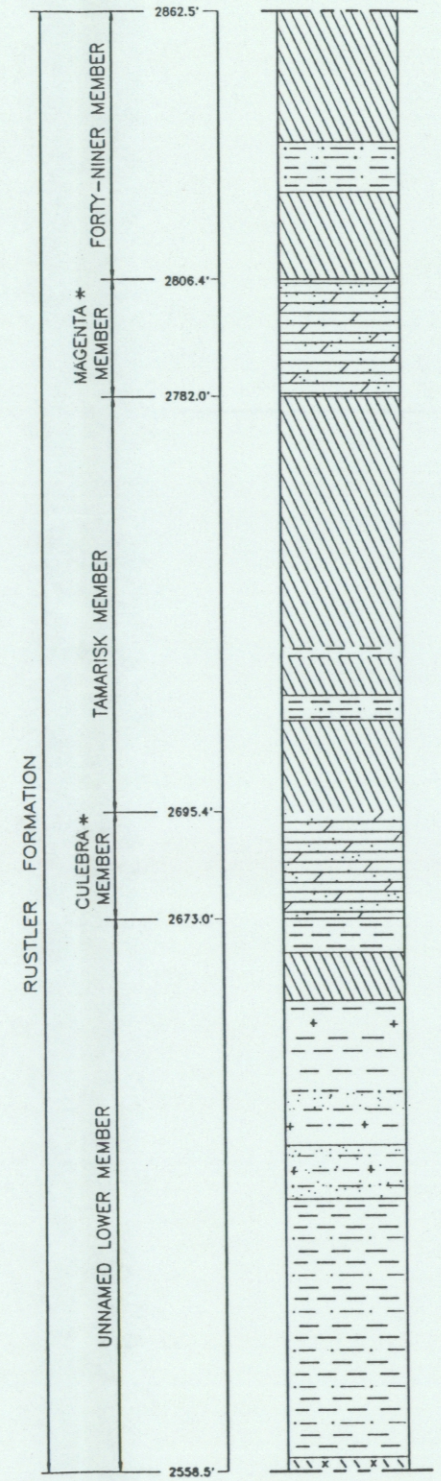
(SEE NOTE 1)

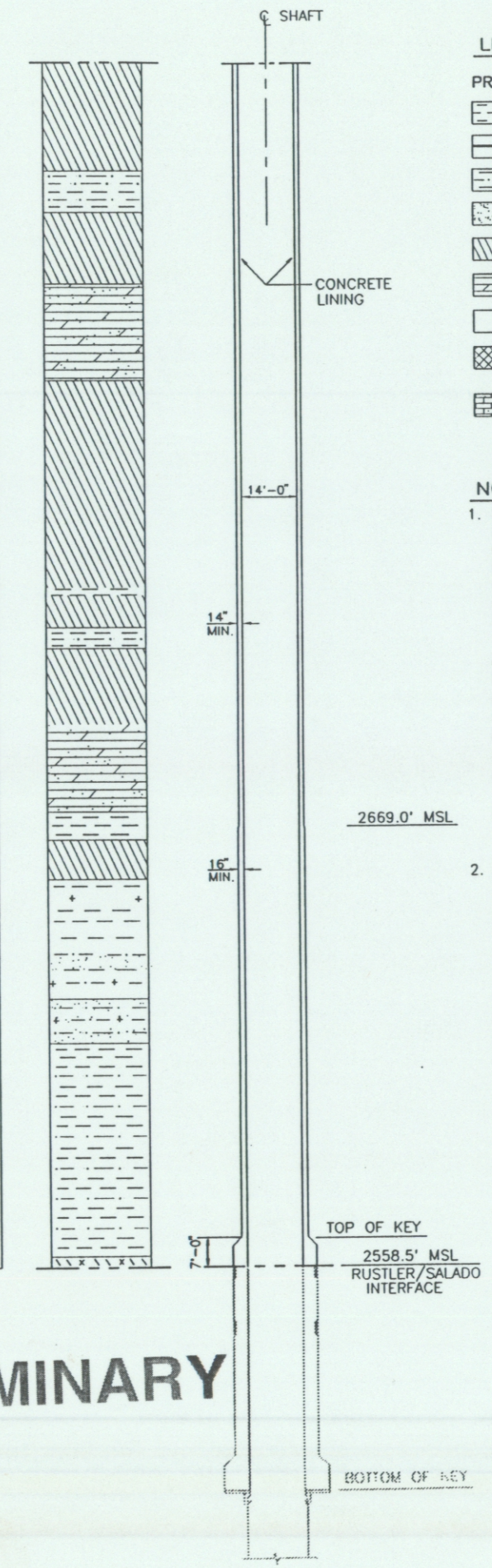


SHAFT









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

PRELIMINARY

REV.	DATE	DESCRIPTION	BY	CK.	APP

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

CONTRACT NO: AG-4909

WIPP SHAFT SEALING SYSTEM
NEAR-SURFACE/RUSTLER FORMATIONS

EXHAUST SHAFT
STRATIGRAPHY &
AS-BUILT ELEMENTS

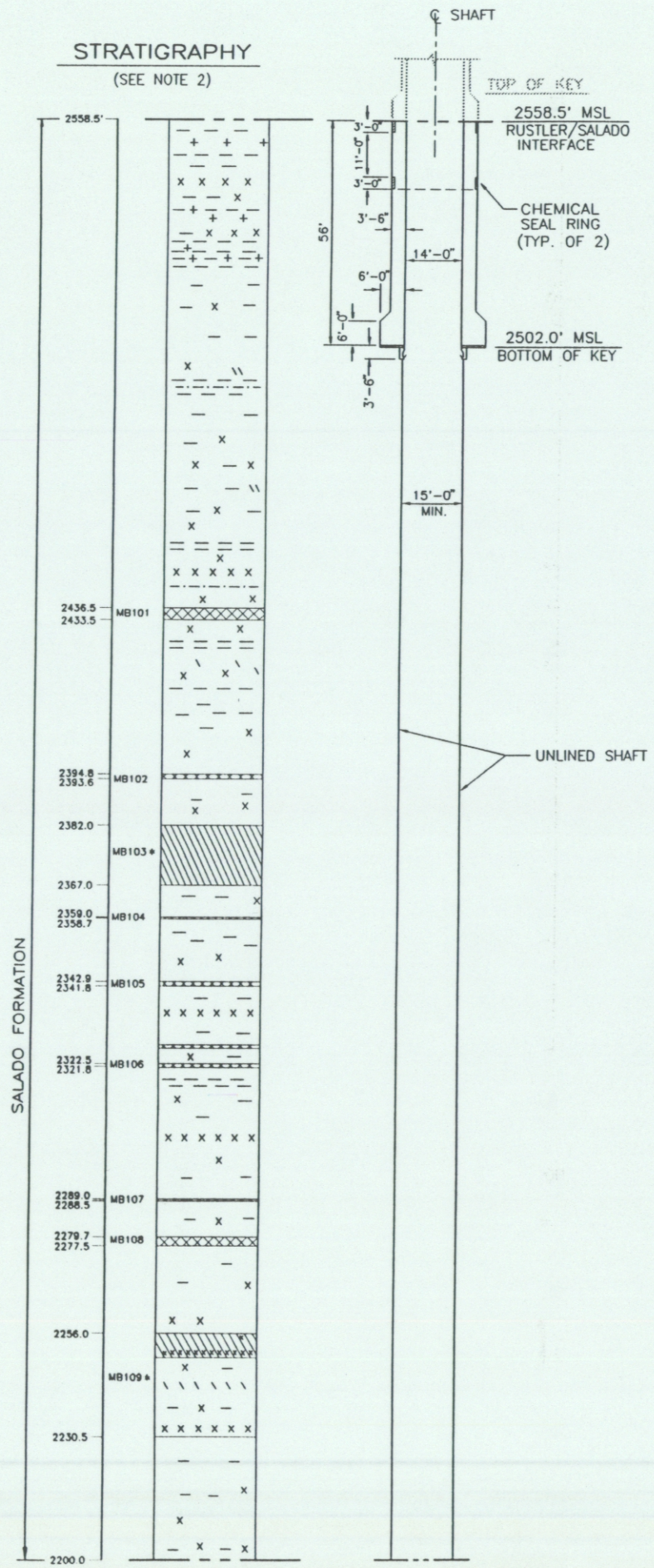
	NAME	DATE
BY	DL	
CK.	SAR	
APP.		
APP.		
APP.		

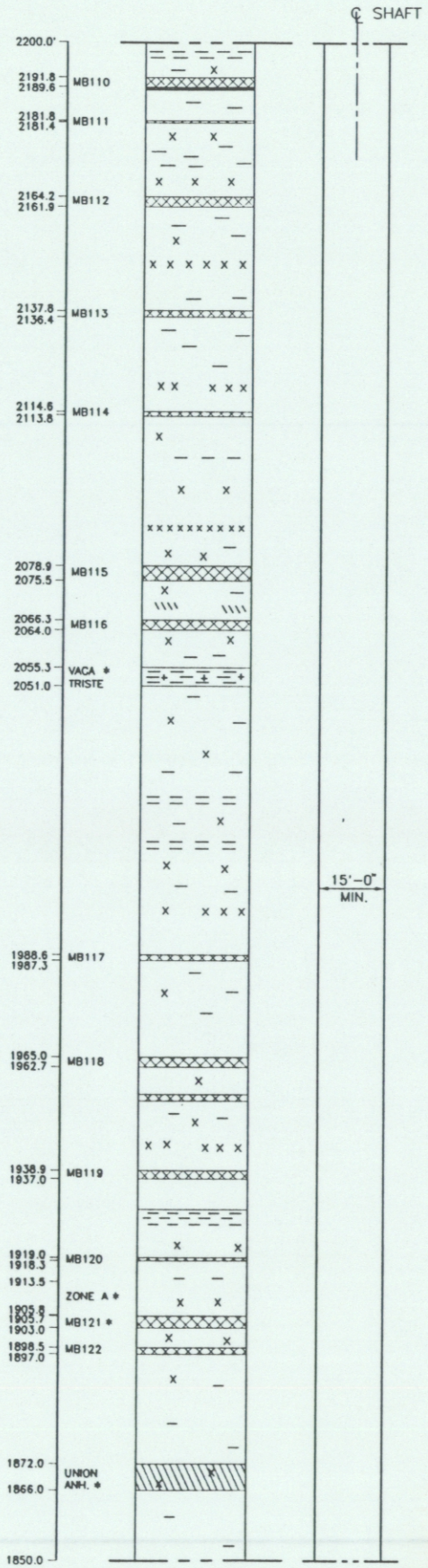
PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG NO	SHEET NO

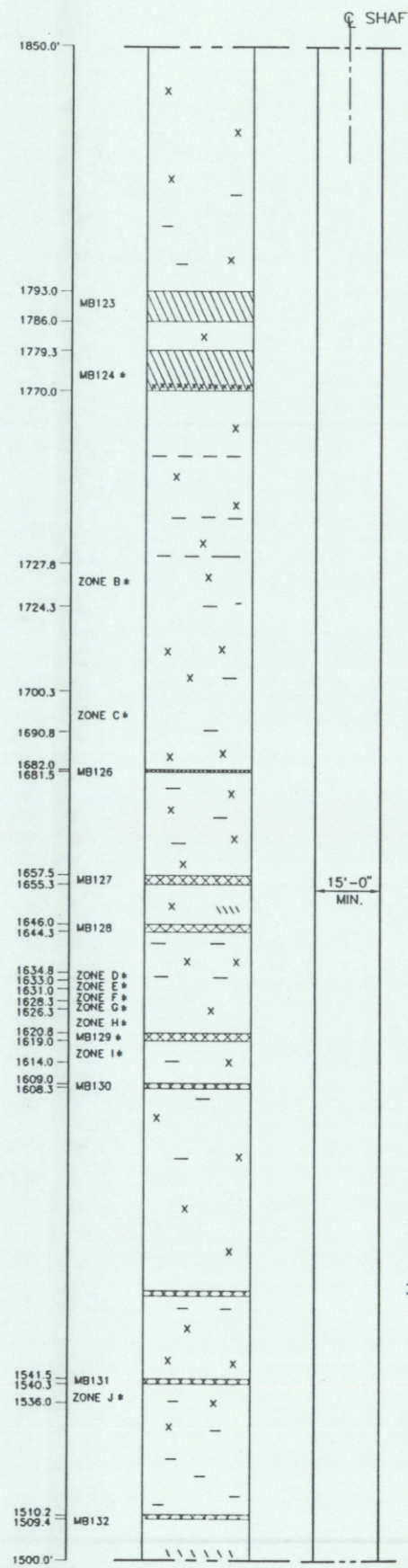
09-CS-35-G01

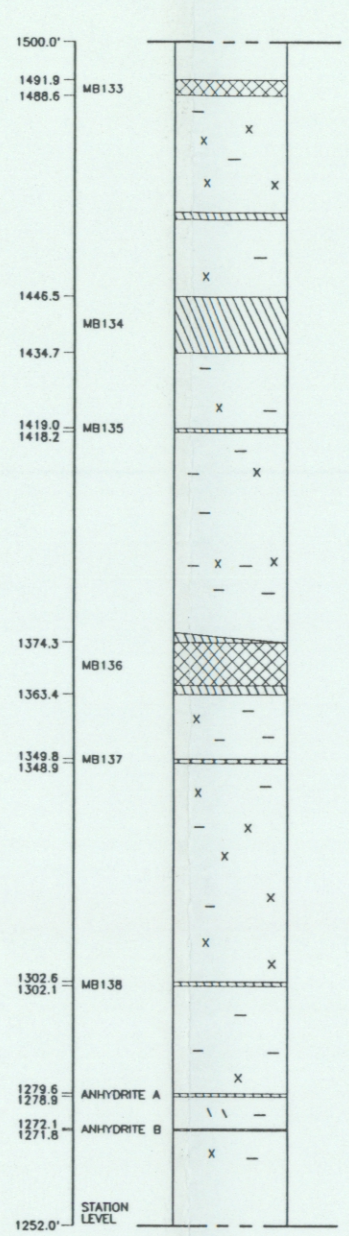
STRATIGRAPHY

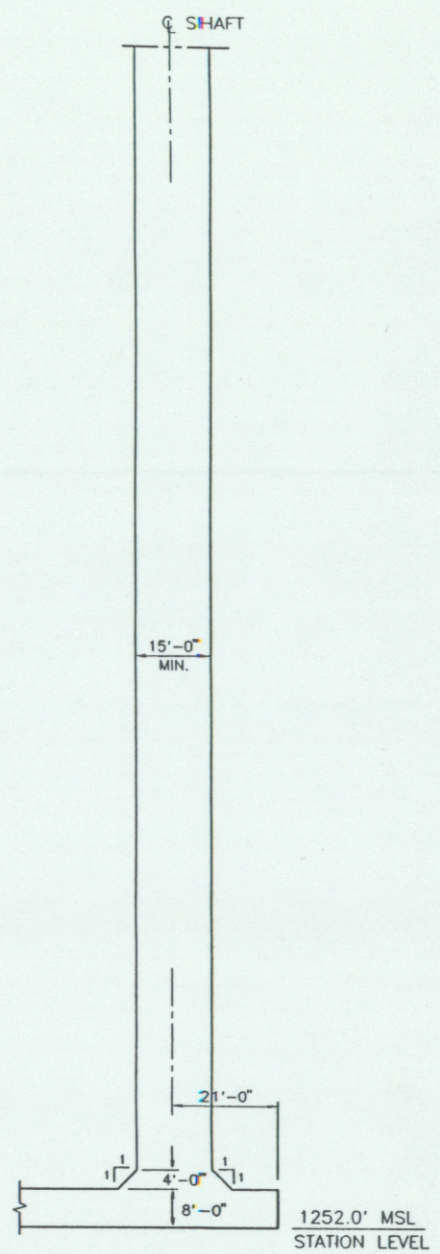
(SEE NOTE 2)











NOTES:

1. SEE DWG. NO. 00-G01 FOR GENERAL NOTES AND ABBREVIATIONS
2. SEE DWG. NO. 35-G01 FOR LITHOLOGY AND NOTES.

SCALE IN FEET
0 10 20 30 40 50

PRELIMINARY

REV.	DATE	DESCRIPTION	BY	CK.	APP.

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

CONTRACT NO: AG-4909

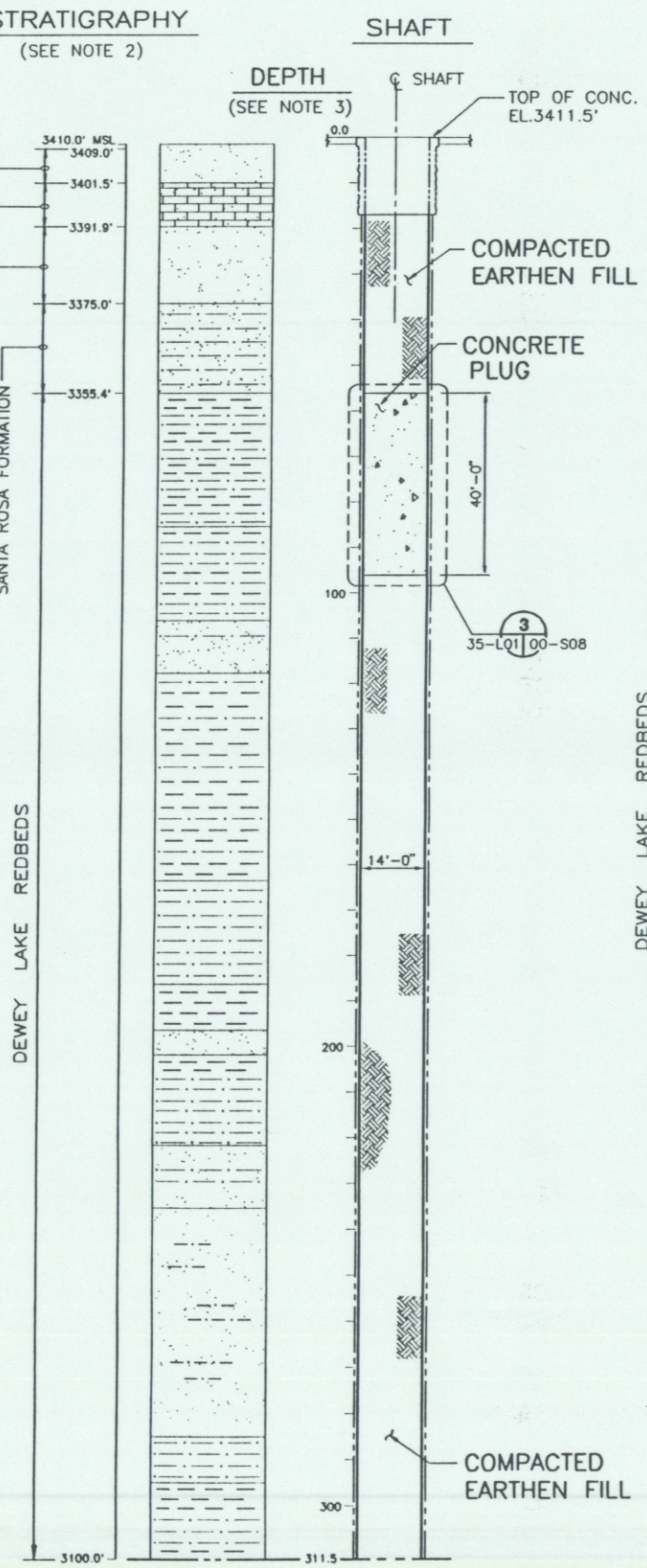
WIPP SHAFT SEALING SYSTEM
SALADO FORMATION
EXHAUST SHAFT
STRATIGRAPHY &
AS-BUILT ELEMENTS

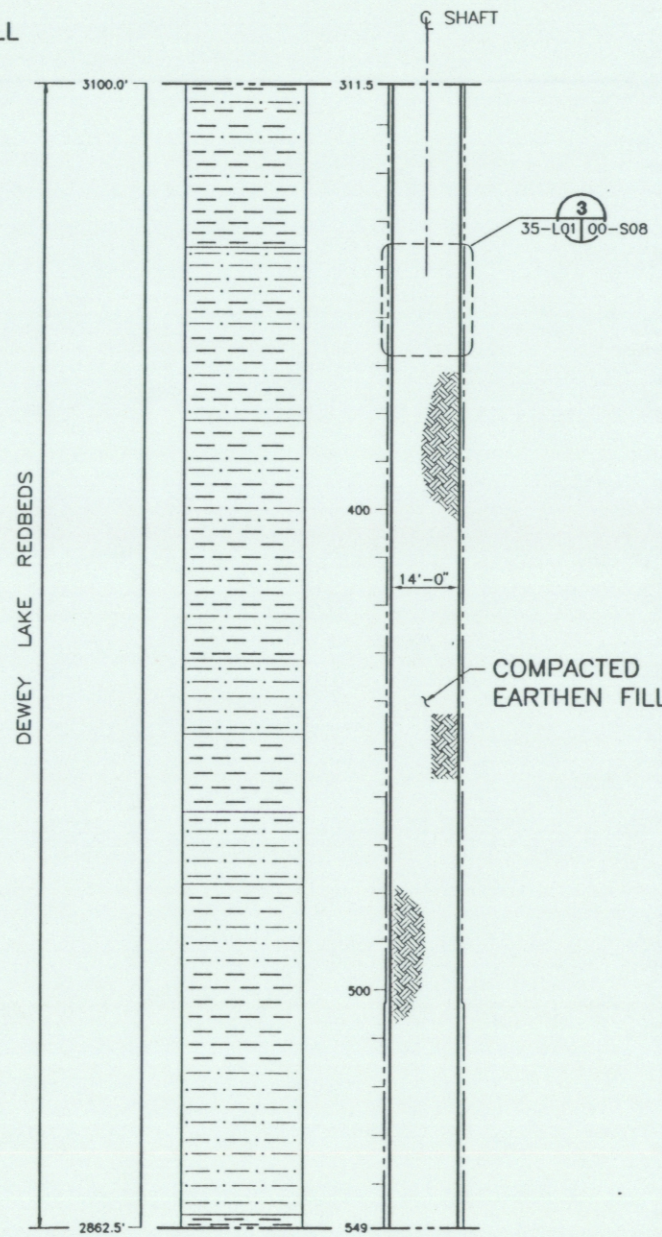
	NAME	DATE
BY	DL	
CK.	SAR	
APP.		
APP.		
APP.		

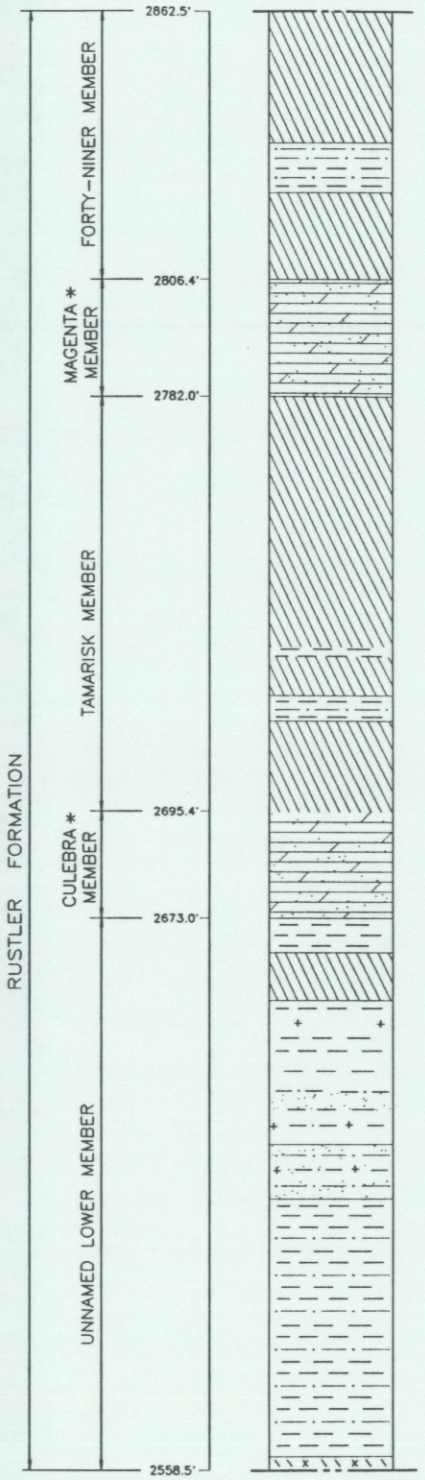
PARSONS BRINCKERHOFF ENERGY SERVICES, INC | SCALE: | SIZE B | SNL DWG NO | SHEET NO

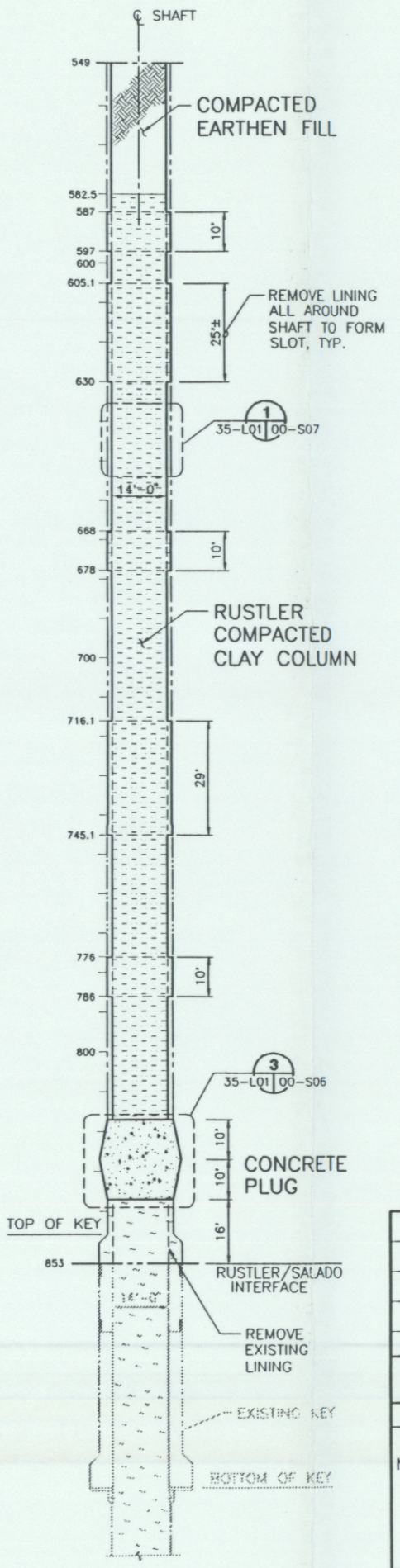
09-CS-35-G02

NAME: C:\A\WIPP\9\CS\CS35-G02.DWG DATE: DECEMBER 11, 1995 TIME: 3:08 PM









NOTES:

1. SEE DWG. NO. 00-G01 FOR GENERAL NOTE, LEGEND AND ABBREVIATIONS
2. SEE DWG. NO. 35-G01 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.

PRELIMINARY

SCALE IN FEET
0 10 20 30 40 50

REV.	DATE	DESCRIPTION	BY	CK.	APP.

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

CONTRACT NO: AG-4909

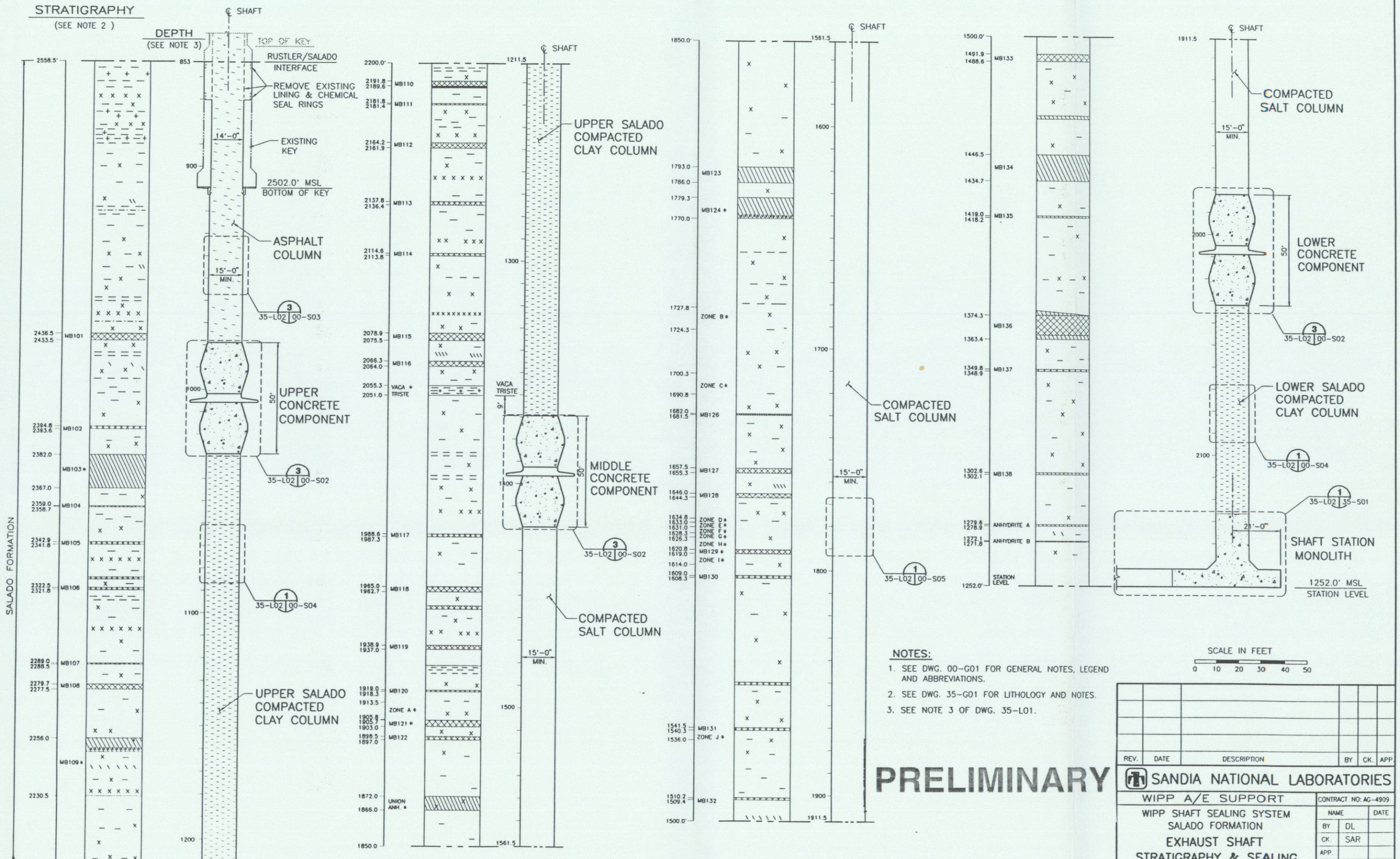
WIPP SHAFT SEALING SYSTEM
NEAR-SURFACE/RUSTLER FORMATIONS
EXHAUST SHAFT
STRATIGRAPHY & SEALING
SUBSYSTEM PROFILE

	NAME	DATE
BY	DL	
CK.	SAR	
APP.		
APP.		
APP.		

PARSONS BRINCKERHOFF ENERGY SERVICES, INC | SCALE: | SIZE B | SNL DWG. NO. | SHEET NO.

09-CS-35-L01

NAME: C:\AX\WIPP\DWGS\CS35L01.DWG DATE: FEBRUARY 01, 1996 TIME: 10:01 AM



NOTES:

1. SEE DWG. 00-G01 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS.
2. SEE DWG. 35-G01 FOR LITHOLOGY AND NOTES.
3. SEE NOTE 3 OF DWG. 35-L01.

SCALE IN FEET
0 10 20 30 40 50

PRELIMINARY

REV.	DATE	DESCRIPTION	BY	CK.	APP.

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

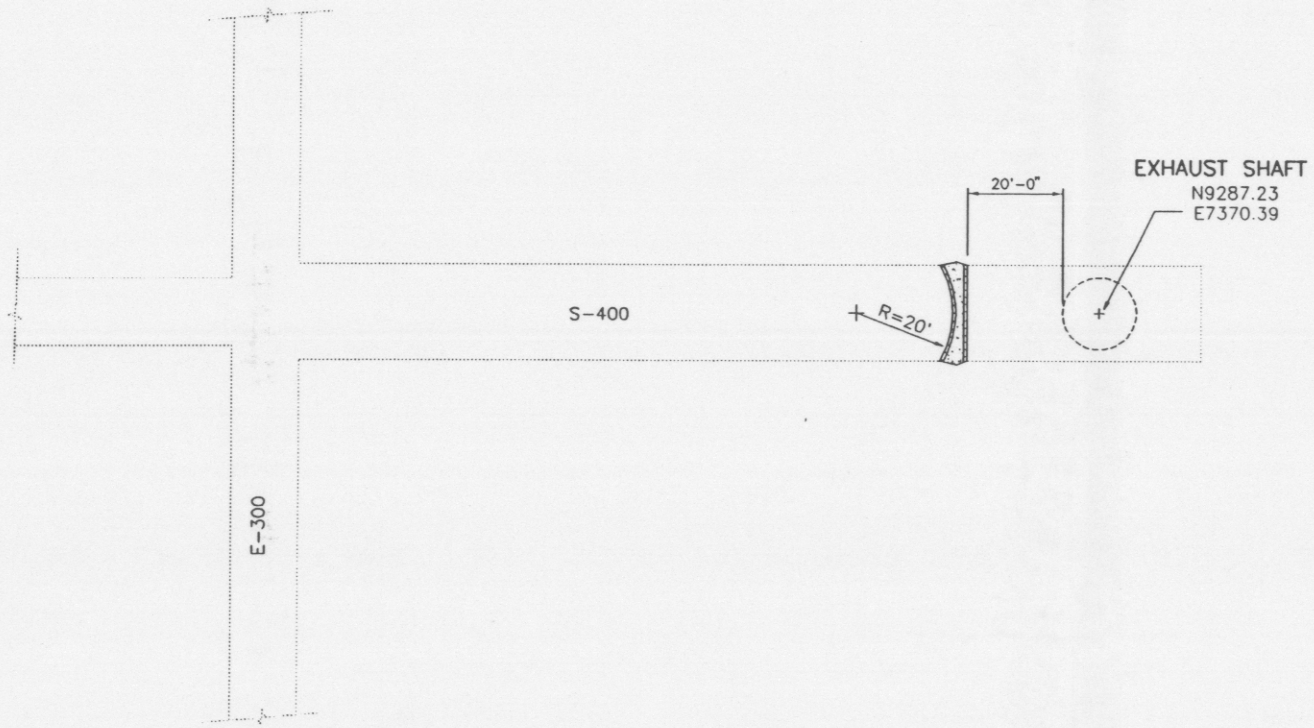
CONTRACT NO: AG-4909

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

	NAME	DATE
BY	DL	
CK.	SAR	
APP.		
APP.		
APP.		

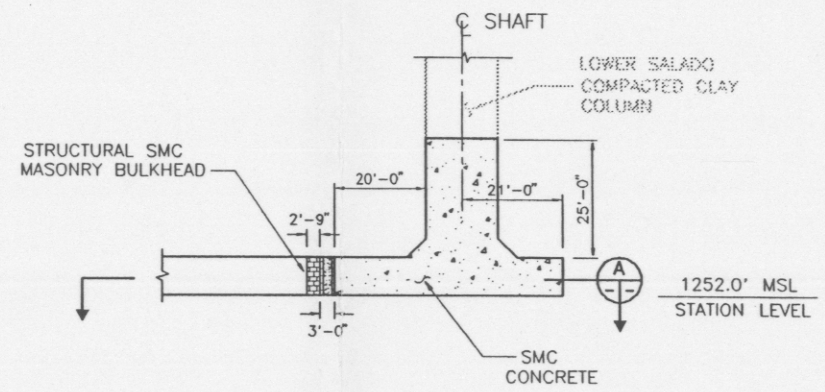
PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG NO	SHEET NO

09-CS-35-L02



SECTION (A)

N



DETAIL 1 / 35-L02 | 35-S01

PRELIMINARY

NOTES:

1. SEE DWG. NO. 00-G01 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS.

SCALE IN FEET
0 10 20 30 40 50

REV.	DATE	DESCRIPTION	BY	CK.	APP.

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT — CONTRACT NO. AC-4909

WIPP SHAFT SEALING SYSTEM

EXHAUST SHAFT
SHAFT STATION MONOLITH

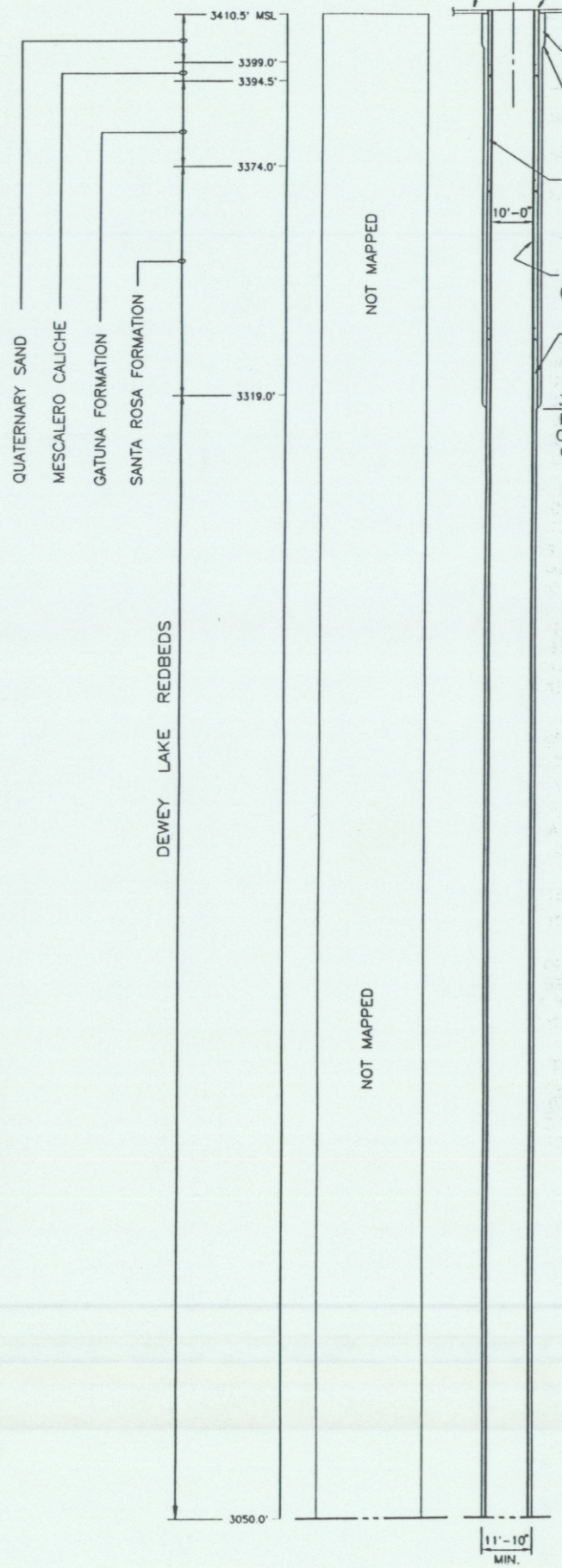
	NAME	DATE
BY	DL	
CK.	SAR	
APP.		
APP.		
APP.		

PARSONS, BRINCKERHOFF ENERGY SERVICES, INC.	SCALE	SIZE B	SNL DWG. NO.	SHEET NO.

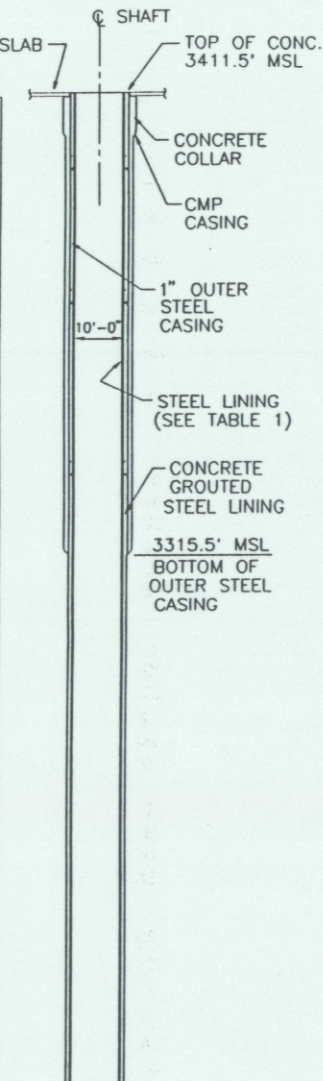
09-CS-35-S01

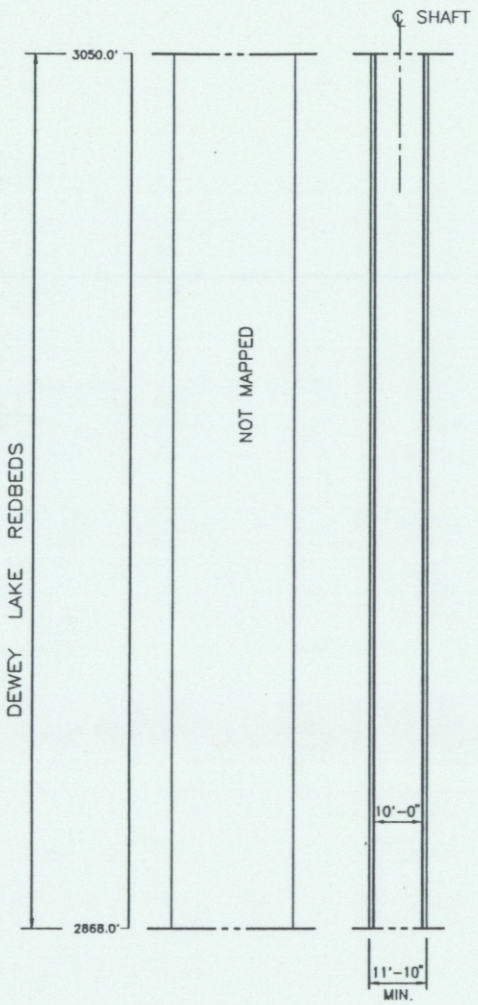
NAME: C:\WIPP\DWG\CS\CS35-S01.DWG DATE: FEBRUARY 01, 1996 TIME: 10:06 AM

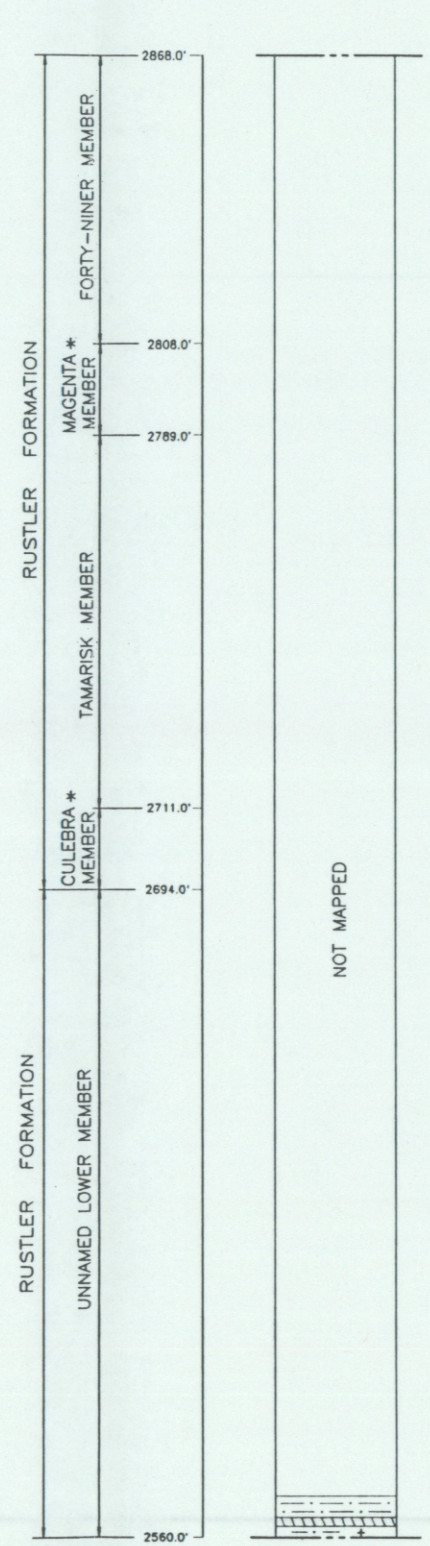
STRATIGRAPHY
(SEE NOTE 1)



SHAFT







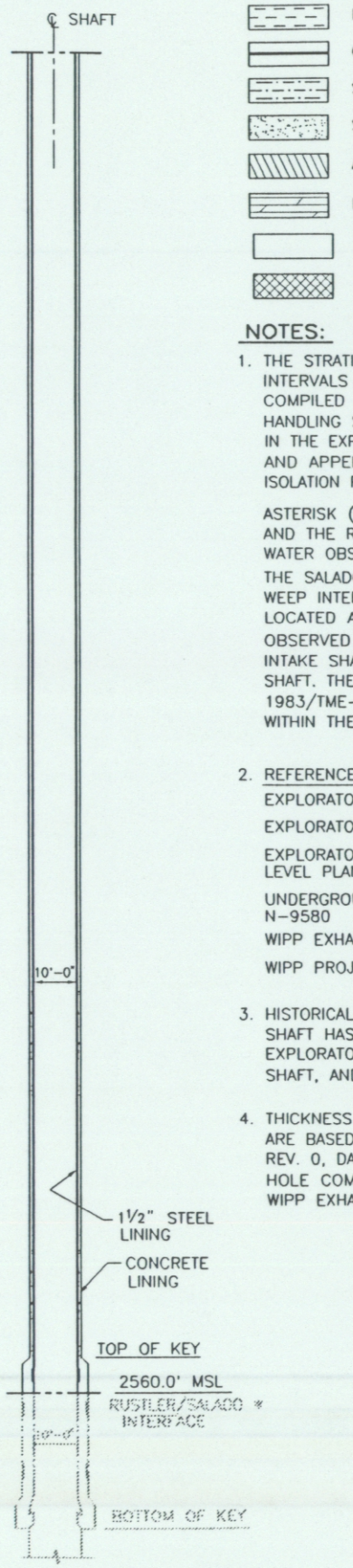


TABLE 1: STEEL LINING SCHEDULE
(SEE NOTE 4)

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

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	x x x	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 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 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 EXPLORATORY 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'.

PRELIMINARY

SCALE IN FEET
0 10 20 30 40 50

REV.	DATE	DESCRIPTION	BY	CK.	APP

SANDIA NATIONAL LABORATORIES

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

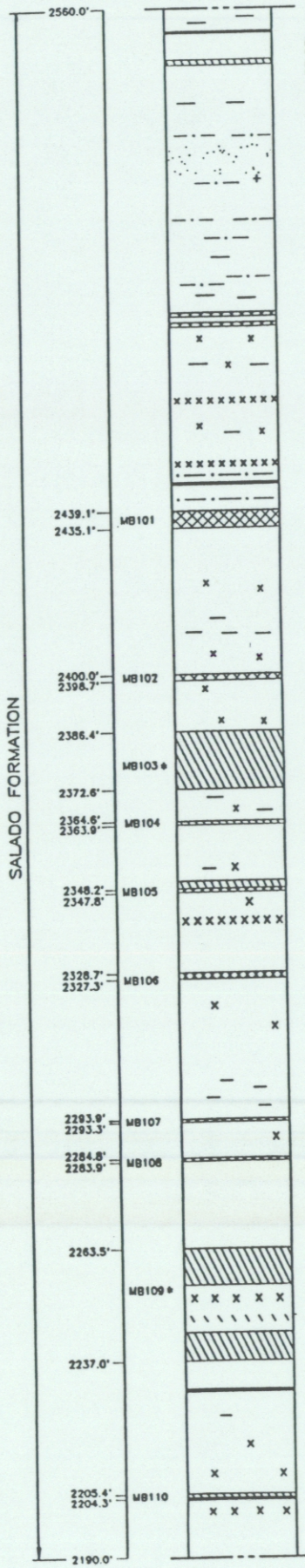
WIPP SHAFT SEALING SYSTEM
NEAR-SURFACE/RUSTLER FORMATIONS
SALT HANDLING SHAFT
STRATIGRAPHY &
AS-BUILT ELEMENTS

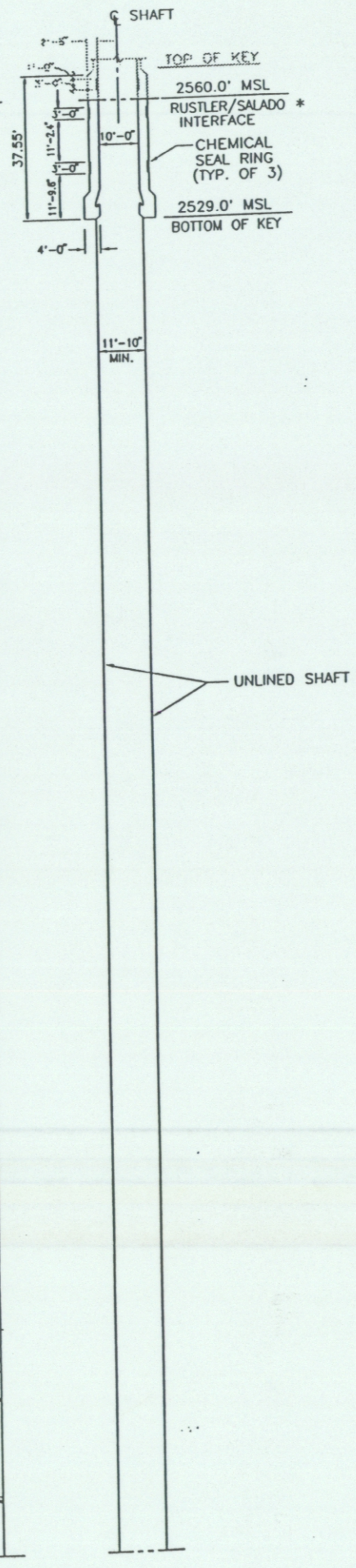
	NAME	DATE
BY	DL	
CK.	SAR	
APP.		
APP.		
APP.		

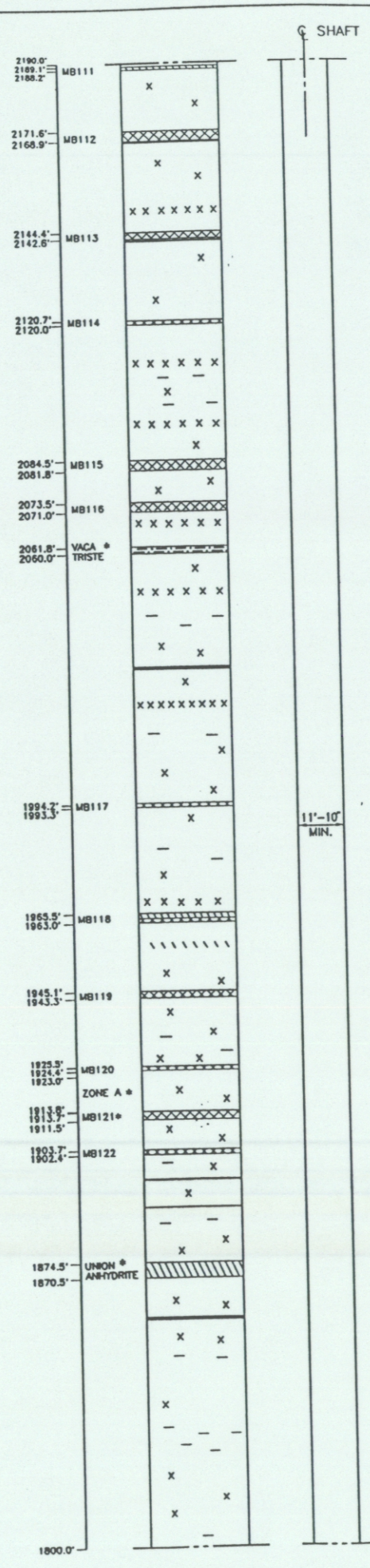
PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO.	SHEET NO.

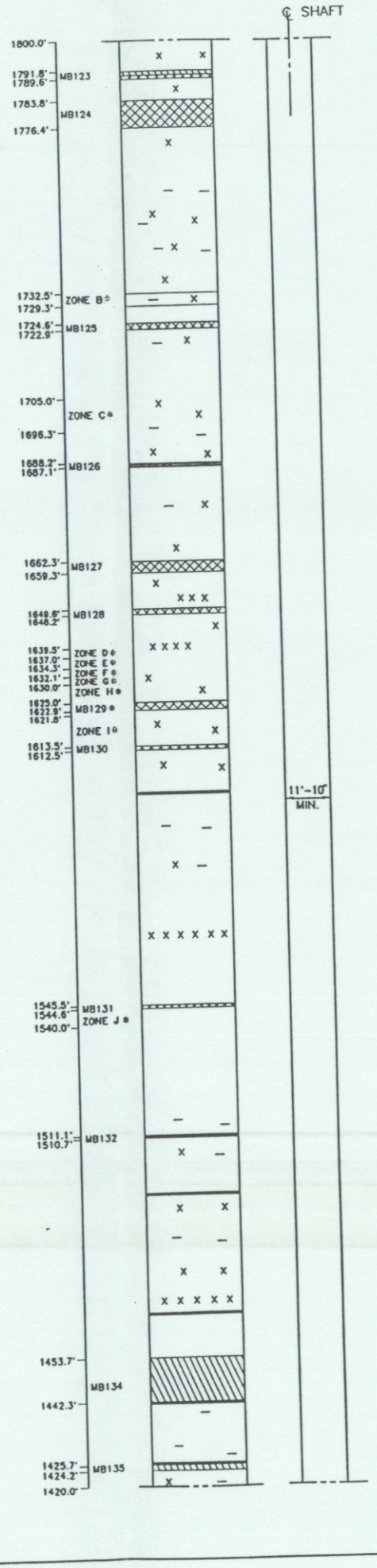
09-CS-37-G01

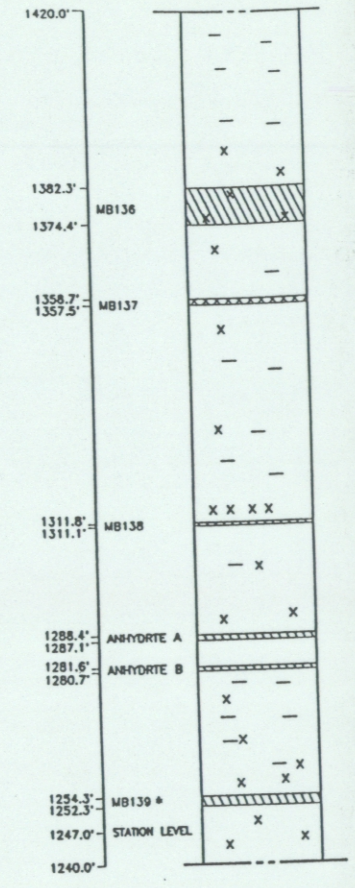
STRATIGRAPHY
(SEE NOTE 2)

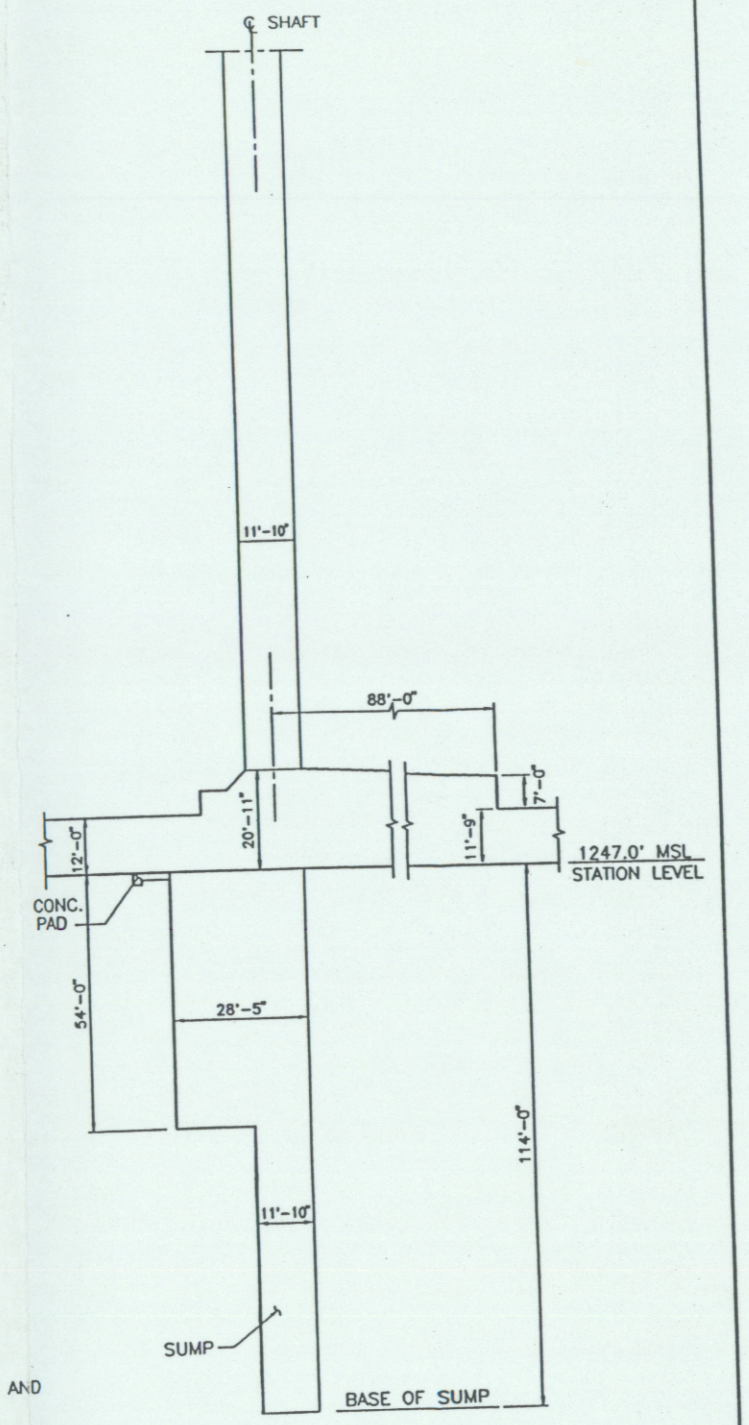












NOTES:

1. SEE DWG. NO. 00-G01 FOR GENERAL NOTES AND ABBREVIATIONS
2. SEE DWG. NO. 37-G01 FOR LITHOLOGY AND NOTES.

PRELIMINARY

SCALE IN FEET
0 10 20 30 40 50

REV.	DATE	DESCRIPTION	BY	CK.	APP

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

CONTRACT NO: AG-4909

WIPP SHAFT SEALING SYSTEM
SALADO FORMATION

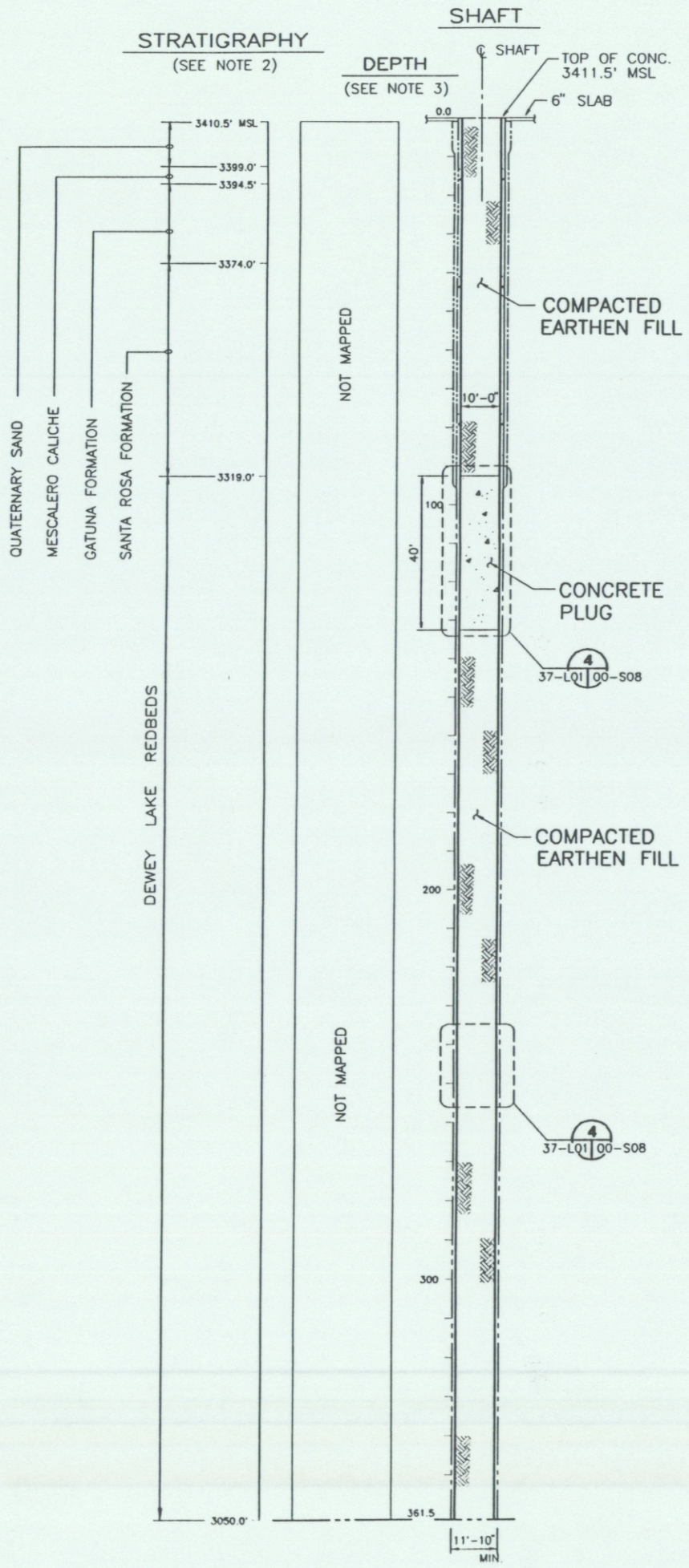
SALT HANDLING SHAFT
STRATIGRAPHY &
AS-BUILT ELEMENTS

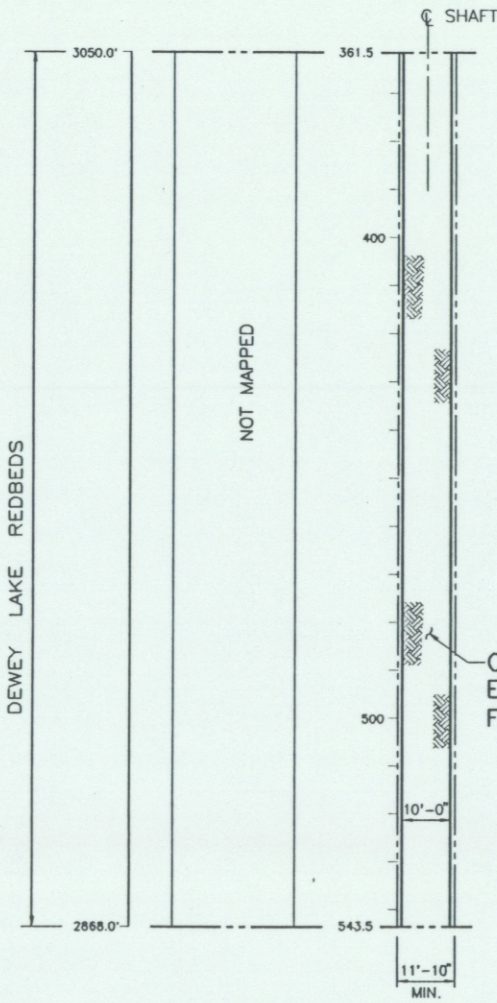
	NAME	DATE
BY	DL	
CK.	SAR	
APP.		
APP.		
APP.		

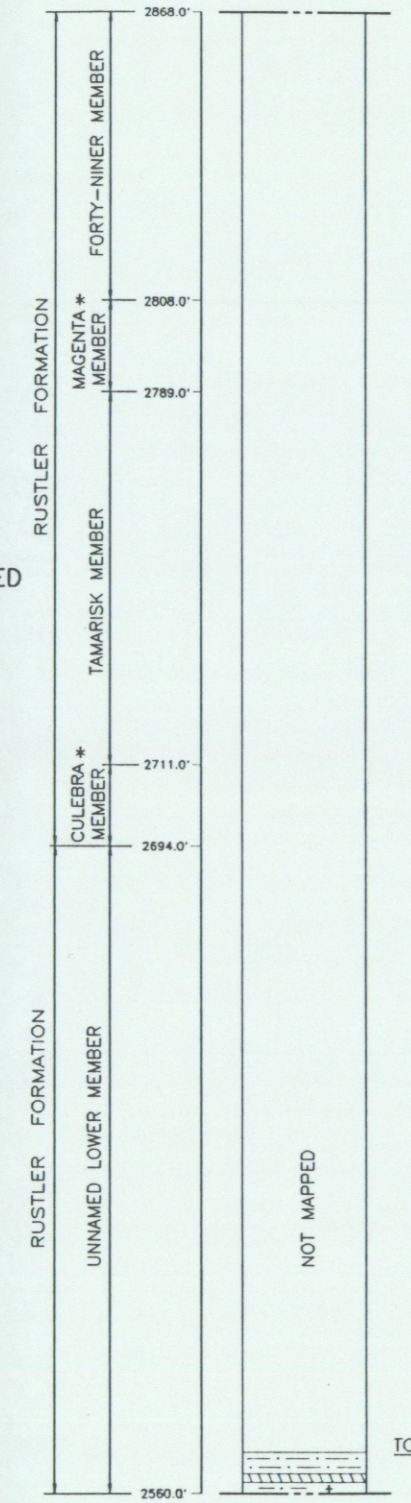
PARSONS BRINCKERHOFF ENERGY SERVICES, INC | SCALE: | SIZE B | SNL DWG. NO. | SHEET NO.

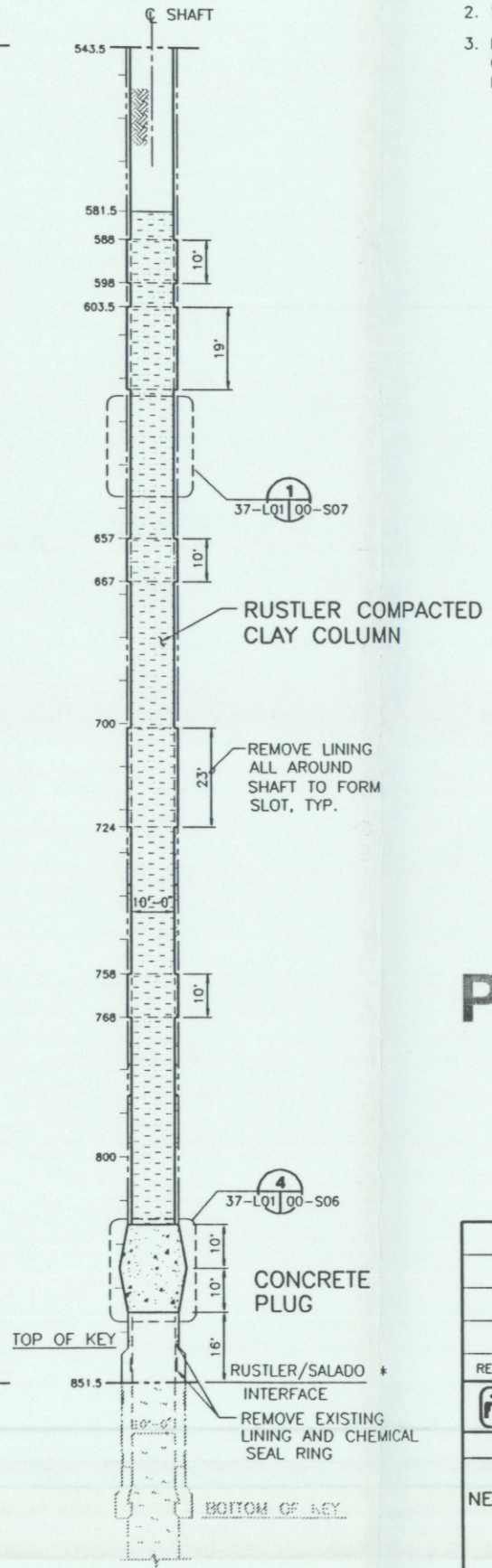
09-CS-37-G02

NAME: C:\A\WIPP\9\CS\CS37-G02.DWG DATE: DECEMBER 12, 1995 TIME: 1:35 PM









NOTES:

1. SEE DWG. 00-G01 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS.
2. SEE DWG. 37-G01 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.

PRELIMINARY

SCALE IN FEET
0 10 20 30 40 50

REV.	DATE	DESCRIPTION	BY	CK.	APP.

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	DL	
CK.	SAR	
APP.		
APP.		
APP.		

PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO	SHEET NO

09-CS-37-L01

STRATIGRAPHY
(SEE NOTE 2)

DEPTH
(SEE NOTE 3)

SALADO FORMATION

℄ SHAFT

TOP OF KEY
2560.0' MSL
RUSTLER/SALADO * INTERFACE
REMOVE EXIST. LINING & CHEMICAL SEAL RINGS
2529.0' MSL
BOTTOM OF KEY
ASPHALT COLUMN
11'-10" MIN.
UPPER CONCRETE COMPONENT
37-L02 00-S03
37-L02 00-S02
37-L02 00-S04
UPPER SALADO COMPACTED CLAY COLUMN

2560.0' 851.5 900 1000 1100 1200 1221.5
2439.1' MB101
2435.1'
2400.0' MB102
2398.7'
2386.4' MB103 *
2372.6'
2364.6' MB104
2363.9'
2348.2' MB105
2347.8'
2328.7' MB106
2327.3'
2293.9' MB107
2293.3'
2284.8' MB108
2283.9'
2263.5' MB109 *
2237.0'
2205.4' MB110
2204.3'
2190.0'

2190.0' 2189.1' 2188.2' MB111
2171.6' 2168.9' MB112
2144.4' 2142.6' MB113
2120.7' 2120.0' MB114
2084.5' 2081.8' MB115
2073.5' 2071.0' MB116
2061.8' 2060.0' VACA TRISTE *
1994.2' 1993.3' MB117
1965.5' 1963.0' MB118
1945.1' 1943.3' MB119
1925.5' 1924.4' 1923.0' MB120 ZONE A *
1913.8' 1913.7' 1911.5' MB121 *
1901.7' 1902.4' MB122
1874.5' 1870.5' UNION * ANHYDRITE
1800.0'

1221.5 1300 1400 1500 1600 1611.5
VACA TRISTE
9'
MIDDLE CONCRETE COMPONENT
50'
11'-10" MIN.
37-L02 00-S02
COMPACTED SALT COLUMN

1800.0' 1791.8' 1789.6' MB123
1783.8' 1776.4' MB124
1732.5' 1729.3' ZONE B *
1724.6' 1722.9' MB125
1705.0' ZONE C *
1696.3'
1688.2' 1687.1' MB126
1662.3' 1659.3' MB127
1649.6' 1648.2' MB128
1639.5' ZONE D *
1637.0' ZONE E *
1634.3' ZONE F *
1632.1' ZONE G *
1630.0' ZONE H *
1625.0' 1622.9' 1621.8' MB129 *
ZONE I *
1613.5' 1612.5' MB130
1545.5' 1544.6' 1540.0' MB131 ZONE J *
1511.1' 1510.7' MB132
1460.0'

1611.5 1700 1800 1900 1951.5
℄ SHAFT
11'-10" MIN.
37-L02 00-S05
COMPACTED SALT COLUMN

1460.0' 1453.7' 1442.3' MB134
1425.7' 1424.2' MB135
1382.3' 1374.4' MB136
1358.7' 1357.5' MB137
1311.8' 1311.1' MB138
1288.4' 1287.1' ANHYDRITE A
1281.6' 1280.7' ANHYDRITE B
1254.3' 1252.3' MB139 *
1247.0' STATION LEVEL
1240.0'

1951.5 2100
℄ SHAFT
COMPACTED SALT COLUMN
LOWER CONCRETE COMPONENT
50'
37-L02 00-S02
37-L02 00-S04
11'-10"
LOWER SALADO COMPACTED CLAY COLUMN
SHAFT STATION MONOLITH
33'
25'
12'-0"
7'
11'-9"
216.5
1247.0' MSL STATION LEVEL
CONC. PAD
37-L02 37-S01
TAMPED WIPP SALT COLUMN
11'-10"
114'-0"
SUMP
BASE OF SUMP

NOTES:
1. SEE DWG. 00-G01 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS.
2. SEE DWG. 37-G01 FOR LITHOLOGY AND NOTES.
3. SEE NOTE 3 OF DWG. 37-L01.

PRELIMINARY

SCALE IN FEET
0 10 20 30 40 50

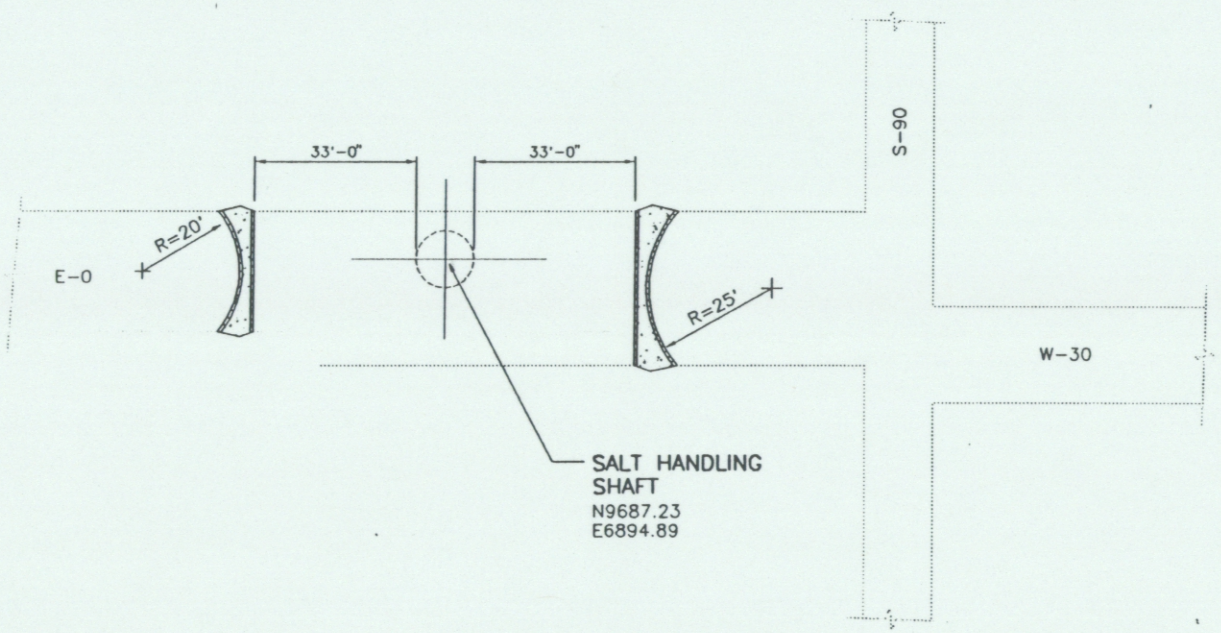
REV.	DATE	DESCRIPTION	BY	CK.	APP.

SANDIA NATIONAL LABORATORIES
WIPP A/E SUPPORT
CONTRACT NO: AG-4909
WIPP SHAFT SEALING SYSTEM
SALADO FORMATION
SALT HANDLING SHAFT
STRATIGRAPHY & SEALING
SUBSYSTEM PROFILE

	NAME	DATE
BY	DL	
CK.	SAR	
APP.		
APP.		
APP.		

PARSONS BRINCKERHOFF ENERGY SERVICES, INC | SCALE: | SIZE B | SNL DWG NO | SHEET NO

09-CS-37-L02



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SCALE IN FEET
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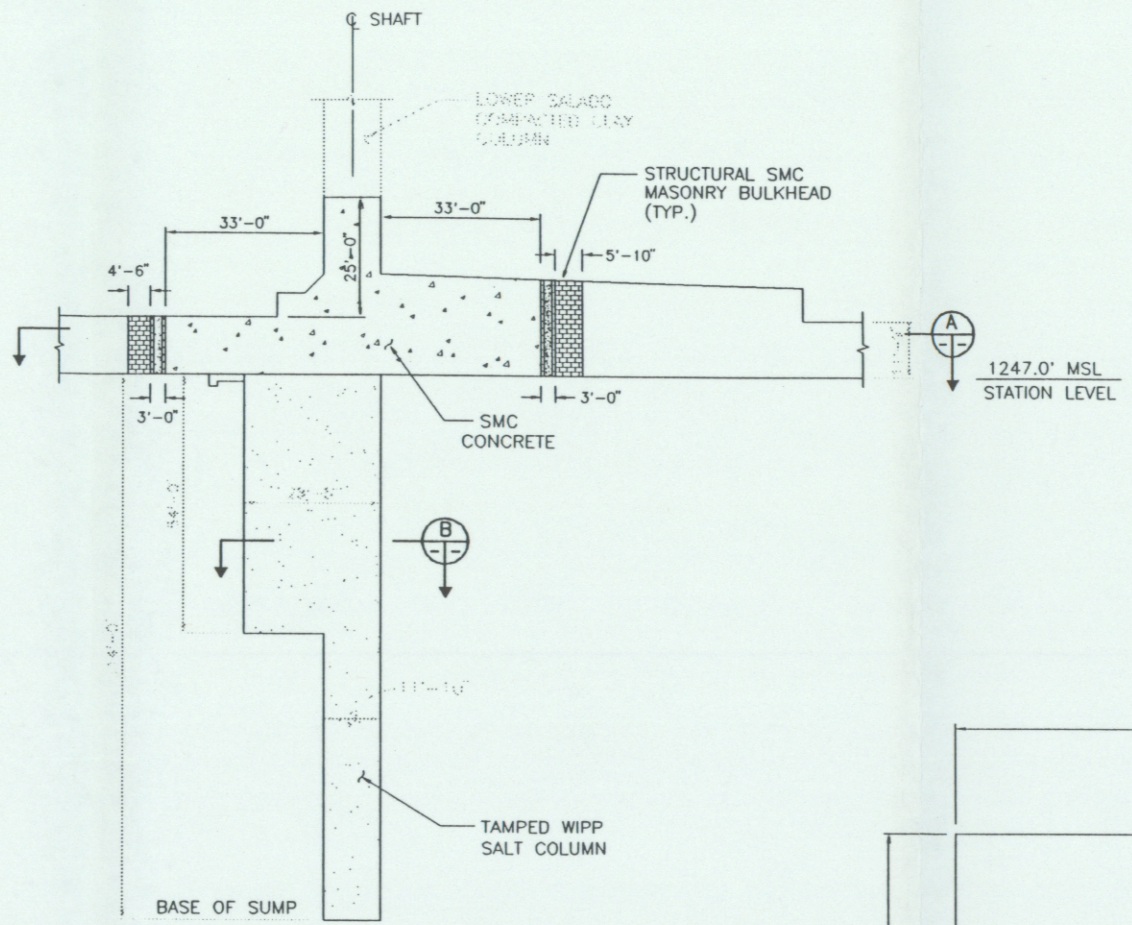

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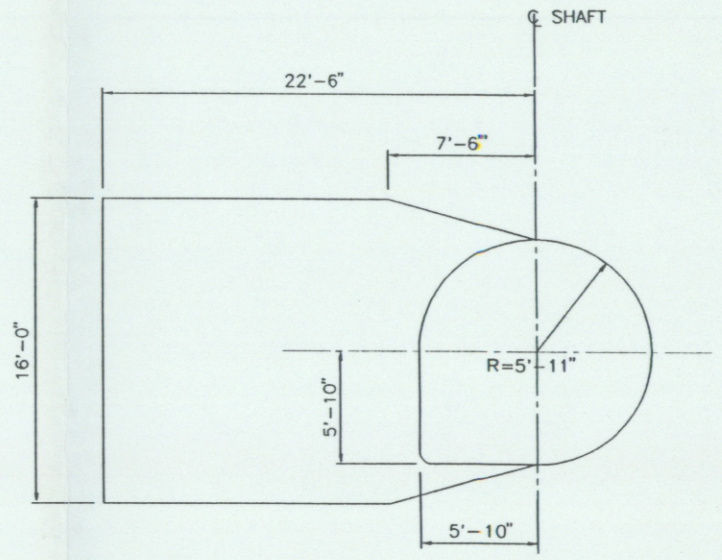

SECTION B

SCALE IN FEET
0 5 10 15 20

NOTES:

1. SEE DWG. NO. 00-G01 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS.

PRELIMINARY

REV.	DATE	DESCRIPTION	BY	CK.	APP.

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

CONTRACT NO: AG-4909

WIPP SHAFT SEALING SYSTEM

SALT HANDLING SHAFT
SHAFT STATION MONOLITH

	NAME	DATE
BY	DL	
CK.	SAR	
APP.		
APP.		
APP.		

PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO.	SHEET NO.

09-CS-37-S01

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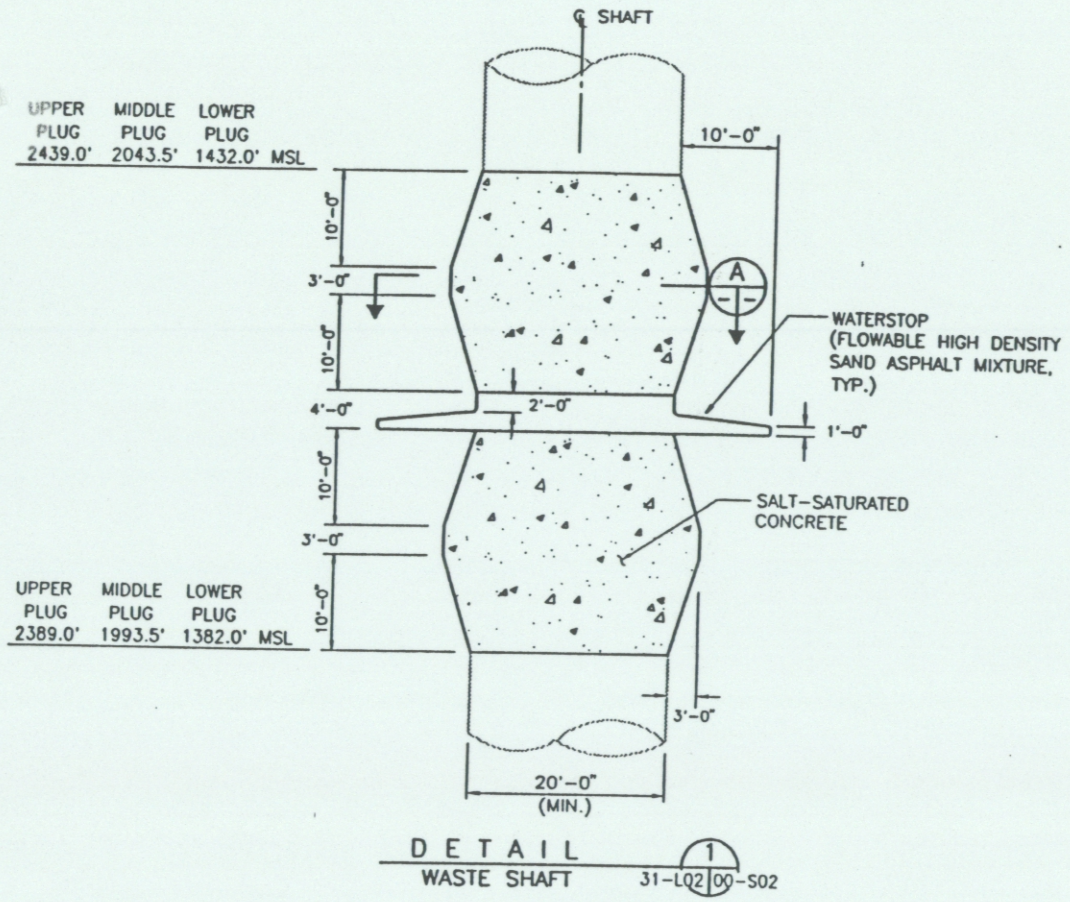

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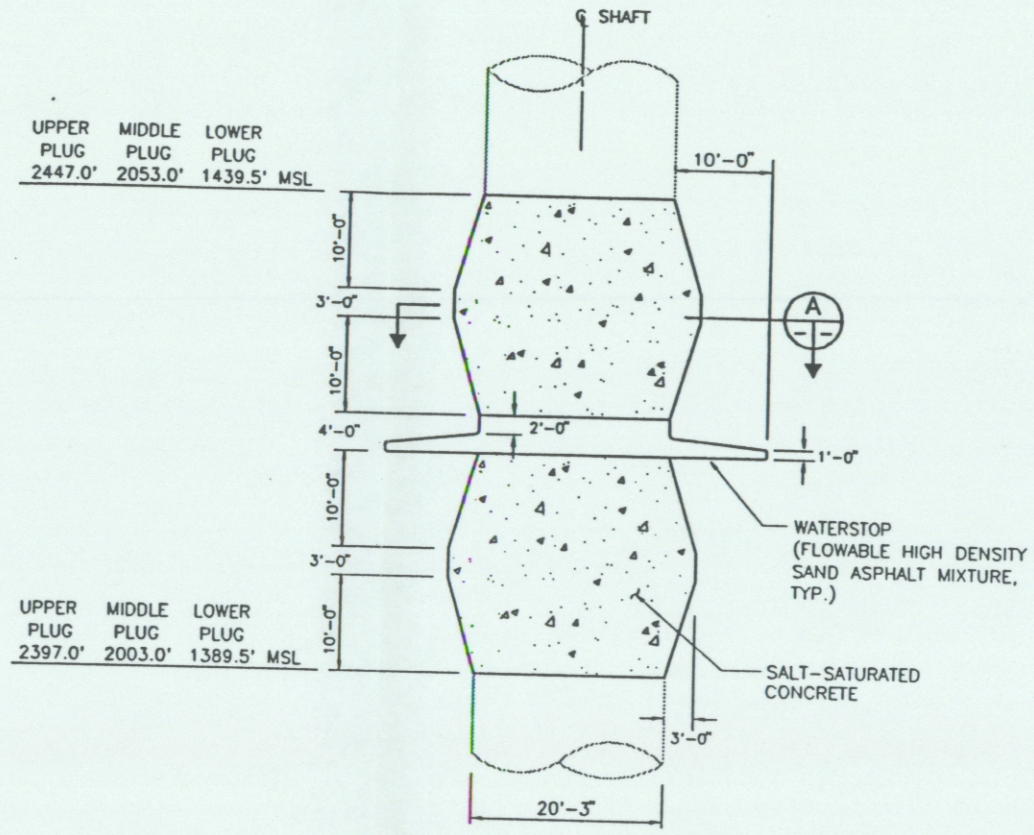

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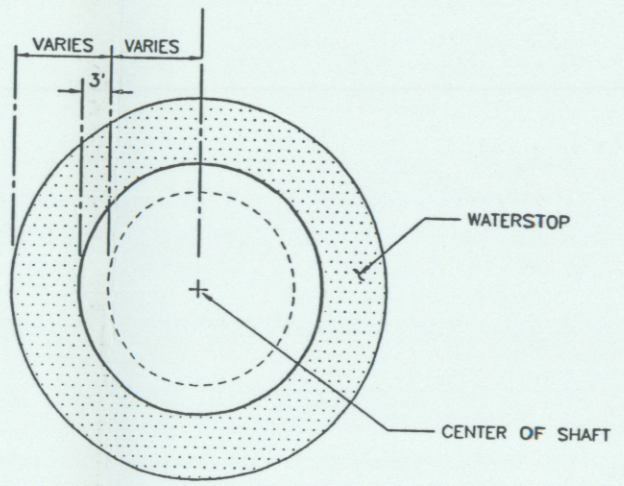
AIR INTAKE SHAFT 33-LQ2|00-S02



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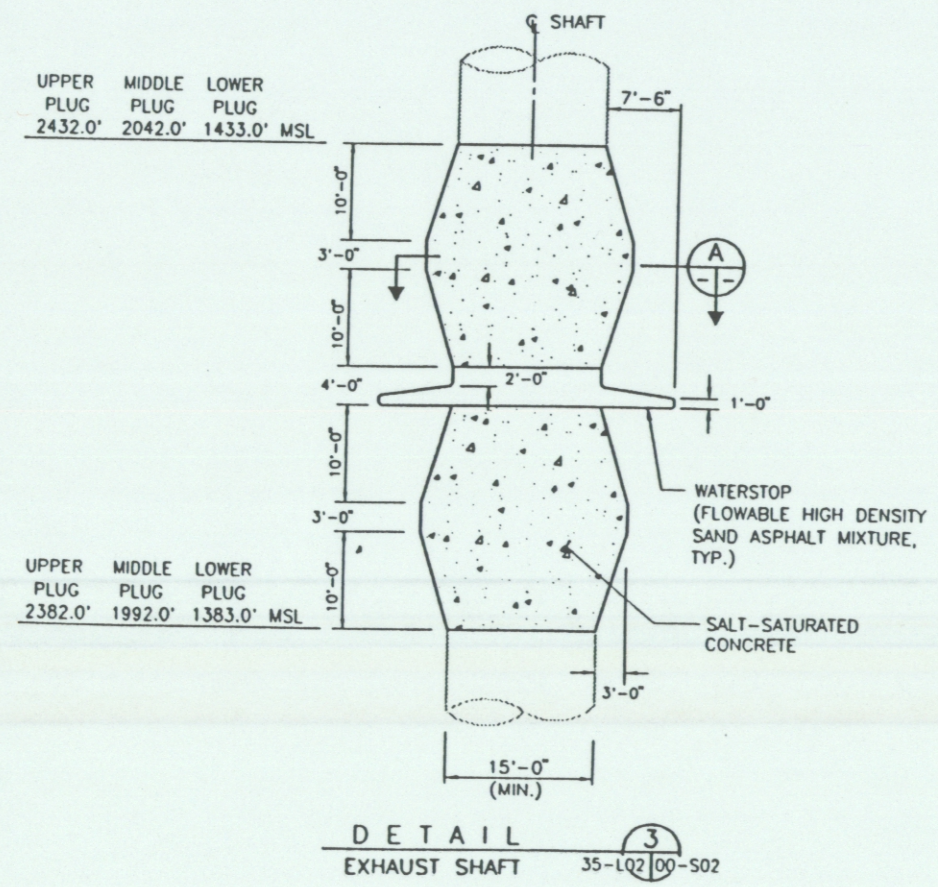
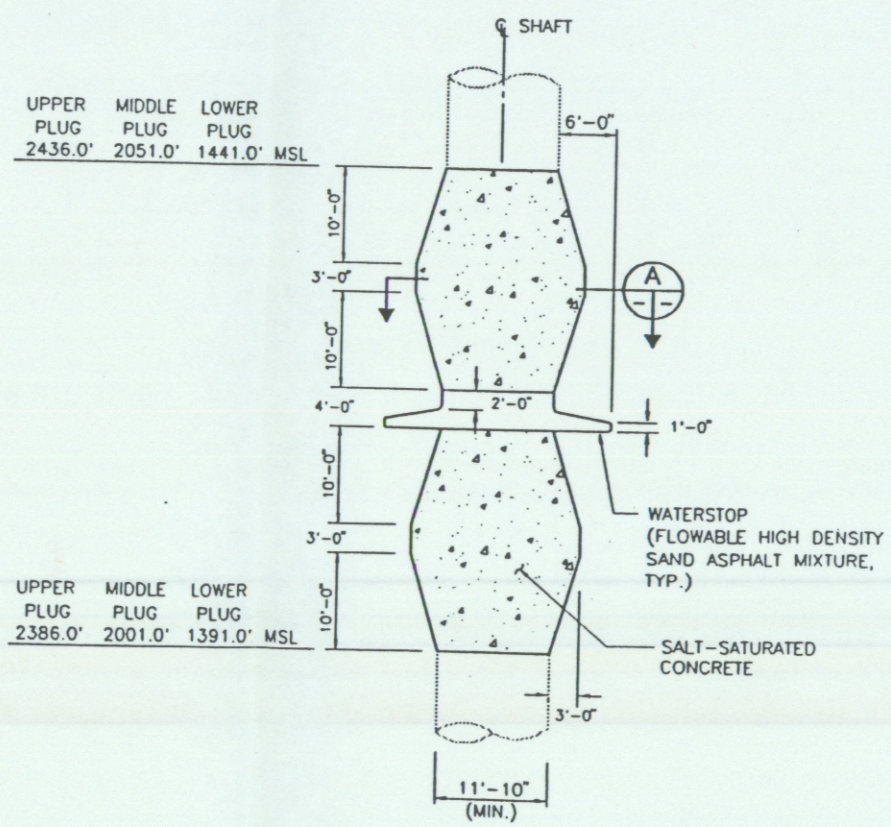


DETAIL 3
EXHAUST SHAFT 35-LQ2|00-S02



DETAIL 4
SALT HANDLING SHAFT 37-LQ2|00-S02

PRELIMINARY

SCALE IN FEET
0 5 10 15 20 25

REV.	DATE	DESCRIPTION	BY	CK.	APP.

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

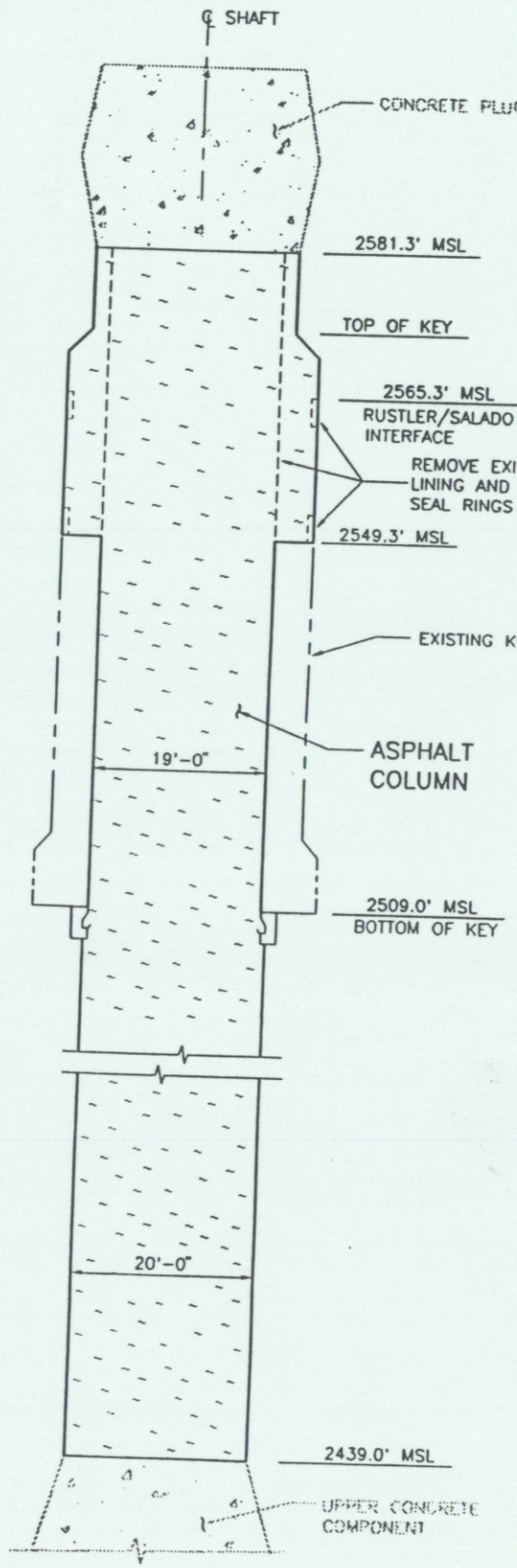
CONTRACT NO: AG-4909

WIPP SHAFT SEALING SYSTEM

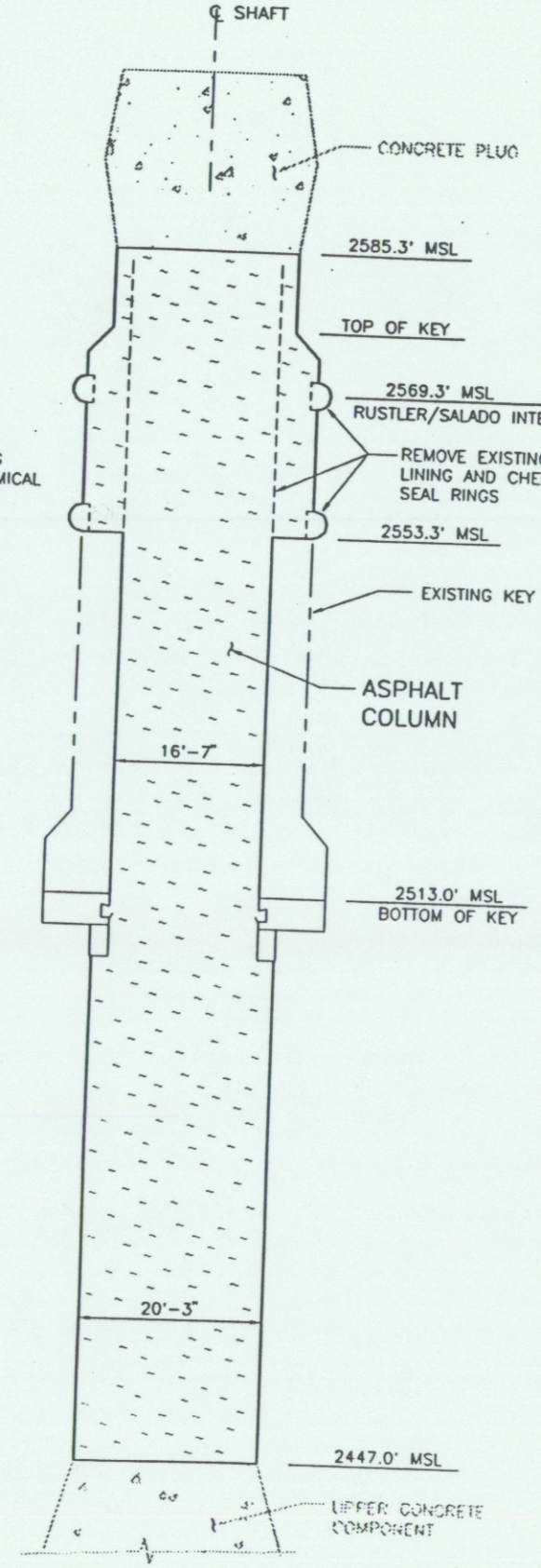
CONCRETE COMPONENT IN SALADO FORMATION

	NAME	DATE
BY	DL	
CK.	SAR	
APP.		
APP.		
APP.		

PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG. NO.	SHEET NO.
				09-CS-00-S02



DETAIL WASTE SHAFT 1 31-L02|00-S03



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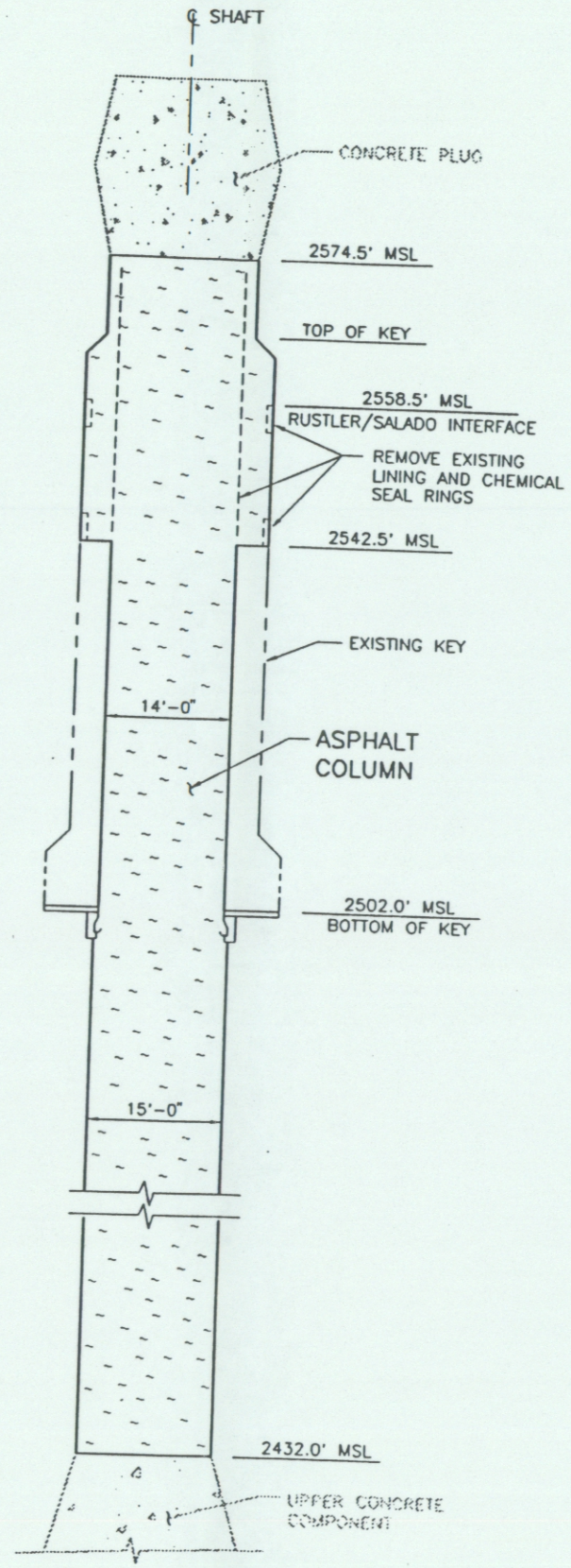

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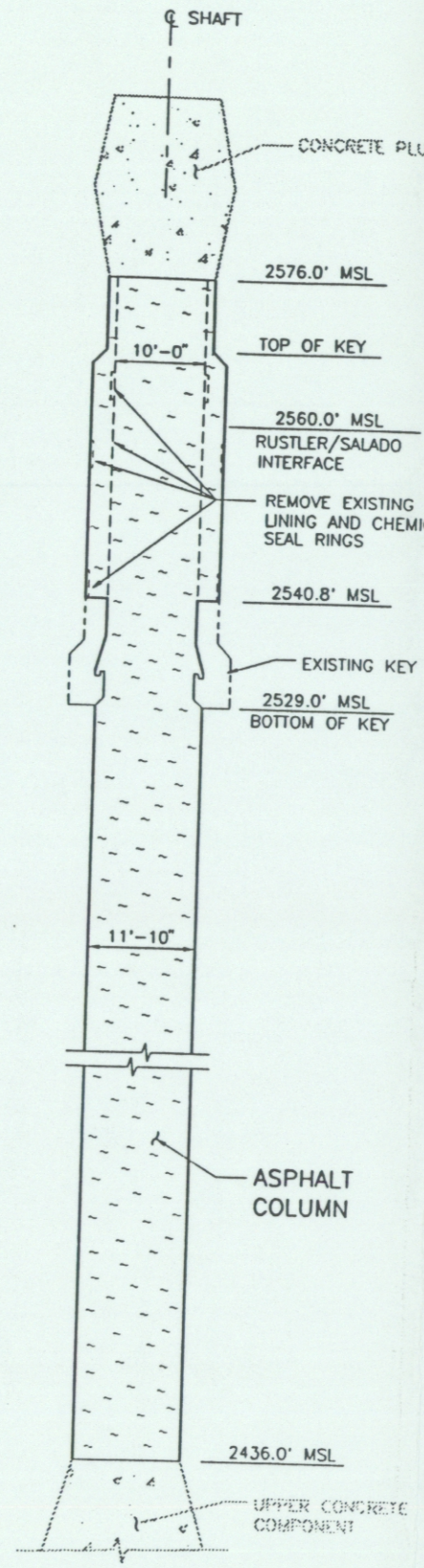


DETAIL SALT HANDLING SHAFT 4 37-L02|00-S03

PRELIMINARY

SCALE IN FEET
0 5 10 15 20 25

REV.	DATE	DESCRIPTION	BY	CK.	APP.

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

CONTRACT NO: AG-4909

WIPP SHAFT SEALING SYSTEM

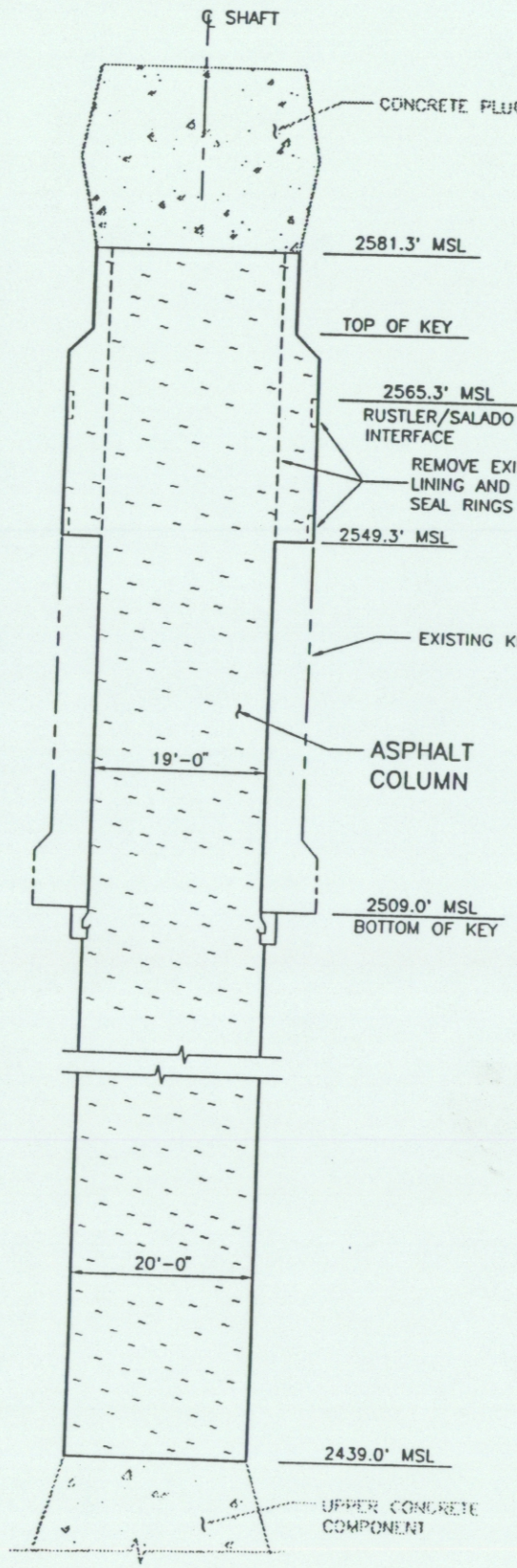
ASPHALT COLUMN

	NAME	DATE
BY	DL	
CK.	SAR	
APP.		
APP.		
APP.		

PARSONS BRINCKERHOFF ENERGY SERVICES, INC | SCALE: | SIZE B | SNL DWG NO | SHEET NO

09-CS-00-S03

NAME: C:\A\WIPP\9\CS\CS00-S03.DWG DATE: NOVEMBER 29 1995 TIME: 2:21 PM



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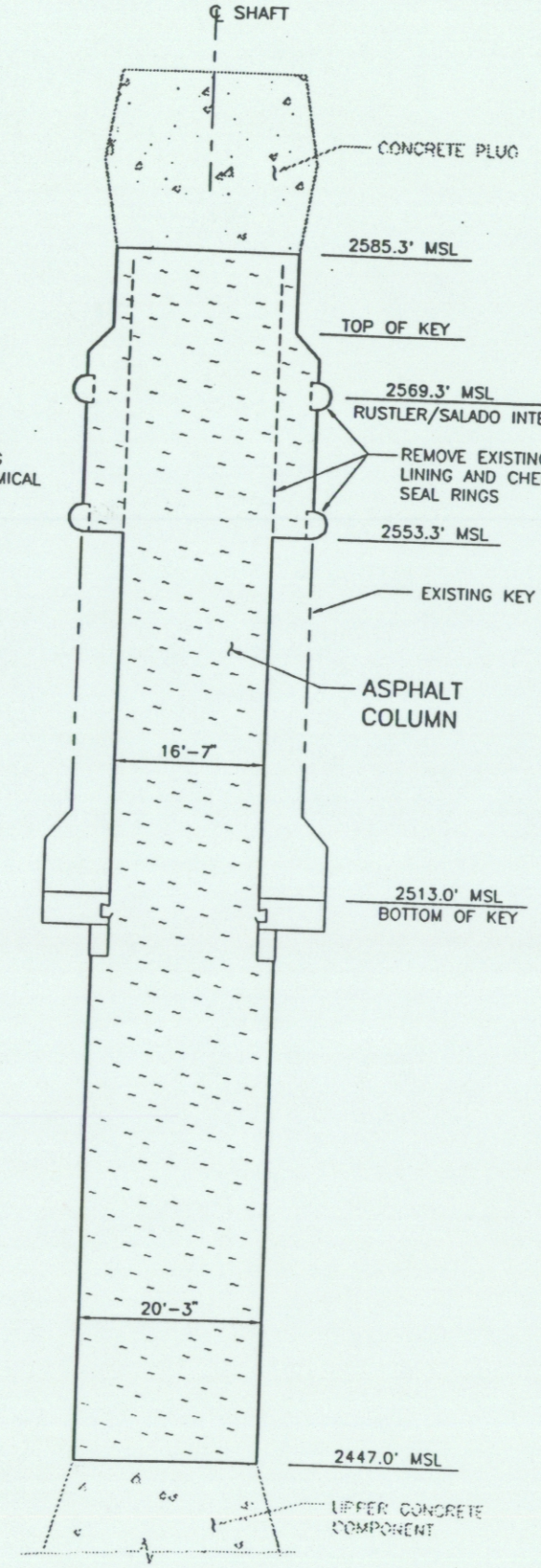

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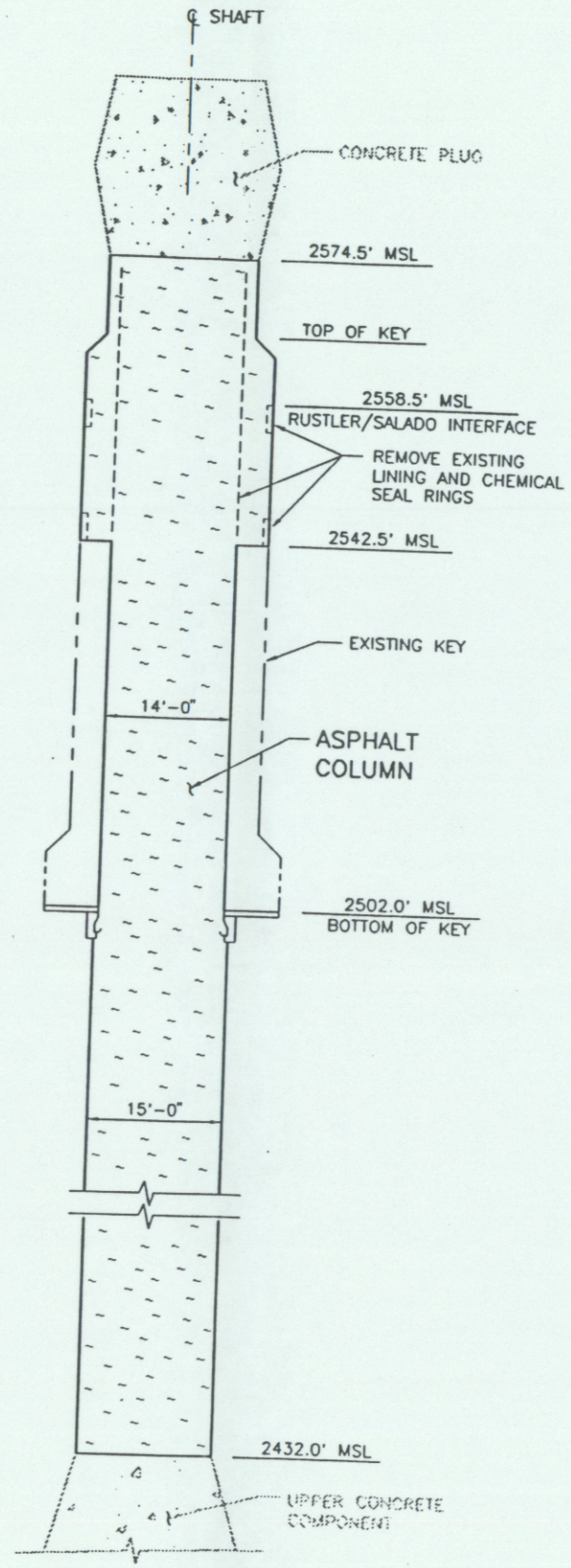

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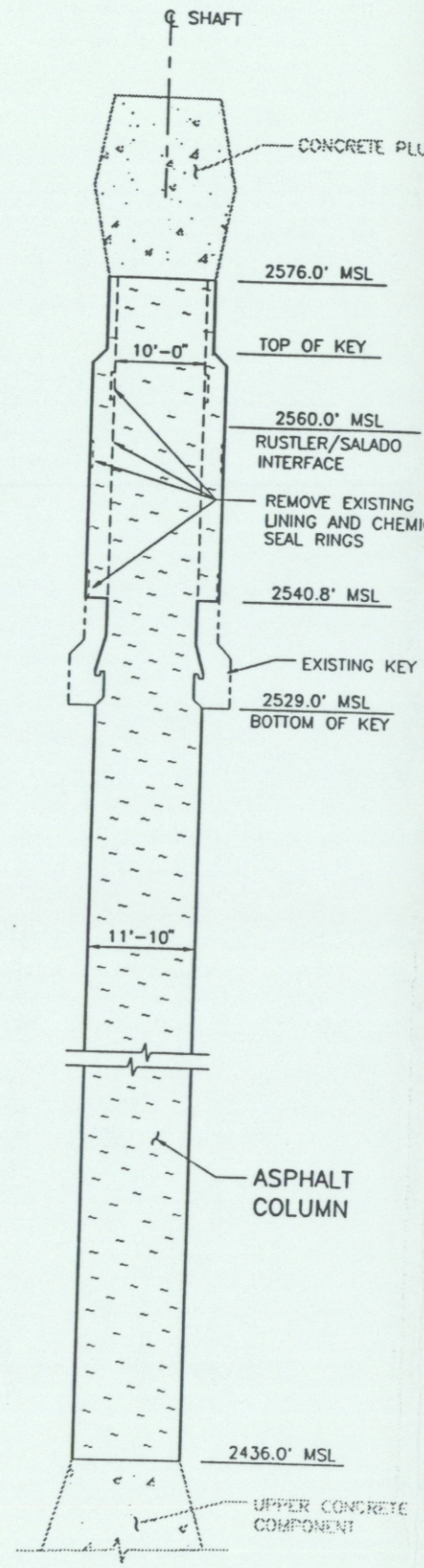


DETAIL SALT HANDLING SHAFT 4 37-L02|00-S03

PRELIMINARY

SCALE IN FEET
0 5 10 15 20 25

REV.	DATE	DESCRIPTION	BY	CK.	APP.

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

CONTRACT NO: AG-4909

WIPP SHAFT SEALING SYSTEM

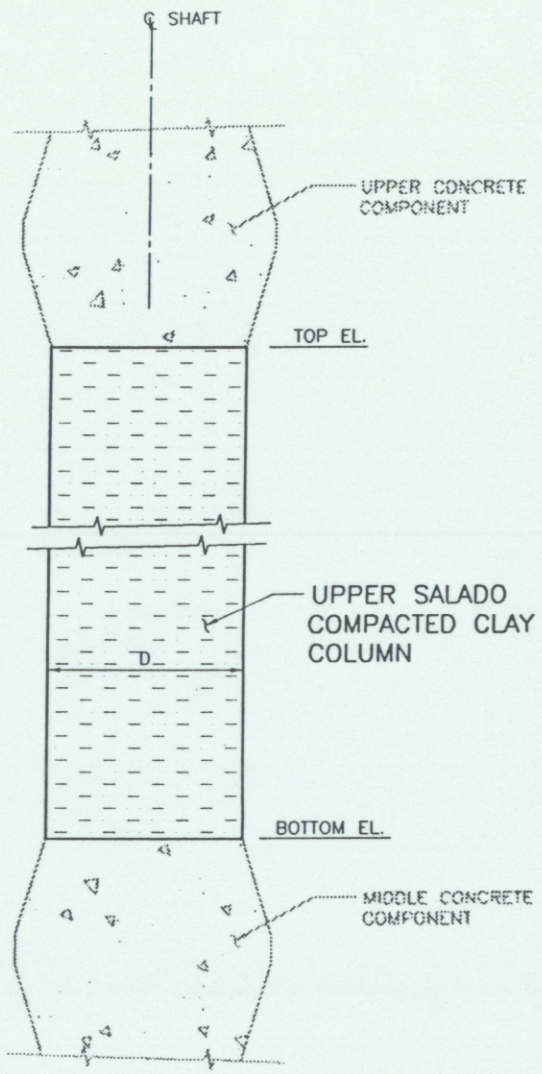
ASPHALT COLUMN

	NAME	DATE
BY	DL	
CK.	SAR	
APP.		
APP.		
APP.		

PARSONS BRINCKERHOFF ENERGY SERVICES, INC | SCALE: | SIZE B | SNL DWG NO | SHEET NO

09-CS-00-S03

NAME: C:\A\WIPP\9\CS\CS00-S03.DWG DATE: NOVEMBER 29 1995 TIME: 2:21 PM



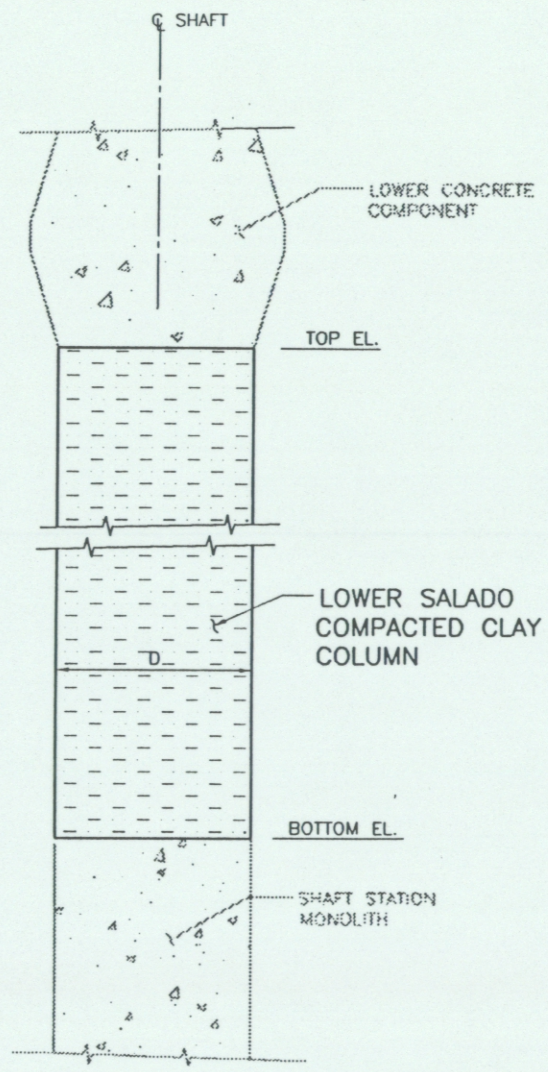


TABLE 1

SHAFT	NOMINAL SHAFT DIAMETER D (FT.)	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	2043.5	345.5	1382.0	1286.0	96.0
AIR INTAKE	20.25	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	11.83	2386.0	2051.0	335.0	1391.0	1284.0	107.0

DETAIL 1

SEE TABLE 1 FOR DETAILS
NO SCALE

31-L02 | 00-S04
33-L02
35-L02
37-L02

PRELIMINARY

REV.	DATE	DESCRIPTION	BY	CK.	APP

SANDIA NATIONAL LABORATORIES

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

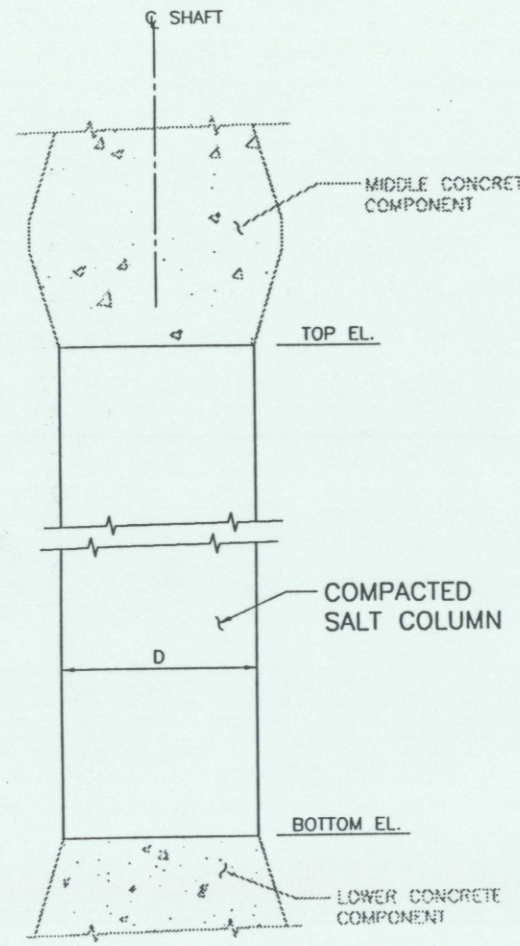
WIPP SHAFT SEALING SYSTEM

UPPER AND LOWER SALADO COMPACTED CLAY COLUMNS

	NAME	DATE
BY	DL	
CK.	SAR	
APP.		
APP.		
APP.		

PARSONS BRINCKERHOFF ENERGY SERVICES, INC | SCALE: | SIZE B | SNL DWG. NO. | SHEET NO.

09-CS-00-S04



DETAIL 1

SEE TABLE 1 FOR DETAILS
NO SCALE

31-L02 00-S05
33-L02
35-L02
37-L02

TABLE 1

SHAFT	NOMINAL SHAFT DIAMETER D (FT.)	COMPACTED SALT COLUMN		
		TOP EL. (FT. MSL)	BOTTOM EL. (FT. MSL)	TOTAL HT. (FT.)
WASTE	20.0	1993.5	1432.0	561.5
AIR INTAKE	20.25	2003.0	1439.5	563.5
EXHAUST	15.0	1992.0	1433.0	559.0
SALT HANDLING	11.83	2001.0	1441.0	560.0

PRELIMINARY

REV.	DATE	DESCRIPTION	BY	CK.	APP.

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

CONTRACT NO: AG-4909

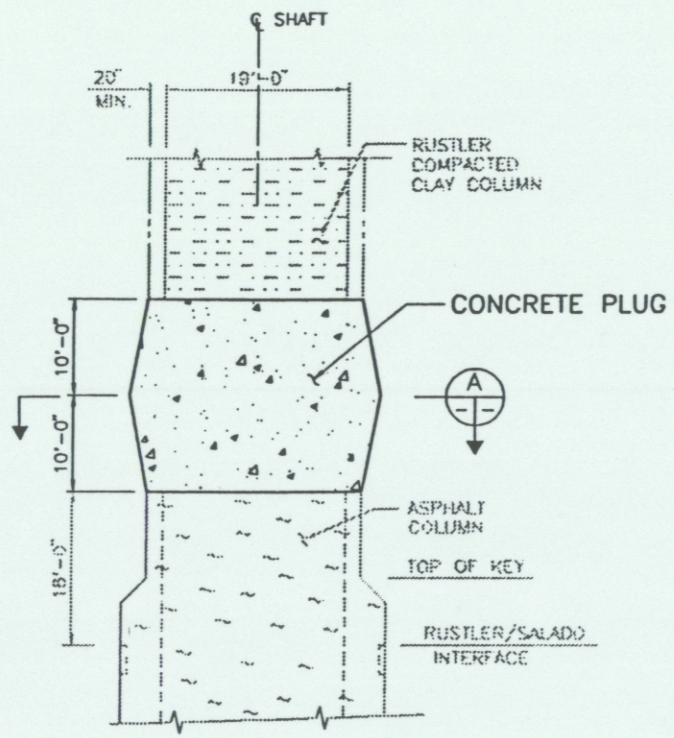
WIPP SHAFT SEALING SYSTEM

COMPACTED SALT COLUMN

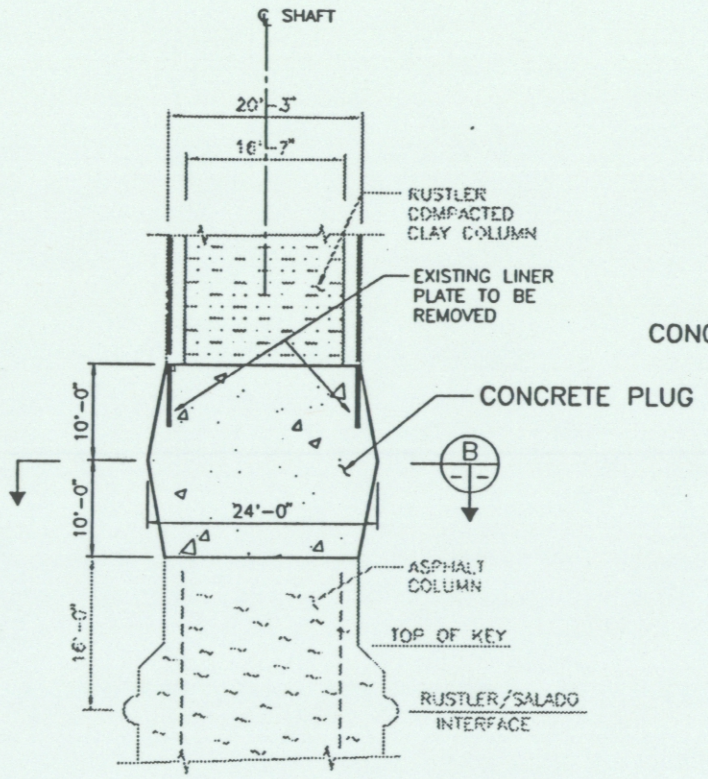
	NAME	DATE
BY	DL	
CK.	SAR	
APP.		
APP.		
APP.		

PARSONS BRINCKERHOFF ENERGY SERVICES, INC	SCALE:	SIZE B	SNL DWG NO	SHEET NO

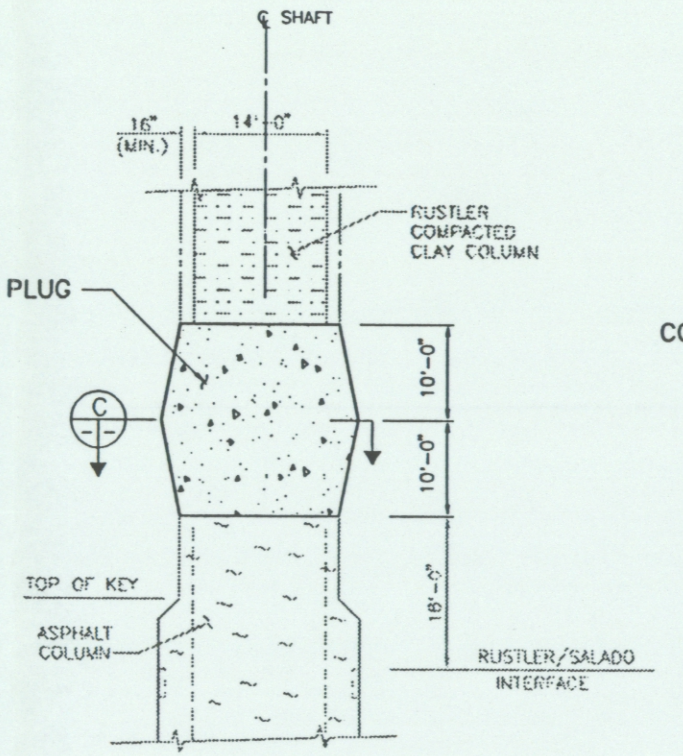
09-CS-00-S05



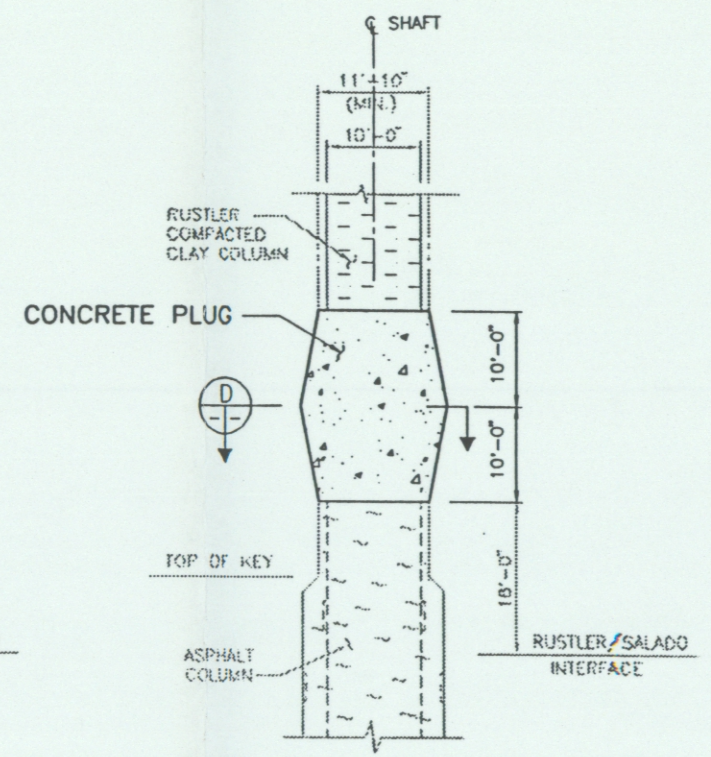
DETAIL — WASTE SHAFT — 1 — 31-L01 | 00-S06



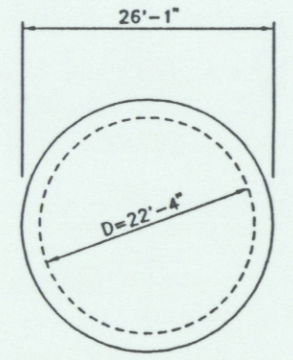
DETAIL — AIR INTAKE SHAFT — 2 — 33-L01 | 00-S06



DETAIL — EXHAUST SHAFT — 3 — 35-L01 | 00-S06



DETAIL — SALT HANDLING SHAFT — 4 — 37-L01 | 00-S06



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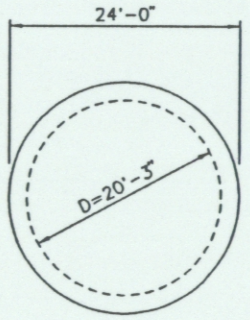

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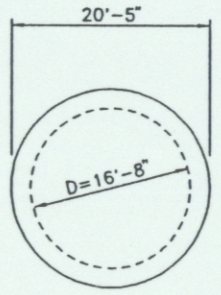

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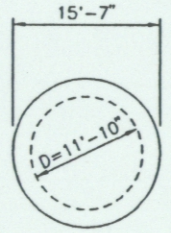

SECTION D

PRELIMINARY

SCALE IN FEET
0 5 10 15 20 25

REV.	DATE	DESCRIPTION	BY	CK.	APP

SANDIA NATIONAL LABORATORIES

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

WIPP SHAFT SEALING SYSTEM

CONCRETE PLUG

	NAME	DATE
BY	DL	
CK.	SAR	
APP.		
APP.		
APP.		

PARSONS BRINCKERHOFF ENERGY SERVICES, INC | SCALE: | SIZE B | SNL DWG NO | SHEET NO

09-CS-00-S06

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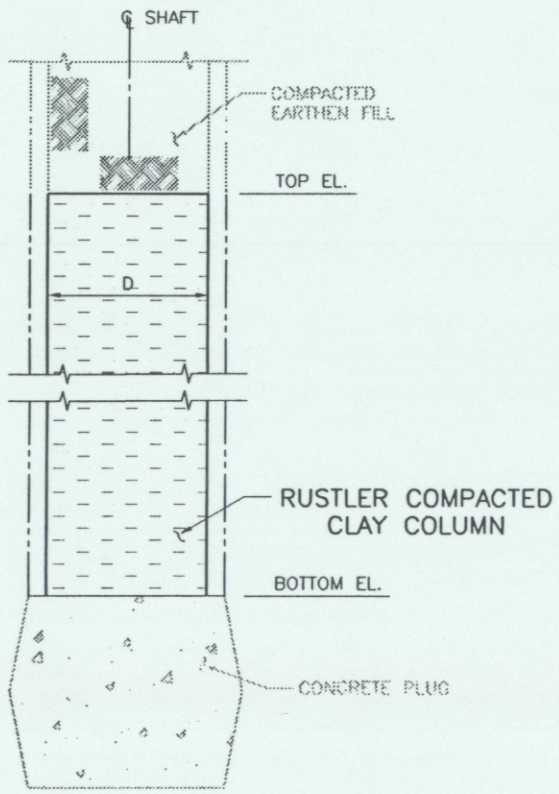

DETAIL 1
SEE TABLE 1 FOR DETAILS
NO SCALE
31-L01 00-S07
33-L01
35-L01
37-L01

TABLE 1

SHAFT	NOMINAL SHAFT DIAMETER D (FT.)	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	16.58	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

PRELIMINARY

REV.	DATE	DESCRIPTION	BY	CK.	APP.

SANDIA NATIONAL LABORATORIES

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

WIPP SHAFT SEALING SYSTEM

RUSTLER COMPACTED CLAY COLUMN

	NAME	DATE
BY	DL	
CK.	SAR	
APP.		
APP.		
APP.		

PARSONS BRINCKERHOFF ENERGY SERVICES, INC | SCALE: | SIZE B | SNL DWG. NO. | SHEET NO.

09-CS-00-S07

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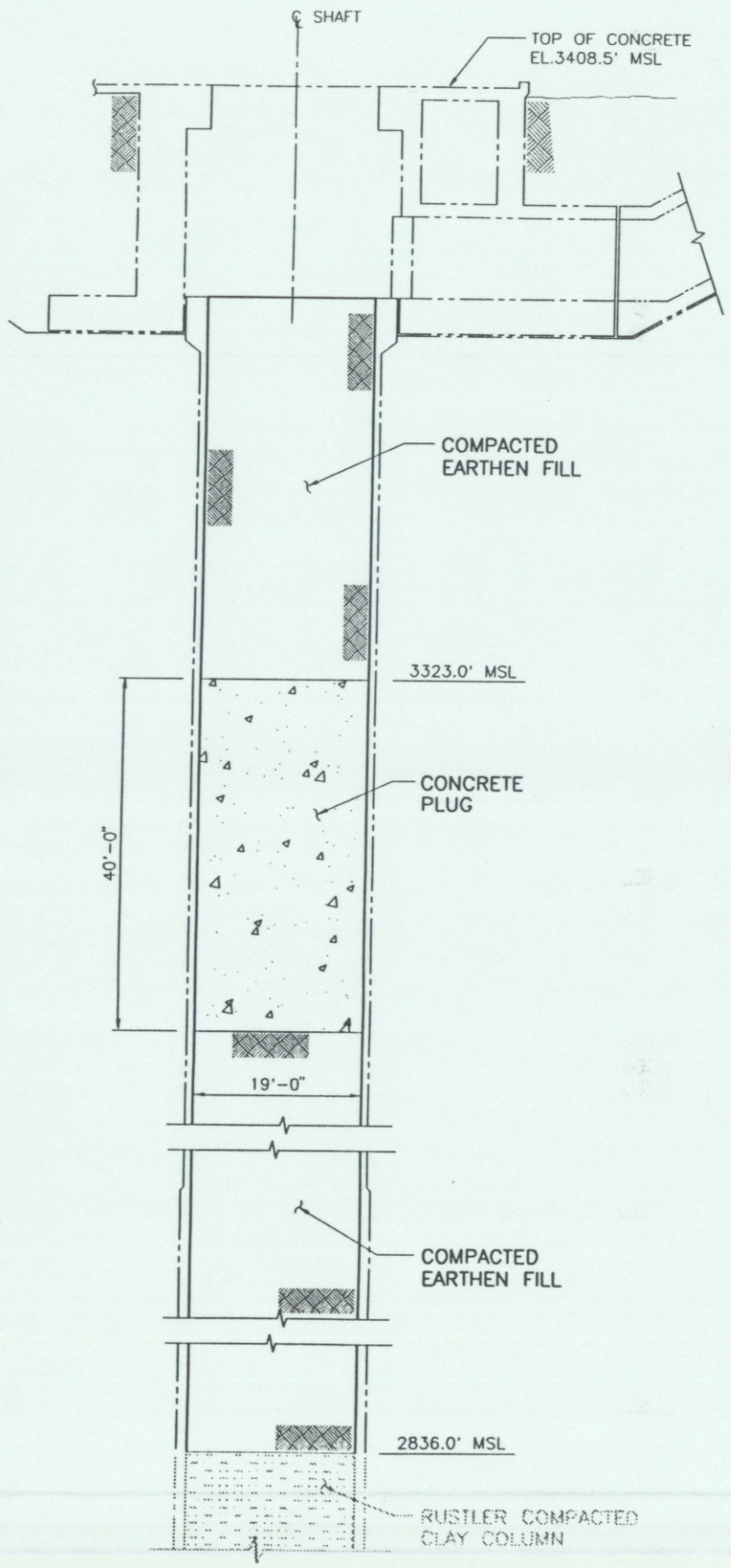
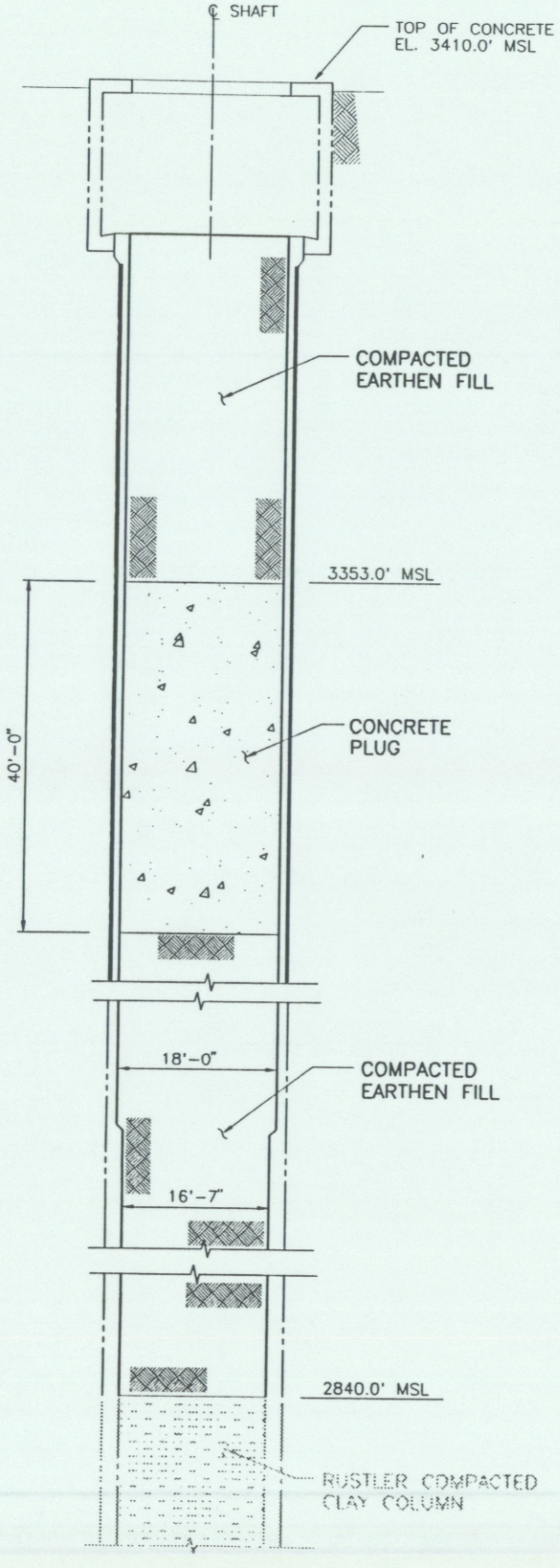
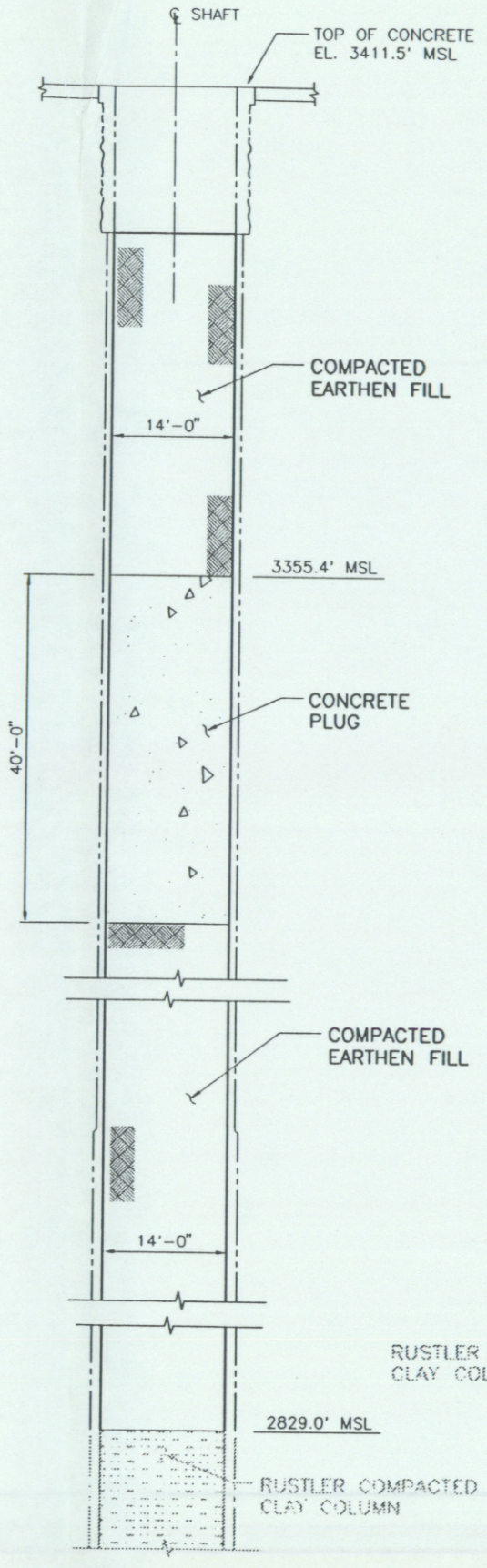


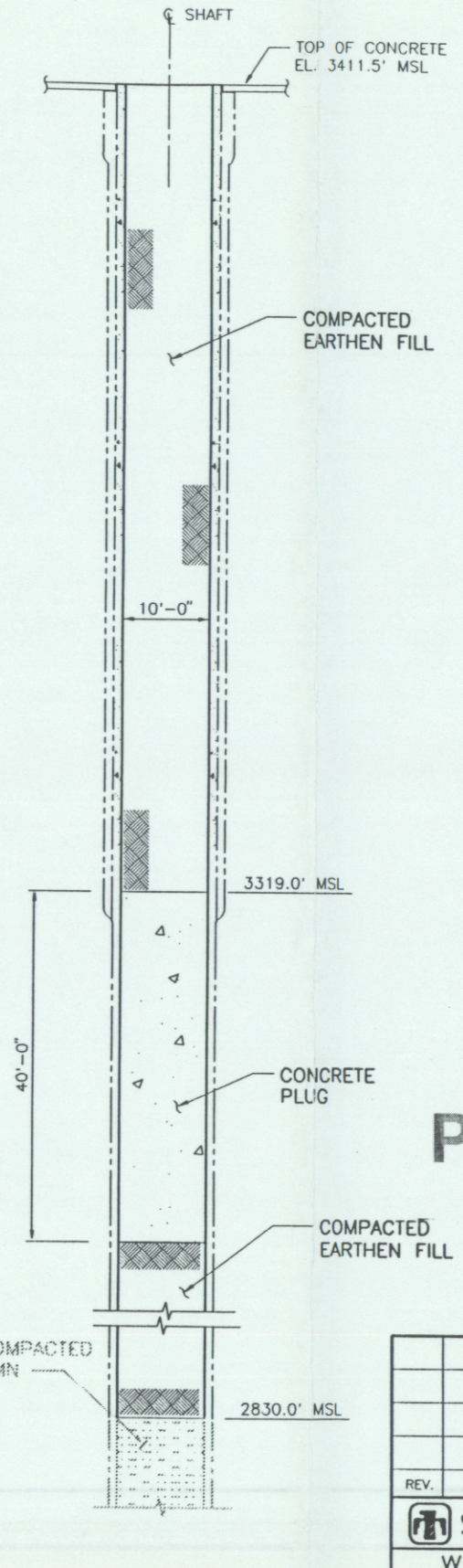
DETAIL
WASTE SHAFT 1 31-L01 00-S08



DETAIL
AIR INTAKE SHAFT 2 33-L01 00-S08



DETAIL
EXHAUST SHAFT 3 35-L01 00-S08



DETAIL
SALT HANDLING SHAFT 4 37-L01 00-S08

SCALE IN FEET
0 5 10 15 20 25

PRELIMINARY

REV.	DATE	DESCRIPTION	BY	CK.	APP.

SANDIA NATIONAL LABORATORIES

WIPP A/E SUPPORT

CONTRACT NO: AG-4909

WIPP SHAFT SEALING SYSTEM

COMPACTED EARTHEN FILL AND CONCRETE PLUG

	NAME	DATE
BY	DL	
CK.	SAR	
APP.		
APP.		
APP.		

PARSONS BRINCKERHOFF ENERGY SERVICES, INC | SCALE: | SIZE B | SNL DWG NO | SHEET NO

09-CS-00-S08

NAME: C:\A\WIPP\9\CS\CS00-S08.DWG DATE: FEBRUARY 01, 1996 TIME: 10:19 AM

APPENDIX I3
CO-DETECTION OF HAZARDOUS AND RADIOACTIVE WASTE RELEASES

APPENDIX I3
TABLE OF CONTENTS

List of Tables I3-ii
I3-1 Purpose I3-1
I3-2 Definition I3-1
I3-3 Discussion I3-1
I3-3a Nature of the Hazardous Waste Portion of TRU Mixed Waste I3-1
I3-3b Nature of the TRU Mixed Waste I3-3
I3-3c Nature of the Releases I3-3
I3-4 Application of Co-detection I3-4
I3-5 Summary I3-5

List of Tables

Table	*Title*	*Page*
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APPENDIX I3
CO-DETECTION OF HAZARDOUS AND RADIOACTIVE WASTE RELEASES

I3-1 Purpose

Within the Resource Conservation and Recovery Act (RCRA) Permit Application for the Waste Isolation Pilot Plant (WIPP), the concept of radiological monitoring is used to determine whether a release of hazardous constituents has occurred. This method is used in addition to the visual examinations and container inspections mandated by the RCRA. The purpose of this paper is to provide a justification for this approach.

I3-2 Definition

Co-detection is used to describe the detection of hazardous waste releases from containers by virtue of detection of a radioactive constituent release. Co-detection assumes the co-release of hazardous and radioactive materials and applies to all releases except the release of volatile organic compounds (VOC) from transuranic (TRU) mixed waste containers. Co-detection is used to identify the presence or absence of hazardous waste constituents based on the presence or absence of radioactivity. Co-detection does not provide any assessment with regard to concentration.

I3-3 Discussion

Co-detection provides the WIPP facility with a very sensitive method of detecting the release of non-VOC hazardous waste constituents through the use of surface sampling (swipes) and radioactivity counting. The feasibility of this approach depends on the nature of the hazardous waste portion of the TRU mixed waste, the nature of the TRU mixed waste, and the nature of the spills. The sections below discuss each of these factors.

I3-3a Nature of the Hazardous Waste Portion of TRU Mixed Waste

Based on the waste codes listed in the Part A and discussed in the WIPP Waste Analysis Plan (Chapter C of the permit application), the hazardous waste constituents consist mainly of EPA F-coded solvents and metals that exhibit the toxicity characteristic. The wastes that are to be shipped to the WIPP facility during the Disposal Phase have been placed into waste categories based on their physical and chemical properties. Waste category information is summarized in Table I2-1 with emphasis on the process that generated the waste. The waste generating processes can be described in five general categories:

1. Wastes (such as combustible waste) that result from cleaning and decontamination activities in which items such as towels and rags become contaminated simultaneously with hazardous constituents and radioactivity. In these cases, the

hazardous constituent and the radioactive constituent are intimately mixed, both on the rag or towel used for cleaning and as residuals on the surface of the object being cleaned. These waste forms are not homogeneous in nature; however, they are generated in a fashion that ensures that the hazardous and radioactive contaminants coexist throughout the waste matrix.

2. Wastes generated when materials that contain metals that are believed to exhibit the toxicity characteristic become contaminated with radioactivity as the result of plutonium operations (leaded rubber, some glass, and metal waste are typical examples). These materials may also become contaminated with solvents during decontamination or plutonium recovery activities.

3. A class of processes where objects that are not metals are used in plutonium processes and become contaminated with radioactivity. They are subsequently cleaned with solvents to recover plutonium. Surfaces of these objects (such as graphite, filters, and glass) are contaminated with both radioactive constituents and hazardous constituents.

4. Waste generating processes involving foundry operations where impurities are removed from plutonium. These impurities may result in the deposition of toxicity characteristic metals on the surfaces of objects, such as firebrick, ceramic crucibles, pyrochemical salts, and graphite, which are contaminated with residual quantities of radioactivity.

5. In all of the process waste categories in the lower half of the attached table, the hazardous constituent and the radioactivity are physically mixed together as a result of the treatment process. In these wastes, the release of any portion of the waste matrix will involve both the hazardous waste and the radioactive waste components, because the treatment process generates a relatively homogeneous waste form.

Some waste forms only contain radioactive contamination on the surface, because they are not the result of a treatment process or are not porous in form. These include glass, leaded rubber, metals, graphite, ceramics, firebricks, and plastics. In theory, a hazardous waste release could occur if the interiors of these materials became exposed and were involved in a release or spill. Such an occurrence is not likely during operations, because no activities are planned or anticipated that would result in the breaking of these materials to expose fresh surfaces.

Based on the information in the attached table and the discussion above, hazardous constituent releases could potentially occur in only one of two forms: 1) VOC and 2) particulate resulting from the catastrophic failure of a container. Mechanisms that can initiate releases in these forms are discussed subsequently. Regardless of how the release occurs, the nature of the waste and

the processes that generated it is such that the radioactive and hazardous components are intimately mixed. A release of one without the other is not feasible.

I3-3b Nature of the TRU Mixed Waste

TRU mixed waste is defined as waste in which radioactive waste constituents and hazardous waste constituents exist as co-contaminants. The processes that placed the radioactivity in the waste are, for the most part, the same processes that placed the hazardous constituent in the waste. Therefore, the TRU mixed waste forms are described in terms of both classes of constituents. The WIPP Waste Acceptance Criteria (WAC) document places limits on the waste that can be shipped to the WIPP facility based on the characteristics of the waste form. According to the WAC, certain waste forms with specific characteristics are not allowed at the WIPP facility. Liquid waste is one waste form that is not allowed. Waste forms with greater that 1 percent respirable fines (particulates less than 10 microns in diameter) are not allowed. Other limitations include a prohibition on pyrophoric materials, corrosive materials, ignitable waste, and compressed gases. Furthermore, TRU waste must contain 100 nanocuries or more of transuranic elements per gram of waste, which means that the radioactive component of the waste will always be present within the waste in significant concentrations. The limitations and restrictions are provided to ensure any waste form handled at the WIPP facility is stable and can be managed safely.

One benefit of waste form restrictions, such as no liquids or limited particulates, is that they limit the kinds of releases that could occur to those that would be readily detectable through visual inspection (i.e., large objects that fall out of ruptured containers) or through the use of radiation monitoring either locally or within the adjacent area to detect materials that have escaped from containers.

I3-3c Nature of the Releases

The fundamental operating philosophy at the WIPP facility is to handle only sealed containers of waste. This practice minimizes the opportunity for releases or spills. For the purposes of safety analysis, it was assumed that releases and spills during operations occur by either of two mechanisms: 1) surface contamination and 2) accidents.

Surface contamination is documented in the WIPP Final Safety Analysis Report (FSAR) to be the only credible source of contamination external to the containers during normal operations. Surface contamination is assumed to be caused by waste management activities at the generator site that result in the contamination of the outside of a waste container. *(Note: There are WAC limits on surface contamination; however, conservative assumptions were made regarding the occurrence of minor contamination.)* Contamination would most likely be particulates (dirt or dust) that would be deposited during generator-site handling/loading activities. This contamination would not be detected by visible inspections. Surface contamination is monitored upon arrival at the WIPP facility through the use of swipes and radiation monitoring equipment. U.S. Department of Energy (DOE) Orders require that off-site

shipments of radioactive waste be checked to assure that the radioactive surface contamination is below very low levels. Consequently, any surface contamination that may be detected at the WIPP facility will be very minor. Because the hazardous constituents, if present, also occur in minor concentrations as residues and traces within the waste, they represent very small health risks.

It should be noted that, with respect to surface contamination, detection using radioactivity is very sensitive and allows for the detection of contamination that may not be visible on the surface of the container. This exceeds the capability required by the RCRA, which is generally limited to inspections that detect only visible evidence of spills or leaks.

Releases due to accidents are modeled in the WIPP FSAR. Significant accidents within the waste handling process are assumed to result in the release and dispersion of particulate radioactive contaminants and VOCs. Radioactive releases of particulates are detectable using surface-sampling (swipe) techniques and the extensive network of radiation sensors located throughout the facility. An accidental release would be detected immediately by the operator or the health physics technician. The impact of VOC releases is discussed in Chapter D.

In summary, releases that are most likely at the WIPP facility involve the dispersion of particulates containing radioactivity. This radioactivity is readily detectable. On the other hand, the presence of hazardous constituents in these releases would likely go undetected due to their extremely low concentrations without conservative co-detection practices.

I3-4 Application of Co-detection

The use of co-detection applies to any situation calling for sampling or monitoring for nonvolatile releases. This includes initial sampling for surface radiological contamination upon receipt, sampling for contamination during waste handling activities, monitoring for releases of particulates or liquids during testing, sampling for contamination during decommissioning, sampling for contamination during packaging for off-site shipment, and sampling to demonstrate the effectiveness of decontamination activities that follow a release or spill and retrieval. Radiation monitoring and sampling are mandated by DOE Orders and provide an immediate indication of a release or spill, even when they are not visibly detectable. The basis for accepting co-detection is that the radioactivity is intimately mixed with the hazardous constituents to the extent that both are present in the waste. It can be assumed that a release or spill involving hazardous constituents (except VOCs) will also involve a release or spill of radioactivity. This assurance that hazardous and radioactive contaminants are mixed is based on the processes that generated the waste and the physical form of the waste. These processes mixed the hazardous and radioactive components, as described in Section 3.1, to the extent that detection of the radioactive component can lead to the conclusion that the hazardous component is also present. Conversely, the absence of the radioactive component indicates that no release or spill has occurred. The assumption that hazardous and radioactive materials are released

together is appropriate in that no reasonable release mechanisms that can be postulated which would separate the different types of contamination.

I3-5 Summary

The use of co-detection at the WIPP facility as a means of detecting both radioactive and hazardous waste constituents can be summarized as follows:

1. Two waste components are intimately mixed such that a release of one will be accompanied by a release of the other (except for gaseous releases of regulated VOCs).

2. Without the ability for co-detection using radiological sampling and monitoring, the hazardous constituents would likely go undetected because of their extremely low concentrations, unless visible evidence of a spill or release is present.

3. Radiation detection is sensitive enough to detect hazardous contamination, even in cases where the contamination is not visible.

4. Radiation sampling and monitoring provides easy and immediate detection of contamination.

5. The use of radiation for detection and the assumption that the hazardous constituents are also present lead to a conservative RCRA classification of spills and releases.

6. The use of radiation detection can be used to detect releases and contamination during all phases of operations, including retrieval and decontamination.

7. Even with the use of radiation detection to identify spills and releases, required RCRA inspections activities will be performed to assure that containers are not deteriorating.

TABLE I3-1
SUMMARY OF WASTE GENERATION PROCESSES AND WASTE FORMS

Waste Category	Hazardous Waste Codes	Description of Processes	Description of Waste Form
Combustibles	F001, F002, F003, D008, D019	Cloth and paper wipes are used to clean parts and wash down gloveboxes. Wood and plastic parts are removed from gloveboxes after they are cleaned. Lead may occur as shielding tape or as minor noncombustible waste in this category.	Materials such as metals may retain traces of organics left on surfaces that were cleaned. Waste may remain on the cloth and paper that was used for cleaning or for wiping up spills.
Graphite		Graphite molds, which may contain impurities of metals, are scraped and cleaned with solvents to remove the recoverable plutonium.	Surfaces may retain residual solvents. Lead may be used as shielding or may be an impurity in the graphite.
Filters	F001, F002	Filters are used to capture radioactive particulate in air streams associated with numerous plutonium operations and to filter particulate from aqueous streams.	Filter media may retain organic solvents that were present in the air or liquid streams.
Benelex® and Plexiglas®	F001, F002, D008	Materials are used in gloveboxes as neutron absorbers. The glovebox assembly often includes leaded glass. All surfaces may be wiped down with solvents to remove residual plutonium.	Surfaces may retain residual solvents from wiping operations. Leaded glass may also be present.
Firebrick and Ceramic Crucibles	F001, F002, F005, D006, D007, D008	Firebrick is used to line plutonium processing furnaces. Ceramic crucibles are used in plutonium analytical laboratories. Both may contain metals as surface contaminants.	Metals deposited during plutonium refining or analytical operations could remain as residuals on surfaces. Surfaces may retain residual solvents.
Leaded Rubber	D008	Leaded rubber includes lead oxide impregnated materials such as gloves and aprons.	The leaded rubber could potentially exhibit the toxicity characteristic.
Metal	F001, F002, D008	Metals range from large pieces removed from equipment and structures to nuts, bolts, wire, and small parts. Many times, metal parts will be cleaned with solvents to remove residual plutonium.	Solvents may exist on the surfaces of metal parts. The metals themselves potentially exhibit the toxicity characteristic.
Glass	F001, F002, D006, D007, D008, D009	Glass includes Raschig rings removed from processing tanks, leaded glass removed from gloveboxes, and miscellaneous laboratory glassware.	Solvents may exist as residuals on glass surfaces and in empty containers. The leader glass may exhibit the toxicity characteristic.
Inorganic Wastewater Treatment Sludge	F001-F003, D006-D009, P015	Sludge is vacuum filtered and stabilized with cement or other appropriate sorbent prior to packaging.	Traces of solvents and heavy metals may be contained in the treated sludge which is in the form of a solid dry monolith, highly viscous gel-like material, or dry crumbly solid.

TABLE I3-1 (CONTINUED)
SUMMARY OF WASTE GENERATION PROCESSES AND WASTE FORMS

Waste Category	Hazardous Waste Codes	Description of Processes	Description of Waste Form
Organic Liquid and Sludge	F001, F003	Organic liquids such as oils, solvents, and lathe coolants are immobilized through the use of various solidification agents or sorbent materials.	Solvents and metals may be present within the matrix of the solids created through the immobilization process.
Solidified Liquid	F001, F003, D006, D008	Liquids that are not compatible with the primary treatment processes and have to be batched. Typically these liquids are solidified with portland or magnesium cement.	Solvents and metals may be present within the matrix of the solids created through the immobilization process.
Inorganic Process Solids and Soil	F001, F002, F003, D008	Solids that cannot be reprocessed or process residues from tanks, firebrick fines, ash, grit, salts, metal oxides, and filter sludge. Typically solidified with portland or gypsum-based cements.	Solvents and metals may be present within the matrix of the solids created through the immobilization process.
Pyrochemical Salts	D007	Molten salt is used to purify plutonium and americium. After the radioactive metals are removed, the salt is discarded.	Residual metals may exist in the salt depending on impurities in the feedstock.
Cation and Anion Exchange Resins	D008	Plutonium is sorbed on resins and is eluted and precipitated.	Feed solutions may contain traces of solvents or metals depending on the preceding process.

APPENDIX I4

WIPP ACTIVE ACCESS CONTROLS AFTER DISPOSAL DESIGN CONCEPT DESCRIPTION

Active Institutional Controls

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ACRONYMS

CH	contact-handled
CFR	Code of Federal Regulations
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
LWA	Land Withdrawal Act
RH	remote-handled
SWB	standard waste box
TRU	transuranic
WIPP	Waste Isolation Pilot Plant

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APPENDIX AIC

The containment requirements for a disposal system for transuranic (TRU) radioactive wastes are defined in Title 40 Code of Federal Regulations (CFR) § 191.13 (U.S. Environmental Protection Agency [EPA] 1993). 40 CFR § 191.14 is titled Assurance Requirements. With regard to the active institutional controls aspect of Assurance Requirements, 40 CFR § 191.14 states the following:

> To provide the confidence needed for long-term compliance with the requirements of §191.13, disposal of spent fuel or high-level or transuranic wastes shall be conducted in accordance with the following provisions... (a) Active institutional controls over disposal sites should be maintained for as long a period of time as is practicable after disposal; however, performance assessments that assess isolation of the wastes from the accessible environment shall not consider any contribution from active institutional controls for more than 100 years after disposal...

40 CFR §191.12 states the following:

> Active institutional controls mean:
> 1) controlling access to a disposal site by any means other than passive institutional controls,
> 2) performing maintenance operations or remedial actions at a site,
> 3) controlling or cleaning up releases from a site, or
> 4) monitoring parameters related to disposal system performance.

Purpose: The purpose of this report is to describe the design of a system that the U.S. Department of Energy (DOE) intends to implement for compliance with the requirement to control access to the Waste Isolation Pilot Plant (WIPP) disposal site and implement maintenance and remedial actions pertaining to the site access controls. In addition, this report addresses the scheduling process for control of inspection, maintenance, and periodic reporting related to long-term monitoring. Long-term monitoring addresses the monitoring of disposal system performance, as required by 40 CFR § 191.14(b), and environmental monitoring, in accordance with the Consultation and Cooperation Agreement between the DOE and the state of New Mexico. A description of the long-term monitoring program is contained in Appendix MON of this application. The scheduling process will also address evaluation of testing activities related to the permanent marker system design contained within the passive institutional controls. A description of the passive institutional controls is contained in Appendix PIC of this application.

Implementation of active institutional controls at the WIPP will commence at disposal. 40 CFR § 191.02 defines disposal for waste in a mined geologic repository as occurring when all of the shafts to the repository are backfilled and sealed. The sealing of the shafts is also the point in time at which final facility closure is achieved, as defined in the hazardous waste facility permit application. Implementation of active institutional controls marks the transition from the operational limits imposed by Subpart A of 40 CFR Part 191 to the disposal limits of Subparts B and C of 40 CFR Part 191. The DOE intends to continue the imposition of active institutional controls until such time as it is determined that there are no

significant concerns to be addressed by continued implementation of the controls. The DOE will implement this system of active controls for a minimum of 100 years after disposal.

The WIPP Land Withdrawal Act (LWA) (U.S. Congress 1992), requires the development of a plan for WIPP decommissioning and a management plan for the withdrawal after decommissioning (LWA Section 13). The concepts for decommissioning activities, which include decontamination and site restoration, are described in Appendix D&D of this application. However, Appendix D&D is not meant to meet the LWA requirement for a final decommissioning plan. The LWA-required management plan and decommissioning plan will be available by October 1997.

The decontamination effort will be completed prior to sealing of the shafts to allow disposal of all derived waste (radioactive and/or hazardous waste derived from TRU/TRU-mixed waste received at the WIPP) into the repository. With the implementation of active institutional controls upon completion of sealing of the shafts, access control will be successful in preventing human intrusion into the repository and thus there will be no future inadvertent releases from the site and no application of the 40 CFR § 191.12 "controlling or cleaning up releases from a site" condition for active institutional controls. The DOE's restoration efforts will return the land disturbed by the WIPP activities to a stable ecological state that will assimilate with the surrounding undisturbed ecosystem. Necessary exceptions to returning the site to its full pre-WIPP condition include the construction associated with the permanent marker system (see Appendix PIC) and measurements associated with long-term monitoring (see Appendix MON). The Land Management Plan (see Appendix LMP) describes the management and use of the land withdrawal area after facility decommissioning.

Scope: The access controls description includes a means of controlling access to the site of the repository's surface footprint (the repository area projected to the surface) and maintenance, including corrective actions, for access control system components. Active control of access to the site will be exercised by the DOE or another federal government entity for as long as practicable or until such time as it is determined that there are no significant concerns to be addressed by continued imposition of the controls. In any event, active institutional controls will be in place for at least 100 years after final facility closure. Control of access will preclude the inadvertent intrusion into the disposed waste by deep drilling or mining for natural resources. This appendix also describes a process for scheduling activities related to the testing of elements of the permanent marker system and the scheduling of activities required to meet the needs of the long-term monitoring of the repository. Some of the activities supporting the monitoring programs will be initiated during the disposal phase to establish databases. These activities are planned to continue beyond disposal through the time after removal of the site structures and return of the land disturbed by the WIPP activities to a stable ecological state that will assimilate with the surrounding undisturbed ecosystem. Permanent marker testing and long-term monitoring requirements will be necessarily integrated with efforts toward returning the land to a stable ecological state.

Background: The WIPP was sited and designed as a research and development facility to demonstrate the safe disposal of radioactive wastes. The wastes are derived from DOE defense-related activities. Specifically, the mission of the WIPP project is to conduct research, demonstration, and siting studies relevant to the permanent disposal of TRU wastes. Some of these wastes will be contaminated with hazardous constituents, making them mixed wastes.

The LWA addresses the disposal phase of the WIPP project, the period following closure of the site, and the removal of the surface facilities. Other codified requirements addressing postclosure activities include

- 40 CFR § 264.117(a)(1), which requires that

  > Post-closure care for each hazardous waste management unit subject to the requirements of § 264.117 through 264.120 must begin after completion of closure of the unit and continue for 30 years after that date...

- 40 CFR § 264.601, which requires that

  > A miscellaneous unit must be...maintained and closed in a manner that will ensure protection of human health and the environment...

- and 40 CFR § 264.603, which requires that

  > A miscellaneous unit that is a disposal unit must be maintained in a manner that complies with § 264.601 during the postclosure care period.

The LWA set aside 10,240 acres (4,144 hectares) located in Eddy County, 26 miles (42 kilometers) east of Carlsbad, New Mexico, as the WIPP site. A 277-acre (112-hectare) portion within the 10,240 acres (4,144 hectares) is bounded by a barbed wire fence. This fenced area contains the surface facilities and the mined salt piles for the WIPP site. Figure AIC-1 is a cutaway illustrating the spatial relationship of the surface facilities and the underground repository. (See Chapter 3.0 of this application for a description of the WIPP site.)

Upon receipt of the necessary certifications and permits from the EPA and the New Mexico Environment Department, the DOE will begin disposal of contact-handled (CH) TRU waste in the WIPP. This activity is scheduled to begin in 1998, with subsequent emplacement of remote-handled (RH) TRU waste to begin at a later date. This waste emplacement and disposal phase will continue until the regulated capacity of the repository of 6,200,000 cubic feet (175,588 cubic meters) of TRU waste has been reached. For the purposes of this application, this is assumed to be 25 years. The waste will be shipped from 10 DOE facilities across the country in specially designed transportation containers certified by the Nuclear Regulatory Commission, TRUPACT-IIs for CH-TRU waste and shielded road casks for RH-TRU waste. The transportation routes from these facilities to the WIPP have been

predetermined. The CH-TRU waste will be packaged in 55-gallon (208-liter) steel drums and/or standard waste boxes (SWBs). An SWB is a steel container having a free volume of approximately 65 cubic feet (1.8 cubic meters). Figure AIC-2 shows the general arrangement of a seven-pack of drums and an SWB as received in the TRUPACT-II. The RH-TRU waste will be shipped in a shielded road cask containing a three-drum capacity canister.

Upon receipt and inspection of the waste containers in the waste handling building, the containers will be moved into the repository 2,150 feet (655 meters) below the surface. The containers will then be transported to a disposal room. (See Figure AIC-1 for room and panel arrangement.) The initial seven disposal rooms are in Panel 1. Panel 1 is the first of eight panels planned to be excavated. Special supports and ground control corrective actions have been implemented in Panel 1 to ensure its stability. Upon filling an entire panel, that panel will be closed to isolate it from the rest of the repository and the ventilation system. During the period of time it takes to fill a given panel, an additional panel will be excavated. Sequential excavation of Panels 2 through 8 will ensure that these individual panels remain stable during the entire time a panel is being filled with waste. Ground control maintenance and evaluation with appropriate corrective action will be required to ensure that Panels 9 and 10 (ventilation and access drifts in the repository) remain stable.

Decontamination of the WIPP facility will commence with a detailed radiation survey of the entire site. Radioactively contaminated areas and equipment will be evaluated and decontaminated in accordance with applicable requirements. Where decontamination efforts identify areas that are below radiological release criteria, as defined in the WIPP's *Radiological Control Manual* (Westinghouse Electric Corporation 1996), routine dismantling and salvaging practices will determine the disposition of the material or equipment involved. Material and equipment that do not meet radiological release criteria will be emplaced in the access entries (Panels 9 and/or 10). Upon completion of emplacement of the contaminated facility material, the entries will be closed and the repository shafts will be sealed. Final repository closure entails sealing the shafts leading to the repository. Figure AIC-3 illustrates the shaft sealing arrangement. Completion of waste disposal that includes shaft sealing will end disposal operations and initiate the period for implementation of active controls.

The DOE will remove the surface facilities and return the land disturbed by the WIPP activities to a stable ecological state that will assimilate with the surrounding undisturbed ecosystem. However, the ability to return the land to the pre-WIPP condition will be impacted by the following conditions:

- As part of the permanent marker system, the hot cell concrete structure, protected by a chain link fence, will remain as an artifact marking the WIPP site. The hot cell is a reinforced concrete structure measuring approximately 71 feet by 40 feet with 4.5-foot thick walls (21.6 meters by 12 meters with walls 1.4 meter thick). The hot cell foundation extends approximately 28 feet (8.5 meters) below grade and the roof is 61 feet (18.6 meters) above grade.

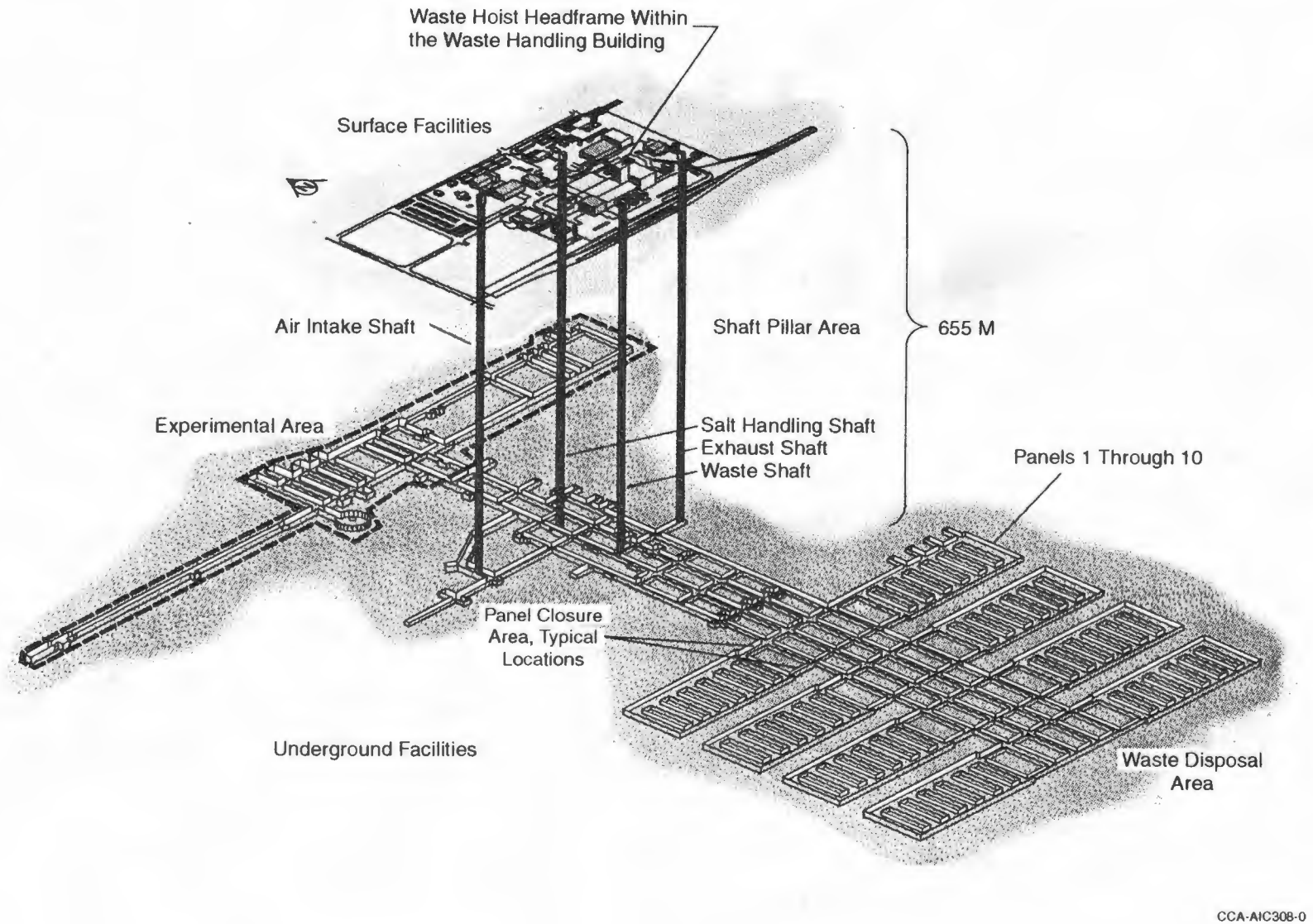

Figure AIC-1. Spatial View of WIPP Surface and Underground Facilities

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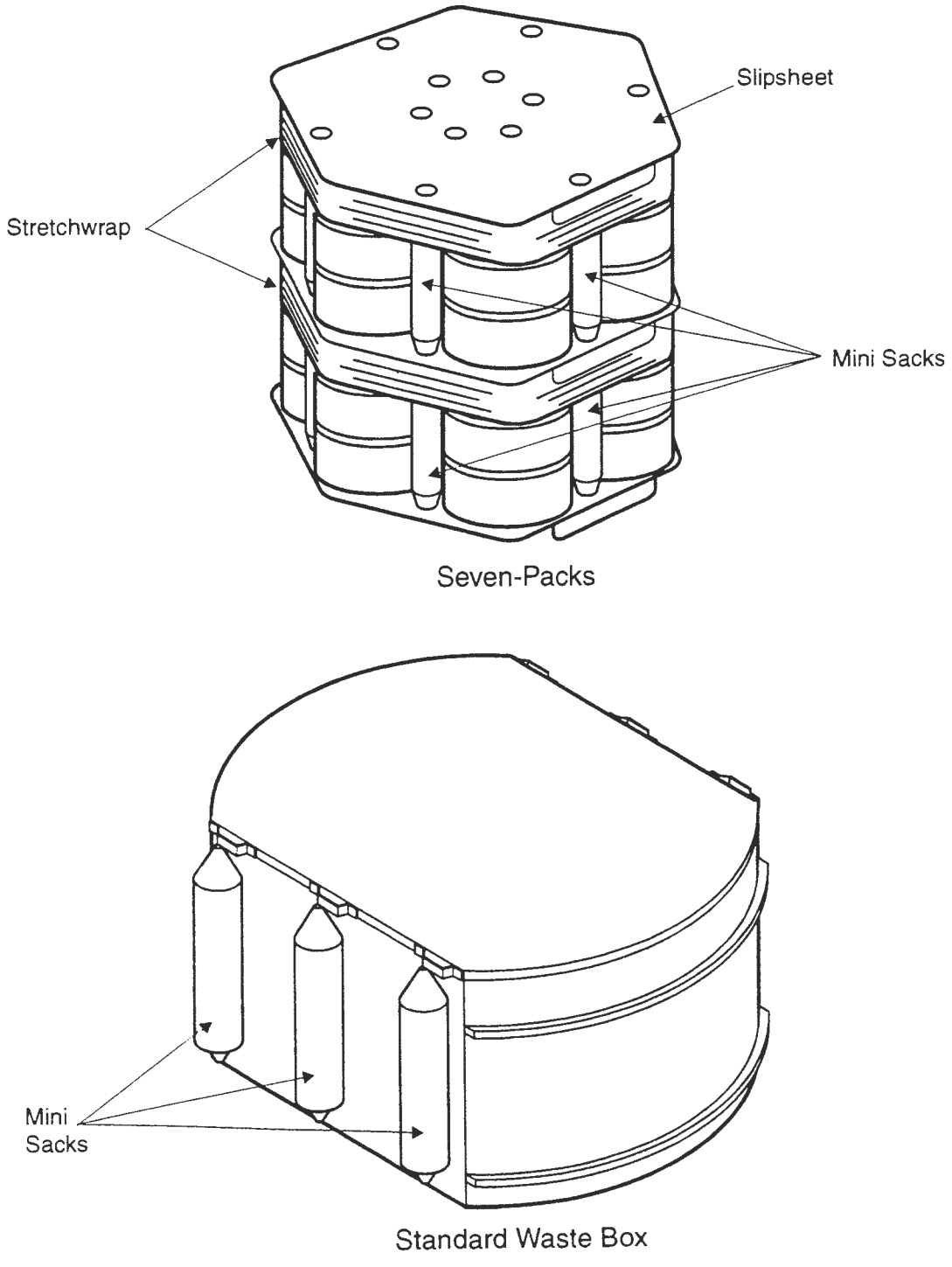

Figure AIC-2. Standard Waste Box and Seven-Pack Configuration

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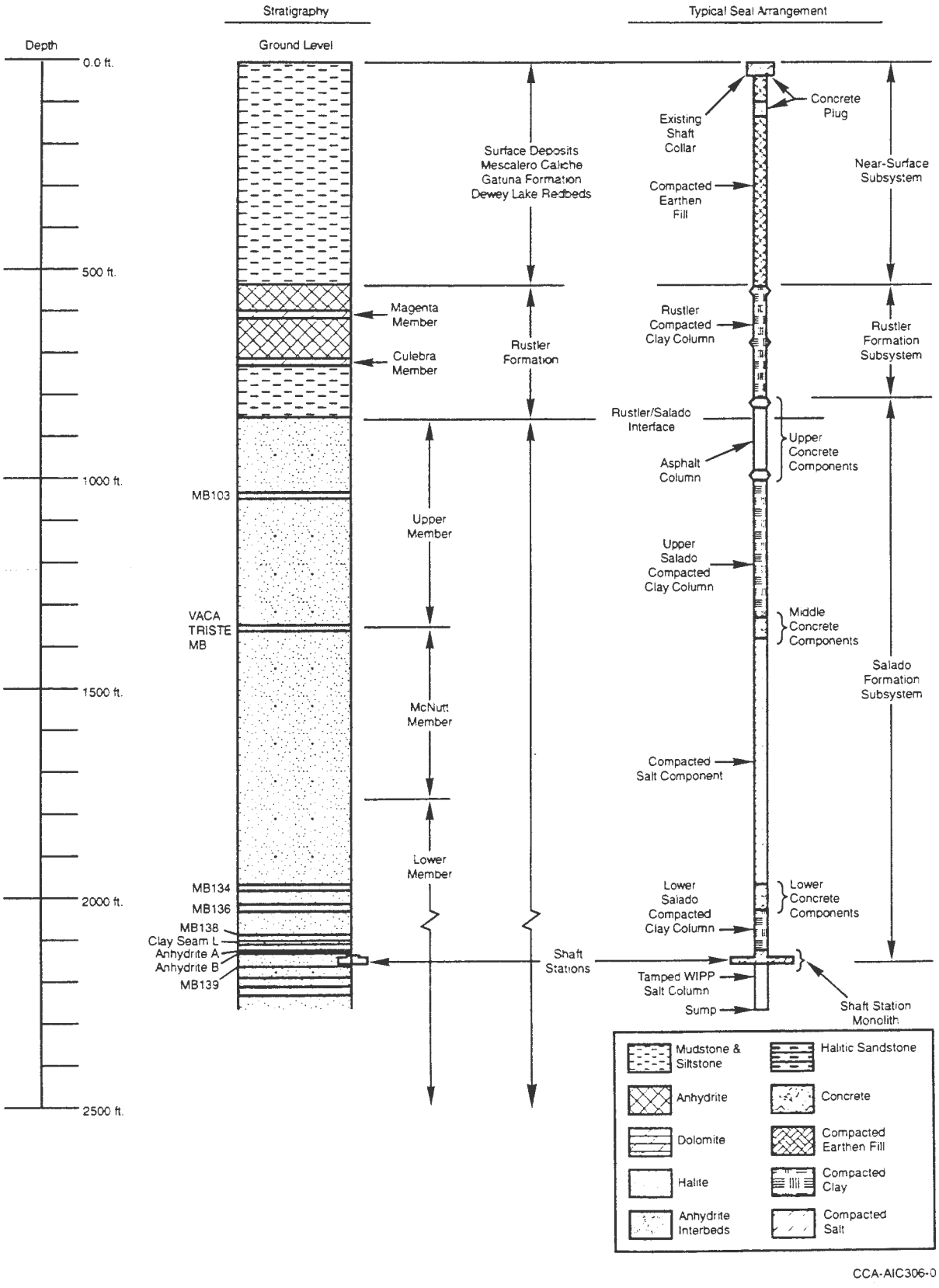

Figure AIC-3. Typical Shaft Sealing System

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- The test program supporting the permanent marker system will require the construction of a berm section, the erection of test monuments, and the emplacement of test markers, all of which impact the ability to return the land disturbed by the WIPP activities to a stable ecological state that will assimilate with the surrounding undisturbed ecosystem.

- A posted access barrier will be erected around the repository footprint, also affecting the return of the land disturbed by the WIPP activities to a stable ecological state.

- Elevation benchmarks to support the long-term monitoring program will be located within a grid network on the surface of the withdrawal area.

- A portion of the mined salt sufficient to support future construction of the berm component of the permanent marker system (see Appendix PIC) will remain on the surface.

- The water supply line to the site will be disconnected. At a future time, a water supply may have to be reestablished to support construction of the permanent marker system. This supply will also be disconnected when construction of the marker system is complete.

- The electrical supply to the site will be removed and isolated at the utility company's substation. Electricity will be required for the future construction of the permanent marker system.

Over the several decades following site restoration, activities supporting the long-term monitoring program and evaluation of the performance of the permanent marker system test program will require occasional access to the site surface area. Construction of the permanent marker system will be a significant effort that will again require the development of water, electrical, and transportation facilities at the site. Both railroad and trucking will be used to transport required materials to the site. This effort is scheduled to last several years.

Upon completion of the permanent marker system, the access control program for the site will be reevaluated and modified as required to address any changes necessitated by the effects of the permanent marker system. At the time that the permanent marker system construction effort is completed, the utilities and railroad spur supporting the site will be removed and the affected terrain returned to a stable ecological state that will assimilate with the surrounding undisturbed ecosystem.

AIC.1 Design Criteria

The access control design criteria applicable to the WIPP active institutional controls after disposal have been developed to meet the definition in 40 CFR § 191.12 for controlling access to the disposal site. In addition to active access controls, the criteria also address scheduling

processes to be implemented upon completion of shaft sealing activities. The decontamination, decommissioning, and restoration of the land is addressed in Appendix D&D of this application and will be described in detail in the *Plan for WIPP Decommissioning*. The *Passive Institutional Controls Conceptual Design Report* (Appendix PIC) addresses postdecommissioning testing activities conducted at the WIPP site. To a limited extent, the restoration of the land to its original condition will be impacted by the testing activities related to the permanent marker system and by the hot cell structure, which will not be removed but will remain as an artifact of the WIPP operating surface activity. The monitoring plan for the detection of substantial and detrimental deviations from expected performance of the disposal system is described in Appendix MON.

Although the LWA establishes a 10,240-acre (4,144-hectare) area for administrative control by the Secretary of Energy in conducting activities associated with the WIPP, the actual disposal area is only approximately 120 acres (48.5 hectares). Access is controlled to ensure that inadvertent intrusion into the disposal area does not occur. Deep or shallow drilling and mining activities are the scenarios requiring consideration as human intrusion events in performance assessment. Drilling techniques in the local area do not normally include slant drilling (see Appendix DEL). In those cases where slant drilling is used, deviation from vertical does not begin until a depth of approximately 4,000 feet (1,200 meters) is attained. This depth is well below the Salado Formation, which extends to approximately 2,800 feet (854 meters) below the surface in the vicinity of the repository. Salt formations do not typically support slant drilling because of the solubility and insufficient consolidation of the salt material (that is, its softness) (Rodriguez and Hughes 1994 and Rodriguez 1996, both in the Bibliography). These technical facts reasonably preclude slant drilling into the repository from outside the area immediately above the repository. In addition, as described in Appendix PIC, the withdrawal boundary is marked with warnings not to drill or conduct mining operations within the 16-square-mile (41-square-kilometer) controlled area. Therefore, it is reasonable not to extend a restrictive access control program to the entire 10,240 acres (4,144 hectares) with the accompanying cost increase and unnecessary resulting prohibition of such uses as grazing, hunting, and other public recreational activities.

The design features developed for the active access controls after disposal are the following:

1. A fence line will be established to control access to the repository footprint area on the surface. A standard four-strand (three barbed and one unbarbed, in accordance with the Bureau of Land Management specifications) wire fence will be erected along the perimeter of the repository surface footprint. To provide access to the repository footprint during construction of the berm (which may be built in multiple sections simultaneously), the fence will have gates placed approximately midway along each of the four sides. The western gate will be 20 feet (6 meters) wide. The remaining three gates will each be 16 feet (4.9 meters) wide. Additional fencing may be needed for remote locations that are used for disposal system monitoring. Such fences will meet the same construction specifications as the repository footprint perimeter fence.

2. Unpaved roadways 16 feet (4.9 meters) wide will be established along the perimeter of the barbed wire fence as well as along the WIPP site boundary. These roadways will be constructed so as to provide ready vehicle access to any point around the fenced perimeter and the site boundary. These roadways will facilitate inspection and maintenance of the fenceline and will allow visual observation of the repository footprint and the site boundary to the extent permitted by the lay of the land. These roadways will connect to the paved south access road. Roads to remote sites will also be constructed and maintained as needed.

3. The fence line will be posted with signs having, as a minimum a legend reading "Danger—Unauthorized Personnel Keep Out" (40 CFR § 264.14[c]) and warning against entering the area without specific permission of the federal government. The signs must be legible from a distance of at least 25 feet (7.6 meters). The size of the visual warning and the spacing of the warning signs will be sufficiently large and close to ensure that one or more of the signs can be seen from any approach prior to an individual actually making contact with the fence line. In no case will the spacing be greater than 300 feet (91.5 meters).

4. The federal government will ensure that periodic inspection and expedited corrective maintenance are conducted on the fence line, its associated warning signs, and the roadway.

5. The federal government will provide for routine periodic patrols and surveillance of the protected area by personnel trained in security surveillance and investigation.

6. A process will be implemented for monitoring and controlling the long-term testing requirements of the permanent marker system and implementing the periodic monitoring requirements of the long-term monitoring system.

7. The federal government will ensure that any necessary modifications to the active controls appropriate for access control and surveillance upon installation of the permanent marker system are provided.

8. The federal government will provide for actions to be taken to address abnormal conditions identified during periodic surveillance and inspections.

9. Reports addressing activities associated with the performance of the active access controls after disposal will be prepared periodically by the federal government for submittal to the appropriate regulatory and legislative authority.

The primary active attribute of access control consists of the routine surveillance patrols of the fence barrier and the repository footprint within that barrier. Periodic monitoring of the parameters associated with repository performance is a secondary active control feature. The

development of a schedule for these activities and implementation of that schedule serves as a tertiary active control. The details of the monitoring program are described in Appendix MON.

AIC.2 Access Controls

40 CFR § 191.12 defines active institutional controls to consist of four elements:

- controlling access to a disposal site by any means other than passive institutional controls,
- performing maintenance operations or remedial actions at a site,
- controlling or cleaning up releases from a site, and
- monitoring parameters related to disposal system performance.

The LWA has removed the WIPP site from public use as a site for mining and other types of mineral resource extraction. Since any type of exploration activity would require authorization, the issuance of approval to intrude upon the repository is precluded by the LWA. The existence of the LWA as law permits meeting the requirements of the first element above by implementing low technology barriers. These barriers include a posted fence and active surveillance at a frequency that denies sufficient time for an individual or organization to intrude into the repository undetected using today's drilling technology. As identified in the design criteria, maintenance and remedial actions at the WIPP site will be conducted by the federal government at the time of implementing the access controls for the site. Those maintenance operations and remedial actions associated with decommissioning and site restoration following final facility closure are discussed in Appendix D&D. The control or cleanup of releases from the site will be conducted as part of the operational program prior to sealing of the shafts. This is necessary to ensure that all radioactive derived waste is disposed of within the repository prior to shaft sealing. There is no credible scenario for the release of radioactive material during the active institutional controls period. Both preclosure and postclosure monitoring of disposal system performance are addressed in Appendix MON.

The federal government has the responsibility to maintain the access controls. Such responsibility includes the maintenance and corrective actions necessary to ensure that the fence and patrol requirements (surveillance) are met for as long as the federal government remains a viable controlling entity. Justification that such control will endure for at least 100 years is supported by the fact that the U.S. government has existed for over 200 years, and in that 200 years, its degree of control over activities affecting the common good has steadily increased. In addition, historical evidence supports that as the human population increases

and technology advances, the need to control the resulting complexities gives rise to society's acceptance of a governing system of laws, regulations, and oversight of activities affecting the common good.

AIC.2.1 Repository Footprint Fencing

Access to an area approximately 2,780 feet by 2,360 feet (875 meters by 720 meters) will be controlled by a four-strand barbed wire fence. A single gate will be included along each side of the fence for access. Around the perimeter of the fence, an unpaved roadway 16 feet (4.9 meters) wide will be cut to allow for patrolling of the perimeter. Figure AIC-4 is an illustration of the fence line in relation to the repository footprint. Patrolling of the perimeter is based upon the need to ensure that no mining or well drilling activity is inadvertently initiated that could threaten the integrity of the repository.

Fencing off an area larger than the disposal area footprint would not significantly reduce the risk of inadvertent intrusion but would interfere with cattle grazing established prior to the LWA. The LWA states that the Secretary of Energy can allow grazing to continue where it was established prior to enactment of the LWA. Based upon current drilling technologies, discussions with local well drilling organizations, and observation of well drilling activities in the WIPP vicinity, it typically requires at least two to three days for a driller to set up a deep drilling rig and commence actual drilling operations. Attaining the 2,150-foot (655-meter) depth that would approach the repository horizon takes at least another week to 10 days. Based upon current drilling practices (see Appendix DEL), patrolling the fenced area two to three times weekly would identify any potential drilling activity well before any breach of the repository could occur.

A scenario involving drilling at a location outside the disposal area surface footprint and inadvertently intruding into the disposal area is extremely unlikely. The most economical drilling practice is to drill vertically into the targeted formation. Local slant drilling is conducted only when the desired drill location is not available because of circumstances that the operator cannot overcome. When slant drilling practices are employed, the deviation from a vertical position directly below the drill rig does not commence until approximately 4,000 feet (1,200 meters) below the surface in the local area. Slant drilling within a salt formation is not practical because the salt is water soluble and insufficiently consolidated to support the technique for accurate control of the drill bit (Rodriguez 1996 in the Bibliography). According to the local office of the Bureau of Land Management, local operators and drillers, and oil field consultants, slant drilling in the local area does not begin until the drilling operator has reached a level below the evaporite formations. The lowest evaporite formation in the WIPP vicinity is the Castile Formation, which lies immediately below the Salado, which contains the WIPP repository.

Construction of access control systems using higher technology than described is not required or cost-effective. Likewise, continuous surveillance whether human or electronic is not required or practicable. The staffing levels required to achieve continuous human surveillance

become significant when weighed against the potential threat and alternatives for controlling access. Continuous electronic surveillance also has significant costs of procurement, installation, testing, and maintenance. Electronic systems would require significant maintenance, both operational and corrective, and probably would not relieve the need to make routine patrols to the site. This is especially true of alarmed electronic surveillance in a location populated by a variety of wild and domestic animals that might trigger numerous false alarms. Televised electronic surveillance that combines both human and electronic technology could be incorporated to deter inadvertent human intrusion; however, this method is extremely costly.

AIC.2.2 Surveillance Monitoring

The federal government (initially DOE and/or the Bureau of Land Management) will conduct periodic surveillance of the site and the repository footprint. Unpaved roadways around the WIPP site boundary and around the repository footprint will facilitate such surveillance. Contractual arrangements with a local organization such as the Eddy County Sheriff's Department would provide some distinct advantages. Among the advantages are the following:

- deputies are trained in patrol and surveillance activities,
- deputies are authorized to arrest members of the general public who are found to be violating trespassing laws,
- the liability associated with apprehension, attempted apprehension, or circumstances arising from attempts would remain with the Sheriff's Department, and
- the general area to be patrolled is already a part of the Sheriff's area of responsibility.

Surveillance will consist of drive-by patrolling around the fenced perimeter a minimum of two times per week. In the course of the patrol, particular note will be taken of the fence integrity. In addition, the locked condition of each gate will be checked to ensure that gate integrity is maintained and there is no evidence of tampering. Surveillance will also include visual observation of the entire enclosed area for any signs of human activity. Additionally, surveillance patrols will be conducted around the site boundary's perimeter for signs of unauthorized human activities. A routine summary of each month's surveillance activity will be prepared documenting the date and time of each patrol and any unusual circumstances that may have been observed. This surveillance routine will continue throughout the active controls period and for at least 100 years following the sealing of shafts.

Upon beginning construction of the permanent marker system, a routine presence at the site will once again be established and periodic surveillance will not be necessary. Once the permanent marker system is completed, the active controls program and access control measures will be reevaluated, and changes necessitated by construction of the permanent

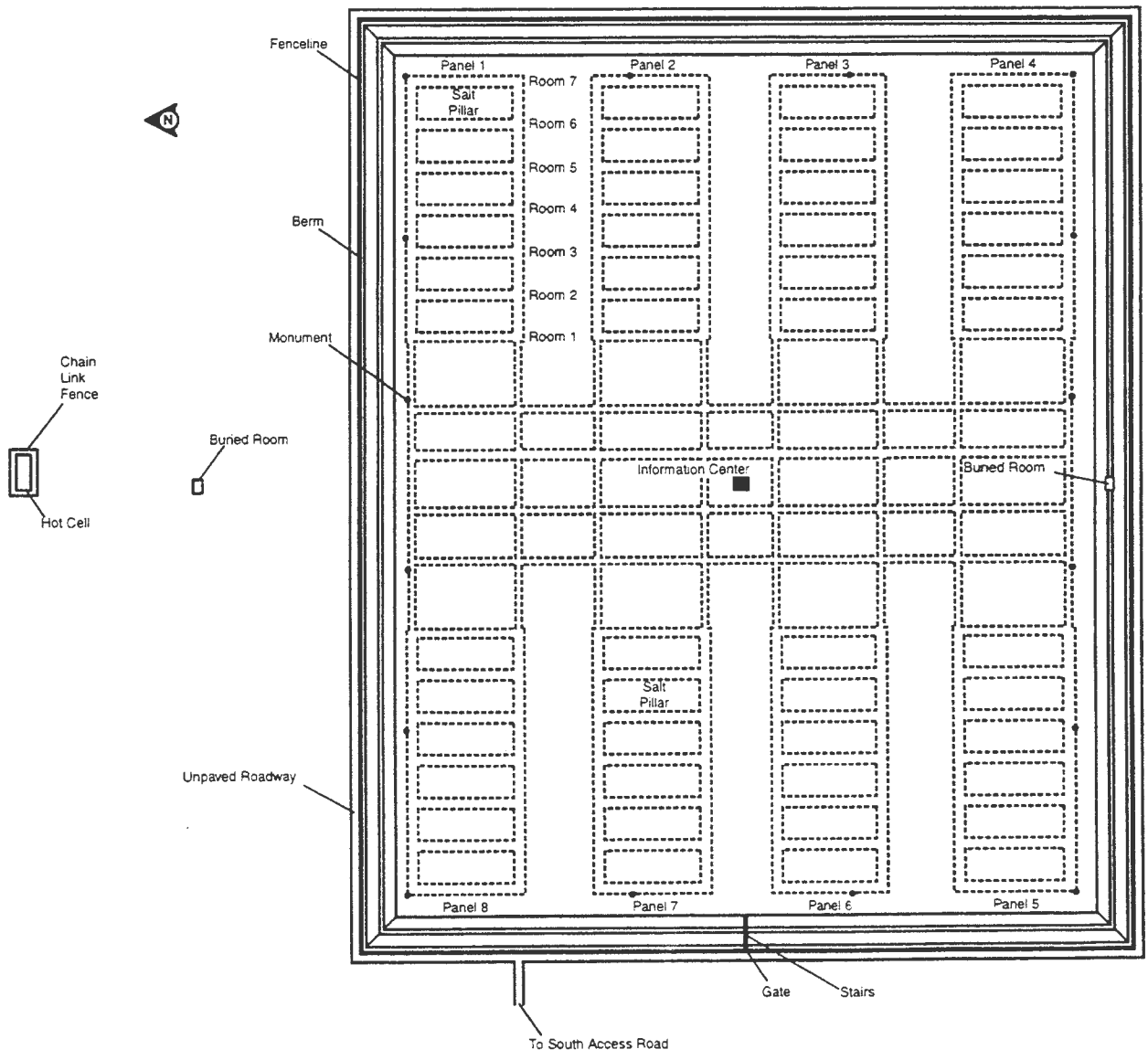

Figure AIC-4. Perimeter Fenceline and Roadway

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marker system will be made and implemented for the remainder of the active controls period. With construction of the permanent marker system, easy visual inspection will not be possible from the perimeter fence because the berm and monuments will restrict vision. However, this will not affect the ability of patrols to properly survey the repository footprint integrity. The berm profile and configuration would require an extensive dismantling effort to create an opening sufficient to permit entrance of drilling equipment. The routine patrols would detect this effort well before intrusion into the repository could occur.

AIC.2.3 Maintenance and Remedial Actions

Anticipated maintenance and remedial action issues during the active controls period are minimal and should encompass such issues as

- fence and road maintenance,
- correction of any damage that occurs due to vandalism,
- response to evidence of potential erection of drilling equipment, and
- response to unauthorized entry into prohibited areas.

The federal government (initially the DOE) will provide maintenance services when the need is identified during routine patrolling activity. Any observed vandalism or unauthorized entry will be investigated and action will be taken as the circumstances warrant.

AIC.2.4 Control and Clean-up of Releases

The *Plan for WIPP Decommissioning* (as required by the LWA) will describe how the DOE intends to decontaminate and dismantle the surface structures. The decontamination process and disposal of the derived radioactive waste will be completed prior to sealing the shafts and final facility closure. With the location of the WIPP repository at 2,150 feet (655 meters) below the surface and with panels closed and shafts sealed, the potential for releases of radioactive material following the sealing of the shafts is precluded. There will be no credible pathway for releases from the repository other than human intrusion. Routine patrols in accordance with access control requirements will preclude human intrusion into the repository.

AIC.2.5 Monitoring Disposal System Performance

Subsidence monitoring is one of three monitoring programs that are expected to be conducted throughout the active institutional controls period (see Appendix SMP). The other programs are groundwater surveillance and drilling practice observation (Appendices GWMP and DMP). If, upon analysis of monitoring data, disposal system performance deviates from what

is expected, other techniques also described in the long-term monitoring plan may be used to assist in acquiring more information regarding performance.

Performance assessment sensitivity analyses have identified important repository performance parameters (see Appendix MON). Those important parameters that lend themselves to current monitoring technologies without compromising the integrity of the disposal system were considered as candidates for preclosure and postclosure monitoring.

AIC.3 Periodic Activity Controls

With the advent of decommissioning the WIPP and returning the land disturbed by the WIPP activities to a stable ecological state that will assimilate with the surrounding undisturbed ecosystem, continuous occupancy of the site for operational and security purposes will cease. However, during the active controls period after disposal (at least 100 years) there will be an ongoing need to carry out periodic activities associated with the long-term monitoring program and evaluations of the performance of permanent marker system features under long-term testing. To ensure that these periodic activities are implemented and that their results are included in periodic reports to the appropriate regulatory and legislative authorities, the essential elements of the process for controlling these activities have been identified. The process will be managed from the appropriate DOE office. The essential elements of the process include the following:

- development of detailed individual activities supporting the long-term monitoring plan;

- development of detailed individual activities supporting the evaluation of performance of permanent marker system features;

- development of the individual steps and identification of responsible personnel required for the drafting, review, commenting, and approval of reports to the appropriate regulatory authority;

- development of the individual steps and identification of responsible organizations or personnel required for the drafting, review, commenting, and approval of reports to the appropriate legislative authority;

- identification of the requirements defined from the above actions in a detailed schedule covering a period of at least 10 years;

- review of the approved schedule at least quarterly during the first two years following completion of land restoration and implementation of active institutional controls; and

- semiannual reviews of the schedule including updating and progress reporting to the DOE to be documented until such time as the federal government ceases active control of the site.

For long-term repository performance monitoring, a detailed subsidence survey will be conducted upon completion of land restoration. That survey will include, at a minimum, the 54 elevation benchmarks currently monitored. Once every 10 years, an additional detailed subsidence survey will be taken and analyzed for indications of unexpected repository performance. The long-term monitoring plan describes in detail additional technologies to be used to further evaluate repository performance should any unanticipated subsidence data be developed. These additional technologies may include

- seismic reflection and refraction surveys,
- gravitational surveys,
- electromagnetic conductivity surveys,
- resistivity surveys, and
- ground-penetrating radar surveys.

Currently, none of these technologies is developed to the degree of providing irrefutable evidence of the condition of the sealed repository. However, over the next few decades while waste is being emplaced in the repository, the technologies will likely advance significantly. It is also possible that images available using today's technologies will improve to a point where resolution of images of the repository acquired from grade level will be of sufficient quality to make some assessments of repository performance. Updating the 10-year schedule every six months to one year will ensure that this infrequent requirement is not lost.

To optimize the final design of the permanent marker system, testing of various materials and berm configurations over a long period of time is a prudent and logical course of action. The detailed activities supporting the testing required to evaluate various aspects of the planned permanent marker system design will be included in the schedule managed during the active institutional controls period. Periodic reports will also be managed by the scheduling activity during the active controls period.

Because of the relatively simple technology utilized in providing access control to the repository footprint and the hot cell, the range of potential abnormal occurrences is quite limited. Primarily, the abnormal occurrences will involve damage to the fencelines or roadway through vandalism, weather effects, and aging of the materials. The federal government is responsible for corrective action to repair these effects. Considering the properties for which access control is being provided, there is no need to provide continuous

surveillance. However, arrangements will be made to increase vehicular patrols of the site to daily patrols until repairs are made, if the damage is of a suspicious nature. If not, no increase in patrol activity will be required.

Abnormal occurrences associated with the environmental monitoring activities will be investigated. As described above, the postdecommissioning environmental monitoring program will include both radiological and nonradiological monitoring for the first two years following land restoration and then only radiological monitoring thereafter. Because of the reduced activity to support the WIPP after disposal, it is probably more cost effective for the DOE to contract for the periodic sampling and analyses than to maintain a Carlsbad staff for that purpose. Within the contractual arrangements, immediate notification by the contractor to the DOE Albuquerque Operations Office in the event of an abnormal occurrence will be a requirement. Appropriate guidelines for action to mitigate the effects of abnormal occurrences related to environmental monitoring will include

- verification of analytical results,
- increased frequency of sampling and analyses,
- determination of cause,
- investigation of additional geographical and/or parameter monitoring areas that might be affected, and
- timely communication to the press regarding any potential adverse impacts and mitigating actions to be taken.

The action guidelines for abnormal occurrences associated with subsidence are the same as those proposed for the environmental monitoring program.

AIC.4 Quality Assurance

The quality assurance and quality control discipline will be applied to the procurement of materials for and the erection of the fencelines enclosing the repository footprint and the hot cell. In particular, quality control inspection of the placement and tensioning of the barbed wire and chain link fabric should be applied and utilized to provide reasonable assurance that the fencing structures will function over an extended period of years without significant maintenance.

Quality assurance and quality control will also be applied to the sampling and analyses supporting the environmental monitoring program and the long-term monitoring plan. DOE contractors collecting samples and laboratories conducting analyses should be qualified in

accordance with guidelines prescribed in the most current edition of the *Quality Assurance Program Document* (see Appendix QAPD of this application) at the time that the contracts are awarded.

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APPENDIX I5

WESTINGHOUSE SELF-INSURANCE PROGRAM
CONTRACT DE-AC04-86AL31950

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Contract No. DE-AC04-86AL31950
Modification No. M121

H.6 INSURANCE - LITIGATION AND CLAIMS

(a) The Contractor may, with the prior written authorization of the Contracting Officer, and shall, upon the request of the Government, initiate litigation against third parties, including proceedings before administrative agencies, in connection with this contract. The Contractor shall proceed with such litigation in good faith and as directed from time to time by the Contracting Officer, and in accordance with DOE approved Contractor litigation management procedures.

(b) The Contractor shall give the Contracting Officer immediate notice in writing of any action, including any proceeding before an administrative agency, filed against the Contractor arising out of the performance of this contract. Except as otherwise directed by the Contracting Officer, in writing, the Contractor shall furnish immediately to the Contracting Officer copies of all pertinent papers received by the Contractor with respect to such action.

(c) (1) Except as provided in subparagraph (2) immediately following, the Contractor shall provide and maintain workers' compensation, employer's liability, comprehensive general liability (bodily injury), comprehensive automobile liability (bodily injury and property damage) insurance, and such other bonds and insurance required by law, this contract, or by the written direction of the Contracting Officer.

(2) The Contractor may, with the approval of the Contracting Officer, maintain a self-insurance program; provided that, with respect to workers' compensation, the Contractor is qualified pursuant to statutory authority.

(3) All bonds and insurance required by this clause shall be in a form and amount and for those periods as the Contracting Officer may require or approve and with sureties and insurers approved by the Contracting Officer.

(d) The Contractor agrees to submit for the Contracting Officer's approval, to the extent and in the manner required by the Contracting Officer, any other bonds and insurance that is maintained by the Contractor in connection with the performance of this contract and for which the Contractor seeks reimbursement.

(e) Except as provided in subparagraphs (g) and (h) of this clause, the Contractor shall be reimbursed–

(1) For that portion of the reasonable cost of bonds and insurance allocable to this contract required in accordance with contract terms or approved under this clause; and

(2) For certain liabilities (and expenses incidental to such liabilities) to third persons not compensated by insurance or otherwise without regard to and as an exception to the clause of this contract entitled "DEAR 970.5204-15 Obligation of Funds (Feb 1993)". These liabilities must arise out of the performance of this contract, whether or not caused by the negligence of the Contractor or of the Contractor's agents, servants, or employees, and must be represented by final judgments or settlements approved in writing by the Government. These liabilities are for–

(i) Loss of or damage to property;

(ii) Losses, damages, or judgments of a type for which written approval by the Contracting Officer has been provided (e.g., medical malpractice, errors or omissions, and comprehensive general liability); or

(iii) Death or bodily injury.

(f) The Government's liability under paragraph (e) of this clause is subject to the availability of appropriated funds at the time a contingency occurs. Nothing in this contract shall be construed as implying that the Congress will, at a later date, appropriate funds sufficient to meet deficiencies.

(g) The Contractor shall not be reimbursed for liabilities (and expenses incidental to such liabilities)–

(1) For which the Contractor is otherwise responsible by law or the provisions of this contract.

(2) For which the Contractor has failed to insure or to maintain insurance as required by law or by written direction of the Contracting Officer.

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(h) (1) Notwithstanding any other provision of this contract, the Contractor's liabilities to third persons are not allowable unless the Contractor demonstrates to the Contracting Officer that such liabilities were not caused by either (i) the willful misconduct or lack of good faith of the Contractor's managerial personnel, or (ii) the failure of the Contractor's managerial personnel to exercise prudent business judgment.

(2) Punitive damages are not allowable unless the Contractor demonstrates to the Contracting Officer that they were incurred as a result of compliance with specific terms and conditions of the contract or written instructions from the Contracting Officer.

(3) The cost of insurance procured by the Contractor to cover the third-party liabilities referenced in subparagraph (h)(1) of this clause is not allowable.

(4) The term "Contractor's managerial personnel" as used in subparagraph (h)(1) of this clause means the Contractor's directors, officers and any of its managers, superintendents, or other equivalent representatives who have supervision or direction of (i) all or substantially all of the Contractor's business; or (ii) all or substantially all of the Contractor's operation at any one facility or separate location at which this contract is being performed; or (iii) a separate and complete major industrial operation in connection with the performance of this contract; or (iv) a separate and complete major construction, alteration, or repair operation in connection with performance of this contract; or (v) a separate and discrete major task or operation in connection with the performance of this contract.

(i) The Contractor may at its own expense and not as an allowable cost procure for its own protection insurance to compensate the Contractor for any unallowable or unreimbursable costs incurred in connection with contract performance.

(j) If any suit or action is filed or any claim is made against the Contractor, the cost and expense of which may be reimbursable to the Contractor under this contract, and the risk of which is then uninsured or is insured for less than the amount claimed, the Contractor shall–

(1) Immediately notify the Contracting Officer and promptly furnish copies of all pertinent papers received;

(2) Authorize Government representatives to collaborate with (i) in-house or approved outside counsel in settling or defending the claim, or (ii) counsel for the insurance carrier in settling or defending the claim when the amount of the liability claimed exceeds the amount of coverage, unless precluded by the terms of the insurance contract; and

(3) Authorize Government representatives to settle or defend the claim and to represent the Contractor in or to take charge of any litigation, if required by the Government, when the liability is not insured or covered by bond. The Contractor may, at its own expense, be associated with the Government representatives in any such claim or litigation.

APPENDIX I6

NUCLEAR HAZARDS INDEMNITY AGREEMENT
CONTRACT DE-AC04-86AL31950

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Contract No. DE-AC04-86AL31950
Modification No. M121

I.66 DEAR 952.250-70 NUCLEAR HAZARDS INDEMNITY AGREEMENT (JAN 1992)

(a) *Authority*. This clause is incorporated into this contract pursuant to the authority contained in subsection 170d. of the Atomic Energy Act of 1954, as amended (hereinafter called the Act.)

(b) *Definitions*. The definitions set out in the Act shall apply to this clause.

(c) *Financial Protection*. Except as hereafter permitted or required in writing by DOE, the Contractor will not be required to provide or maintain, and will not provide or maintain at Government expense, any form of financial protection to cover public liability, as described in paragraph (d)(2) below. DOE may, however, at any time require in writing that the Contractor provide and maintain financial protection of such a type and in such amount as DOE shall determine to be appropriate to cover such public liability, provided that the costs of such financial protection are reimbursed to the Contractor by DOE.

(d) *Indemnification*. (1) To the extent that the Contractor and other persons indemnified are not compensated by any financial protection permitted or required by DOE, DOE will indemnify the Contractor and other persons indemnified against (i) claims for public liability as described in subparagraph (d)(2) of this clause; and (ii) such legal costs of the Contractor and other persons indemnified as are approved by DOE, provided that DOE's liability, including such legal costs, shall not exceed the amount set forth in section 170e.(1)(B) of the Act in the aggregate for each nuclear incident or precautionary evacuation occurring within the United States or $100 million in the aggregate for each nuclear incident occurring outside the United States, irrespective of the number of persons indemnified in connection with this contract.

(2) The public liability referred to in subparagraph (d)(1) of this clause is public liability as defined in the Act which (i) arises out of or in connection with the activities under this contract, including transportation; and (ii) arises out of or results from a nuclear incident or precautionary evacuation, as those terms are defined in the Act.

(e) *Waiver of Defenses*. (1) In the event of a nuclear incident, as defined in the Act, arising out of nuclear waste activities, as defined in the Act, the Contractor, on behalf of

itself and other persons indemnified, agrees to waive any issue or defense as to charitable or governmental immunity.

(2) In the event of an extraordinary nuclear occurrence which:

(i) Arises out of, results from, or occurs in the course of the construction, possession, or operation of a production or utilization facility; or

(ii) Arises out of, results from, or occurs in the course of transportation of source material, by-product material, or special nuclear material to or from a production or utilization facility; or

(iii) Arises out of or results from the possession, operation, or use by the Contractor or a subcontractor of a device utilizing special nuclear material or by-product material, during the course of the contract activity; or

(iv) Arises out of, results from, or occurs in the course of nuclear waste activities, the Contractor, on behalf of itself and other persons indemnified, agrees to waive:

(A) Any issue or defense as to the conduct of the claimant (including the conduct of persons through whom the claimant derives its cause of action) or fault or persons indemnified, including, but not limited to:

1. Negligence;
2. Contributory negligence;
3. Assumption of risk; or
4. Unforeseeable intervening causes, whether involving the conduct of a third person or an act of God;

(B) Any issue or defense as to charitable or governmental immunity; and

(C) Any issue or defense based on any statute of limitations, if suit is instituted within 3 years from the date on which the claimant first knew, or reasonably could have known, of his injury or change and the cause thereof. The waiver of any such issue or defense shall be effective regardless of whether such issue or defense may otherwise be deemed jurisdictional or relating to an element in the cause of action. The waiver shall be judicially

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enforceable in accordance with its terms by the claimant against the person indemnified.

(v) The term extraordinary nuclear occurrence means an event which DOE has determined to be an extraordinary nuclear occurrence as defined in the Act. A determination of whether or not there has been an extraordinary nuclear occurrence will be made in accordance with the procedures in 10 CFR part 840.

(vi) For the purposes of that determination, "offsite" as that term is used in 10 CFR part 840 means away from "the contract location" which phrase means any DOE facility, installation, or site at which contractual activity under this contract is being carried on, and any Contractor-owned or controlled facility, installation, or site at which the Contractor is engaged in the performance of contractual activity under this contract.

(3) The waivers set forth above:

(i) Shall be effective regardless of whether such issue or defense may otherwise be deemed jurisdictional or relating to an element in the cause of action;

(ii) Shall be judicially enforceable in accordance with its terms by the claimant against the person indemnified;

(iii) Shall not preclude a defense based upon a failure to take reasonable steps to mitigate damages;

(iv) Shall not apply injury or damage to a claimant or to a claimant's property which is intentionally sustained by the claimant or which results from a nuclear incident intentionally and wrongfully caused by the claimant;

(v) Shall not apply to injury to a claimant who is employed at the site of and in connection with the activity where the extraordinary nuclear occurrence takes place, if benefits therefor are either payable or required to be provided under any workmen's compensation or occupational disease law;

(vi) Shall not apply to any claim resulting from a nuclear incident occurring outside the United States;

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Modification No. M121

(vii) Shall be effective only with respect to those obligations set forth in this clause and in insurance policies, contracts or other proof of financial protection; and

(viii) Shall not apply to, or prejudice the prosecution or defense of, any claim or portion of claim which is not within the protection afforded under (A) the limit of liability provisions under subsection 170e. of the Act, and (B) the terms of this agreement and the terms of insurance policies, contracts, or other proof of financial protection.

(f) *Notification and litigation of claims.* The Contractor shall give immediate written notice to DOE of any known action or claim filed or made against the Contractor or other person indemnified for public liability as defined in paragraph (d)(2). Except as otherwise directed by DOE, the Contractor shall furnish promptly to DOE, copies of all pertinent papers received by the Contractor or filed with respect to such actions of claims. DOE shall have the right to, and may collaborate with, the Contractor and any other person indemnified in the settlement or defense of any action or claim and shall have the right to (1) require the prior approval of DOE for the payment of any claim that DOE may be required to indemnify hereunder; and (2) appear through the Attorney General on behalf of the Contractor or other person indemnified in any action brought upon any claim that DOE may be required to indemnify hereunder, take charge of such action, and settle or defend any such action. If the settlement or defense of any such action or claim is undertaken by DOE, the Contractor or other person indemnified shall furnish all reasonable assistance in effecting a settlement or asserting a defense.

(g) *Continuity of DOE obligations.* The obligations of DOE under this clause shall not be affected by any failure on the part of the Contractor to fulfill its obligation under this contract and shall be unaffected by the death, disability, or termination of existence of the contractor, or by the completion, termination or expiration of this contract.

(h) *Effect of other clauses.* The provisions of this clause shall not be limited in any way by, and shall be interpreted without reference to, any other clause of this contract, including the clause entitled Contract Disputes, provided, however, that this clause shall be subject to the clauses entitled Covenant Against Contingent Fees, Officials Not to Benefit, and Examination of Records by the Comptroller General, and any provisions that are later added to this contract as required by applicable Federal law, including statutes, executive orders and regulations, to be included in Nuclear Hazards Indemnity Agreements.

(i) *Civil penalties.* The Contractor and its subcontractors and suppliers who are indemnified under the provisions of this clause are subject to civil penalties, pursuant to

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234A of the Act, for violations of applicable DOE nuclear-safety related rules, regulations, or orders.

(j) *Criminal penalties*. Any individual director, officer, or employee of the Contractor or of its subcontractors and suppliers who are indemnified under the provisions of this clause are subject to criminal penalties, pursuant to 223c. of the Act, for knowing and willful violation of the Atomic Energy Act of 1954, as amended, and applicable DOE nuclear safety-related rules, regulations or orders which violation results in, or, if undetected, would have resulted in a nuclear incident.

(k) *Inclusion in subcontracts*. The Contractor shall insert this clause in any subcontract which may involve the risk of public liability, as that term is defined in the Act and further described in paragraph (d)(2) above. However, this clause shall not be included in subcontracts in which the subcontractor is subject to Nuclear Regulatory Commission (NRC) financial protection requirements under section 170b. of the Act or NRC agreements of indemnification under section 170c. or k. of the Act for the activities under the subcontract.

(l) *Effective Date*. This indemnity agreement shall be applicable with respect to nuclear incidents occurring on or after October 1, 1990.

(m) To the extent that the Contractor is compensated by any financial protection, or is indemnified pursuant to this clause, or is effectively relieved of public liability by an order or orders limiting same, pursuant to 170e of the Act, the provisions of the clause providing general authority indemnity shall not apply.

APPENDIX J1
SOLID WASTE MANAGEMENT UNIT
CHARACTERIZATION SHEETS

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APPENDIX J1
SOLID WASTE MANAGEMENT UNIT CHARACTERIZATION SHEETS

001 MUD PITS

Unit Type:	Mud Pits
Unit Use:	Storage/Settling
Operational Status:	Decommissioned/In Use
Use Period:	1970s - Present
Materials Managed:	Solid Waste
Hazardous Release:	None
Radioactive Release:	None
Information source(s):	Process Knowledge

Unit Description

Refer to Figure J-1 for location. Thirteen decommissioned mud pits are identified in the WIPP RFA. Additional mud pits associated with seven groundwater monitoring well sites have been created since the RFA. They were used for settling drill cuttings out of the drilling fluids being used in drilling holes to support hydrologic testing and monitoring, potash evaluation, and drilling for hydrocarbons. These mud pits ranged in size from approximately 150 by 150 by 5 feet (ft) (46 by 46 by 1.5 m) to 10 by 30 by 5 ft (3 by 9 by 1.5 m). Diesel fuel, foaming agents and other organic additives were added to the drilling mud to reduce dissolution of the water-soluble rocks, promote hole stability, and to help lubricate the drill rods. It is not known how many of the wells were drilled using diesel in the drilling mud. Each mud pit was lined with a plastic sheet and used for one to two months during drilling, then allowed to dry out. To facilitate drying, holes were cut in the bottom of the liner of some pits. In general, once a pit was dry, it was covered with the soil that had been removed to make the berms and then graded to the original contours. The individual mud pits in SWMU No. 001 are listed on Table J1-1. It is difficult to determine the exact location of most of the mud pits because of the grading and revegetation that has taken place.

Many of these mud pits were the result of exploration activity that was conducted prior to the selection of the area for the WIPP facility and, therefore, were not created by DOE in support of the WIPP Project. All such locations are indicated in Table J1-1.

Waste Description

Materials in the mud pits consisted of sodium- and potassium chloride-saturated brine to which starch, bentonite gel, and diesel fuel were added; drill cuttings; metal cuttings; trace amounts of hydraulic fluid, grease, and motor oil: and the plastic liner.

Release Information

Potential releases from each of the drill sites occurred when the mud pits were drained by cutting holes in the liner. The materials released consisted of saturated brines, which are not considered hazardous under the RCRA. All of the solids confined in the plastic liner of the mud pits were buried when the pits were covered with soil and graded.

TABLE J1-1
SWMU DATA — MUD PITS

SWMU[a]	Location[b]	Hole No.	No. of Pits[c]	Period of Use	Well Status	Size of Drill Pad (Acres/ Hectares)
001-x	NW, NE, SW, 17	WIPP-13	2	8/78 & 10/85	Open	4/1.6
001-p	SW, NE, SW, 34	Cotton Baby	2	1973-1974	Plugged	3/1.2
001-o	NW, NE, SW, 15	Badger Unit	1	1974	Plugged	2/0.8
001-t	SE, SE, SW, 30	IMC-374	1	Unknown (pre-1975)	Plugged	1/0.4
001-q	SE, SE, SE, 28	DOE-1	2	1982	Open	3/1.2
001-n	SW, SW, SW, 31	P-15	1	10/76	Plugged	1/0.4
001-g	SW, SW, SW, 29	H-14 P-1	2	9/86 8/76	Sampled once/3 yrs. Plugged	1/0.4
001-h	NE, NE, NE, 28	H-15 P-2	2	10/86-11/86	Sampled once/3 yrs.	1/0.4
001-s	SE, SE, SE, 20	ERDA-9	1	4/76-6/76	Open	2/0.8
001-j	SE, SE, SW, 20	P-3	1	8/76-9/76	Plugged	0.5/0.2
001-k	SE, SW, SE, 28	P-4	1	8/76-9/76	Plugged	.75/0.3
001-l	SE, SE, SE, 17	P-5 WIPP-12	4	9/76 11/78 & 10/85	Plugged Open	6/2.4
001-m	SW, SW, NW, 30	P-6	1	9/76	Plugged	1/0.4
001-ah	SE, NW, SW, 28	H-19	multiple	1994-present	Open	4.65/1.9
001-ai	NW, NE, NW, 20	WQSP-1	2	1994-present	Open	0.46/0.19
001-aj	SW, NW, SW, 16	WQSP-2	2	1994-present	Open	0.46/0.19
001-ak	SE, SW, SW, 16	WQSP-3	2	1994-present	Open	0.46/0.19
001-al	SE, NW, SW, 28	WQSP-4	2	1994-present	Open	0.46/0.19
001-am	SE, SE, SE, 29	WQSP-5	2	1994-present	Open	0.46/0.19
001-an	SW, NE, SW, 29	WQSP-6 WQSP-6A	4	1994-present	Open	0.46/0.19

[a]SWMU designation in parentheses is the designation used in the WIPP RCRA Facility Assessment.
[b]All of the mud pits are in T22S, R31E. The location column gives the 1/4 of the 1/4 of the 1/4 of the section.
[c]Probable number of mud pits. Many of the drill pads were used to drill several holes, requiring the use of more than one mud pit.
[d]These are wells that were not drilled at the request of DOE; they were drilled for hydrocarbon and potash exploration.

002 LANDFILLS

Unit type:	Landfill
Unit use:	Disposal
Operational status:	Active
Use period:	1976 - Present
Materials managed:	Solid Waste
Hazardous release:	None
Radioactive release:	None
Information source(s):	Process Knowledge
	Aerial Photos

Unit Description

Refer to Figure J-1 for location. Two areas have been used as landfills at the WIPP facility. The older location, called the Brinderson Landfill (003-a), is located 1 mi (1.6 km) due south of Zone I. Prior to use as a construction landfill, the area was used as a quarry for road-bed materials. It was an active landfill from 1976 to January 1988 and covers about 4 acres (ac) (1.6 hectares [ha]). The closure of the Brinderson Landfill was approved by the U.S. Department of Interior, Bureau of Land Management (BLM). Since it was closed, the Brinderson Landfill has been covered over and reseeded. The new landfill (003-b) is located ½ mi (0.8 km) south of Zone I. The new construction landfill was developed in two parts. The first part, to the south of the current one, was excavated on BLM land and operated under a BLM permit until 1989. It was closed at the request of the BLM. The second part of the landfill was opened on land designated by the BLM as part of the DOE Exclusive Use Area in Public Land Order 6403. Ground was first broken for the new landfill area in November 1989; it is still active and covers about 15 ac (6 ha). Permits were obtained from the BLM for both landfills on BLM-administered land.

Waste Description

Both of the landfills have been used to bury construction debris consisting of foundation excavation soils, waste concrete, scrap wood, and metal. In addition, it has been reported that small amounts of nonconstruction debris (most likely office wastes) were dumped in the Brinderson Landfill. No asbestos materials are known to have been disposed of in the landfills. Disposal of RCRA hazardous waste or hazardous constituents in the construction landfill is done in accordance with written procedures.

Release Information

Releases of RCRA hazardous waste or hazardous constituents have not occurred at these sites.

003 STORAGE YARDS

Unit type:	Storage Areas
Unit use:	Storage
Operational status:	Active
Use period:	1976 - Present
Materials managed:	Solid Waste
	Hazardous Waste
	Oils
Hazardous release:	Potential
Radioactive release:	None
Information source(s):	Process Knowledge
	Aerial Photos

Unit Description

Refer to Figure J-1 for location. One area presently used for storage was designated in the RFA. This storage yard, the Portacamp (004-a), is located about 1,000 ft (305 m) southeast of Zone I. The yard is used to store construction and maintenance materials and as temporary storage for wastewater and waste oils awaiting laboratory analysis or recycling. The waste oils are recycled if free of hazardous contamination. The area is approximately 2 ac (0.8 ha) in extent and has been active since 1976.

Waste Description

The wastes stored at the Portacamp are water contaminated with motor oil, hydraulic oil, and diesel fuel from the vehicle wash bays; used hydraulic oil; used motor oil; glycol-based oils; used antifreeze; discontinued oils and empty 55-gallon drums. In 1987 the excess chemical grout from grouting the Exhaust Shaft and the Waste Shaft was stored in this yard prior to being shipped off site for disposal as hazardous waste.

Release Information

There have been no releases of RCRA hazardous waste or hazardous constituents from the area; however, small areas of stained soil under the pallets where excess or used petroleum products are stored indicate there have been minor releases of oil and petroleum products (non-RCRA regulated materials) from the drums. Any releases from the area used for staging wastewater and waste oils are remediated according to the applicable WIPP facility procedure.

010 SHAFT SUMPS

Unit type:	Shaft Sumps
Unit use:	Collection/Storage
Operational status:	Active
Use period:	1981 - Present
Materials managed:	Solid Waste
	Hazardous Waste
Hazardous release:	Lead
Radioactive release:	None
Information source(s):	Process Knowledge, Sampling and Analysis

Unit Description

Refer to Figure J-2 for location. Four shafts have been completed to the WIPP facility underground. The Salt Handling and the Waste Shafts have sumps (010-a and 010-b) that extend below the facility horizon (148 feet and 119 feet, respectively). The sumps have been cut into the salt and are not lined. The other two shafts, the Exhaust Shaft and the Air Intake Shaft, end at the facility horizon and do not have sumps. The bottoms of these shafts are 010-c and 010-d, respectively. The bottoms of all four shafts have received construction debris. All shafts are lined and grouted to minimize wastewater accumulation. The solid material cleaned up from the bottom of the shafts without sumps is disposed of on the main salt storage area. The Waste Shaft sump periodically collects brine. In June 1995, increased volumes of brine flow into the Waste Shaft sump (SWMU 010b) were noticed. The brine was tested and was determined to contain RCRA levels of lead. A corrective action plan was immediately implemented. The source of the increased flow into the Waste Shaft sump was traced to water entering the mine from condensation and seepage in the Exhaust Shaft. The source of the lead in the brine appears to be chain-link mesh used for support in the Exhaust Shaft. As part of the corrective action, the debris and muck at the base of the Exhaust Shaft were cleared and a plastic catchment basin installed to collect water coming down the shaft and to prevent further flow to the Waste Shaft sump. The collected water is managed in accordance with New Mexico Solid Waste and Water Quality Control Commission (WQCC) Regulations. The lead containing waters are currently being managed and disposed of at an off-site treatment, storage, and disposal facility in accordance with the requirements of 20 NMAC 4.1 Subpart III. Alternatively, when the levels of lead are below the limits in the DOE's WQCC Discharge Plan DP-831, the water is discharged to the WIPP sewage lagoon along with other waters collected from the WIPP underground.

Since the corrective action involved the removal of the debris and muck at the base of the Exhaust Shaft, the SWMU previously identified as SWMU 010c is considered closed. The catchment basin has been designated as a new SWMU and assigned the designation SWMU 010e.

Waste Description

The wastes consist of welding debris, scrap steel, concrete from the shaft lining, cement grout, chemical grout, grease, wash water, brine from the Salado and overlying formations some of which contains RCRA levels of lead, and salt.

Release Information

Brine containing lead in excess of RCRA levels has flowed through the Exhaust Shaft area and collected in the Waste Shaft sump. No other RCRA hazardous wastes or hazardous constituents have been detected at these sites.

TABLE J1-2
SWMU DATA-SHAFT SUMPS

SWMU	Dates	*Location and Description	Status	Material Stored
010-a Salt Handling Shaft	1981 to Pres.	0/0 Sump extends 148 feet below the facility horizon	Active	Welding residue, scrap wood and metal, salt, Class C cement, Chemical-seal, bentonite, grease, and oil
010-b Waste Shaft	1982 to Pres.	S400/E30 Sump extends 119 feet below the horizon.	Active	Concrete, salt, cement grout, chemical grout, brine from Rustler Formation, wash water, grease, and oil, lead
010-c Exhaust Shaft	1985 to 1996	S400/E480 Shaft ends at the facility horizon.	Closed	Salt, concrete, cement grout, chemical grout, brine from Rustler Formation, grease, and oil
010-d Air Intake Shaft	1989 to Pres.	0/W620 Shaft ends at the facility horizon.	Active	Salt, brine from Rustler Formation, concrete, grease, and oil
010-e Exhaust Shaft	1996 to Pres.	S400/E480 Catchment Basin at base of shaft	Active	Salt, brine, lead

* All locations given by underground coordinates.

APPENDIX K1

BIENNIAL ENVIRONMENTAL COMPLIANCE REPORT

OCTOBER 1994

From Previously Published Waste Isolation Pilot Plant Biennial Environmental Compliance Report, October 1994. U.S. Department of Energy (DOE), 1994, DOE/WIPP 94-021, Carlsbad, New Mexico

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DOE/WIPP 94-021

Waste Isolation Pilot Plant Biennial Environmental Compliance Report

October 1994

United States Department of Energy
Carlsbad Area Office
Carlsbad, New Mexico

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ACRONYMS AND ABBREVIATIONS

AEA	Atomic Energy Act
AEC	Atomic Energy Commission
AHERA	Asbestos Hazard Emergency Response Act
ALARA	As Low As Reasonably Achievable
AMR	Annual Mitigation Action Plan Report
AQCR	Air Quality Control Regulation
ASTM	American Society of Testing and Materials
BECR	Biennial Environmental Compliance Report
BLM	Bureau of Land Management
BMP	best management practice
BTU	British thermal unit
C of C	Certificate of Compliance
CAA	Clean Air Act
CAM	continuous air monitor
CAO	Carlsbad Area Office
CAS	Chemical Abstract Service
CEQ	Council of Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFC	chlorofluorocarbon
CFR	Code of Federal Regulations
CH	contact-handled
CMR	Central Monitoring Room
CMS	Corrective Measures Study
CWA	Clean Water Act
DAC	derived air concentration
DMR	Discharge Monitoring Report
DOE	U.S. Department of Energy
DOI	U.S. Department of the Interior
DOT	U.S. Department of Transportation
DP	Discharge Plan
DPS	Department of Public Safety
EA	Environmental Assessment
EC&S	Environmental Compliance and Support
ECAP	Environmental Compliance Assessment Program
EDE	effective dose equivalent
EEG	Environmental Evaluation Group
EHS	extremely hazardous substance

EIA	Environmental Impact Assessment; Environmental Improvement Act
EIB	Environmental Improvement Board
EID	Environmental Improvement Division
EIS	Environmental Impact Statement
EMA	Emergency Management Act
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
ESH&RC	Environment, Safety, Health and Regulatory Compliance Department
FAR	Federal Acquisition Regulation
FAS	fixed air sampler
FEIS	Final Environmental Impact Statement
FFA	Federal Facility Agreement
FFCA	Federal Facility Compliance Act
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FLPMA	Federal Land Policy and Management Act
FONSI	Finding of No Significant Impact
FOSS	Facility Operations Shift Supervisor
FR	*Federal Register*
FSAR	Final Safety Analysis Report
FWS	U.S. Fish and Wildlife Service
GET	General Employee Training
GP	general permit
gpd	gallons per day
GR	general requirement
GWPA	Ground Water Protection Act
HAP	hazardous air pollutant
hazmat	hazardous material(s)
HCIA	Hazardous Chemicals Information Act
HEPA	high-efficiency particulate air
HMT	hazardous materials training
HMTA	Hazardous Materials Transportation Act
HMTUSA	Hazardous Materials Transportation Uniform Safety Act
HPD	Historic Preservation Division
HSWA	Hazardous and Solid Waste Amendments of 1984
HWA	Hazardous Waste Act
HWMR	Hazardous Waste Management Regulation
HWO	Hazardous Waste Operations

IATA	International Air Transport Association
ICV	inner containment vessel
L	liter
LDR	land disposal restriction
LEPC	Local Emergency Planning Committee (or Coordinator)
LWA	(Waste Isolation Pilot Plant) Land Withdrawal Act
MAP	Mitigation Action Plan
MCL	maximum contaminant level
MOC	Managing and Operating Contractor
MOU	Memorandum of Understanding
mg/L	milligrams per liter
mrem	millirem
MSDS	Material Safety Data Sheet
MVAC	motor vehicle air conditioner
NAAQS	National Ambient Air Quality Standard
NAR	North Access Road
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEPA	National Environmental Policy Act
NESHAPS	National Emission Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NMAAQS	New Mexico Ambient Air Quality Standard
NMD	No-Migration Determination
NMDG&F	New Mexico Department of Game and Fish
NMED	New Mexico Environment Department
NMSA	New Mexico Statutes Annotated
NMVP	No-Migration Variance Petition
NOD	Notice of Deficiency
NOI	Notice of Intent
NOT	Notice of Termination
NPDES	National Pollutant Discharge Elimination System
NRC	U.S. Nuclear Regulatory Commission
NRCr	National Response Center
NRDC	Natural Resources Defense Council
NuPac	Nuclear Packaging Inc.
NWPA	Nuclear Waste Policy Act
OCA	outer containment assembly
OCV	outer containment vessel
ODC	ozone-depleting chemical

ODS	ozone-depleting substance
ORR	Operational Readiness Review
OSHA	Occupational Safety and Health Administration
PCB	polychlorinated biphenyl
pCi/m^2-s	picocuries per square meter-second
pd	probability of detection
pfa	probability of false alarm
PL	Public Law
PM	particulate matter
ppm	parts per million
ppmw	parts per million by weight
PPP	Pollution Prevention Plan
PSD	Prevention of Significant Deterioration
PV	proposed variance
PWR	plant work request
QA	Quality Assurance
QAPP	Quality Assurance Program Plan
QAPjP	Quality Assurance Project Plan
QC	Quality Control
QSL	Qualified Supplier List
RCRA	Resource Conservation and Recovery Act
REAC/TS	Radiation Emergency Assistance Center/Training Site
RFI	RCRA Facility Investigation
RH	remote-handled
ROD	Record of Decision
RPP	Radiation Protection Program
RPR	Radiation Protection Regulation
RQ	reportable quantity
RTR	real-time radiography
SAA	satellite accumulation area
SARA	Superfund Amendments and Reauthorization Act of 1986
SARP	Safety Analysis Report for Packaging
SDWA	Safe Drinking Water Act
SEIS	Supplement Environmental Impact Statement
SERC	State Emergency Response Commission
SHPO	State Historic Preservation Officer (or Office)
SIC	Standard Industrial Classification
SIP	State Implementation Plan

SLO	State Land Office
SOP	standard operating procedure
SPCC	Spill Prevention, Control, and Countermeasures Plan
SPDV	Site and Preliminary Design Validation
SR	specific requirement
STEP	States Training and Education Program
SWA	Solid Waste Act
SWB	standard waste box
SWDA	Solid Waste Disposal Act
SWMR	Solid Waste Management Regulation
SWMU	solid waste management unit
SWPPP	Storm Water Pollution Prevention Plan
TAP	toxic air pollutant
TDOP	10-drum overpack
TDS	total dissolved solid
TLD	thermoluminescent dosimeter
TPQ	Threshold Planning Quantity
tpy	tons per year
TRAMPAC	TRUPACT-II Authorized Methods for Payload Control
TRI	Toxic Chemical Release Inventory
TRU	transuranic
TRUCON	TRUPACT-II content codes
TRUPACT-II	Transuranic Package Transporter Model II
TSCA	Toxic Substances Control Act
TSDF	treatment/storage/disposal facility
TSP	total suspended particulate
USFWS	U.S. Fish and Wildlife Service
UIC	underground injection control
UL	Underwriters Laboratories
UN	United Nations
USC	United States Code
UST	underground storage tank
USTR	Underground Storage Tank Regulation
VOC	volatile organic compound
VOST	volatile organic sampling train
WAC	Waste Acceptance Criteria
WID	Westinghouse Waste Isolation Division
WIPP	Waste Isolation Pilot Plant

WPSO	WIPP Project Site Office, U.S. Department of Energy
WQA	New Mexico Water Quality Act
WQCC	Water Quality Control Commission
WSR	Water Supply Regulation

1.0 INTRODUCTION

This *Biennial Environmental Compliance Report* (BECR) addresses regulatory compliance at the Waste Isolation Pilot Plant (WIPP), a research and development facility designed to demonstrate the safe disposal of transuranic (TRU) radioactive waste. As required by the WIPP Land Withdrawal Act [Public Law (PL) 102-579], the BECR documents WIPP's compliance with applicable Federal laws implemented by the U.S. Environmental Protection Agency (EPA). It also addresses compliance with applicable New Mexico laws, regulations, and permit conditions.

1.1 Background of the Waste Isolation Pilot Plant (WIPP)

The WIPP project was authorized by the U.S. Department of Energy (DOE) National Security and Military Applications of Nuclear Energy Authorization Act of 1980 (PL 96-164). This legislation mandated that DOE provide a research and development facility to demonstrate the safe disposal of radioactive waste resulting from U.S. defense activities and programs. Under this statute, the WIPP facility is exempted from regulation by the U.S. Nuclear Regulatory Commission (NRC). Initially, the WIPP mission was to include experimentation with high-level wastes, but subsequent legislation has restricted the radioactive waste to TRU waste. TRU waste is radioactive waste that contains alpha-emitting radionuclides of atomic number greater than 92 with half-lives longer than 20 years which are present in concentrations greater than 100 nanocuries per gram of waste. Most of this waste is generated from plutonium reprocessing and fabrication.

In January 1981, the DOE announced its decision to proceed with a phased development of the WIPP, to be located in Eddy County in southeastern New Mexico, 26 miles east of the City of Carlsbad. The decision called for the WIPP to be designed to accommodate approximately 6.2 million cubic feet of contact-handled (CH) TRU waste and 0.25 million cubic feet of remote-handled (RH) TRU waste. The WIPP Land Withdrawal Act (LWA) has limited the total WIPP capacity to 6.2 million cubic feet of transuranic waste.

After completing a Site and Preliminary Design Validation (SPDV) phase, the construction phase at the WIPP began in 1983. At present, surface and underground facilities to support waste handling and emplacement operations have been completed. Of the nine surface buildings, the largest structure is the Waste Handling Building, which includes areas for the receipt, inventory, inspection, and transfer of waste to the underground. The WIPP underground facility, which is 2,150 feet below the land surface in a 2,000-foot-thick bedded salt formation, consists of four shafts, the waste disposal area, the experimental area (for repository safety and mine performance studies), an equipment and maintenance facility, and connecting tunnels. Only a few waste disposal rooms have been mined at present because of the natural phenomenon of salt creep, which causes eventual room closure. Additional waste disposal rooms will be mined prior to permanent waste emplacement.

Originally, the construction phase was to have been followed by the pilot plant phase. Following the preparation of the Supplement Environmental Impact Statement (SEIS) in 1990, the DOE decided that the construction phase was to be followed by the test phase, during which tests with TRU waste would have been conducted underground at the WIPP. However, on October 21, 1993, the DOE decided not to conduct TRU waste tests underground at the WIPP facility, but to conduct enhanced laboratory tests at existing DOE facilities elsewhere. Thus, no TRU or TRU mixed waste (radioactive waste with hazardous constituents) will be sent to WIPP until after the initiation of the disposal phase. The disposal phase will be followed by the decontamination and decommissioning phase.

More detailed information on the background of the WIPP project can be found in the DOE's *Final Environmental Impact Statement, Waste Isolation Pilot Plant* (FEIS; DOE, 1980); the DOE's 1981 Record of Decision (ROD) to the FEIS (DOE, 1981); the 1990 *Final Supplement Environmental Impact Statement, Waste Isolation Pilot Plant* (SEIS; DOE, 1990a); and the 1990 ROD to the SEIS (DOE, 1990b).

1.2 Biennial Environmental Compliance Report under the WIPP Land Withdrawal Act

This BECR provides the documentation required by the 1992 LWA. The LWA specifies that:

> The Secretary shall, not later than 2 years after the date of the enactment of this Act, and biennially thereafter, submit documentation of continued compliance with the laws, regulations and permit requirements described in paragraph (1) to the Administrator, and, with the law described in paragraph (1)(C), to the State [§ 9(a)(2)].

Paragraph (1) requires that the WIPP comply with Subpart A of 40 CFR Part 191; the Clean Air Act; the Solid Waste Disposal Act (SWDA); the Safe Drinking Water Act; the Toxic Substances Control Act; the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); "all other applicable Federal laws pertaining to public health and safety or the environment"; and "all regulations promulgated, and all permit requirements" under these laws. Paragraph (1)(C) requires compliance with the Solid Waste Disposal Act.

1.3 Regulatory Requirements Hierarchy

The first step in documenting regulatory compliance is the identification of all applicable regulatory requirements. This section describes the interrelationships among laws, regulations, and permit conditions and identifies the origins of the detailed regulatory requirements discussed in this report.

1.3.1 Federal/State Laws

Laws result from legislative processes at either the Federal, State, or local level. This report will summarize the purpose of each relevant law and discuss its applicability and importance to the WIPP.

1.3.2 Implementing Regulations

Once a law has been enacted, it must be implemented. Statutory authority for each new act is usually assigned to a particular agency during the legislative process. That agency is responsible for developing regulations to implement the act. At the Federal level, these regulations are first published in the *Federal Register* as "proposed" for comment from interested groups and individuals. The implementing agency must then respond appropriately to the comments and prepare the final regulations. These final regulations are again published in the *Federal Register*, along with a discussion of the comments, and are inserted into the appropriate part(s) of the Code of Federal Regulations (CFR).

New Mexico agencies use a similar process in the promulgation of regulations, with the proposed and final regulations published in the *New Mexico Register*. Many State environmental laws evolve from Federal statutes, many of which mandate that the State become authorized to administer and enforce its own regulatory program in lieu of the Federal program as long as the State regulations are no less stringent than the Federal requirements. In these cases, the State must send its "final" regulations to the U.S. Environmental Protection Agency (EPA) for approval. The EPA may approve all, part, or none of the final regulations. After EPA approval, notification of EPA's authorization of the State program is published in the *Federal Register*.

Local laws or ordinances that apply to the WIPP are limited to those under the authority of the county commission. The only local laws or ordinances applicable to the facility are zoning ordinances. These do not affect the facility's ability to protect human health and the environment. Therefore, these laws and ordinances are not included in this report.

This report identifies specific requirements from Federal/State implementing regulations that apply to the WIPP facility. In some cases where implementing regulations have not been promulgated or where a particular statute requirement is not covered by the implementing regulations, this report identifies specific requirements directly from the statute.

1.3.3 Permit Conditions

A number of Federal/State implementing regulations include permit programs. Because many implementing regulations are couched in general terms, permits and permit programs allow the regulatory agency to regulate individual facilities and stipulate site-specific conditions that must be met by a specific facility in order to meet the statutory goals of protection of the public and the environment. Thus, permits are used to regulate discharges and activities (construction, modifications, and/or operations) of a facility. This report identifies site-specific permit conditions that apply to the WIPP.

1.4 Regulatory Compliance at the WIPP

The DOE and the Westinghouse Waste Isolation Division (WID), the Managing and Operating Contractor (MOC) for the WIPP, are fully committed to conducting operations at the WIPP in such a manner as to achieve and demonstrate compliance with applicable regulations and permit conditions. Both organizations have implemented plans and procedures to achieve and maintain compliance with the regulations and have established aggressive assessment programs to validate continued successful implementation of these activities.

In a number of areas throughout this document, it is noted that procedures and manuals are in place to guide and direct WID personnel in the performance of specific job tasks which have or could have a direct impact on the compliance status in a given situation. These procedures and manuals are in place to supplement personnel training, education, and qualifications and to promote the operation of the WIPP facility in a safe and environmentally sound manner. Because this is the intended purpose of these documents, they are continually evaluated and revised to ensure that they are effective and current with respect to both regulatory and operational changes. For this reason, specific procedures and manuals are not referenced in the body of this document.

In addition, a number of reports (especially those reports which are a result of regulatory requirements) are referenced throughout the document. Due to the continual update and revision requirements for reports of this nature, they are referenced only by the report title or by the citation that requires their submittal rather than by document numbers.

1.4.1 Organizational Structure

The organizational structure of the DOE WIPP Carlsbad Area Office (CAO) and WID reflect the importance of regulatory compliance at the WIPP and the commitment of both organizations to achieving and maintaining full compliance.

The backbone of DOE CAO's organization for the WIPP consists of the Area Manager who oversees the five major branches: the Administrative Branch, the Compliance Branch, the Experimental Programs Branch, the WIPP Site Branch, and the National TRU Program Office. The Chief of the Compliance Branch is responsible for overall strategy and criteria to demonstrate and validate long-term compliance for the disposal of TRU waste and leads the preparation of the repository compliance package. The Chief of the WIPP Site Branch oversees the environment, safety, and health activities related to site operations. The Chief of the Environment, Safety, and Health Section addresses additional compliance activities and reports to the Chief of the WIPP Site Branch. The Chief of the Compliance Branch provides additional oversight in the areas of quality assurance for compliance-related activities.

WID's commitment to compliance is also represented in their organizational structure, consisting of the General Manager, the Deputy Manager, and nine department managers. The Department Manager of Environment, Safety, Health, and Regulatory Compliance reports directly to the General Manager and provides the management necessary for WID's compliance responsibilities. The Department Manager for Quality Assurance provides support to ensure that compliance activities are managed and performed in a manner consistent with WID's commitment to compliance.

1.4.2 Compliance Activities

Compliance includes a wide range of activities, ranging from the preparation of plans, procedures, reports, or permit applications to hands-on actions such as recordkeeping, monitoring, sampling and analysis, performing assessments or audits, and housekeeping. The compliance activities carried out at the WIPP to fulfill applicable regulatory requirements are identified in this report. In addition, plans and reports that have been established to maintain compliance at the WIPP are identified and discussed, and applicable manuals and procedures are mentioned.

Where appropriate, plans and procedures have been established to address compliance. Inspections and audits of related activities are conducted to demonstrate the effectiveness of these plans and procedures. WID has an aggressive Environmental Compliance Assessment Program (ECAP), which provides a comprehensive system to appraise compliance with applicable environmental statutes and requirements at the WIPP and to identify operationally feasible and environmentally sound corrective action measures for any procedural non-conformance or observation identified. The ECAP is designed around five compliance assessment processes: (1) environmental compliance appraisals, (2) environmental audits, (3) independent review group evaluations, (4) environmental event evaluations, and (5) environmental compliance status tracking and reporting.

The ECAP represents a substantial commitment by WID in compliance appraisal activities. The ECAP is expected to enhance protection of public health and the environment by discovering and eliminating any WIPP programmatic, procedural, and operational deficiencies that could lead to (1) permit violations; (2) regulatory noncompliance; (3) safety and health risks to WIPP site workers and/or the public; and (4) spills, releases, or discharges of environmental pollutants. This BECR will summarize the results of completed compliance assessments as they apply to overall WIPP compliance.

1.5 Organization of and Reporting Period for the Report

The organization of and reporting period for the BECR are discussed in the following subsections.

1.5.1 Organization of the Report

This report organizes the pertinent regulatory requirements into 14 parts, each of which corresponds to a Federal or State agency that is authorized to administer regulatory programs. Under each agency, separate chapters identify and discuss each law administered by the agency that is relevant to the WIPP facility. For example, the first part contains all pertinent regulatory programs administered by the EPA. Within this part, 10 chapters correspond to the 10 environmental laws and sets of regulations that apply to the WIPP for which the EPA is responsible (Chapters 2 through 11).

Each of the following 37 chapters summarizes a law and its implementing regulations and briefly describes their applicability to the WIPP. For ease in identifying compliance status, summary tables in each chapter provide a synopsis of WIPP's compliance with each specific requirement and a cross-reference to the more detailed discussion in the text. Each section of the text discussion summarizes a requirement and addresses its compliance status. Compliance status is identified as "achieved," "up to date," or "not applicable":

ACHIEVED — Items with the status of "achieved" are requirements that have been met and do not require any further action. They are essentially "one-time" occurrences.

Example: As a generator of hazardous waste, WIPP must obtain an EPA ID number; this requirement has been achieved.

UP TO DATE Items with the status of "up to date" are requirements that require some type of ongoing activity to maintain compliance.

Example: The DOE must file a biennial hazardous waste report; these reports are up to date.

NOT APPLICABLE Items with the status of "not applicable" were evaluated and determined not to be applicable to the WIPP either during this reporting period or throughout the duration of the project.

Example: Since the WIPP disposes of its construction and demolition debris at a landfill located on DOE property and in accordance with the applicable regulations, the requirement for obtaining a permit is not applicable.

Following the list of references, Appendix A presents an index of the specific requirements discussed in the report by regulating agency. Appendix B indexes the specific requirements in terms of their technical subject areas (for example, waste management requirements, water quality requirements, historic preservation requirements).

1.5.2 Reporting Period

This first BECR sets forth the status of WIPP compliance during the period from the Congressional approval of the WIPP LWA on October 30, 1992, to the March 31, 1994, cutoff date. Future BECRs will address the compliance status of WIPP programs and activities for the reporting period beginning April 1 and ending on March 31 two years later. The purpose for establishing a cutoff date is to provide consistency in the reporting period from year to year and to provide sufficient time to prepare and review the biennial report prior to its submittal to the EPA and the State of New Mexico.

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2.0 RESOURCE CONSERVATION AND RECOVERY ACT AND SOLID WASTE DISPOSAL ACT

2.1 Summary of the Law

The Resource Conservation and Recovery Act (RCRA; 42 §§ USC 6901 et seq.) is a statute designed to provide "cradle-to-grave" control of hazardous waste by imposing management requirements on generators and transporters of hazardous wastes and on the owners and operators of treatment/storage/disposal facilities (TSDFs). RCRA applies primarily to active facilities; abandoned and inactive sites are regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, or Superfund; see Chapter 3).

The legislative history of RCRA was initiated in 1965 when Congress enacted the Solid Waste Disposal Act (SWDA; PL 89-72; 42 USC §§ 3251 et seq.). This law dealt with solid waste disposal and gave the States the responsibility for developing solid waste management plans. In 1970, Congress passed the Resource Recovery Act (PL 91-512) to provide the U.S. Environmental Protection Agency (EPA) with funding for resource recovery programs. The Resource Conservation and Recovery Act of 1976 (PL 94-580) completely replaced the SWDA and incorporated the intent of the Resource Recovery Act. A number of minor amendments were added during the next few years. The Hazardous and Solid Waste Amendments of 1984 (HSWA; PL 98-616) reauthorized RCRA, expanded its scope significantly, and altered many of its provisions. The term "RCRA" will be used throughout this document to refer to the reauthorized law as amended.

There are two major objectives of RCRA. The first is to promote the protection of health and the environment and to conserve material and energy resources. This objective is to be accomplished through such means as ensuring that hazardous waste management practices are conducted so as to protect human health and the environment, minimizing the generation of hazardous waste, prohibiting open dumping on the land, and requiring existing open dumps to be converted to facilities that pose no danger to the environment or health. The second objective of RCRA is to set national policy to reduce or eliminate the generation of hazardous waste as expeditiously as possible and to ensure that any hazardous waste generated be treated, stored, or disposed of so as to minimize the present and future threat to human health and the environment.

The EPA implements RCRA primarily through the 40 CFR Part 260-280 series. Parts 260-270 of Title 40 of the Code of Federal Regulations (CFR) consist of requirements and standards pertaining to solid waste, particularly hazardous waste; 40 CFR Parts 280-281 pertain to the management of underground storage tanks (USTs) containing petroleum products or hazardous chemicals.

Congress intended for the RCRA program to be implemented by States. Consequently the EPA has defined a process through which States may apply for and receive authorization to administer the RCRA program. New Mexico received authorization for the base RCRA program in

January 1985. New Mexico administers its program through the Hazardous Waste Management Regulations (HWMRs). By virtue of this authorization, New Mexico has primary authority for most aspects of the RCRA program.

The Federal Facility Compliance Act of 1992 (FFCA; 42 USC 6961) subjects the DOE to the requirements of RCRA or State hazardous waste programs. However, WIPP is not currently subject to the requirements for fees, inventory reporting, reporting the status of treatment capacity and technology (site treatment plans), or other FFCA requirements. Even though WIPP is subject to the Land Disposal Restrictions (LDRs) (and, as such, DOE has opted to obtain a variance from treatment standards prior to disposal), the WIPP will not generate or treat mixed waste subject to the requirements of the FFCA during operation. Therefore, these requirements are not addressed further in this report.

During this reporting period, WID conducted an operational readiness review (ORR) of WIPP operations and activities to verify that WIPP has completed those actions necessary to receive shipments of transuranic/mixed waste in support of Type I bin testing. This review included performance-based inspections to augment the numerous affidavit reviews performed by the ORR team. The ORR team was comprised of experienced WID staff who were removed from their duties. The team was supplemented by contract technical experts as required. The ORR affidavits that are mentioned in this document refer to signed statements that certify compliance with established acceptance criteria. These affidavits have been mentioned in this report to provide additional documentation of compliance to specific requirements. Completed affidavits and supportive documentation are handled, stored, and archived as permanent quality assurance records.

Because of the complexity of the regulations and requirements under RCRA, Table 2-1 is presented to assist the reader. This table shows the location of the RCRA-related requirements in this BECR by section and table numbers. The Federal requirements are presented in this chapter; the State RCRA-related requirements are incorporated in Chapter 25, under the New Mexico Environment Department (NMED). The conditions and requirements from the EPA's No-Migration Determination are also included in this table.

TABLE 2-1. Index of Requirements Pertaining to RCRA in the BECR

Citation	Title	BECR Section
The Resource Conservation and Recovery Act (RCRA), 42 USC §§ 6901 et seq.		
RCRA, § 3016	Inventory of Federal hazardous waste facilities	2.2.1
Regulations Implementing RCRA		
40 CFR Part 262; HWMR-7, Part III	Standards Applicable to Generators of Hazardous Waste	25.2.2
40 CFR Part 263; HWMR-7, Part IV	Standards Applicable to Transporters of Hazardous Waste	25.2.3
40 CFR Part 264; HWMR-7, Part V	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities	Not applicable
40 CFR Part 265; HWMR-7, Part VI	Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities	25.2.4
40 CFR Part 268	Land Disposal Restrictions	2.2.2
40 CFR Part 270; HWMR-7, Part IX	EPA Administered Permit Programs: the Hazardous Waste Permit Program	25.2.5
EPA's Proposed Variance and Conditional No-Migration Determination (NMD)		
55 FR 13068, 4/6/90	Specific conditions under the proposed variance	2.3
Section VI, 55 FR 47700, 11/14/90	Specific conditions of the NMD	2.3

TABLE 2-1 (continued)

Citation	Title	BECR Section
55 FR 47700, 11/14/90	General conditions of the NMD	2.3
Requirements for and Registration of Underground Storage Tanks (USTs)		
40 CFR Part 280; USTR-1 through 14	New Mexico Underground Storage Tank Regulations	25.2.6
NMSA 74-6B-1 through 74-6B-14	New Mexico Ground Water Protection Act	28 and 25.2.2

RCRA provides direction for the management of solid and hazardous waste. It should be noted that waste defined as hazardous under RCRA (40 CFR Part 261, *Identification and Listing of Hazardous Waste*) does not include radionuclides. Thus, mixed waste, which consists of radioactive waste with hazardous constituents, is regulated under both the Atomic Energy Act (for the radionuclides) and RCRA (for the hazardous constituents).

Requirements and conditions related to the EPA's land-disposal restrictions are codified in 40 CFR Part 268 and are applicable to the WIPP facility. Under the 1984 HSWA, the land disposal of hazardous wastes not meeting EPA-imposed treatment standards is prohibited unless it can be demonstrated "to a reasonable degree of certainty" that there will be "no migration of hazardous constituents from the disposal unit . . . for as long as the wastes remain hazardous" [RCRA § 3004(d)(1)]. Section 40 CFR 268.6 allows for a variance from the land disposal restrictions when the applicant can make the required demonstration of no migration.

Because the proposed activity at the WIPP consists of placement "in or on the land," 40 CFR Part 268 applies. Consequently, the DOE submitted a petition to EPA headquarters for a no-migration variance in March 1989. On April 6, 1990, the EPA published the proposed variance for WIPP (EPA, 1990a). The EPA's decision to grant the final Conditional No-Migration Determination for WIPP (NMD) was published on November 14, 1990 (EPA, 1990b).
One section of RCRA governs the management of underground storage tanks (USTs). This portion of RCRA and the regulations specified under 40 CFR Parts 280 and 281 address USTs containing petroleum products or hazardous chemicals. (Requirements for tanks containing hazardous wastes are specified under Subpart J of 40 CFR Parts 264 and 265.) Requirements for UST management pertain to the design, construction, installation, and operation of USTs as

well as notification and corrective action requirements in the event of a release and actions required for out-of-service USTs.

The NMED has been authorized by the EPA to regulate USTs. Therefore, the State UST requirements and the compliance status for each requirement are presented in Chapter 25 of this report.

2.2 Compliance Status of the Regulatory Requirements

This section provides information on requirements of RCRA and of the EPA's regulations implementing this act. Each subsection contains a summary table with the requirement and the compliance status, and more detailed information is provided in the text.

2.2.1 Compliance with the Resource Conservation and Recovery Act

Nearly all of the requirements specified in RCRA are covered in more detail in the implementing regulations. The exception is § 3016 of the act, which requires each Federal agency to provide a biennial inventory of its TSDFs (see Table 2-2).

TABLE 2-2. The RCRA Requirements Not Covered by Implementing Regulations - Compliance Status

Citation	Requirement	Compliance Status
§ 3016	Inventory of Federal hazardous waste facilities	**UP TO DATE** Report filed biennially in even-numbered years [Section 2.2.1.1]

2.2.1.1 Inventory of Federal Hazardous Waste Facilities, § 3016

The DOE files the hazardous waste inventory report with the EPA and the NMED biennially (on even-numbered years) as required by § 3016 of RCRA. The most recent of these reports was submitted in 1994.

2.2.2 Compliance with the Land Disposal Restriction (LDRs), 40 CFR Part 268

This section is limited to those EPA regulations implementing RCRA that are directly applicable to the WIPP. Regulations implementing other portions of RCRA for which the State of New Mexico is authorized are found in Chapter 25.

The compliance status of each of the applicable land-disposal restrictions of 40 CFR Part 268 is summarized in Table 2-3. Detailed information is provided in the text.

TABLE 2-3. RCRA Land-Disposal Restrictions - Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
40 CFR 268.1	Purpose, scope, and applicability	ACHIEVED *WIPP No-Migration Variance Petition* (NMVP); No-Migration Determination (NMD) [Section 2.2.2.1]
40 CFR 268.6(a)	Submittal of petitions to allow land disposal of a waste prohibited under Subpart C of Part 268	ACHIEVED NMVP [Section 2.2.2.2]
40 CFR 268.6(b)	Requirements of demonstration of no-migration in petition	ACHIEVED NMVP [Section 2.2.2.3]
40 CFR 268.6(c)	Contents of petition	ACHIEVED NMVP [Section 2.2.2.4]

TABLE 2-3 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
40 CFR 268.6(d)	Submittal of petition to EPA Administrator	**ACHIEVED** NMVP [Section 2.2.2.5]
40 CFR 268.6(e)	Consistency of activities with those described in the petition and notification of EPA of changes in conditions at the unit and/or in the environment	**UP TO DATE** Westinghouse Waste Isolation Division (WID) procedure [Section 2.2.2.6]
40 CFR 268.6(f)	Activities required if hazardous constituents are found to have migrated from the repository	**NOT APPLICABLE** No waste emplaced at WIPP [Section 2.2.2.7]
40 CFR 268.6(g)	Certification in petition	**ACHIEVED** NMVP; certification signature [Section 2.2.2.8]
40 CFR 268.6(h)	Additional information requested by Administrator	**ACHIEVED** Two addenda to the NMVP [Section 2.2.2.9]
40 CFR 268.6(k)	Terms of variance	**ACHIEVED** NMD for test phase; up to November 14, 2000 [Section 2.2.2.10]

TABLE 2-3 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
40 CFR 268.6(n)	Non-exemption of liquid hazardous wastes containing $\geq$ 500 ppm polychlorinated biphenyls (PCBs)	**UP TO DATE** Prohibition of liquids by *WIPP Waste Acceptance Criteria* [Section 2.2.2.11]
40 CFR 268.7	Waste analysis and recordkeeping	**UP TO DATE** WID procedures [Section 2.2.2.12]
40 CFR 268.8	Landfill and surface impoundment disposal restrictions	**UP TO DATE** WIPP generated LDR waste treated prior to disposal [Section 2.2.2.13]
40 CFR 268.9	Special rules regarding wastes that exhibit a characteristic	**UP TO DATE** NMD received for test phase [Section 2.2.2.14]
40 CFR 268.10-12	Identification of waste to be evaluated by August 8, 1988; by June 8, 1989; and by May 8, 1990	**NOT APPLICABLE** No treatment standard for mixed waste; NMD received for test phase [Section 2.2.2.15]

TABLE 2-3 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
40 CFR 268.30	Waste-specific prohibitions--solvent wastes	**UP TO DATE** WIPP generated solvent wastes receive treatment prior to TSDF land disposal [Section 2.2.2.16]
40 CFR 268.31	Waste-specific prohibitions--dioxin-containing wastes	**NOT APPLICABLE** NMD [Section 2.2.2.17]
40 CFR 268.32	Waste-specific prohibitions--California-listed wastes	**UP TO DATE** WIPP generated California-listed wastes receive treatment prior to TSDF land disposal [Section 2.2.2.18]
40 CFR 268.33	Waste prohibitions--first-third wastes	**UP TO DATE** WIPP generated first-third wastes receive treatment prior to TSDF land disposal [Section 2.2.2.19]
40 CFR 268.34	Waste prohibitions--second-third wastes	**UP TO DATE** WIPP generated second-third wastes receive treatment prior to TSDF land disposal [Section 2.2.2.20]

TABLE 2-3 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
40 CFR 268.35	Waste prohibitions--third-third wastes	UP TO DATE WIPP generated third-third wastes receive treatment prior to TSDF land disposal [Section 2.2.2.21]
40 CFR 268.41	Treatment standards expressed as concentrations in waste extract	UP TO DATE WIPP provides appropriate treatment standards on the notification and/or certification forms that accompany each shipment of LDR wastes. WIPP does not treat site generated hazardous wastes [Section 2.2.2.22]
40 CFR 268.42	Treatment standards expressed as specified technologies	UP TO DATE WIPP provides appropriate treatment standards on the notification and/or certification forms that accompany each shipment of LDR wastes. WIPP does not treat site generated hazardous wastes [Section 2.2.2.23]

TABLE 2-3 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
40 CFR 268.43	Treatment standards expressed as waste concentrations	**UP TO DATE** WIPP provides appropriate treatment standards on the notification and/or certification forms that accompany each shipment of LDR wastes. WIPP does not treat site generated hazardous wastes [Section 2.2.2.24]
40 CFR 268.44	Variance from a treatment standard	**NOT APPLICABLE** No treatment standards for mixed waste [Section 2.2.2.25]
40 CFR 268.50	Prohibitions on storage of restricted wastes	**UP TO DATE** WID procedures and manuals [Section 2.2.2.26]

2.2.2.1 Purpose, Scope, and Applicability, 40 CFR 268.1

The hazardous wastes restricted from land disposal are specified in this chapter. Limited circumstances are described under which an otherwise prohibited waste may continue to be land disposed.

The requirements of 40 CFR Part 268 apply to generators and to the owners and operators of hazardous waste TSDFs. Therefore, WIPP is subject to 40 CFR Part 268. WID procedures are in place for identifying and characterizing hazardous waste generated at the facility.

With respect to WIPP as a TSDF, restricted waste may continue to be placed in a salt-bed formation when an exemption from a prohibition pursuant to a petition under 268.6 has been granted. WIPP obtained such an exemption for the test phase during which TRU mixed waste was to be tested at WIPP [i.e., the EPA's *Conditional No-Migration Determination for the WIPP Test Phase* (NMD) dated November 14, 1990]. In the wake of the DOE's decision to test TRU and TRU mixed waste only at non-WIPP facilities, some of the conditions specified in the EPA's NMD no longer apply (see Section 2.3 of this chapter).

2.2.2.2 Submittal of Petitions to Allow Land Disposal of Prohibited Waste, 40 CFR 268.6(a)

A petition may be submitted to the Administrator requesting land disposal of a waste that is prohibited under Subpart C of Part 268. The petition must demonstrate, with a reasonable degree of certainty, that there will be no migration of hazardous constituents from the unit as long as the wastes remain hazardous.

The *WIPP No-Migration Variance Petition* (NMVP) was submitted to the EPA in January 1990 and revised in March 1990 (DOE, 1990f). The EPA granted the NMD for the test phase in November 1990 (EPA, 1990b). Another petition must be prepared for the disposal phase and EPA approval obtained before TRU mixed waste may be received at WIPP.

2.2.2.3 Criteria for the Demonstration of No-Migration in Petition, 40 CFR 268.6(b)

A number of criteria for demonstrating no-migration in the petition are specified.

All criteria specified were met in the WIPP NMVP, as demonstrated by the EPA's granting of the NMD for the test phase at WIPP.

Since the NMVP and the NMD pertained only to the testing of TRU and TRU mixed waste at WIPP during the test phase, a new NMVP must be submitted to the EPA for the disposal phase at WIPP. One of the requirements that must be completed prior to the implementation of the disposal phase is the EPA's publication of a variance for this phase.

2.2.2.4 Contents of Petition, 40 CFR 268.6(c)

> *Each petition must include a monitoring plan for the monitoring program required to verify continued compliance with the conditions of the variance; baseline monitoring prior to receipt of the prohibited waste; submittal of the monitoring data to the Administrator; retention of the data on site in the operating record; and the Administrator's approval of all sampling, testing, and analytical data as well as of all estimation and monitoring techniques and the quality assurance and quality control plan for the monitoring program.*

The NMVP submitted to the EPA in March 1990 contained all topics required in such a petition. These topics included the monitoring program and plan for volatile organic compounds (VOCs) (NMVP, Section 2.8; Appendices H, I, J, and K; and Chapter 6 of the addendum to the NMVP); baseline monitoring prior to receipt of the prohibited waste (NMVP Addendum, Chapter 6); submittal of monitoring data to the Administrator (NMVP Addendum, Chapter 6); and retention of the data in the operating record on site (WID procedure). The estimation and monitoring techniques and the quality assurance/quality control (QA/QC) program for the VOC monitoring program were included in the NMVP; their approval by the Administrator is implied by the EPA's publication of the NMD. The Administrator's approval of WIPP's sampling, listing, and analytical data is predicated upon EPA approval of the annual VOC monitoring report required by the NMD (see Section 2.3).

2.2.2.5 Submittal of Petition to EPA Administrator, 40 CFR 268.6(d)

> *Each petition must be submitted to the EPA Administrator.*

In March 1989, the DOE submitted the NMVP to the EPA. In response to requests for additional information from the EPA, the DOE submitted two addenda to the NMVP, one on October 1, 1989, the other on January 22, 1990. For the convenience of commentors, the various portions of the petition and addenda were consolidated and reprinted as a single eight-volume document dated March 1990.

The EPA published its *Notice Proposing to Grant a Conditional Variance to the Department of Energy Waste Isolation Pilot Plant (WIPP) for Land Disposal Restrictions* in the *Federal Register* on April 6, 1990 (EPA, 1990a); the *Conditional No-Migration Determination for the Department of Energy Waste Isolation Pilot Plant (WIPP)* was published on November 14, 1990 (EPA, 1990b). (See Section 2.3 for the conditions imposed on WIPP by these documents.)

2.2.2.6 Consistency of Activities with those Described in the Petition and Notification of EPA of Changes in Conditions, 40 CFR 268.6(e)

After a petition has been approved, any changes in conditions at the unit or the environment around the unit that significantly depart from the conditions described in the variance and affect the potential for migration of hazardous constituents from the unit must be reported.

A WID procedure has been prepared and implemented for reviewing changes (either planned or unplanned) in conditions at WIPP and/or the surrounding environment that may significantly depart from conditions described in the NMD and affect the potential for migration of hazardous constituents beyond the unit boundary. The purpose of this procedure is to ensure that such changes or proposed changes will trigger notification of the DOE, which will notify the EPA in accordance with 40 CFR 268.6(e) and (f). Any deliberate plans to modify or add to the procedures and conditions (e.g., experimental test plans, repository design, construction, and operations) set forth in the *WIPP Test Phase Plan: Performance Assessment* (DOE, 1990c) or the NMD constitute "planned changes." Action taken to mitigate the effects of unintentional deviations from what was modeled or predicted in the *WIPP Test Phase Plan: Performance Assessment* or the NMD are unplanned changes. Unplanned changes may be related to repository performance (e.g., revised understanding of site geology and hydrology characteristics due to new data, facility design and operations, predicted environmental impacts, modeled uncertainty analyses) or the migration of hazardous constituents.

The Administrator must be notified in writing at least 30 days prior to making any proposed change. The requirement states that the Administrator will determine whether the change invalidates the terms of the petition and will determine the appropriate response. In addition, any change must be approved by the Administrator prior to being made. If a condition at the site that was modeled or predicted in the petition does not occur as predicted, the Administrator must be notified in writing within 10 days of the discovery of the change. If conditions do not occur as modelled or predicted, the Administrator will determine any further action, including termination of waste acceptance and revocation of the petition, petition modification, or other actions.

2.2.2.7 Activities Required if Hazardous Constituents Migrate, 40 CFR Part 268.6(f)

If hazardous constituents are found to have migrated from the repository, receipt of prohibited waste at the unit must be suspended immediately, and the Administrator must be notified in writing within 10 days of the determination that a release occurred. Within 60 days of the receipt of the notification, the Administrator will determine whether the facility may continue receiving prohibited waste in the unit, whether the variance is to be revoked, and whether further examination of any migration is warranted under applicable provisions of 40 CFR Part 264 or 265.

In the event that hazardous constituents are found to have migrated from the unit, a WIPP procedure will be invoked, according to which the DOE is responsible for arranging the immediate suspension of the receipt of restricted waste. The DOE is also responsible for notifying the EPA Regional Administrator within the required time frame.

2.2.2.8 Certification in Petition, 40 CFR 268.6(g)

Each petition must include a signed certification statement indicating the completeness and accuracy of the information included.

A signed certification accompanied the submittal of the NMVP to the EPA.

2.2.2.9 Additional Information Requested by the Administrator, 40 CFR 268.6(h)

The Administrator may request additional information to evaluate the demonstration.

Additional information was requested by the EPA after the DOE submitted the original NMVP in March 1989. The additional information was provided to the EPA on October 1, 1989. Additional requests for information from the EPA resulted in the preparation and submittal of a second addendum in January 22, 1990. (See also response in Section 2.2.2.5.)

2.2.2.10 Length of Variance, 40 CFR 268.6(k)

The term of a variance granted by the EPA will be no longer than the term of the RCRA permit or up to 10 years from the date of approval for an interim-status TSDF.

The NMD provides for a 10-year term for the variance (i.e., through November 14, 2000).

2.2.2.11 Non-Exemption of Liquid Hazardous Wastes Containing PCBs, 40 CFR 268.6(n)

Liquid hazardous wastes containing $\geq$ 500 ppm of polychlorinated biphenyls (PCBs) are not eligible for an exemption under this section.

The *WIPP Waste Acceptance Criteria* (WAC; DOE, 1991b) allow only residual liquids, not to exceed 1 percent of the volume of the internal container. Furthermore, there are no plans to accept PCBs or PCB-containing wastes at WIPP.

2.2.2.12 Waste Analysis and Recordkeeping, 40 CFR 268.7

Waste analysis and recordkeeping requirements include the retention of any notices and certifications from the generator site that the waste meets the treatment standards of Subpart D and the results of the testing of the waste or of an extract of the waste to ensure that the wastes are in compliance with the treatment standards. The testing must be performed in accordance with the facility's waste analysis plan.

No treatment standards currently exist for mixed waste; therefore, no such notices and certifications are anticipated from the generator sites. Prior to the initiation of the disposal phase at WIPP, the DOE will submit a variance petition for disposal to the EPA. If the EPA grants a variance for the disposal phase, the DOE will be allowed to ship untreated TRU and TRU mixed waste to WIPP upon completion of all other pre-disposal-phase requirements.

Sampling and analysis will be conducted at the generator sites as addressed in the *Waste Analysis Plan* (DOE, 1993d), the *Waste Characterization Program Sampling and Analysis Guidance Manual* (DOE, 1992a), and the *Quality Assurance Program Plan for the Experimental Waste 2 Characterization Program* (DOE, 1991d). Sampling consists of visual examination (including weighing of individual items), real-time radiography, and headspace gas sampling of drums and

of the inner containers within the drums. Samples are analyzed for both organic and inorganic constituents. Process knowledge will also be used where possible.

The amount of sampling and analysis to be done at WIPP must be determined. However, minimizing the opening of the drums containing TRU and TRU mixed waste will minimize the potential for contamination at WIPP.

As a generator of land disposal restricted waste, WIPP provides with each shipment, the appropriate notification and/or certification forms to the TSDF accepting the waste. WID procedures provide guidance regarding compliance with the generator requirements under this part (see also Chapter 25 on compliance with 40 CFR 262.40).

2.2.2.13 Landfill and Surface Impoundment Disposal Restrictions, 40 CFR 268.8

Specific disposal restrictions apply to landfills and surface impoundments. Generators must make a good faith effort to locate and contract with treatment and recovery facilities prior to disposing of hazardous waste in landfills and surface impoundments.

As a generator, WIPP has provisions in place for shipping its hazardous waste to treatment and/or recovery facilities. Surface impoundments are not used.

WIPP will not manage TRU mixed waste using surface impoundments or landfills. Thus, the disposal restrictions for landfills and surface impoundments do not apply to WIPP as a TSDF.

2.2.2.14 Special Rules Regarding Wastes Exhibiting a Characteristic, 40 CFR 268.9

Special rules have been promulgated regarding wastes that exhibit a characteristic. The generator of the waste must determine the EPA Hazardous Waste Number for the waste to ascertain the applicable treatment standard under Subpart D of 40 CFR Part 268.

WIPP personnel determine the appropriate EPA Hazardous Waste Number for all hazardous waste generated at WIPP. This information is included on the manifest that is sent to the TSDF that will receive the waste.

The requirements of 40 CFR 268.9 are not applicable to WIPP as a TSDF. No treatment standards currently exist for mixed waste. A variance from these requirements similar to the NMD for the test phase at WIPP will be needed for the disposal phase.

Waste generated at WIPP will be handled in accordance with WID procedures. These procedures provide guidance regarding compliance with the generator requirements (see also Chapter 25 on compliance with 40 CFR 262.40).

2.2.2.15 Identification of Waste to be Evaluated, 40 CFR 268.10-12

> *Wastes to be evaluated for land-disposal prohibition and establishment of treatment standards were divided into three thirds. Mixed waste, which was to have been evaluated by May 8, 1990, was included in the "third third."*

No treatment standards have been devised for mixed waste. Therefore, the emplacement of any mixed waste at WIPP will require a variance from the requirement for treatment prior to shipment to WIPP. The mixed wastes expected to be received at WIPP for disposal will be listed in Part A of the RCRA permit application for the disposal phase.

2.2.2.16 Waste-Specific Prohibitions--Solvent Wastes, 40 CFR 268.30

> *Solvent wastes are prohibited from land disposal unless they are treated in accordance with the treatment standards of Subpart D.*

WIPP generated solvent wastes receive treatment prior to land disposal.

The EPA granted a variance from the treatment standards for the test phase in the NMD.

2.2.2.17 Waste-Specific Prohibitions--Dioxin-Containing Wastes, 40 CFR 268.31

> *Dioxin-containing wastes are prohibited from land disposal unless they are treated in accordance with the treatment standards of Subpart D.*

No dioxin-containing wastes are generated at WIPP.

The EPA granted a variance from the treatment standards for the test phase in the NMD.

2.2.2.18 Waste-Specific Prohibitions--California-Listed Wastes, 40 CFR 268.32

California-listed wastes are prohibited from land disposal unless they are treated in accordance with the treatment standards of Subpart D.

WIPP generated California-listed wastes receive treatment prior to land disposal.

The EPA granted a variance from the treatment standards for the test phase in the NMD.

2.2.2.19 Waste Prohibitions--First-Third Wastes, 40 CFR 268.33

First-third wastes are prohibited from land disposal unless they are treated in accordance with the treatment standards of Subpart D.

WIPP generated first-third wastes receive treatment prior to land disposal.

The EPA granted a variance from the treatment standards for the test phase in the NMD. Since mixed wastes are categorized as third-third wastes, see Section 2.2.2.21.

2.2.2.20 Waste Prohibitions--Second-Third Wastes, 40 CFR 268.34

Second-third wastes are prohibited from land disposal unless they are treated in accordance with the treatment standards of Subpart D.

WIPP generated second-third wastes receive treatment prior to land disposal.

The EPA granted a variance from the treatment standards for the test phase in the NMD. Since mixed wastes are categorized as third-third wastes, see Section 2.2.2.21.

2.2.2.21 Waste Prohibitions--Third-Third Wastes, 40 CFR 268.35

Third-third wastes are prohibited from land disposal unless they are treated in accordance with the treatment standards of Subpart D.

WIPP generated third-third wastes receive treatment prior to land disposal.

In the NMD, the EPA granted a variance from the treatment standards for the test phase at WIPP. A new variance or treatment of mixed waste will be required prior to WIPP's acceptance of TRU mixed waste at WIPP during the disposal phase.

2.2.2.22 Treatment Standards Expressed as Concentrations in Waste Extract, 40 CFR 268.41

Treated waste must meet the treatment standards expressed as concentrations in waste extract for the waste to be land disposed.

The EPA granted a variance (i.e., the NMD) from the treatment standards for mixed waste land disposal at WIPP during the test phase. A new variance will be required from the EPA prior to WIPP's acceptance of TRU mixed waste during the disposal phase.

The WIPP facility does not treat site-generated hazardous waste subject to land disposal regulations. It does, however, provide the appropriate treatment standards on the notification and/or certification forms that accompany each shipment of LDR waste. (see 2.2.2.12)

2.2.2.23 Treatment Standards Expressed as Specified Technologies, 40 CFR 268.42

Certain wastes must be treated with the technologies specified in this section for the wastes to be land disposed.

The EPA granted a variance (i.e., the NMD) from the treatment standards for mixed waste land disposal at WIPP during the test phase, when TRU mixed wastes were to have been tested at WIPP. A new variance from the EPA will be required prior to WIPP's acceptance of TRU mixed waste during the disposal phase. Therefore, these requirements are not applicable.

The WIPP facility does not treat site-generated hazardous waste subject to land disposal regulations. It does, however, provide the appropriate treatment standards on the notification and/or certification forms that accompany each shipment of LDR waste. (see 2.2.2.12)

2.2.2.24 Treatment Standards Expressed as Waste Concentrations, 40 CFR 268.43

The waste concentrations specified in this section may not be exceeded for wastes to be land disposed.

The EPA granted a variance (i.e., the NMD) from the treatment standards for mixed waste land disposal at WIPP during the test phase, when TRU mixed wastes were to have been tested at WIPP. A new variance from the EPA will be required prior to WIPP's acceptance of TRU mixed waste during the disposal phase. Therefore, these requirements are not applicable.

The WIPP facility does not treat site-generated hazardous waste subject to land disposal regulations. It does, however, provide the appropriate treatment standards on the notification and/or certification forms that accompany each shipment of LDR waste. (see 2.2.2.12)

2.2.2.25 Variance from a Treatment Standard, 40 CFR 268.44

A variance from a treatment standard may be granted by the EPA.

This requirement is not applicable as no treatment standards currently exist for mixed waste.

2.2.2.26 Prohibitions on Storage of Restricted Wastes, 40 CFR 268.50

A number of prohibitions and requirements relating to the storage of restricted wastes are specified in this section. They include storing accumulated hazardous/mixed waste for no longer than 1 year and prohibiting liquid hazardous/mixed wastes that contain PCBs at concentrations greater than or equal to 50 ppm unless the facility meets the requirements of 40 CFR 761.65(b) of the Toxic Substances Control Act (TSCA).

As a generator of hazardous waste, programs have been developed at WIPP that demonstrate compliance with the storage prohibitions for restricted waste. WIPP procedure manuals contain the procedures by which waste is identified, collected, stored, manifested, and transported off site for disposal.

This requirement does not apply to waste covered by a variance granted under 40 CFR 268.6. During the disposal phase, small amounts of TRU and TRU mixed waste may be generated at WIPP from managing the TRU waste shipped from the generator sites (i.e., "derived waste"). All such derived waste will be managed as if it were TRU mixed waste. (See also Chapter 25.)

At present, the DOE has no plans to accept PCB-containing waste at WIPP. Furthermore, the *WIPP Waste Acceptance Criteria* (DOE, 1991b) precludes the receipt of liquid waste exceeding 1 percent of the volume of a container.

2.3 Compliance with the Conditional No-Migration Determination (NMD)

On April 6, 1990, the EPA published its *Notice Proposing to Grant a Conditional Variance to the Department of Energy Waste Isolation Pilot Plant (WIPP) from Land Disposal Restrictions* in the *Federal Register* (EPA, 1990a). This was followed by the publication of the EPA's final *Conditional No-Migration Determination for the Department of Energy Waste Isolation Pilot Plant (WIPP)* (NMD) in the *Federal Register* on November 14, 1990 (EPA, 1990b). The NMD specified eight conditions for placement of hazardous constituents at WIPP during the test phase. In addition, four general conditions were established. The NMD also stipulated that the conditions pertaining to the VOC monitoring program that were discussed in detail in the proposed variance published in April be adopted by reference and that compliance with these conditions is also mandatory.

The compliance status of each of these conditions is summarized in Table 2-4; the text provides more detailed information. Conditions 1 through 8 from the NMD are presented in Sections 2.3.1 through 2.3.10. The general conditions from the NMD are discussed in Sections 2.3.11 through 2.3.14, and the specific conditions from the proposed variance that pertain to the VOC monitoring program are contained in Sections 2.3.15 through 2.3.40.

In a DOE news release dated October 21, 1993, DOE changed its previous position of conducting tests with radioactive wastes in the WIPP underground to conducting laboratory tests at a facility other than WIPP. This change in policy is consistent with DOE's phased development approach at WIPP and will allow the DOE and the EPA to focus on disposal certification issues. Because of this policy change, a number of the requirements addressed in this document are no longer applicable to the WIPP facility (specifically those programs resultant from planned test phase operations). However, the DOE has chosen to maintain the programs necessary for compliance with a number of these requirements.

TABLE 2-4. The Conditional No-Migration Determination and the Proposed Variance - Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
EPA's Conditional No-Migration Determination (NMD), *Federal Register*, November 14, 1990, pp. 47700-47721 (55 FR 47700)		
Condition 1, IV.B.1 and VI(1)	Only testing for the purpose of determining the long-term acceptability of WIPP to be performed during the test phase	**NOT APPLICABLE** DOE decision to discontinue WIPP test phase [Section 2.3.1]
Condition 2, IV.B.2 and VI(2)	Wastes not to exceed 8,500 drums or 1 percent of repository's total capacity	**NOT APPLICABLE** DOE decision to discontinue WIPP test phase [Section 2.3.2]
Condition 3, IV.B.3 and VI(3)	Retrieval of waste if noncompliance with 40 CFR 268.6	**NOT APPLICABLE** DOE decision to discontinue WIPP test phase [Section 2.3.3]
Condition 4, IV.B.4 and VI(4)	Readily retrievable placement of waste	**NOT APPLICABLE** DOE decision to discontinue WIPP test phase [Section 2.3.4]
Condition 5, IV.B.5 and VI(5)	Installation of carbon adsorption device	**ACHIEVED** Carbon adsorption device installed [Section 2.3.5]

TABLE 2-4 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
Condition 6, IV.B.6 and VI(6)	Implementation of air monitoring plan for VOCs	**UP TO DATE** VOC Monitoring Plan; WID procedures (see also Sections 2.3.15-2.3.40) [Section 2.3.6]
Condition 7(a), IV.B.7(a) and VI(7)(a)	Waste analysis: flammable mixtures of gases	**UP TO DATE** *Waste Analysis Plan*; WID procedure [Section 2.3.7]
Condition 7(b), IV.B.7(b) and VI(7)(b)	Waste analysis: comparison of analytical results with estimated compositions	**UP TO DATE** *Waste Analysis Plan*; WID procedure [Section 2.3.8]
Condition 7(c), IV.B.7(c) and VI(7)(c)	Waste analysis: maintenance of records	**UP TO DATE** Records maintained by WID [Section 2.3.9]
Condition 8, IV.B.8 and VI(8)	Annual report	**UP TO DATE** Annual reports submitted [Section 2.3.10]

TABLE 2-4 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
General Conditions for Compliance with the NMD (EPA, 1990b)		
General condition (GC) 1, IV.B.1	Correlation between wastes received and those described in the No-Migration Variance Petition (NMVP)	**UP TO DATE** NMVP; WID procedure [Section 2.3.11]
GC 2, VI	Notification of EPA of changes in conditions	**UP TO DATE** WID procedure [Section 2.3.12]
GC 3, VI	Suspension of receipt of restricted wastes and notification of EPA in the event of migration of hazardous constituents from the repository	**UP TO DATE** WID procedures [Section 2.3.13]
GC 4, VI	Term of petition approval	**UP TO DATE** NMD valid until November 14, 2000 [Section 2.3.14]
Additional Requirements for Air Monitoring under the Proposed Variance (PV) Published in the *Federal Register* on April 6, 1990 (EPA, 1990a)		
PV 1, IV.K	Monitoring in the exhaust shaft	**UP TO DATE** VOC Monitoring Plan; monitoring implemented July-August 1991 [Section 2.3.15]

TABLE 2-4 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
PV 2, IV.K	Monitoring of bin-scale experiment rooms	**UP TO DATE** VOC Monitoring Plan; monitoring implemented July-August 1991 [Section 2.3.16]
PV 3, IV.K	Monitoring of alcoves	**NOT APPLICABLE** DOE decision to discontinue WIPP test phase [Section 2.3.17]
PV 4, IV.K.1	Measurement of the leakage rate of sealed alcoves	**NOT APPLICABLE** DOE decision to discontinue WIPP test phase [Section 2.3.18]
PV 5, IV.K.1	Weekly collection of air samples	**UP TO DATE** VOC Monitoring Plan [Section 2.3.19]
PV 6, IV.K.1	Weekly monitoring at the exhaust shaft and air intake locations	**UP TO DATE** VOC Monitoring Plan [Section 2.3.20]
PV 7, IV.K.1	Monitoring frequency for the bin discharge system	**UP TO DATE** VOC Monitoring Plan; VOC Monitoring Quality Assurance Program Plan (QAPP) [Section 2.3.21]

TABLE 2-4 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
PV 8, IV.K.1	Increased monitoring frequency due to increased variability	**UP TO DATE** VOC Monitoring Plan [Section 2.3.22]
PV 9, IV.K.2	Routine quantification of any VOC	**UP TO DATE** VOC Monitoring Plan; VOC Monitoring QAPP [Section 2.3.23]
PV 10, IV.K.2	Standard operating procedures to identify certain other VOCs	**ACHIEVED** VOC Monitoring Plan; VOC Monitoring QAPP; WID procedure [Section 2.3.24]
PV 11, IV.K.3	Use of the average response factor for each target analyte	**ACHIEVED** VOC Monitoring Plan; VOC Monitoring QAPP [Section 2.3.25]
PV 12, IV.K.4	Use of standard operating procedures to ensure the validity of the monitoring data	**ACHIEVED** VOC Monitoring QAPP; WID manual and procedures [Section 2.3.26]
PV 13, IV.K.4	Recalibration of instruments	**UP TO DATE** VOC Monitoring QAPP [Section 2.3.27]

TABLE 2-4 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
PV 14, IV.K.4	Establishment and annual evaluation of the method limit of quantification for each target analyte	UP TO DATE VOC Monitoring Plan; VOC Monitoring QAPP [Section 2.3.28]
PV 15, IV.K.4	Separate determination of the method limit of quantification for the bin, alcove, and exhaust shaft monitoring locations	ACHIEVED VOC Monitoring Plan; VOC Monitoring QAPP Section 2.3.29]
PV 16, IV.K.4	Collection and analysis of recovery samples	UP TO DATE VOC Monitoring Plan; VOC Monitoring QAPP [Section 2.3.30]
PV 17, IV.K.4	Collection and analysis of duplicate samples	UP TO DATE VOC Monitoring Plan; VOC Monitoring QAPP; WID procedures [Section 2.3.31]
PV 18, IV.K.4	Validation of the completeness of the data	UP TO DATE VOC Monitoring QAPP [Section 2.3.32]
PV 19, IV.K.4	Tracking and evaluation of accuracy, precision, and completeness of the data	UP TO DATE VOC Monitoring QAPP [Section 2.3.33]

TABLE 2-4 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
PV 20, IV.K.4	Performance of systems audits	**UP TO DATE** VOC Monitoring QAPP [Section 2.3.34]
PV 21, IV.K.4	Corrective action required for improper conditions or practices	**ACHIEVED** VOC Monitoring QAPP [Section 2.3.35]
PV 22, IV.K.4	Establishment of specific quality assurance objectives for data acceptability	**ACHIEVED** VOC Monitoring QAPP [Section 2.3.36]
PV 23, IV.K.4	Corrective action required	**ACHIEVED** VOC Monitoring QAPP [Section 2.3.37]
PV 24, IV.K.5	Annual averaging of concentrations of targeted constituents	**ACHIEVED** WID procedures; annual reports [Section 2.3.38]
PV 25, IV.K.5	Submittal of annual data summaries and summaries of data accuracy, precision, and completeness for each monitoring location	**ACHIEVED** WID procedures; annual reports [Section 2.3.39]

TABLE 2-4 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
PV 26, IV.K.5	Maintenance of documentation on all aspects of QA/QC	ACHIEVED WID procedures [Section 2.3.40]

2.3.1 Condition 1, Testing Only of Long-Term Acceptability of WIPP

Only testing for the purpose of determining WIPP's long-term acceptability is to be performed during the test phase.

Due to DOE's decision to discontinue plans for radioactive waste tests in the WIPP underground, this condition is no longer applicable.

2.3.2 Condition 2, Wastes Not to Exceed 8,500 Drums or 1 Percent of the Repository's Total Capacity

Waste to be emplaced during the test phase at WIPP will not exceed 8,500 drums or 1 percent of repository's total capacity.

Prior to the promulgation of the LWA, the DOE was limited to emplacing no more than 8,500 drums, or 1 percent of the total planned capacity of the WIPP, as specified by the NMD. The LWA, however, further restricts the amount of waste that may be emplaced at the WIPP during the test phase to one-half of 1 percent of the total capacity of the repository (i.e., 4,250 drums). The WIPP-related DOE documents that have been issued since the promulgation of the LWA on October 30, 1992, reflect this change and commit to emplacing no more than this latter volume of TRU waste underground. Due to DOE's decision to discontinue plans for radioactive waste tests in the WIPP underground, this condition is no longer applicable.

2.3.3 Condition 3, Retrieval of Waste in the Event of Noncompliance with 40 CFR 268.6

If the DOE cannot demonstrate compliance with the standards of 40 CFR 268.6, all wastes emplaced in WIPP must be removed.

During the test phase, all waste emplaced in the WIPP underground waste management area was to be maintained in a manner that would ensure that wastes were readily retrievable. The DOE prepared the *Waste Retrieval Plan for the Waste Isolation Pilot Plant* (DOE, 1993b) to specify retrieval actions and to demonstrate the ability to retrieve waste. The original waste retrieval plan was issued in May, 1990. This plan has subsequently been revised and issued as Revision 1 (DOE, 1993b). The DOE would submit the required retrieval schedule in the event that it was determined that the repository could not meet the standards for long-term disposal or 6 months prior to the expiration of the petition approval. Due to DOE's decision to discontinue plans for radioactive waste tests in the WIPP underground, this condition is no longer applicable.

2.3.4 Condition 4, Readily Retrievable Placement of Waste

> *All wastes emplaced at WIPP during the test phase must be placed in a readily retrievable manner.*

The EPA defined "readily retrievable" in the NMD as the adoption of specific measures identified in the NMVP to maintain room stability, such as room size, rock bolting, standoff walls, and the use of easily retrieved waste containers (e.g., boxes and drums). This information and the DOE's commitments to maintain the waste in a readily retrievable manner are included in the *Waste Retrieval Plan* and in Section 2.6.8 of the NMVP. This information was reviewed by the EPA during its review of the NMVP. Subsequently on March 19, 1993, the DOE submitted Revision 1 of the Waste Retrieval Plan to the EPA.

The DOE had agreed that no backfilling would be used to seal the rooms in which waste would be emplaced during the test phase; such backfilling would greatly decrease the retrievability of the emplaced waste. Due to DOE's decision to discontinue plans for radioactive waste tests in the WIPP underground, this condition is no longer applicable.

2.3.5 Condition 5, Installation of a Carbon Adsorption Device

> *The DOE must install and operate a carbon adsorption device designed to achieve a control efficiency of 95 percent in the discharge system of the bin experiment rooms.*

A carbon adsorption control device has been installed underground as required by this condition. The efficiency of the carbon adsorption system depends upon the surface area of the carbon, the quantity of carbon used, the flow rate of air through the system, and the types and quantities of constituents to be adsorbed. Data to document that the carbon sorption system is at least 95 percent efficient in removing VOCs are maintained as part of the WIPP operating record as specified by the EPA. The following data are being collected and maintained:

- The date and time when the carbon in the control device is replaced with fresh carbon and when Volatile Organic Sampling Train (VOST) tube samples are collected for monitoring carbon breakthrough, along with records of the monitoring results;

- Engineering design analyses used to size the control device and to determine the frequency of carbon replacement; and

- A signed certification that all carbon removed from the control device is regenerated or reactivated by a process that minimizes the release of VOCs to the atmosphere or is disposed of in compliance with Federal and State of New Mexico regulations.

The bin-scale test VOC monitoring system includes three VOST tubes. Samples of carbon packed in the tubes are analyzed, and test results, along with the system mass flow data, provide a basis for estimating the lifetime of the carbon in the main sorption unit.

2.3.6 Condition 6, Implementation of the Air Monitoring Plan for VOCs

> *The DOE must implement the air monitoring plan for VOCs described in Section IV.K of the proposed variance (see also BECR Sections 2.3.15 through 2.3.40). Requirements include weekly monitoring of the five targeted VOCs, QA/QC, collection of a matrix spike and a concurrent matrix duplicate to adjust for background VOC concentrations, ±10 percent accuracy of the concentration data, a quarterly check on the calibration of the ventilation exhaust fans, and annual calibration. The five target compounds are carbon tetrachloride; methylene chloride; trichloroethylene; 1,1,1-trichloroethane; and 1,1,2-trichloro-1,2,2-trifluoroethane.*

The VOC monitoring program described in the addendum to the NMVP has been implemented at WIPP. The EPA required that this program be implemented 30 days prior to the first receipt of TRU waste at WIPP. This requirement was met during July and August of 1991. Records relating to VOC air monitoring are being maintained in the WIPP operating record and will be retained for the term of the NMD (i.e., until November 14, 2000) or for 3 years, whichever is longer, as required by this condition.

The monitoring schedule shows requirements for weekly monitoring of VOCs.

Affidavit VOC Prog. A.52.07 indicates that the DOE has committed to a full dynamic calibration of the exhaust fans annually, with quarterly checks (Section 2.4 of the affidavit). The quarterly checks consist of a Pitot tube traverse, comparing the measured value from the reference method with that of the system being tested. If the system is outside tolerance, a full dynamic calibration will be performed. The quarterly checks are performed in accordance with WID preventive maintenance procedures.

2.3.7 Condition 7(a), Waste Analysis: Flammable Mixtures of Gases

> *Three conditions were imposed relating to waste analysis. The first of these conditions is that the DOE ensure that each waste container emplaced underground at WIPP has no layer of confinement in containers that contain flammable mixtures of gases. This prohibition must be implemented by analytical testing of headspace gases from each drum/container. (The other two conditions relating to waste analysis are described in Sections 2.3.8 and 2.3.9.)*

The *Waste Analysis Plan* (DOE, 1993d) requires DOE waste generators to provide the required information to the DOE prior to the shipment of waste to WIPP. The DOE will approve shipment to WIPP of only those wastes for which the required information has been provided. Only waste meeting the criteria specified in Conditions 7(a)-(c) will be approved for shipment (Sections 2.3.7 through 2.3.9).

Waste-category-specific waste profile plans were developed for categories of waste proposed for emplacement in WIPP during the test phase. The plans specified the waste characterization activities to be performed to meet the minimal information requirements that were to be satisfied through the implementation of each plan. The minimal requirements include testing the waste containers for flammable gases. Only those waste containers tested in accordance with this condition and demonstrated to be within the EPA-specified flammability limits will be acceptable for shipment to the WIPP.

A WID procedure is in place that addresses the review of waste characterization records from the generator sites to verify that each waste container emplaced at the WIPP has no layer of confinement containing flammable mixtures of gases, as defined in the NMD [i.e., "measured concentrations (excluding methane) of 500 parts per million or greater"]. This review is conducted by WID in accordance with a WID procedure. This procedure contains a checklist which is used to verify that the data contained in the Bin Case Addendum Report (i.e., the results of bin sampling and analysis) meet the requirements of the NMD. This checklist directs the WID reviewer to ensure that the concentration of flammable VOCs in the headspace of the bin does not exceed a concentration of 500 parts per million (ppm). If the concentration of

flammable VOCs exceeds 500 ppm, the WID reviewer ensures (in accordance with the checklist) that an explicit flame test has been conducted and that the results of this test were negative (i.e., not flammable), as required by the NMD[1]. At the generator sites, all internal layers of confinement are breached while a bin of waste is loaded. As such, the only layer of confinement in a bin of waste is the bin itself. Since the bin was to have been the "container emplaced at the WIPP," a bin headspace sample would have been used to verify that the NMD flammability limit has not been exceeded. Due to DOE's decision to discontinue plans for radioactive waste tests in the WIPP underground, this condition is no longer applicable.

2.3.8 Condition 7(b), Waste Analysis: Comparison of Analytical Results with Estimated Compositions

> *The second condition pertaining to waste analysis is that the DOE must analyze representative samples of the headspaces of containers and compare the results with the estimated compositions provided in the WIPP NMVP.*

The *Waste Analysis Plan* requires DOE waste generators to provide the required information to the DOE prior to the shipment of the waste to WIPP. The DOE will approve shipment to WIPP of only those wastes for which the required information has been provided. Only waste meeting the criteria specified in Conditions 7(a)-(c) will be approved for shipment (Sections 2.3.7 through 2.3.9).

The results of the headspace tests will be checked to ensure that the gas compositions are comparable to those described in the NMVP. A procedure is in place to ensure that waste characterization records from the generator sites are reviewed to verify that the concentrations of VOCs in the headspace of each container are less than the concentrations listed in the NMD. This review is conducted by WID in accordance with a WID procedure.

2.3.9 Condition 7(c), Waste Analysis: Maintenance of Records

> *The third condition relating to waste analysis is that waste analysis records must be maintained for the term of the NMD or for 3 years after generation, whichever is longer. Records must also be maintained during the course of any enforcement action for which they are relevant.*

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[1]However, the NRC's Certificate of Compliance (C of C) for the TRUPACT-II package prohibits the transportation of waste that exceeds the 500-ppm limit.

The waste analysis records will be maintained in the WIPP operating records throughout the 10-year term of the NMD, for 3 years, or during the course of any enforcement action for which they are relevant, whichever is longer.

2.3.10 Condition 8, Annual Report

The DOE must provide annual written reports to EPA Region VI on the status of DOE's performance assessment during the test phase.

During this reporting period, the Office of Solid Waste at EPA headquarters as well as EPA's Region VI office have been provided with two annual written reports containing a description of the tests to date and their results, modifications to the test plan, a summary of the DOE's current understanding of the repository's performance, waste characterization data from pre-test waste characterization, and an annual summary of VOC monitoring data.

2.3.11 General Condition (GC) 1, Correlation between the Wastes Emplaced by DOE at WIPP and DOE's Activities with those Described in the NMVP

The wastes to be emplaced by the DOE at WIPP and the experiments and tests conducted during the test phase must be consistent with those described in the NMVP and in the DOE's performance assessment test plan.

Wastes to have been emplaced in the WIPP during the test phase would have been consistent with those described in the NMVP. WID uses administrative controls such as procedures to ensure that project activities are consistent with those described in the NMVP. Individuals responsible for initiating changes that could be impactive are required to submit relevant information to WID. WID then ensures that the proposed change is subject to review with respect to departure from the conditions described in the WIPP NMVP. If it is determined that the change proposed is significant and may affect the potential for the migration of hazardous constituents, the EPA will be notified. Any notifications to this effect will also be provided to the NMED.

2.3.12 General Condition 2, Notification of EPA of Changes in Conditions

The DOE must notify the EPA of "any changes in conditions at the unit and/or environment that significantly depart from the conditions described in the variance and affect the potential for migration of hazardous constituents from the unit..." If the change

is planned, the EPA must be notified in writing 30 days before the change; if it is unplanned, the EPA must be notified within 10 days.

Wastes emplaced in the WIPP during the test phase would have been consistent with those described in the NMVP. WID uses administrative controls such as procedures to ensure that project activities are consistent with those described in the NMVP. The responsible individuals are required to submit relevant information to WID. WID is responsible for ensuring that the proposed change is subject to review with respect to departure from the conditions described in the WIPP NMVP. If it is determined that the proposed change is significant and may affect the potential for the migration of hazardous constituents, WID will notify the DOE, which will notify the EPA. Any notifications to this effect will also be provided to the NMED. Any unplanned change will result in notification of the EPA within 10 days.

2.3.13 General Condition 3, Suspension of Receipt of Restricted Wastes and Notification of EPA within 10 Days in the Event of Migration of Hazardous Constituents from the Repository

In the event of the migration of hazardous constituents from the repository, the DOE will suspend receipt of restricted wastes and will notify the EPA (Office of Solid Waste and EPA Region VI) within 10 days.

The NMVP demonstrates that the only credible pathway for the migration of hazardous constituents beyond the unit boundary in concentrations exceeding health-based standards is via the airborne transport of VOCs. The EPA has concurred with this demonstration in the proposed variance and in the NMD.

WID has developed a procedure to implement the determination of airborne concentrations of VOCs in the underground exhaust air stream. In addition, another WID procedure specifies the steps to be taken to notify regulatory authorities in the event of an environmental release of a hazardous material or in the event that migration of a hazardous constituent is determined to have occurred from the WIPP underground waste management area.

2.3.14 General Condition 4, Term of Petition

The term of the petition approval specified in the NMD is 10 years (i.e., until November 14, 2000).

The NMD pertains to the test phase only. Since the test phase no longer will involve the testing of TRU and TRU mixed waste at WIPP, the need for an extension is unlikely.

2.3.15 Proposed Variance Condition (PV) 1, Monitoring in the Exhaust Shaft

Monitoring in the exhaust shaft must begin 30 days prior to the emplacement of any experimental wastes underground.

This requirement is stipulated in Section 3.3 of the *VOC Monitoring Plan for the Bin-Scale Tests*. This requirement was met during July and August of 1991, when VOC monitoring was initiated at WIPP.

It should be noted that this and the rest of the requirements in this section would have been applicable only to the performance of tests on TRU mixed waste at WIPP if they had been conducted. However, the DOE has chosen to maintain the programs necessary for compliance with a number of these requirements.

2.3.16 Proposed Variance Condition 2, Monitoring of Bin-Scale Experiment Rooms

Monitoring of bin-scale experiment rooms must commence prior to emplacement of any bins containing TRU waste.

This requirement is stipulated in Section 3.3 of the *VOC Monitoring Plan for the Bin-Scale Tests*. This requirement was met during July and August of 1991, when VOC monitoring was initiated at WIPP.

2.3.17 Proposed Variance Condition 3, Monitoring of Alcoves

Monitoring of alcoves must commence prior to initiation of alcove experiments, after alcoves are sealed, and prior to purging of alcove atmosphere.

Due to DOE's decision to discontinue plans for radioactive waste tests in the WIPP underground, this condition is no longer applicable.

2.3.18 Proposed Variance Condition 4, Leakage Rate of the Sealed Alcoves

The leakage rate of the sealed alcoves must be measured by means of injecting tracer gases into the atmosphere within each alcove and monitoring the tracer gas levels.

Due to DOE's decision to discontinue plans for radioactive waste tests in the WIPP underground, this condition is no longer applicable.

2.3.19 Proposed Variance Condition 5, Weekly Collection of Air Samples

Air samples must be collected at least weekly.

A weekly schedule for collecting air samples for the subsequent analysis of VOCs was being used at the WIPP, as indicated in Section 7.2.1 of the *VOC Monitoring Quality Assurance Program Plan* (WID, 1991a). The monitoring schedule for the first two quarters of 1993 is included in Affidavit VOC Prog. M.66.04. This schedule shows that weekly sampling of VOCs was performed.

2.3.20 Proposed Variance Condition 6, Weekly Monitoring at the Exhaust Shaft and Air Intake Locations

Exhaust shaft and air intake locations must be monitored weekly.

A weekly schedule for collecting air samples for the subsequent analysis of VOCs was being used at the WIPP, as indicated in Section 7.2.1 of the *VOC Monitoring Quality Assurance Program Plan*. Weekly collection of air samples was performed.

2.3.21 Proposed Variance Condition 7, Monitoring Frequency

In no event shall the monitoring frequency for the bin discharge system be reduced to less than 20 percent of the minimum time required for the consumption of the total working capacity of the carbon adsorption system.

This condition is reflected in Section 3.3.1 of the *VOC Monitoring Plan for the Bin-Scale Tests* and in Section 7.2.1 of the *VOC Monitoring Quality Assurance Program Plan.*

2.3.22 Proposed Variance Condition 8, Increased Monitoring Due to Increased Variability

In the event that the results of weekly air monitoring exhibit increased variability, daily air sampling must be resumed if the calculated relative standard deviation in the preceding 4-week period at the monitoring locations exceeds 75 percent for any targeted constituent.

This condition is reflected in Section 3.3.1 of the *VOC Monitoring Plan for the Bin-Scale Tests*.

2.3.23 Proposed Variance Condition 9, any VOC Routine Quantification of any VOC

Any VOC must be targeted for routine quantification if the average estimated concentration at the point of sampling is 1 ppm or more during any 4-month period and the compound is detected in at least 10 percent of the samples collected from the gas discharge system from either the room containing bins or from 50 percent of the samples collected from any alcove.

This requirement is reflected in Section 4.4 of the *VOC Monitoring Plan for the Bin-Scale Tests* and in Section 9.4.2 of the *VOC Monitoring Quality Assurance Program Plan*.

2.3.24 Proposed Variance Condition 10, Standard Operating Procedures to Identify Certain other VOCs

The DOE must implement standard operating procedures to provide positive identification of the following compounds: perchloroethylene (i.e., tetrachloroethylene), chloroform, bromoform, dichloroethane, dichloroethylene, toluene, and chlorobenzene.

This requirement is reflected in Section 4.2 of the *VOC Monitoring Plan for the Bin-Scale Tests* and in Sections 9.2.1.6 and 9.2.1.7 of the *VOC Monitoring Quality Assurance Program Plan*. To implement these plans, a standard operating procedure (SOP) is in place at the contract laboratory to provide positive identification of these nontargeted VOCs as well as of the targeted compounds, as documented in Affidavit VOC Prog. M.66.03.

2.3.25 Proposed Variance Condition 11, use of the Average Response Factor for each Target Analyte

The average response factor for each target analyte, as determined by five-point instrument calibration, must be used for quantification in high-resolution gas chromatography.

This requirement is reflected in Section 5.5 of the *VOC Monitoring Plan for the Bin-Scale Tests* and in Sections 9.2.1.5 and 9.2.2.4 of the *VOC Monitoring Quality Assurance Program Plan.*

2.3.26 Proposed Variance Condition 12, Standard Operating Procedures to Ensure the Validity of Monitoring Data

Standard operating procedures must be adopted by the DOE to ensure the validity of the monitoring data.

This requirement is reflected in Section 12.0 of the *VOC Monitoring Quality Assurance Program Plan.* A number of procedures have been issued to implement these requirements. Affidavit VOC Prog. M.66.04 examined these WID SOPs to ensure the validity of the VOC Monitoring Program data. The procedures and activities examined during this review were for sampling and analysis certification, instrument calibration checks, duplicate sampling, audit cylinder sampling, technical system audits, and data quality audits. The SOPs developed by the contract laboratory to analyze the samples and certify the canister samples were also covered by the affidavit.

2.3.27 Proposed Variance Condition 13, Recalibration of Instruments

Consistent with EPA's Method 8240 of SW-846, instruments must be recalibrated by a full five-point calibration if the response factor from the calibration check differs by more than 25 percent of the average or expected response factor.

This requirement is reflected in Section 9.2.1.5 of the *VOC Monitoring Quality Assurance Program Plan.*

2.3.28 Proposed Variance Condition 14, Establishment and Annual Evaluation of the Method Limit of Quantification for each Target Analyte

The method limit of quantification for each target analyte must be established prior to the initiation of the monitoring program and must be reevaluated annually thereafter in accordance with EPA/530-SW-90-021, "Quality Assurance and Quality Control," dated August 1990.

This requirement is reflected in Section 6.1.6 of the *VOC Monitoring Plan for the Bin-Scale Tests* and in Section 9.3.2.6 of the *VOC Monitoring Quality Assurance Program Plan.*

2.3.29 Proposed Variance Condition 15, Separate Determination of the Method Limit of Quantification for the Bin, Alcove, and Exhaust Shaft Monitoring Locations

The method limit of quantification must be determined separately for the bin, alcove, and exhaust shaft monitoring locations.

This requirement is reflected in Section 6.1.6 of the *VOC Monitoring Plan for the Bin-Scale Tests* and in Section 9.3.2.6 of the *VOC Monitoring Quality Assurance Program Plan.*

2.3.30 Proposed Variance Condition 16, Collection and Analysis of Recovery Samples

Recovery samples must be collected from audit cylinders and analyzed at a frequency of 10 percent at each monitoring location.

This requirement is reflected in Section 6.1.4 of the *VOC Monitoring Plan for the Bin-Scale Tests* and in Section 9.3.1.4 of the *VOC Monitoring Quality Assurance Program Plan.*

2.3.31 Proposed Variance Condition 17, Collection and Analysis of Duplicate Samples

Duplicate samples must be collected and analyzed at a frequency of 10 percent in each monitoring location, including the exhaust shaft.

This requirement is reflected in Section 6.1.4 of the *VOC Monitoring Plan for the Bin-Scale Tests* and in Section 9.3.1.3 of the *VOC Monitoring Quality Assurance Program Plan*. In addition, Affidavit VOC Prog. M.66.04 examined the procedures pertaining to duplicate sampling and found them to be satisfactory.

2.3.32 Proposed Variance Condition 18, Validation of the Completeness of the Data

Data completeness must be evaluated by data validation audits at a frequency not less than 5 percent.

This requirement is reflected in Sections 9.3.2.10 and 12.4 of the *VOC Monitoring Quality Assurance Program Plan*.

2.3.33 Proposed Variance Condition 19, Tracking and Evaluation of Accuracy, Precision, and Completeness

To ensure that any sampling analysis problems that may occur are detected and corrected, accuracy, precision, and completeness must be tracked and evaluated after every 10 quality control analyses.

This requirement is reflected in Section 9.3.2.9 of the *VOC Monitoring Quality Assurance Program Plan*.

2.3.34 Proposed Variance Condition 20, Performance of Systems Audits

Systems audits must be performed not only prior to the initiation of the monitoring program but also semi-annually thereafter to be consistent with good operating practice.

This requirement is reflected in Section 12.3 of the *VOC Monitoring Quality Assurance Program Plan*.

2.3.35 Proposed Variance Condition 21, Corrective Action Required for Improper Conditions or Practices

Corrective action must be taken whenever a condition or practice is found that is outside systems specifications or SOPs or that could

reasonably be expected to compromise the ability of the monitoring program to meet established quality assurance objectives for data acceptability.

This requirement is reflected in Section 11.0 of the *VOC Monitoring Quality Assurance Program Plan*.

2.3.36 Proposed Variance Condition 22, Establishment of Specific Quality Assurance Objectives

Specific quality assurance objectives must be established for data acceptability for the WIPP air monitoring program consistent with method capability and good operating practice.

This requirement is reflected in Section 9.3.2 of the *VOC Monitoring Quality Assurance Program Plan*.

2.3.37 Proposed Variance Condition 23, Corrective Action Required

Corrective action must be taken whenever quality assurance objectives for data acceptability are not being met.

This requirement is reflected in Section 11.0 of the *VOC Monitoring Quality Assurance Program Plan*.

2.3.38 Proposed Variance Condition 24, Annual Averaging of Concentrations of Targeted Constituents

To determine whether migration has occurred, concentrations of targeted constituents must be averaged over an annual time period.

Procedures addressing this requirement have been issued. The data averaged over an annual time period are included as part of the two annual reports issued to the EPA during this reporting period, which were required by Condition 8 of the NMD (see Section 2.3.10).

2.3.39 Proposed Variance Condition 25, Submittal of Annual Data Summaries and Summaries of Data Accuracy, Precision, and Completeness for each Monitoring Location

Annual data summaries and summaries of data accuracy, precision, and completeness for each monitoring location, together with calculated concentrations at the exhaust shaft and documentation of the actual method limit of detection achieved for each targeted analyte, must be submitted to the EPA.

Procedures addressing this requirement have been issued and implemented as part of a WID manual. These data were included as part of the annual reports issued to the EPA, which are required by Condition 8 of the NMD (see Section 2.3.10).

2.3.40 Proposed Variance Condition 26, Maintenance of Documentation on all Aspects of QA/QC

Documentation on all aspects of QA/QC as described in EPA/530-SW-90-021 must be maintained at WIPP.

Auditable records pertaining to the VOC Monitoring Program were examined under Affidavit VOC Prog. A.12.01. The records were found to be satisfactory.

3.0 COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT

3.1 Summary of the Law

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA; 42 USC §§ 9601 et seq.), or "Superfund," and the Superfund Amendments and Reauthorization Act of 1986 (SARA) establish a comprehensive Federal strategy for responding to, and establishing liability for, releases of hazardous substances from a facility to the environment. The Emergency Planning and Community Right-to-Know Act (EPCRA) was enacted as a stand-alone portion under SARA. It is described in further detail in Chapter 4.

Any spills of reportable quantities of hazardous substances must be reported to the National Response Center (NRCr) under the provisions of § 103 of CERCLA, *Notices, Penalties,* and the implementing regulations in 40 CFR Part 302, *Designation, Reportable Quantities, and Notification*. Because the WIPP is not a CERCLA remediation site and is not expected to become one, most of the requirements of this act do not apply.

The WIPP is liable for any release of hazardous substances as defined in § 101 of CERCLA, *Definitions*, in quantities equal to or greater than the reportable quantities mentioned in § 102; *Reportable Quantities and Additional Designations*, and specified in 40 CFR Part 302. In the event of a release of a hazardous substance to the environment in an amount that meets or exceeds the reportable quantity for that substance, a notification of the release will be made to the appropriate agencies by WIPP personnel as required by § 103 of CERCLA.

Section 120(c) of CERCLA, *Federal Agency Hazardous Waste Compliance Docket*, establishes a docket that provides information regarding Federal facilities that manage hazardous waste or from which hazardous substances may be or have been released. This is information to be submitted to the EPA by other Federal agencies under § 103 of CERCLA or under § 3005, 3010, or 3016 of RCRA. Facilities listed under the docket must prepare a Preliminary Assessment and submit it to the EPA within 18 months of the date of publication in the *Federal Register*. If deemed necessary, a site inspection report is also due to the EPA within the same time frame.

Under 40 CFR Part 300, *National Oil and Hazardous Substances Pollution Contingency Plan* (NCP), the organizational structures and procedures are provided for preparing for and responding to discharges of oil and releases of hazardous substances, pollutants, and contaminants. The NCP is required by § 105 of CERCLA.

3.2 Compliance Status of the Regulatory Requirements

Table 3-1 summarizes each applicable requirement and its compliance status under CERCLA. The text provides more detail on the compliance status of each requirement.

TABLE 3-1. Comprehensive Environmental Response, Compensation, and Liability Act - Summary of Regulatory Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
§ 120, *Federal Facilities*, of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)		
CERCLA, § 120(d)	Assessment and evaluation	**UP TO DATE** Preliminary assessment due August 5, 1994 [Section 3.2.1]
40 CFR Part 300, *National Oil and Hazardous Substances Pollution Contingency Plan*		
40 CFR 300.215(b)	Emergency planning requirements	**ACHIEVED** WIPP representative on Emergency Management Advisory Board/Local Emergency Planning Committee (LEPC) [Section 3.2.2]

TABLE 3-1 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
40 CFR 300.215(e)	Material safety data sheet (MSDS) and inventory form	**ACHIEVED** List of hazardous chemicals; Emergency and Hazardous Chemical Inventory Report (Tier II Report) [Section 3.2.3]
40 CFR Part 302, *Designation, Reportable Quantities, and Notification*		
40 CFR 302.4	Designation of hazardous substances	**ACHIEVED** Spills of ethylene glycol identified as hazardous [Section 3.2.4]
40 CFR 302.5	Determination of reportable quantities (RQs)	**ACHIEVED** Spills of ethylene glycol that exceeded current RQ [Section 3.2.5]
40 CFR 302.6(a)	Notification requirements	**ACHIEVED** Ethylene glycol spills reported to National Response Center (NRCr) [Section 3.2.6]

TABLE 3-1 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
40 CFR 302.6(b)(1)	Release of mixtures or solutions	**ACHIEVED** RQ for mixture of hazardous constituents determined - see Section 3.2.5 [Section 3.2.7]
40 CFR 302.6(b)(2)	Notification of releases of radionuclides	**NOT APPLICABLE** Applicable upon receipt of TRU waste [Section 3.2.8]
40 CFR 302.6(d)	Notification of the release of heavy metals	**NOT APPLICABLE** No release of heavy metals at WIPP [Section 3.2.9]

3.2.1 Assessment and Evaluation of Federal Facilities, § 120 of CERCLA

> *A preliminary assessment and, if warranted, a site inspection must be submitted to the EPA by each Federal facility that is included on the docket of Federal facilities that manage hazardous waste or from which hazardous substances have been released. The preliminary assessment or preliminary assessment//site inspection for a facility must be submitted to the EPA within 18 months of the publication of the notice that includes the facility on the Federal Agency Hazardous Waste Compliance docket.*

On February 5, 1993, WIPP was included as a new facility in the additions made to the Federal Agency Hazardous Waste Compliance Docket in the *Federal Register* (58 *FR* 7298). Therefore, a preliminary assessment for WIPP must be submitted to the EPA by August 5, 1994. As a

result of negotiations with the preliminary assessment coordinator of the Region VI EPA office, only a brief preliminary assessment is required of WIPP at the present time; no site inspection is needed. The brief preliminary assessment is currently in preparation.

3.2.2 Emergency Planning Requirements, 40 CFR 300.215(b)

> *A facility is subject to emergency planning requirements if an extremely hazardous substance [as defined in 40 CFR Part 355] is present at the facility in an amount equal to or in excess of the threshold planning quantity established for the substance. A Governor may designate additional facilities that will also be subject to these planning requirements. Facility owners or operators should name a facility representative who will participate in the planning process as a facility Emergency Coordinator.*

WIPP is subject to the emergency planning requirements. A WIPP representative has been designated to serve as the Emergency Coordinator for the Eddy County Emergency Management Advisory Board, which is very similar to a Local Emergency Planning Committee (LEPC). An official LEPC will be created in 1994; the current WIPP representative to the EMA Board will also represent WIPP on the LEPC. Chapter 4 also discusses this requirement.

3.2.3 Material Safety Data Sheet and Inventory Form, 40 CFR 300.215(e)

> *Each facility required to prepare or have available a material safety data sheet (MSDS) will submit either an MSDS for each hazardous chemical or a list of hazardous chemicals to the appropriate State Emergency Response Commission (SERC), LEPC, and local fire department in accordance with 40 CFR Part 370.*
>
> *Each facility will also submit an inventory form to the SERC, LEPC, and local fire department. This inventory form must contain an estimate of the maximal amount of hazardous chemicals present at the facility during the preceding year, an estimate of the average daily amount of hazardous chemicals at the facility, and the location of those chemicals.*

In lieu of MSDS, WIPP submits a list of those hazardous chemicals that are present at WIPP in amounts that exceed their respective reportable quantities.

The requirement to submit the Emergency and Hazardous Chemical Inventory report to the SERC, LEPC, and local fire department has been met. These requirements are also discussed in Chapter 4.

3.2.4 Designation of Hazardous Substances, 40 CFR 302.4

> *Hazardous substances released to the environment must be identified.*

During this reporting period, there have been three antifreeze spills from WIPP facility systems. The major ingredient of antifreeze is ethylene glycol [Chemical Abstract Service (CAS 107-21-1)]. This substance is designated as a hazardous substance under § 302.4 of CERCLA.

3.2.5 Determination of Reportable Quantities, 40 CFR 302.5

> *Reportable quantities (RQs) are established for each substance listed in Table 302.4 or in Appendix B.*

Each of the spills was determined to have exceeded the RQ for ethylene glycol (currently 1 pound). This determination was based upon the concentration of the ethylene glycol/water mixture, the data obtained from the MSDS, and the current RQ for the substance.

3.2.6 Notification Requirements, 40 CFR 302.6(a)

> *Any release of a hazardous substance in a quantity equal to or exceeding the reportable quantity determined in 40 CFR 302.5 or in 40 CFR Part 117 in any 24-hour period shall immediately be reported to the NRCr at (800) 424-8802.*

The ethylene glycol spills were reported to the National Response Center as required. [See also the *WIPP NPDES Storm Water Pollution Prevention Plan* (WID, 1993b).]

3.2.7 Releases of Mixtures or Solutions, 40 CFR 302.6(b)(1)

> *If a mixture or solution is released and the quantity of all hazardous constituents is known, notification is required when a quantity that meets or exceeds the RQ of any hazardous constituent has been released. If the quantity of one or more of the hazardous constituents is not known, notification is required when the total amount of the mixture or solution released equals or exceeds the RQ for the hazardous constituent with the lowest RQ.*

The determination of the RQs for hazardous constituents of a mixture was discussed in Section 3.2.5.

3.2.8 Notification of Releases of Radionuclides, 40 CFR 302.6(b)(2)

> *Radionuclides are subject to these notification requirements only under the following circumstances:*
>
> - *If the identity and quantity of each radionuclide in a released mixture or solution is known and the sum of the ratios (quantity released in curies/RQ for the radionuclide) for the radionuclides in the mixture or solution is equal to or greater than 1 or*
>
> - *If the quantity of each radionuclide in a released mixture or solution is known but the quantity released (in curies) of one or more of the radionuclides is unknown and the total quantity (in curies) of the mixture or solution is equal to or greater than the lowest RQ of any individual radionuclide in the mixture or solution or*
>
> - *If the identity of one or more radionuclides in a released mixture or solution is unknown and the total quantity (in curies) released is equal to or greater than either 1 curie or the lowest RQ of any known individual radionuclide in the mixture or solution, whichever is lower.*

This requirement will become applicable when WIPP receives TRU waste.

3.2.9 Notification of the Release of Heavy Metals, 40 CFR 302.6(d)

> *Notification of the release of an RQ of solid particles of antimony, arsenic, beryllium, cadmium, chromium, copper, lead, nickel, selenium, silver, thallium, or zinc is not required if the mean diameter released is larger than 100 micrometers except for releases of radionuclides.*

There have been no releases of heavy metals from the WIPP facility to date.

4.0 EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT

4.1 Summary of the Law

Title III of the Superfund Amendments and Reauthorization Act (SARA), otherwise known as the Emergency Planning and Community-Right-to-Know Act of 1986 (EPCRA; 42 USC §§ 11001 et seq.), authorizes a nationwide program of emergency planning as protection against accidents involving extremely hazardous substances (EHSs). The act also requires a comprehensive body of information about hazardous substances to be submitted to various State and local groups. Under Subtitle A, *Emergency Planning and Notification*, facilities such as WIPP are required to make various notifications to the State Emergency Response Commission (SERC) and the Local Emergency Planning Committee (LEPC). These notifications include notification of applicability under EPCRA, designation of a facility Emergency Coordinator, and notification of extremely hazardous substance releases to the environment. Subtitle B, *Reporting Requirements*, requires the submittal of information such as inventories of specific hazardous chemicals used or stored within a facility to the SERC, LEPC, and the fire department that has jurisdiction over the facility. Within Subtitle B, the following sections outline specific reporting requirements: (1) Section 311, *Material Safety Data Sheets*, directs the submission of a Material Safety Data Sheet (MSDS) for each hazardous chemical present or a list of hazardous chemicals present that require an MSDS; (2) Section 312, *Emergency and Hazardous Chemical Inventory Forms*, directs the annual submission of an inventory of hazardous chemicals present during the preceding year; and (3) Section 313, *Toxic Chemical Release Forms*, outlines requirements for facilities to submit a toxic chemical release report to the EPA and the resident State if toxic chemicals are used at that facility in excess of established threshold amounts.

The regulations under 40 CFR Part 355, *Emergency Planning and Notification*, established the list of extremely hazardous substances, the threshold planning quantities, and facility notification responsibilities necessary for the development and implementation of State and local emergency response plans.

The regulations of 40 CFR Part 370, *Hazardous Chemical Reporting: Community Right-to-Know*, established reporting requirements that provide the public with vital information on the hazardous chemicals in their communities, with the intent of ensuring enhanced community awareness of chemical hazards and facilitating the development of State and local emergency response plans.

In 40 CFR Part 372, *Toxic Chemical Release Reporting: Community Right-to-Know*, requirements are established for the submission of information relating to the release of toxic chemicals under Section 313.

4.2 Compliance Status of the Regulatory Requirements

Table 4-1 summarizes the applicable requirements and their compliance status under the Emergency Planning and Community Right-to-Know Act. The text provides more detail on the compliance status of each requirement.

TABLE 4-1. Emergency Planning and Community Right-to-Know Act - Summary of Regulatory Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
40 CFR Part 355, *Emergency Planning Notification*		
40 CFR 355.30(a)-(b)	Emergency planning	**ACHIEVED** Notification submitted to SERC [Section 4.2.1]
40 CFR 355.30(c)	Facility Emergency Coordinator	**ACHIEVED** WIPP Emergency Coordinator; Eddy County Emergency Management Advisory Board and Local Emergency Planning Committee (LEPC) [Section 4.2.2]
40 CFR 355.30(d)	Provision of information	**ACHIEVED** Information provided to LEPC as required [Section 4.2.3]
40 CFR 355.40	Releases of extremely hazardous substances (EHSs)	**NOT APPLICABLE** No EHS releases [Section 4.2.4]

TABLE 4-1 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
40 CFR Part 370, *Hazardous Chemical Reporting: Community Right-to-Know*		
40 CFR 370.21	Submission of MSDS or chemical list	**UP TO DATE** Revised list submitted in March and August 1993 and in March 1994 [Section 4.2.5]
40 CFR 370.25	Submission of hazardous chemical inventory form	**UP TO DATE** Inventory submitted in March 1993 and 1994 [Section 4.2.6]
40 CFR Part 372, *Toxic Chemical Release Reporting: Community Right-to-Know*		
40 CFR 372.30	Submission of the Toxic Chemical Inventory Report	**NOT APPLICABLE** Toxic chemical inventory reporting not required due to certain exemptions [Section 4.2.7]

4.2.1 Emergency Planning, 40 CFR 355.30(a)-(b)

A facility must notify the SERC that it is subject to the emergency planning requirements if there are extremely hazardous substances equal to or in excess of the threshold planning requirements.

DOE has notified the SERC that emergency planning requirements are applicable to the WIPP facility.

4.2.2 Facility Emergency Coordinator, 40 CFR 355.30(c)

> *The facility shall designate a facility representative who will participate in the local emergency planning process as a facility emergency response coordinator.*

WID has appointed a WIPP representative who acts as the Emergency Coordinator for the Eddy County Emergency Management Advisory Board, which will be replaced by an official LEPC in 1994. The same individual will serve in the LEPC as the WIPP Emergency Coordinator.

4.2.3 Provision of Information, 40 CFR 355.30(d)

> *The facility will inform the LEPC of any changes occurring at the facility that may be relevant to emergency planning.*

WIPP provides information to the LEPC regarding changes at the facility which may be relevant to emergency planning.

4.2.4 Releases of Extremely Hazardous Substances, 40 CFR 355.40

> *For releases of extremely hazardous substances under SARA Title III (40 CFR Part 355, Appendix A), the owner or operator must notify the National Response Center of any area that is likely to be affected by the release.*

There have been no releases of extremely hazardous substances from the WIPP.

4.2.5 Submission of a Material Safety Data Sheet or List of Chemicals, 40 CFR 370.21

> *Facilities must submit either an MSDS for each hazardous chemical present at the facility according to established minimum threshold schedules or a list of the hazardous chemicals for which the MSDS is required.*

The WIPP submits a list of hazardous chemicals to the SERC, the LEPC, and the local fire department whenever additional hazardous substances are received at WIPP or if significant new information is received about an item for which a list was provided. In March and August 1993, and again in March 1994, a revised list of hazardous chemicals was submitted to the appropriate organizations. The listing was comprised of extremely hazardous substances present in amounts

equal to or greater than the threshold planning quantity (TPQ) or 500 pounds, whichever was less, and all substances classified as hazardous under the Occupational Safety and Health Act Hazard Communication Standard with site inventories equal to or greater than 10,000 pounds.

4.2.6 Submission of a Hazardous Chemical Inventory, 40 CFR 370.25

> *On or before March 1 of each year, facilities must submit an inventory form containing Tier I information on hazardous chemicals present during the preceding year, or Tier II information in lieu of Tier I, with respect to any specific hazardous chemical at the facility. This inventory must be submitted to the State Emergency Response Commission, the Local Emergency Planning Committee, and the local fire department.*

The WIPP submitted the Emergency and Hazardous Chemical Inventory Report (Tier II) in March 1993 and 1994 to the SERC, LEPC, and the local fire department.

4.2.7 Submission of a Toxic Chemical Release Inventory Report, 40 CFR 372.30

> *For each toxic chemical on site in excess of the reporting threshold level, the owner or operator must submit a completed EPA Form R TO THE EPA AND THE STATE.*

During this reporting period, the WIPP was exempt from Section 313 reporting under 40 CFR 372.38, Exemptions. However, due to the promulgation of Executive Order (EO) 12856 on August 6, 1993, the WIPP is reevaluating the reporting requirements of Section 313, and examining the use of chemicals on site in regards to their relationship to the primary mission. Under section 3-304 of the EO the first report will be due on July 1, 1995, if the WIPP site meets applicable thresholds.

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5.0 ATOMIC ENERGY ACT

5.1 Summary of the Law

The Atomic Energy Act of 1954 as amended (AEA; 42 USC §§ 2011 et seq.) initiated a national program for research, development, and use of atomic energy for both national defense and domestic civilian purposes. In § 161 of the AEA, the Atomic Energy Commission (succeeded by the DOE for national defense purposes) was authorized to prescribe regulations and Orders to:

> [G]overn any activity authorized pursuant to [the AEA], including standards, and restrictions governing the design, location, and operation of facilities used in the conduct of such activity, in order to protect health and to minimize danger to life or property.

The authority of the DOE to develop policies, issue Orders, and promulgate regulations addressing environmental, safety, and health protection aspects of radioactive waste and nuclear materials is derived directly from the AEA. The DOE, under the authority of the AEA, uses a system of Orders, notices, and directives to carry out the mandate to implement effective and consistent programs to protect the public, the environment, and employees from adverse consequences resulting from DOE operations.

The AEA also authorized the U.S. Nuclear Regulatory Commission (NRC) to serve a similar function for commercial nuclear facilities. Regulations promulgated by the NRC under the AEA establish standards for the management of special nuclear material and the protection of the public from radiation. Additional NRC requirements apply to the licensing, packaging, preparation, and transportation of radioactive materials. The NRC does not have regulatory authority over DOE facilities, but NRC standards and requirements are incorporated into DOE Orders. The NRC's requirements pertain to WIPP only in the transportation of TRU waste from the generator sites to WIPP (See Chapter 15).

Much of the waste to be emplaced at the WIPP is mixed (i.e., radioactive waste with hazardous constituents). This waste is subject to dual regulation: the radioactive constituents of the waste are regulated under the AEA, whereas the hazardous constituents are regulated under RCRA. Nevertheless, there may be some circumstances under which RCRA regulation of the hazardous constituents would be found to be inconsistent with AEA health and safety requirements.

The authority of the EPA to establish standards for the protection of the public and the environment from radiation is derived from the AEA, as amended; Reorganization Plan No. 3 of 1970; and the Nuclear Waste Policy Act (NWPA) (Public Law 97-425). The protection standards found at 40 CFR Part 191 apply to spent nuclear fuel and high-level radioactive waste as defined by the Nuclear Waste Policy Act and to TRU waste that contains more than 100 nanocuries per gram of waste of alpha-emitting TRU isotopes with half-lives greater than

20 years. These standards consist of three subparts: A, B, and C. For the purpose of this report, only subpart A is included.

Subpart A, *Standards for Management and Storage*, sets the operational term requirements limiting annual doses to members of the public from management and storage operations at disposal facilities that are operated by the DOE and are not regulated by either the NRC or by agreement States. The annual dose equivalent to any member of the public in the general environment may not exceed 25 millirem (mrem) to the whole body and 75 mrem to any critical organ.

5.2 Compliance Status of the Regulatory Requirements

The compliance status of each of the applicable requirements is summarized in Table 5-1. More detail is provided in the text.

TABLE 5-1. Atomic Energy Act - Summary of Regulatory Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
40 CFR Part 191, *Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level, and Transuranic Radioactive Waste*		
Subpart A, 40 CFR 191.03-191.04	**Standard:** Annual dose equivalent of 25 mrem to whole body and 75 mrem to any critical organ	**NOT APPLICABLE** Will become applicable when waste receipt begins [Sections 5.2.1 and 6.2.2]

5.2.1 Standard, Subpart A of 40 CFR 191.03-191.04

A standard of an annual dose equivalent of 25 mrem to the whole body and 75 mrem to any critical organ has been set for 40 CFR Part 191.

In the Second Modification to the Agreement for Consultation and Cooperation (dated August 4, 1987), the DOE and the State of New Mexico agreed that the WIPP will comply with the standards of Subpart A upon the initial receipt of waste and thereafter. However, since the

only possible pathway for releases from the facility during operations is air, the applicable NESHAPs standard under 40 CFR Part 61, Subpart H (i.e., an annual effective dose equivalent of 10 mrem), is more restrictive. See also the report prepared by the S.M. Stoller Corporation, *Verification of the Station A Alpha CAM Alarm Set Point at the Waste Isolation Pilot Plant* (dated January 17, 1991) and the letter report prepared by Cooper (dated November 2, 1992) that amended the 1991 report.

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6.0 CLEAN AIR ACT

6.1 Summary of the Law

The Clean Air Act (CAA), as amended, establishes a national regulatory strategy and program to protect and enhance air quality in the United States. The CAA includes a number of standards, requirements, and permit programs to protect the quality of air in attainment areas (areas in which air pollutant emissions do not exceed the appropriate standards) and to improve it in nonattainment areas (areas that do not meet the national primary or secondary ambient air-quality standard for an air pollutant).

Congress enacted the Clean Air Act Amendments of 1990 (CAAA; PL 101-549) on November 15, 1990. The 11 titles in this public law are:

I. Provisions for Attainment and Maintenance of National Ambient Air Quality Standards
II. Provisions Relating to Mobile Sources
III. Hazardous Air Pollutants
IV. Acid Deposition Control
V. Permits
VI. Stratospheric Ozone Protection
VII. Provisions Relating to Enforcement
VIII. Miscellaneous Provisions
IX. Clean Air Research
X. Disadvantaged Business Concerns
XI. Clean Air Employment Transition Assistance.

The 11 titles of the CAAA resulted in numerous changes to the CAA and other acts and established six titles in the CAA:

I. Air Pollution Prevention and Control,
II. Emission Standards for Moving Sources,
III. General Provisions,
IV. Acid-Deposition Control (i.e., control of acid rain),
V. Operating Permits, and
VI. Stratospheric Ozone Protection.

Title I, *Air Pollution Prevention and Control*: Title I of the CAA contains requirements and standards for a number of programs that govern air pollutant emissions from stationary sources. These include the National Ambient Air Quality Standards (NAAQSs), the New Source Performance Standards (NSPS), the National Emission Standards for Hazardous Air Pollutants (NESHAPs), the Prevention of Significant Deterioration (PSD) program, and requirements for

nonattainment areas. Most of these programs are requirements for proposed new construction or for modifications of existing sources. In addition, Titles VII and IX of the CAAA established provisions relating to enforcement and requirements for CAA-related research programs, respectively.

NAAQS - A program established by Title I of the CAA (and revised by Title I of the CAAA) is the NAAQS program for the six "criteria" pollutants: sulfur dioxide, particulate matter, carbon monoxide, ozone, nitrogen dioxide, and lead. These standards establish the maximum levels of each pollutant allowed in the air within a particular area. The Federal NAAQSs are specified in 40 CFR 50.4 through 40 CFR 50.12, and the program is implemented under 40 CFR Part 51. The U.S. Environmental Protection Agency (EPA) has authorized the New Mexico Environment Department (NMED) to administer the NAAQS program. Therefore, the Federal NAAQSs have been superseded by the New Mexico Ambient Air Quality Standards (NMAAQSs) for the six criteria pollutants. Therefore, the two backup diesel electrical power-supply generators at WIPP are regulated under New Mexico regulations, and compliance with these regulations is discussed in Chapter 29 under the New Mexico Air Quality Act.

NSPS - The NSPS program regulates emissions from operating facilities and specifies emission standards and test methods for analyzing the emissions. This program, which was initiated by § 111 of the CAA and is implemented by 40 CFR Part 60, *Standards of Performance for New Stationary Sources*, specifies standards of performance for air pollutant emissions from different types of facilities and equipment. Pollutants that are regulated under the NSPS include sulfur dioxide, nitrogen oxides, particulate matter, visible emissions (opacity), carbon monoxide, volatile organic compounds (VOCs), and lead. Since the EPA has authorized the NMED to administer the NSPS program, the NMED requirements supersede the Federal requirements. Therefore, emissions from the backup generators at WIPP are regulated under the State program, which is discussed in Chapter 29.

NESHAPs - Hazardous air pollutant emissions are regulated under § 112 of the CAA (Title III of the CAAA) as implemented by 40 CFR Part 61, *National Emission Standards for Hazardous Air Pollutants (NESHAPs)*. Before the CAA was amended in 1990, Subpart A of NESHAPS listed only eight hazardous air pollutants (HAPs). These pollutants are asbestos, benzene, beryllium, coke oven emissions, inorganic arsenic, mercury, radionuclides, and vinyl chloride. The CAAA (§ 301) added 181 HAPs, bringing the list of HAPs regulated under Subpart A to 189. De minimis levels for all the HAPs have been proposed under § 112(g) as referenced by the proposed rule *Hazardous Air Pollutants: Proposed Regulations Governing Constructed, Reconstructed or Modified Major Sources* dated April 1, 1994 (59 FR 15504).

In 1993, the WIPP completed a Hazardous Air Pollutant (HAP) Emission Inventory (WID, 1993c) The HAP inventory was developed as a baseline document to calculate maximum potential hourly and annual emissions of criteria pollutants, all 189 regulated NESHAP pollutants, and the New Mexico toxic air pollutants (TAPs) specified under New Mexico Air Quality Control Regulations (AQCRs) 751 and 702, Part III. Emission estimates were used to determine if the WIPP is required to obtain air permits under State or Federal regulations.

Based on HAPs inventory calculations, WIPP operations are significantly below the 10-ton per year (tpy) emission limit for any individual HAP or the 25-tpy limit for combined HAPs emissions established in Subpart A. Thus, the WIPP does not have any NESHAP Subpart A permitting or reporting requirement at this time. However, 40 CFR 61.09(a)(1) requires that the EPA be notified of WIPP's anticipated date of initial startup of the source no more than 60 days or less than 30 days before that date.

The HAPs inventory is updated annually to evaluate regulatory changes and to monitor the use of HAPs and TAPs at the site. The WIPP Chemical Inventory Database is used to evaluate chemical use at the site. Using chemical inventory data, WIPP personnel evaluate potential replacement chemicals and minimize the use of materials that are regulated under NESHAPs as much as possible.

After consultation with the NMED Air Quality Bureau, a determination was made that the WIPP was required to obtain a permit under AQCR 702 for the operation of two back-up diesel electrical power-supply generators. A State permit is required when criteria pollutants exceed the State threshold levels of 10 pounds per hour or 25 tons per year. For the compliance status with the State permit programs, see Chapter 29.

With regard to radionuclide emissions at the WIPP, only Subpart H of NESHAPs applies due to the nature of wastes to be received at the WIPP. No radium-containing TRU wastes are currently identified for disposal at the WIPP. Subpart H of 40 CFR Part 61, *National Emission Standards for Emissions of Radionuclides Other Than Radon from Department of Energy Facilities*, pertains to non-radon radionuclide emissions from DOE facilities. The NESHAP for radionuclides is an effective dose equivalent (EDE) of 10 millirem (mrem) per year to any member of the public. A NESHAPs application must be filed if the anticipated EDE will exceed 1 percent of the standard. The DOE and the EPA have agreed that the WIPP will be regulated under NESHAPs through the disposal phase at the WIPP [see the NESHAPs Memorandum of Understanding (MOU) between the EPA and the DOE, draft # 6, dated September 7, 1993].

In the *WIPP Final Safety Analysis Report* (FSAR) (DOE, 1990d), doses from radionuclide emissions anticipated from WIPP were calculated to be less than 1 percent of the allowable EDE of 10 mrem per year to any one member of the public. The DOE

documented the expected emission levels in a data package submitted to the EPA. An emissions monitoring system was installed to comply with NESHAPs and to meet confirmatory monitoring requirements. Emissions monitoring test results will be used to verify compliance after receipt of TRU waste at WIPP.

PSD Program - The PSD program, like many of the other programs under the CAA, is designed for proposed new construction or the modification of existing facilities. It pertains to any proposed new or modified facility to be located in an attainment area, particularly if the facility could impact the air quality in a national park, wilderness area, monument, seashore, or other areas of special national or regional natural, recreational, scenic, or historic value. Because the WIPP does not emit over 100 tpy of any criteria pollutant, the WIPP is not categorized as a major source, and the PSD program does not apply.

Title II, *Emission Standards for Moving Sources*: Although most of the requirements under the CAA pertain to stationary sources, the requirements under Title II of the CAA and the CAAA pertain to mobile sources and establish standards for motor vehicles and fuel. Many of these requirements are aimed at automobile manufacturers and petroleum companies (e.g., Part A of Title II, *Motor Vehicle Emission and Fuel Standards*). Federal agency fleets are covered in § 248 of the CAA. Federal agencies that operate fleets in nonattainment areas for ozone and/or carbon monoxide are required to use clean-fuel vehicles and must use clean alternative fuels when operating in the nonattainment area. At present, the requirements for Federal agency fleets under Title II are not applicable to the WIPP because it is not located in a nonattainment area.

Title III, *General Provisions*: Title III of the CAA provides general provisions for the administration of the CAA and pertains to all titles. The provisions stipulated under Title III include administration, Federal procurement, suits, audits, and air-quality monitoring and modeling. It does not add additional programs. Title III of the CAA (VIII of the CAAA) also requires that the EPA perform a comprehensive analysis of the impact of the CAAA.

Title IV, *Acid Deposition Control*: Title IV of the CAA and the CAAA is aimed primarily at utilities and power plants that emit large quantities of sulfur dioxide and/or nitrogen oxides. It seeks to reduce emissions of sulfur dioxide and nitrogen oxides in order to decrease the acid-rain problem in the United States. It is not applicable to WIPP.

Title V, *Permits*: Most of the other permitting programs under the CAA are designed primarily for proposed new construction or the modification of existing facilities. Title V of the CAA and the CAAA as promulgated in 40 CFR Part 70, *State Operating Permit Programs*, identifies the operating permit requirements for major stationary sources. Those facilities required by the State or by the EPA to have an operating permit will be expected to submit an operating permit application, a compliance plan, and periodic compliance reports.

Currently the State of New Mexico has no approved operating permit program in place. The State submitted an Operating Permit State Implementation Plan (SIP) to the EPA on November 15, 1993. On May 19, 1994, the EPA proposed to grant interim approval to the NMED for its operating permit program (59 FR 26158). If approved, the interim approval will go into effect for up to 2 years.

The SIP identifies two new regulations to implement the requirements of 40 CFR Part 70. New Mexico Air Quality Control Regulation (AQCR) 770 adopts and adds to the provisions of 40 CFR Part 70, and AQCR 771 establishes permit fees for emissions for the New Mexico Operating Permit Program (see also Chapter 29). The Federal program (40 CFR Part 70) regulates and requires permits for both area and major sources. At this time, emission limits for those area sources required to have an operating permit have not been established; therefore, the major-source emission thresholds are used to determine which facilities require operating permits for both area and major sources under 40 CFR Part 70 and AQCRs 770 and 771. The HAP inventory was also used to determine if the WIPP is a major source as defined in 40 CFR Part 70 and AQCR 771. A facility is considered a "major source" and is required to obtain an operating permit if the facility emits 100 tons per year (tpy) of criteria pollutants, 10 tpy of any single HAP, or 25 tpy of any combination of HAPs. Based on HAP inventory emission calculations, the WIPP is not a major source and is not required to obtain a Federal CAA operating permit.

Title VI, *Stratospheric Ozone Protection*: Title VI of the CAA and the CAAA places restrictions on and phases out the use of ozone-depleting chemicals, particularly chlorofluorocarbons (CFCs). It is implemented by 40 CFR Part 82, *Protection of Stratospheric Ozone*. These regulations are designed to phase out the use of Class I and Class II substances. Class I substances are CFCs, halons, carbon tetrachloride, methyl chloroform, hydrobromofluorocarbons (HBFCs), and methyl bromide. Class II substances are hydrochlorofluorocarbons, which generally have a lower ozone-depleting potential than do CFCs. The production of most Class I substances will be prohibited as of January 1, 1996 (January 1, 2001, for methyl bromide, as indicated in 58 FR 69235). Proposed legislation indicates that, effective January 1, 2010, the use of Class II substances will be prohibited unless the substance has been used, recovered, and recycled; is used and entirely consumed in producing other chemicals; or is used as a refrigerant in appliances that were manufactured prior to January 1, 2020 (58 FR 15014). By January 1, 2030, the manufacture of all Class II substances will also be prohibited (58 FR 65018).

Implementing regulations pertaining to labeling requirements and the use and disposal of Class I substances during the service, repair, or disposal of appliances and industrial process refrigeration have been published in the *Federal Register*. Recycling equipment registrations and training certification have been received from all WIPP refrigerant recycling contractors. Effective February 16, 1993, the distribution or sale of any Class I substance identified as nonessential was implemented. Nonessential products include safety horns, wall-mounted

alarms, CFC-containing cleaning fluids for electronic or photographic equipment, and CFC-containing aerosol products or other pressurized dispensers.

Most of the requirements pertaining to ozone-depleting substances (ODSs) such as CFCs are applicable primarily to manufacturers of the chemicals, products containing the chemicals, or products in which ODSs are used during the manufacturing process. However, these regulations are applicable to WIPP in that these products will no longer be available after the time specified in the regulations; therefore, replacement products must be found. It is anticipated that the most significant impact on WIPP will be in finding appropriate solvents and warning devices that do not make use of ODSs.

Any container in which Class I or Class II substances (including waste) will be transported must have a warning label as required by 40 CFR 82.106, *Warning Statement Requirements*. However, the *WIPP Waste Acceptance Criteria* (WAC; DOE, 1991b) require that each generator site document that all aerosol cans included in the waste packages intended for WIPP have been punctured (because the WAC allows no pressurized containers to be transported in the TRUPACT-II containers) and that all such containers are empty; thus, wastes destined for the WIPP will not include containers with Class I or Class II substances. Therefore, the labeling requirements for Class I and Class II substances are not applicable to TRU wastes destined for WIPP.

6.2 Compliance Status of the Regulatory Requirements

Table 6-1 summarizes each applicable requirement and its compliance status under the Clean Air Act. Following the table, the text provides more detail on the compliance status of each requirement.

TABLE 6-1. Clean Air Act - Summary of Regulatory Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
Clean Air Act as amended, § 118, *Control of Pollution from Federal Facilities*		
§ 118	Control of pollution from Federal facilities	See Chapters 6 and 29 [Section 6.2.1]

TABLE 6-1 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
Subpart H of 40 CFR Part 61, *National Emission Standards for Emissions of Radionuclides Other Than Radon from Department of Energy Facilities*		
40 CFR 61.96	NESHAPs application for radionuclides	**ACHIEVED** *Radionuclide Emission Data Package for the WIPP* [Section 6.2.2.1]
40 CFR 61.93(a),(b)	EPA approval of any alternative methods for monitoring/sampling for radionuclide emissions and air flow rate that differ from those specified under NESHAPs	**UP TO DATE** Not deemed to be required for confirmatory sampling [Section 6.2.2.2]
40 CFR 61.93(b) and Appendix B, Method 114, § 4.10	NESHAPs Quality Assurance Project Plan (QAPjP)	**ACHIEVED** *NESHAPs QAPjP*, 1993 [Section 6.2.2.3]
40 CFR 61.09(a)(1)	EPA notification under NESHAPs, pre-startup	**UP TO DATE** Notifications: June 1991; update required before receipt of TRU waste [Section 6.2.2.4]
40 CFR 61.09(a)(2)	EPA notification under NESHAPs, post-startup	**NOT APPLICABLE** Will be required after receipt of TRU waste [Section 6.2.2.5]
40 CFR 61.94	NESHAPs annual report	**NOT APPLICABLE** Will be required prior to receipt of TRU waste [Section 6.2.2.6]

TABLE 6-1 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
National Emission Standards for Hazardous Air Pollutants for Non-Radionuclides		
40 CFR Part 61, Subpart A	General NESHAPs requirements	See Chapter 29
40 CFR Part 70, *State Operating Permit Programs, if applicable*[1]		
40 CFR 70.3(a)(3)	Operating permit application from area sources under NESHAPs	**NOT APPLICABLE** No area-source thresholds established yet by the EPA or NMED [Section 6.2.3.1]
40 CFR 70.5(c)(8)	Compliance plan for 40 CFR Part 70 sources as part of operating permit application	**NOT APPLICABLE** Will be required if operating permit application is requested [Section 6.2.3.2]
40 CFR 70.5(c)(8)(iv) and 70.6(a)(3)(iii)(A)	Semiannual operating permit reports and progress reports on compliance plan	**NOT APPLICABLE** Will be required if operating permit is needed [Section 6.2.3.3]

[1]Applicability of 40 CFR Part 70: "A State program with whole or partial approval under this part must provide for permitting of at least the following sources: ...(3) Any source, including an area source, subject to a standard or other requirement under section 112 of the Act..." [40 CFR 70.3(a)].

TABLE 6-1 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
CAA, § 112, National Emission Standards for Hazardous Air Pollutants		
CAA, § 112(r)(6)(K)	Risk management plan/hazard assessment, if applicable	**NOT APPLICABLE** Low levels of emissions and exemptions (HAPs inventory, Tier II report, and *WIPP Final Safety Analysis Report*) [Section 6.2.3.4]
40 CFR Part 82, *Protection of Stratospheric Ozone*		
40 CFR 82.40	Restrictions on repairing and servicing motor vehicle air conditioners (MVACs)	**ACHIEVED** Off-site certified service technicians used on all Government Service Administration (GSA) vehicles [Section 6.2.4.1]
40 CFR 82.54(c) and 82.104(a)	Prohibition of nonessential Class I ozone-depleting substances (ODSs)	**UP TO DATE** Non-essential ODSs removed from purchase lists; substitute products being evaluated and used to replace ODSs [Section 6.2.4.2]
40 CFR 82.66	Ban on nonessential products containing Class I substances	**UP TO DATE** Substitute products [Section 6.2.4.3]

TABLE 6-1 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
40 CFR 82.84	Federal procurement requirements	**NOT APPLICABLE** Substitute products [Section 6.2.4.4]
40 CFR 82.86	Reporting requirements	**NOT APPLICABLE** Substitute products [Section 6.2.4.5]
40 CFR Part 82, Subpart E	Labeling of products and containers containing Class I or Class II ODS	**NOT APPLICABLE** Aerosol cans in waste packages punctured and containers drained to less than 1% residual liquid; label requirement not applicable [Section 6.2.4.6]
40 CFR 82.102	Applicability	**NOT APPLICABLE** Manufacturers: see also Section 6.2.4.6 [Section 6.2.4.7]
40 CFR 82.106	Required warning statements	**NOT APPLICABLE** Manufacturers; see also Section 6.2.4.6 [Section 6.2.4.8]
40 CFR 82.108 and 82.112	Placement of warning statement and prohibition of removal of the label bearing the warning statement	**NOT APPLICABLE** Manufacturers; see also Section 6.2.4.6 [Section 6.2.4.9]

TABLE 6-1 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
40 CFR 82.122	Certification, recordkeeping, and notice requirements	**UP TO DATE** Labels applied to containers as required [Section 6.2.4.10]
40 CFR 82.150	Service, maintenance, and repair of appliances using refrigerants	**ACHIEVED** EPA certification requirements met by contractors' recycling appliances at WIPP [Section 6.2.4.11]
40 CFR 82.154	Prohibitions	**ACHIEVED** Contractors responsible for management of appliances; no appliances sold at WIPP [Section 6.2.4.12]
40 CFR 82.156	Required practices	**UP TO DATE** Certified contractors and equipment; self-contained equipment; same-day repair of leaks [Section 6.2.4.13]

6.2.1 Control of Pollution from Federal Facilities, CAA § 118

Each department of the executive, legislative, and judicial branches of the Federal government having jurisdiction over any property or facility or engaged in any activity resulting in or that may result in the discharge of air pollutants and each employee thereof is subject to and must comply with all Federal, State, interstate, and local requirements respecting the control and abatement of air pollution in the same manner and to the same extent as any nongovernmental entity.

The DOE complies with all Federal and State requirements pertaining to the release of air pollutants that apply to WIPP. Compliance with Federal and State air-quality requirements are described in this chapter and in Chapter 29, respectively.

6.2.2 National Emission Standards for Hazardous Air Pollutants (NESHAPs), 40 CFR 61, Subpart H

The NESHAP for radionuclides other than radon from DOE facilities is an effective dose equivalent (EDE) of 10 mrem/year.

Subpart H, *National Emission Standards for Emissions of Radionuclides Other Than Radon from Department of Energy Facilities,* of 40 CFR Part 61 requires that facilities owned or operated by the DOE that emit any radionuclides other than radon-222 and radon-220 into the air are subject to this regulation.

After receipt of waste, WIPP could emit radionuclides other than radon-222 and radon-220 and therefore would be subject to the emissions standard specifying that no member of the public may receive an EDE of 10 mrem/year in any year. Information on modeling for radionuclide emissions that was published in the *WIPP Final Safety Analysis Report* of May 1990 (DOE, 1990d) indicates that individuals could receive a maximum effective dose of 0.0017 mrem/year from routine operations at WIPP during disposal phase operations. In May 1994, additional modeling was performed for NESHAPs compliance using the CAP-88 code, which resulted in an estimated EDE of 4.04E-04 mrem/year. These calculated values are well below 1 percent of the regulatory limit of 10 mrem/year; thus, only confirmatory sampling will be required to comply with Subpart H. If radionuclide emissions are routinely found to exceed 1 percent of the standard (i.e., 0.1 mrem/year), it may be necessary to develop a continuous monitoring program, file a NESHAPs application for approval by the EPA, and/or report monthly instead of annually, at the discretion of the EPA. However, no source term exists at or is planned for WIPP that could cause normal operations to exceed the 1-percent emission limit. Thus, any projected emissions exceeding the 1-percent level would be the result of an extremely unlikely accident scenario.

6.2.2.1 NESHAPs Application for Radionuclides, 40 CFR 61.96

The submittal of a NESHAPs application is required prior to construction or modification of any DOE facility that will emit radionuclides to the air.

An application under NESHAPs would ordinarily be required prior to receipt of radioactive waste at WIPP. However, if the estimated annual EDE is less than 1 percent of the standard,

no application is required. Since the estimated EDE was well below this number, no application was required for compliance with Subpart H of NESHAPs at WIPP. Therefore, the application that had been prepared was converted to a data package (*Radionuclide Emission Data Package for the Waste Isolation Pilot Plant*) in November 1990 and transmitted to the EPA for their information in February 1991 (WID, 1990). An application will be required only if confirmatory monitoring reveals that the emissions may have reached or exceeded 1 percent of the standard. If radionuclide emissions are routinely found to exceed 1 percent of the standard (i.e., 0.1 mrem/year), it may be necessary to develop a continuous monitoring program, file a NESHAPs application for approval by the EPA, and/or report monthly instead of annually, at the discretion of the EPA. However, no source term exists at or is planned for WIPP that could cause normal operations to exceed the 1-percent emission limit. Thus, any projected emissions exceeding the 1-percent level would be the result of an extremely unlikely accident scenario.

6.2.2.2 EPA Approval of any Alternative Methods Used, 40 CFR 61.93(a),(b)

EPA approval is required for any alternative methods for monitoring/sampling for radionuclide emissions and air-flow rate that differ from those specified under NESHAPs.

In accordance with the draft MOU between the EPA and the DOE (draft 6), it is DOE policy to implement the requirements of Subpart H of 40 CFR Part 61 at WIPP until closure of the facility. Accordingly, the WID has evaluated the criteria stipulated in Subpart H and determined that the technology used at WIPP is consistent with EPA-approved methods. The WIPP employs a single-point, anisokinetic sampling technology for performing the required periodic confirmatory measurements rather than using an isokinetic system. The technology being used more accurately measures potential emissions in the WIPP mine atmosphere but is not an EPA-approved sampling methodology. Because calculated emissions are less than 1 percent of the 10-mrem standard, the WIPP is required to perform confirmatory sampling only. For demonstrating compliance with Subpart H, the DOE is taking the position that EPA approval of a single-point anisokinetic sampling technology is not required for confirmatory sampling. However, the EPA is authorized to review WIPP's confirmatory sampling methodology as part of the data package review. The EPA can make a determination that the sampling methods being used are adequate for periodic confirmatory measurements.

Specially designed shrouded aerosol sampling probes provide representative aerosol sampling even though they operate anisokinetically with respect to the effluent stream velocity. The shrouded probe is a unique design developed by Texas A&M University personnel specifically for sampling air in the underground shafts at WIPP. Texas A&M personnel examined the need for an alternative to isokinetic sampling in the 14-foot-diameter underground exhaust shaft in order to meet the criterion of 50-percent collection efficiency for a 10-micron diameter. The shrouded probe has been evaluated as a successful alternative to isokinetic sampling in the

underground exhaust shaft. Documents that support the use of anisokinetic sampling and sampling locations in the exhaust air streams at WIPP include reports by Newton et al. (1987), Anand and McFarland (1988), Turner et al. (1988), and McFarland et al. (1989). The DOE has discussed the use of single-point anisokinetic sampling technology with EPA Region VI and does not anticipate that the EPA will determine that approval of an alternative sampling technology is required prior to the emplacement of TRU waste at WIPP. Based on the results of the Texas A&M studies on the single-point anisokinetic probe, this technology provides a representative sample of the WIPP underground environment.

6.2.2.3 NESHAPs Quality Assurance Project Plan, 40 CFR 61.93(b) and Appendix B, Method 114, Section 4.10

A NESHAPs Quality Assurance Project Plan (QAPjP) is required for facilities subject to Subpart H of NESHAPs.

The draft *Quality Assurance Project Plan for Sampling Emissions of Radionuclides to the Ambient Air at the Waste Isolation Pilot Plant* was completed on August 30, 1993, and submitted to the DOE on September 3, 1993 (WID, 1993d). The NESHAPs QAPjP must be approved by the EPA and implemented at WIPP prior to the receipt of TRU waste.

6.2.2.4 NESHAPs Pre-Startup Notification, 40 CFR 61.09(a)(1)

The EPA will be notified of planned startup between 30 and 60 days prior to startup.

On June 10 and June 26, 1991, DOE sent pre-startup notification letters to the EPA Administrator and the EPA Region VI office, respectively, to inform them of the pending startup of WIPP, which was anticipated between July 17 and August 2, 1991. When startup was delayed, another letter of notification (not dated) was sent from DOE to the EPA Region VI office, indicating that the window for startup had shifted to August 30 to September 30, 1991. Again, startup was delayed. Because of the DOE's agreement to comply with NESHAPs requirements until closure of WIPP, notification of the EPA will be required prior to receipt of TRU waste at WIPP.

6.2.2.5 NESHAPs Post-Startup Notification, 40 CFR 61.09(a)(2)

The EPA will be notified of actual startup of WIPP within 15 days after that date.

When the DOE opens WIPP for emplacement of radioactive waste, it will notify the EPA within 15 days after startup. Until that time, this requirement does not apply to WIPP.

6.2.2.6 NESHAPs Annual Report, 40 CFR 61.94

A NESHAPs annual report must be submitted by June 30th for facilities subject to Subpart H of NESHAPs.

After DOE opens WIPP for the emplacement of radioactive waste, it will file a NESHAPs report by June 30th every year as long as the facility is subject to these regulations. This requirement will no longer be applicable after closure of WIPP, when the radiation protection standards of Subpart B (40 CFR Part 191) will go into effect.

6.2.3 State Operating Permit Programs, 40 CFR Part 70 and Draft AQCRs 770 and 771

The new requirements for operating permits include a provision that State programs must provide for permitting of "any source, including an area source [i.e., a source of the pollutant that is not a major source], subject to a standard or other requirement under § 112 of the [Clean Air] Act" [see Section 70.3(a)(3)], which is the section on NESHAPs. Based on emission calculations in the 1993 HAPs Inventory, emissions at the WIPP are below "major source" and NESHAP emission limits. Thus, the permitting and reporting requirements contained in 40 CFR Part 70 and AQCRs 770 and 771 are not applicable at this time. The HAPs Inventory is updated annually to evaluate regulatory changes and to monitor the use of HAPs and toxic air pollutants (TAPs; defined in New Mexico AQCRs 751 and 702, Part III) at the site. The WIPP Chemical Inventory Database is used to evaluate chemical use at the site. Using chemical inventory data, WIPP personnel evaluated potential replacement chemicals to minimize the use of materials regulated under the NESHAPs and TAP programs.

Because the State does not yet have an operating permit program in place, the Federal requirements for an operating permit program are summarized here.

6.2.3.1 Operating Permit Application, 40 CFR 70.3(a)(3)

Upon approval of its operating permit program, the State may require the submittal of operating permit applications from area sources under NESHAPs.

Based on the 1993 WIPP HAPs Inventory, HAP emissions from the facility are below current operating-permit threshold levels, and an operating permit is not required for WIPP. Submittal of an application is not applicable at this time.

6.2.3.2 Compliance Plan, 40 CFR 70.5(c)(8)

Submittal of a compliance plan is required as part of the operating permit application for 40 CFR 70 sources.

Based on the 1993 WIPP HAPs Inventory, HAP emissions from the facility are below current operating-permit threshold levels, and an operating permit is not required for WIPP. If a determination is made at a later date that an operating permit application is required for the facility, a compliance plan will be part of the application as specified.

6.2.3.3 Semiannual Operating Permit Reports and Progress Reports on the Compliance Plan, 40 CFR 70.5(c)(8)(iv) and 70.6(a)(3)(iii)(A)

Semiannual operating permit reports and progress reports on the compliance plan will be filed, if applicable.

Based on the 1993 WIPP HAPs Inventory, HAP emissions from the facility are below current operating-permit threshold levels, and an operating permit is not required for WIPP. The WIPP will be required to submit these reports if and when WIPP is considered to be subject to the operating permit program.

6.2.3.4 Risk Management Plan/Hazard Assessment, CAA, § 112(r)

A risk management plan/hazard assessment must be prepared, if applicable.

The list of regulated substances for accidental release prevention under § 112(r) of the CAA and the threshold quantities for these substances have been finalized in 40 CFR Part 68, *Chemical Accident Prevention Provisions* (59 FR 4478). However, the requirements for evaluating the need for and the preparation of a risk management plan were published separately as a proposed rule (Subpart B of 40 CFR Part 68) in October 1993 (*Risk Management Programs for Chemical Accidental Release Prevention*, 58 FR 54190). Since the requirements for risk management programs have not yet been finalized, they do not currently apply to WIPP. However, in order to take a proactive approach with Subpart B of 40 CFR Part 68 when these regulations become finalized, three documents were used to determine whether emissions from WIPP exceed the

regulatory threshold level of any of the chemicals listed in the final rule. The three documents are the WIPP HAPs inventory, the *WIPP Tier II Emergency and Hazardous Chemical Inventory Report* required under the Emergency Planning and Community Right-to-Know Act (EPCRA), and the *WIPP Final Safety Analysis Report* (FSAR). It was found that, of the 162 substances and gases listed in the final rule, none meets or exceeds the final threshold levels. Sulfuric acid, which was included in the proposed list, is not included in the final list, and the final threshold quantity for sulfur dioxide (SO_2) is 5000 pounds, which is considerably greater than the SO_2 emissions released as a combustion byproduct from the operation of the backup diesel generators and the emergency diesel fire pump. Therefore, WIPP is not currently required to develop a risk management plan to evaluate accidental releases from the site.

6.2.4 Protection of Stratospheric Ozone, 40 CFR Part 82

A number of requirements have been imposed that relate to chlorofluorocarbons (CFCs) and other ozone-depleting substances (ODSs). Most of these requirements pertain directly to manufacturers; however, because of the planned phase-out of these materials, the regulations will also impact users of these materials.

6.2.4.1 Restrictions on Repairing and Servicing Motor Vehicle Air Conditioners (MVACs), 40 CFR 82.40

> *Effective August 13, 1992, no person repairing or servicing motor vehicles for consideration may perform any service on a motor vehicle air conditioner (MVAC) involving the refrigerant for the air conditioner without using approved refrigerant recycling equipment and unless he/she has been properly trained and certified by a technician certification program approved by the Administrator.*

No government vehicles are serviced, repaired, or maintained by WIPP employees or contractors. The WID Purchasing Department has indicated that no work has been performed on MVACs owned by the Government Service Administration (GSA) since the effective date of the regulations. The vendors have verified that they have not serviced these vehicles.

All equipment owned or used by the vendors that service these vehicles has been approved, and all the service technicians who perform such work are certified to work on MVACs.

6.2.4.2 Prohibition of Nonessential Class I Ozone-Depleting Substances (ODSs), 40 CFR 82.54(c) and 82.104(a)

Nonessential Class I ODSs are being phased out and will no longer be sold or distributed in the United States as of January 17, 1994. The Class I ODSs currently consist of the chlorofluorocarbons (CFCs), halons, carbon tetrachloride, and methyl chloroform.

A list of the ODSs used at WIPP is included in the current WIPP emissions inventory. As WIPP personnel continue to define the actual use of products containing ODSs, waste minimization personnel will continue to obtain substitute products to reduce ODS emissions from WIPP.

6.2.4.3 Ban on Nonessential Products Containing Class I Substances, 40 CFR 82.66

The following products that release a Class I substance were identified as being nonessential and are subject to the prohibitions specified under 40 CFR 82.64:

- *Personal safety horns;*
- *Wall-mounted alarms used in factories or other work areas;*
- *Any plastic flexible or packaging foam product which is manufactured with or contains a CFC;*
- *Any aerosol product or other pressurized dispenser that contains a CFC including but not limited to household, industrial, automotive, and pesticide uses except lubricants, coatings, or cleaning fluids for electrical or electronic equipment that contain no CFCs other than CFC-11, CFC-12, or CFC-113 for solvent purposes; and*
- *Document preservation sprays that contain no other CFC than CFC-113.*

The deadlines set under 40 CFR 82.64 pertain to selling or distributing nonessential products. However, the items have been listed because no purchase of nonessential products shall be made by government entities after October 24, 1994. An inventory of ODSs on site, dated September 17, 1993, was reviewed. No personal safety horns, wall-mounted alarms, or plastic flexible or packaging foam was listed on the inventory list, and the WIPP warehouse has verified that no plastic or packaging foam is present on site.

WIPP has an inventory of aerosol products used at the site. Substitute products are being investigated.

A number of cleaning fluids used at the site are listed on the September 17th inventory list. An inventory list dated October 26, 1992, shows that substitute products are being identified and are replacing ODSs.

No document preservation sprays are used at WIPP.

6.2.4.4 Federal Procurement Requirements, 40 CFR 82.84

Each department, agency, and instrumentality of the United States shall conform its procurement regulations to the requirements and policies of Title VI of the CAA by October 24, 1994. Each such regulation shall provide, at a minimum, the following:

- *In place of Class I or Class II substances or of products made with or containing such substances, safe alternatives identified under 42 USC § 7671(k) (or products made with or containing such alternatives) shall be substituted to the maximum extent practicable.*

- *Consistent with the phaseout schedules for ODS, no purchase shall be made of Class II substances, or products containing Class II substances, for the purpose of any use prohibited under 42 USC § 7671(d)(c).*

- *All active or new contracts involving the performance of any service or activity subject to 42 USC § 7671(g) or 7671(h) or regulations promulgated thereunder include, or be modified to include, a condition requiring the contractor to ensure compliance with all requirements of those sections and regulations.*

- *No purchase shall be made of products whose sale is prohibited under 42 USC § 7671(h), except when they will be used by persons certified under § 609 to service vehicles, and no purchase shall be made of nonessential products as defined under 42 USC § 7671(i).*

- *Proper labeling under 42 USC § 7671(j) shall be a specification for the purchase of any product subject to that section.*

For agencies subject to the Federal Acquisition Regulation (FAR), 48 CFR Part 1, amendment of the FAR, consistent with this subpart, shall satisfy the requirement of this section.

Since the procurement regulations do not become effective until October 24, 1994, the requirements are included for planning purposes. A comparison of the inventory list dated September 17, 1993, with that dated October 26, 1992, indicates that efforts are being made to identify substitute products to replace ODSs.

6.2.4.5 Reporting Requirements, 40 CFR 82.86

No later than 1 year after October 22, 1993, each agency, department, and instrumentality of the United States shall certify to the Office of Management and Budget that its procurement regulations have been amended in accordance with this section.

Certification by the GSA that the FAR has been amended in accordance with this section shall constitute adequate certification for purposes of all agencies subject to the FAR.

The procurement regulations become effective on October 24, 1994. See also response to Section 6.2.4.5.

6.2.4.6 Labeling of Products and Containers Containing Class I or Class II Ozone-Depleting Substances, 40 CFR Part 82, Subpart E

Warning statements are required on containers of and products containing or manufactured with certain ODSs.

Federal procurement regulations require that proper labeling be a specification for the purchase of any product. The labeling requirements apply primarily to manufacturers. However, it should be noted that this requirement could impact transporters of TRU waste to WIPP if the waste contains any Class I or Class II ODSs and if the waste is transported across State boundaries. Containers holding any such waste must be labeled in compliance with Subpart E of 40 CFR Part 82.

6.2.4.7 Applicability, 40 CFR 82.102

These requirements apply to substances designated as Class I or Class II substances as of February 11, 1993, beginning on May 15, 1993. The requirements of this subpart apply to the following containers and products except those products manufactured prior to May 15, 1993, provided that the manufacturer submits documentation to the EPA upon request showing that the product was manufactured prior to that date. The requirements apply to:

- *All containers in which a Class I or Class II substance is stored or transported,*
- *All products containing a Class I substance, or*
- *All products directly manufactured with a process that uses a Class I substance, unless otherwise exempted.*

Beginning on January 1, 2010, or 1 year after any determination between May 15, 1993 and January 1, 2010, if suitable substitute products or manufacturing processes are found, the requirements of this subpart shall apply to the following:

- *All products containing a Class II substance or*
- *All products manufactured with a process that uses a Class II substance*

Federal procurement regulations require that proper labeling shall be a specification for the purchase of any product. The labeling requirements apply primarily to manufacturers. (See also Section 6.2.4.6.)

6.2.4.8 Required Warning Statements, 40 CFR 82.106

Unless otherwise exempted by this subpart, each container or product identified in § 82.102(a) or (b) shall bear the following warning statement, meeting the requirements of this subpart for placement and form:

WARNING: Contains [or Manufactured with, if applicable] [*insert name of substance*], a substance which harms public health and environment by destroying ozone in the upper atmosphere.

Exemptions from the warning label requirement are:

- *Products in which trace quantities of a controlled substance remain as a residue or impurity*
- *Products manufactured using methyl chloroform or CFC-113 by persons who can demonstrate and certify a 95 percent reduction in overall usage from their 1990 calendar year usage of methyl chloroform or CFC-113 as solvents during a 12-month period ending within 60 days of such certification or during the most recently completed calendar year*
- *Products that are otherwise not subject to the requirements of this subpart that are being repaired, using a process that uses a controlled substance.*

Federal procurement regulations require that proper labeling shall be a specification for the purchase of any product. The labeling requirements apply primarily to manufacturers. (See also Section 6.2.4.6.)

6.2.4.9 Placement of Warning Statement and Prohibition on Removal of the Label Bearing the Warning Statement, 40 CFR 82.108 and 82.112

The warning statement shall be "clearly legible and conspicuous." The manner in which the label may be placed on the container is described. Removal of the label bearing the warning statement is prohibited.

The warning statement is primarily the responsibility of the manufacturer. The prohibition on removing the label bearing the warning statement applies primarily to the manufacturer and subsequent wholesalers. (See also Section 6.2.4.6.)

6.2.4.10 Certification, Recordkeeping, and Notice Requirements, 40 CFR 82.122

On or after May 15, 1993, no person may modify, remove, or interfere with any warning statement required by this subpart, except as described in § 82.112.

All appliances and products containing CFCs should have a label from the manufacturer. It is WIPP policy that warning labels not be removed or tampered with. If a label is damaged, it will be replaced.

6.2.4.11 Service, Maintenance, and Repair of Appliances using Refrigerants, 40 CFR 82.150

This subpart applies to any person servicing, maintaining, or repairing appliances except for MVACs. This subpart also applies to persons disposing of appliances, including MVACs. In addition, this subpart applies to refrigerant reclaimers, appliance owners, and manufacturers of appliances and recycling and recovery equipment.

Although no WIPP employees service, maintain, or repair appliances, these regulations apply to WIPP because the facility owns appliances and WIPP is responsible for the disposal of appliances. WIPP policy is that appliances will be sold intact or refrigerants must be removed from all appliances by a certified recycling contractor.

6.2.4.12 Prohibitions, 40 CFR 81.154

Prohibitions are specified for persons who maintain, service, repair, or dispose of appliances who may vent or otherwise release into the environment any Class I or Class II substance used as refrigerant in such equipment. De minimis releases associated with good faith attempts to recycle or recover refrigerants are not subject to this prohibition. No person may dispose of appliances except for small appliances, MVACs, and MVAC-like appliances unless the required practices described in 40 CFR 82.156 are observed and equipment that is certified for that type of appliance is used. Prohibitions are also specified regarding recycling or recovery equipment.

Prohibitions also exist for the sale of Class I or Class II substances consisting wholly or in part of used refrigerants.

It is a violation of this subpart to accept a signed statement pursuant to 40 CFR 82.156(f)(2) if the person knew or had reason to know that such a signed statement is false.

No WIPP employees service, repair, or maintain appliances on site. Before disposing of appliances, refrigerant is evacuated by a contractor/technician. No WIPP employees perform work on regulated appliances, and no recycling or recovery equipment is owned by the facility. Only small appliances have been disposed of by WIPP personnel since the regulation took effect on July 13, 1993. All contractors have submitted a signed statement to the EPA that ensures compliance with and knowledge of applicable regulations and is included in equipment certification form. Recycling and reclamation appliances containing refrigerants used at the WIPP are owned by certified contractors. No recycling or reclamation appliances have been altered since their certification.

No Class I or II substances are sold or distributed from WIPP.

The technician writes and signs all "Work Performed" narratives on the Plant Work Request at WIPP. The technician is always accompanied by an electrician from Work Control who is responsible for the verification of the "Work Performed" statements.

6.2.4.13 Required Practices, 40 CFR 82.156

Effective July 13, 1993, any person opening appliances other than MVACs must evacuate the refrigerant to a system receiver or to a recovery or recycling machine as specified. At least one piece of certified, self-contained recovery equipment must be available at his/her place of business.

Leaks in appliances containing refrigerant must be repaired as specified.

The contractors have indicated that this is done; Plant Work Requests verify that this requirement is met. All recovery equipment owned/used by the contractors at WIPP is certified. All maintenance, service, and repair on applicable appliances is performed by one of the certified contractors, who have verified on the Equipment Certification Form that they have complied with these regulations.

All equipment owned/used by the contractors at WIPP is self contained. All applicable requirements of this section are being met.

To date, there have been no leaks in the commercial refrigeration units used by the WIPP cafeteria. A leak was detected in 41-B-890B; it was repaired the same day the leak was detected.

6.3 Compliance Status of Permit Conditions

Table 6-2 summarizes the applicable permits and the status of the permit conditions. Currently, only the permit for the backup diesel electrical power-supply generators and a permit for open burning are required for WIPP under the Clean Air Act; those permits are discussed in Chapter 29. An operating permit, to be issued by the State or the EPA, may ultimately be required because WIPP is an area source of several pollutants under the NESHAPs program; however, no such permit is currently required.

TABLE 6-2. Permits Required Under the Clean Air Act - Status of Compliance with Permit Conditions

CITATION	REQUIREMENTS	COMPLIANCE STATUS
§ 109	NAAQS permit	See Chapter 29
40 CFR Part 70	Operating permit conditions to be determined, if applicable	**NOT APPLICABLE** Threshold values for area sources requiring operating permits not yet established by EPA or NMED [See Section 6.2.3]

6.3.1 Applicability of Operating Permit Requirements, 40 CFR Part 70

The EPA and the State are required to establish a threshold value for area sources that emit HAPs in amounts that are less than the 10-tpy limit for a single HAP or the 25-tpy limit for combined HAPs emissions. Those facilities that emit HAPs at rates that meet or exceed the threshold values will be regulated under the operating permit program; those area sources with emissions that are lower than the threshold values will not be required to file an operating-permit application. Until the threshold values are promulgated, area sources are considered to be exempt from the operating permit requirements. Specific operating-permit conditions for a given facility will be specified in the individual permit.

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7.0 FEDERAL WATER POLLUTION CONTROL ACT OF 1972 ("CLEAN WATER ACT")

7.1 Summary of the Law

The Federal Water Pollution Control Act of 1972 (33 USC §§ 1251 et seq.) is usually referred to as the "Clean Water Act" (CWA). The major program under this act is the National Pollutant Discharge Elimination System (NPDES). This program, discussed in § 402 of the CWA, regulates the discharge of pollutants into navigable waters of the United States. The regulations implementing the NPDES that are relevant to the WIPP project are found in 40 CFR Part 122, *EPA Administered Permit Programs: the National Pollutant Discharge Elimination System*, which contains definitions and basic application requirements, standard permit conditions, and monitoring and reporting requirements for the NPDES program. However, because there are no point-source discharges into navigable waters at WIPP, the facility is not required to obtain a standard NPDES permit.

In 1990, an NPDES storm water permit program was added to the CWA [§ 402(p)] to govern the discharge of pollutants into precipitation runoff. The EPA has determined that the NPDES storm water regulations found in 40 CFR Part 122.26 are applicable to WIPP because a potential exists for storm water runoff to contact regulated pollutants. The NPDES storm water permit program involves three types of permits: general, individual, and group. To obtain a permit, a facility submits either a Notice of Intent for a general permit, an individual application for an individual permit, or an application as part of a group of applicants for a group permit. The EPA planned to cover most industrial discharges under general permits and issued the *Final NPDES General Permits for Storm Water Discharges Associated with Industrial Activity* in the *Federal Register* on September 9, 1992. These general permits cover facilities that discharge effluents associated with industrial activities in 11 states that do not have authorized NPDES programs, including New Mexico.

Of the other regulations that implement the NPDES program, only 40 CFR 122.21, *NPDES Permit Assessment for Sewage Sludge*, and 40 CFR Part 459, *Photographic Point Source Category*, could apply to WIPP. In order to meet the requirements of 40 CFR Part 122.21(c)(2), the DOE filed an NPDES sewage sludge information package with EPA Region VI, requesting a determination as to whether the facility will be required to obtain an NPDES sewage-sludge discharge permit. Based on the determination made by the Regional Director, the DOE may be required to submit a Notice of Intent (NOI) to obtain a sludge-discharge permit. However, WIPP is exempt from regulation under 40 CFR Part 459 because photographic wastes are collected and transported off-site to a licensed facility for disposal.

Another implementing regulation under the CWA that is applicable to the WIPP project is 40 CFR Part 112, *Oil Pollution Prevention*, which includes criteria and guidelines for the preparation and implementation of a facility's Spill Prevention, Control, and Countermeasures

(SPCC) Plan. The *WIPP Spill Prevention, Control, and Countermeasures Plan* (SPCC Plan) was first issued in November 1988 and is currently undergoing its third revision.

7.2 Compliance Status of the Regulatory Requirements

Table 7-1 summarizes the regulatory requirements and their compliance status under the Clean Water Act. The text gives more detail on the compliance status for each requirement.

TABLE 7-1. Clean Water Act - Summary of Regulatory Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
40 CFR Part 112, *Oil Pollution Prevention*		
40 CFR 112.3	Requirements for preparation and implementation of spill prevention, control, and countermeasures (SPCC) plans	**ACHIEVED** WIPP SPCC Plan [Section 7.2.1]
40 CFR 112.5	Amendment of SPCC plans by owners and operators	**UP TO DATE** WIPP SPCC Plan [Section 7.2.2]
40 CFR Part 122, *EPA-Administered Permit Programs: the National Pollutant Discharge Elimination System (NPDES)*		
40 CFR 122.1(b)(1)	NPDES permits for the discharge of pollutants from any point source into waters of the United States	**NOT APPLICABLE** No NPDES permit required because of lack of process- or point-source discharges at WIPP [Section 7.2.3]

TABLE 7-1 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
40 CFR 122.21(c)(2)	NPDES permit assessment for sewage sludge	**ACHIEVED** Information package submitted to the EPA for NPDES sewage-sludge permit determination by the deadline (February 19, 1994) [Section 7.2.4]
40 CFR 122.26(a)	Requirement for a storm water discharge permit	**ACHIEVED** General permit obtained, # NMR00A021 [Section 7.2.5]
40 CFR 122.26(c)	Application requirement for storm water discharges associated with industrial activity	**NOT APPLICABLE** Requirement superseded by issuance of EPA's NPDES General Permits and filing of Notice of Intent for WIPP [Section 7.2.6]

7.2.1 SPCC Plan Requirements, 40 CFR 112.3

Requirements for the preparation and implementation of SPCC plans are specified under the "Oil Pollution Prevention" regulations of 40 CFR Part 112.

The *WIPP Spill Prevention, Control, and Countermeasures (SPCC) Plan* was issued in November 1988.

7.2.2 Amendment of the SPCC Plan by the Owner/Operator, 40 CFR 112.5

Requirements for amending SPCC plans by the owners/operators of a facility are specified under the "Oil Pollution Prevention" regulations of 40 CFR Part 112.

The WIPP SPCC Plan undergoes an annual review and revision as needed to reflect changes in facility activities and emergency equipment (WID, 1993a).

7.2.3 NPDES Permit Requirement, 40 CFR 122.1(b)(1)

The NPDES program requires permits for the discharge of pollutants from any point source into waters of the United States.

There are no point-source discharges into navigable water from WIPP. Therefore, the facility is not required to obtain a standard NPDES permit.

7.2.4 NPDES Permit Assessment, 40 CFR 122.21(c)(2)

Any "treatment works treating domestic sewage" commencing operations after the promulgation of an applicable standard for sewage sludge use or disposal shall submit an application to the director at least 180 days prior to the date proposed for commencing operations.

The WIPP stabilization sewage lagoon began operating in June 1985. Sludge was disposed of in 1993 during the facility expansion. This expansion included the construction of two new lined evaporation ponds and the subsequent draining and lining of the primary evaporation pond. All sludges were removed from the primary evaporation pond prior to the installation of the synthetic liner. This was the first removal of sludge in the 9-year operation of the facility, and it is anticipated that sludge removal will be necessary approximately twice prior to final facility closure.

The sewage sludge permitting regulations were promulgated on February 19, 1993, and became effective on February 19, 1994 (i.e., the submittal of a sewage sludge application was due on the latter date). WID personnel worked closely with NMED and EPA personnel in complying with these new regulations and satisfied all their applicable requirements. Therefore, the 180-day prenotification period is not applicable here.

Consultation with the NMED Surface Water Bureau and the EPA Region VI Water Management Division provided a determination for land disposal of the sewage sludges. Dried sludges were removed from the primary evaporation pond and mixed with top soils at a reclamation site near the construction landfill. Sludges were used as a soil additive to implement the best management practices (BMPs) identified in the *WIPP National Pollutant Discharge Elimination System (NPDES) Storm Water Pollution Prevention Plan* (WIPP PPP) (WID, 1993b).

7.2.5 Requirement for NPDES Permit for Storm Water Discharges, 40 CFR 122.26(a)

Storm water discharges are regulated by the EPA under the NPDES program. The EPA requires an NPDES permit for facilities that could discharge contaminated storm water runoff to waters of the United States.

The WIPP site is regulated by NPDES Storm Water General Permit # NMR00A021.

Evaluation of NPDES storm water compliance options for the WIPP began in July 1991. On April 2, 1992, the EPA published the final *NPDES Application Deadlines, General Permit Requirements and Reporting Requirements for Storm Water Discharges Associated with Industrial Activity*, which established the new general permit rules for minimal sampling and analytical requirements. The EPA published the *Final NPDES General Permits for Storm Water Discharges Associated with Industrial Activity* (hereafter referred to as the "NPDES General Permits") in the *Federal Register* on September 9, 1992. These general permits established NOI requirements, prohibitions, requirements to develop and implement storm water pollution prevention plans, and requirements to conduct site inspections for facilities with discharges that are authorized by the permit. In addition, these permits established monitoring requirements for certain classes of facilities.

This requirement is addressed in the WIPP PPP. No sampling was required for the submittal of the NPDES General Permits NOI; the WIPP has little existing NPDES storm water monitoring data.

The NPDES storm water rules require compliance sampling of discharges resulting from any storm event that is greater than 0.1 inch in magnitude. The WIPP uses BMPs such as retention basins designed to contain two consecutive 24-hour storm events, the covering of material storage areas, and the reclamation of disturbed sites to eliminate storm water contact with regulated pollutants. By design, it is anticipated that regulated discharges at WIPP will be required to complete compliance sampling only if a storm event results in a discharge from a retention basin. If sampling is required, it will be conducted as required by the NPDES General Permits.

7.2.6 Application Requirement for Storm Water Discharges Associated with Industrial Activity, 40 CFR 122.26(c)

The implementing regulations in Part 122 require the submittal of an application for a storm water NPDES permit.

This requirement was superseded by the issuance of EPA's *Final NPDES General Permits for Storm Water Discharges Associated with Industrial Activity* (57 FR 41236, September 9, 1992),

which replaces the requirement for the submittal of an application with the filing of an NOI for obtaining a general permit. The NOI for WIPP was submitted to the EPA on September 26, 1992 (see Section 7.3.1).

7.3 Compliance Status of Permit Conditions

Table 7-2 summarizes specific conditions and their compliance status under the EPA's *Final NPDES General Permits for Storm Water Discharges Associated with Industrial Activity*. These general permits were published in the *Federal Register* on September 9, 1992. All applicable requirements are specified in Part IV and Appendix B of the NPDES General Permits.

TABLE 7-2. NPDES General Permits - Summary of Permit Condition Compliance Status

CITATION	CONDITION	COMPLIANCE STATUS
CWA, *Final NPDES General Permits for Storm Water Discharges Associated with Industrial Activity* (57 FR 41236, September 9, 1992)		
IV(A); Appendix B, II(A)	Notice of Intent (NOI) to file for general permit	**ACHIEVED** Filed on September 26, 1992 [Section 7.3.1]
IV(A)(4)	Notice of Termination (NOT)	**NOT APPLICABLE** Containment of storm water discharges not demonstrated [Section 7.3.2]
IV(B)(1); Appendix B, III(A)	Prohibition on non-storm water discharges	**ACHIEVED** Discharges: either exempt, non-regulated, or contained [Section 7.3.3]

TABLE 7-2 (continued)

CITATION	CONDITION	COMPLIANCE STATUS
IV(B)(2); Appendix B, III(B)	Releases of reportable quantities of hazardous substances and oil	**UP TO DATE** Three releases of ethylene glycol reported; WIPP PPP, Section 3.3, addresses necessary actions [Section 7.3.4]
IV(C); Appendix B, Part IV	Storm water pollution prevention plan	**ACHIEVED** WIPP PPP [Section 7.3.5]
IV(C)(1); Appendix B, IV(D)(1)	Pollution prevention team	**ACHIEVED** Identified in WIPP PPP, Section 2.2 [Section 7.3.6]
IV(C)(2); Appendix B, IV(D)(2)	Identification of potential pollution sources	**ACHIEVED** WIPP PPP, Chapter 3.0 [Section 7.3.7]
IV(C)(2); Appendix B, IV(D)	Site assessments	**ACHIEVED** Summarized in WIPP PPP, Chapter 3.0. [Section 7.3.8]
IV(C)(3); Appendix B, IV(D)(3)	Measures and controls (including recordkeeping and internal reporting)	**ACHIEVED** Identified in WIPP PPP, Chapter 4.0. [Section 7.3.9]

TABLE 7-2 (continued)

CITATION	CONDITION	COMPLIANCE STATUS
IV(C)(4); Appendix B, IV(D)(4)	Comprehensive site compliance evaluations	**UP TO DATE** Initial site inspection; WIPP PPP, Chapter 3.0 [Section 7.3.10]
IV(D)(1); Appendix B, IV(D)(7)	Requirements for storage, processing, and handling areas for EPCRA § 313 "water priority chemicals"	**NOT APPLICABLE** No reporting under § 313 of EPCRA required [Section 7.3.11]
IV(D)(2); Appendix B, IV(D)(8)	Enclosure or covering of outdoor salt piles	**NOT APPLICABLE** Runoff diverted to evaporation basins; no discharge to waters of the U.S. possible, WIPP PPP, Chapter 4.0 [Section 7.3.12]
IV(D)(3); Appendix B, IV(D)(5)	Notification to municipal large and medium separate storm water systems	**NOT APPLICABLE** Storm water not discharged through a large or medium separate system [Section 7.3.13]
IV(E); Appendix B, Part IV and XI(C)(vi)	Monitoring and reporting requirements	**NOT APPLICABLE** Required monitoring described in WIPP PPP, Chapter 5.0 [Section 7.3.14]

TABLE 7-2 (continued)

CITATION	CONDITION	COMPLIANCE STATUS
IV(G); Appendix B, IV(A)(1)	Deadline for plan preparation and compliance	ACHIEVED WIPP PPP issued March 31, 1993; implementation of BMP completed by October 1, 1993, compliance date [Section 7.3.15]

7.3.1 NOI to File for a General Permit, IV(A) and Appendix B, II(A)

In the EPA's NPDES General Permit, a provision was made that a facility should file an NOI to file for a general storm water discharge permit rather than submit a formal application for the permit.

The NOI to obtain an NPDES general storm water permit was submitted to the EPA on September 26, 1992. The EPA issued a general permit to WIPP on December 31, 1992 (# NMR00A021).

7.3.2 Notice of Termination (NOT), IV(A)(4)

A facility may submit an NOT if no storm water discharges will be released.

Although the WIPP has implemented BMPs that are designed to make WIPP a zero-discharge facility, this requirement is currently not applicable because the facility has the potential to discharge storm water that could contact regulated pollutants. If WIPP can demonstrate that the storm water discharges can be effectively contained, an NOT may be filed as specified under Condition IV(A)(4) of the NPDES General Permits. If the NOT is approved by the EPA, coverage of WIPP under the *NPDES General Permits for Storm Water Discharges Associated with Industrial Activity* will cease.

7.3.3 Prohibition on Non-Storm Water Discharges, IV(B)(1) and Appendix B, III(A)

The EPA prohibits the release of non-storm water discharges under the storm water discharge NPDES permit.

In 1989, an internal audit identified 63 potential non-storm water discharges. A comprehensive sampling program was initiated, and non-storm water discharges have now been characterized, either by chemical analysis or by process knowledge. Of these, 49 were either air-conditioner condensate discharges or fire-water testing discharges, both of which are exempt from the general permit rules. Nine of the 14 remaining discharges are non-regulated because they are below applicable regulatory limits or are collected in containers and not allowed to be discharged to the ground. The remaining five will be contained by engineering controls. Four of these five discharges are oily condensates from the Main Compressor Building. A Plant Work Request (PWR) has been submitted to hard-pipe all four oily condensate discharges into a container. The one remaining discharge is an oily condensate discharge (less than 1 gallon per day) from a small compressor at the Air Intake Shaft. A PWR has been written to collect this discharge in a small container. All condensate discharges will be collected and disposed of as wastes in accordance with the applicable regulatory criteria.

7.3.4 Releases of Reportable Quantities of Hazardous Substances and Oil, IV(B)(2) and Appendix B, III(B)

Releases of reportable quantities of hazardous substances and oil must be reported.

Three spills (ethylene glycol) at WIPP have been reported to the National Response Center. All spills were immediately contained and cleaned up in accordance with the WIPP spill response procedure. All contaminated soils were drummed, manifested, and transported to an off-site disposal facility.

Section 3.3 of the WIPP PPP (WID, 1993b) addresses the actions that must be taken in the event of a reportable spill, including notification of the National Response Center; modification of the PPP within 14 days to provide a description of the release; the circumstances leading to, and the date of the release; measures to prevent recurrence and to respond to such releases; and notification of the EPA.

7.3.5 Storm Water Pollution Prevention Plan, IV(C) and Appendix B, Part IV

Regulated facilities with a general permit must have prepared and implemented a storm water pollution prevention plan.

The WIPP PPP describes how the BMPs and other requirements of the NPDES storm water regulations are being implemented at the WIPP. Requirements addressed include the identification of a pollution prevention team, the potential pollution sources, and past spills and leaks.

7.3.6 Pollution Prevention Team, IV(C)(1) and Appendix B, IV(D)(1)

A pollution prevention team is required for permitted facilities. This team must be addressed in the facility's PPP.

The WIPP Pollution Prevention Team is composed of representatives from organizations within the DOE and the Westinghouse Waste Isolation Division (WID) who are knowledgeable about the facility and its operations and who will provide structure and direction to the storm water management program. The members of the Pollution Prevention Team and their functional area responsibilities are identified in Section 2.2 of the PPP.

7.3.7 Identification of Potential Pollution Sources, IV(C)(2) and Appendix B, IV(D)(2)

Potential sources of pollution must be identified at the permitted facility.

A site inspection was conducted to look for illicit connections into either the WIPP sewage system or into storm water diversion swales. The 4-day site inspection focused on all surface facility operations, the status of existing BMPs, materials handling practices, materials storage areas, and storm water flow patterns and volumes. The inspection revealed seven areas that could contribute pollutants to storm water runoff. These seven areas are identified and discussed in Chapter 3.0, *Assessment*, of the PPP.

Storm water flows were evaluated using NMED and EPA methodology. Because the NMED guidelines for calculating runoff coefficients are more stringent, they were chosen to calculate storm water runoff from the WIPP. Meetings were held with the EPA Region VI Storm Water Section and with the NMED Ground Water and Surface Water Bureaus to evaluate compliance alternatives.

As described in the PPP, three different material inventories were used to complete the materials inventory assessment: the WIPP Stores Stock Inventory, the MSDS Inventory, and the

Hazardous Air Pollutants Inventory. Several site walkarounds were then conducted to examine material storage practice and to identify the operations and storage areas with potential to come into contact with storm water.

The three ethylene glycol spills that were reported to the National Response Center are described in the PPP.

Non-storm water discharges, described in the PPP, are discussed in Section 7.3.3 above. The existing monitoring data are also described in the PPP, and the locations of the data are specified. An identification of potential risks from discharges was not performed because all non-storm water discharges are either exempted, contained, or not regulated.

7.3.8 Site Assessments, IV(C)(2) and Appendix B, IV(D)

A site assessment for storm water discharge sources must be included in a facility's PPP.

A summary of the site assessment is provided in Chapter 3.0 of the PPP. This summary identifies the potential pollutant sources that require additional controls or BMPs to ensure compliance with the requirements (see also Section 7.3.7 above).

7.3.9 Measures and Controls, IV(C)(3) and Appendix B, IV(D)(3)

Measures and controls (including recordkeeping and internal reporting) must be addressed in the PPP.

The measures and controls for discharges are described in the PPP. In Chapter 4.0, BMPs and implementation of these practices are specified for eight management areas, which include the seven areas identified in Section 7.3.7 and the solid waste management units (SWMUs) located in the rest of the 16-section withdrawal area. Included in the discussion are sections on good housekeeping, maintenance, and visual inspections; the WIPP SPCC Plan; management of runoff and of sediment and erosion controls; employee training; compliance reporting; annual site compliance evaluations; and recordkeeping.

7.3.10 Comprehensive Site Compliance Evaluations, IV(C)(4) and Appendix B, IV(D)(4)

Comprehensive site compliance evaluations are mandatory for a permitted facility and must be discussed in the facility's PPP.

Comprehensive site inspections are discussed in Chapter 3.0 of the PPP. The initial internal site assessment is described, along with the periodic site compliance evaluation. The CWA Coordinator is responsible for conducting quarterly site compliance evaluations. The NPDES program, including site operation and materials management, is reviewed annually. In addition, the NPDES storm water permit program is evaluated periodically as part of the WIPP Environmental Compliance Assessment Program. The PPP will be revised annually to reflect changes in compliance strategy, regulations, team members, etc.

During the inspections, material handling and storage areas and other potential sources of pollution are visually inspected for evidence of actual or potential pollutant discharges. Guidelines for housekeeping, maintenance, and visual inspections are provided in a Westinghouse manual. WID personnel conduct self assessments in accordance with a WIPP procedure, which outlines the requirements for evaluating good housekeeping practices and for making visual inspections. In addition, WID personnel conduct quarterly walkarounds to assess compliance with the storm water regulations at the site and develop corrective action plans to mitigate any issues that may arise from these assessments.

7.3.11 Requirements for Storage, Processing, and Handling Areas for EPCRA § 313 "Water Priority Chemicals," IV(D)(1) and Appendix B, IV(D)(7)

The EPA specifies requirements for storage, processing, and handling areas for EPCRA § 313 "water priority chemicals."

This section is not applicable because WIPP has not been required to submit a report under § 313 of EPCRA during this reporting period due to certain exemptions (see Chapter 4.0).

7.3.12 Enclosure or Covering of Outdoor Salt Piles, IV(D)(2) and Appendix B, IV(D)(8)

The EPA's NPDES General Permit requires that outdoor salt piles be enclosed or covered. This requirement applies only to storage pile runoff discharged to waters of the United States.

The outdoor salt piles at WIPP are situated on an impervious, compacted, caliche liner which eliminates potential discharge to waters of the United States. Any storm water runoff is diverted to the caliche-lined evaporation basin. Storm water that collects in the evaporation basin usually evaporates within 24 hours. Furthermore, the moisture contained in the mined salt quickly forms a hard crust over the surface of the pile, which reduces wind-borne particulates. As rain falls on the salt pile, this protective crust becomes thicker and more impervious, which further reduces salt particulate discharges. Because no waters are diverted to waters of the United States, closure or enclosure of the salt piles is not required.

7.3.13 Notification to Municipal Large and Medium Separate Storm Water Systems, IV(D)(3) and Appendix B, IV(D)(5)

The NPDES General Permits require that the permitted facility notify the owners/operators of any municipal large and medium separate storm water systems that service the facility in the event of a discharge.

This requirement is not applicable at WIPP because storm water is not discharged through a large or medium separate storm water system.

7.3.14 Monitoring and Reporting Requirements, IV(E) and Appendix B, Part IV and XI (C)(vi)

Monitoring and reporting requirements required are described in the NPDES General Permits and differ for different types of facilities.

As discussed in the PPP, all regulated storm water discharges are or will be contained within retention basins or controlled by practices such as diversion berms, reclamation, or material covers. Therefore, the need for compliance sampling at WIPP is not anticipated.

As indicated by the PPP, a Discharge Monitoring Report (DMR) is required only if a discharge has occurred. In the event of a discharge, the DMR, along with sampling results, will be submitted to the EPA on the appropriate DMR form by October 28 of the appropriate year.

7.3.15 Compliance Deadlines, IV(G) and Appendix B, IV(A)(1)

The NPDES General Permits require that the permitted facility complete the development of the Pollution Prevention Plan by the regulatory deadline of April 1, 1993, and require compliance with the terms of the plan by October 1, 1993.

As required by the NPDES General Permit for WIPP, the WIPP PPP was issued on March 31, 1993 (WID, 1993b). As described in Chapter 5 of the PPP, the implementation of BMPs such as retention basins, reclamation of disturbed sites in Zone 1, and the covering of material storage areas was completed by the regulatory deadline of October 1, 1993. The BMPs are inspected on a quarterly basis.

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8.0 SAFE DRINKING WATER ACT

8.1 Summary of the Law

The Safe Drinking Water Act of 1974 (SDWA; 42 USC §§ 300f et seq.), as amended, provides the regulatory strategy for protecting public water supply systems and underground sources of drinking water. As defined in the implementing regulations in 40 CFR Part 141, *National Primary Drinking Water Regulations*, these are systems that provide water for human consumption and that have at least 15 connections or regularly serve at least 25 people.

The SDWA also protects underground sources of drinking water from underground injection of contaminated fluids. Underground injection, defined as "subsurface emplacements of fluids by well injections" in § 1421(d) of the SDWA, is governed by the Underground Injection Control (UIC) program described in Subpart C of 40 CFR Part 144. The nearest potential underground source of drinking water to the WIPP is the Dewey Lake Red Bed Formation, a perched water table located approximately 3.5 miles south of the site. The lack of ground water in the Dewey Lake Red Bed Formation at the WIPP site has been interpreted to imply a lack of a hydrogeologic connection with the portions of the formation south of the site that do contain ground water.

The EPA delegated authority for ensuring compliance with the SDWA's National Primary Drinking Water Standards by approving the New Mexico Environmental Improvement Board's (EIB's) New Mexico Water Supply Regulations, WSR 3. (See Chapter 31, New Mexico Water Supply Regulations.)

8.2 Compliance Status of the Regulatory Requirements

The WIPP Land Withdrawal Act specifically requires compliance with the SDWA. The relevant requirements from the SDWA are summarized in Table 8-1, along with the compliance status of each. More detail is presented in the text.

The New Mexico EIB has authority to administer the SDWA in New Mexico. The EIB's Water Supply Regulations contain the State compliance criteria and general operating requirements for the owners and operators of water-supply systems. These regulations and the compliance status at WIPP are covered in Chapter 31.

TABLE 8-1. Safe Drinking Water Act - Summary of Regulatory Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
40 CFR Part 142, *National Primary Drinking Water Regulations Implementation*		
40 CFR 142.4	State program requirements	See Chapter 31, New Mexico Water Supply Regulations [Section 8.2.1]
40 CFR Part 144, *Underground Injection Control*		
40 CFR 144(C)	Underground injection control (UIC)	**NOT APPLICABLE** No TRU waste or other disposal at WIPP using UIC [Section 8.2.2]

8.2.1 State Program Requirements, 40 CFR 142.4

All applicable requirements in this section are covered in the State program for the SDWA. See Chapter 31, which addresses the New Mexico Water Supply Regulations.

8.2.2 Underground Injection Control, 40 CFR 144(c)

The EPA has established a number of requirements for facilities that dispose of wastes by means of underground injection.

None of the hazardous waste currently generated at WIPP is injected underground, nor will TRU waste be disposed of by underground injection at WIPP. Therefore, the EPA's requirements for underground injection requirements for underground injection control (UIC) do not apply to WIPP.

9.0 TOXIC SUBSTANCES CONTROL ACT

9.1 Summary of the Law

Prior to the passage of the Toxic Substances Control Act (TSCA; 15 USC §§ 2601 et seq.), significant gaps existed in the Federal government's authority to test and regulate problem chemicals. The Clean Air Act, the Clean Water Act, and other laws dealt with chemical substances only when they entered the environment as wastes (e.g., as emissions to the air or discharges into the water). In many cases, controls could not be easily fashioned or required without severe economic consequences. Other statutes, such as the Occupational Safety and Health Act and the Consumer Product Safety Act, deal only with one phase of the chemical's existence (worker exposure or direct consumer exposure) and have no authority to address environmental hazards. Whereas both of these statutes were clearly needed, the life cycle of a chemical, from production to ultimate disposal, provides many opportunities for release to the environment, resulting in human exposure, and Federal authority to deal with the overall cycle was fragmented. The TSCA legislation imposed on new toxic substances, which requires testing before the chemicals reach the production phase, helped to overcome this difficulty.

TSCA has two main features: it regulates the production, use, distribution, and disposal of new, potentially toxic chemical substances, where necessary, and it regulates potential hazards from toxic chemicals. TSCA requires that tests be conducted on new chemical substances before significant human or environmental exposure can occur.

The act applies primarily to commercial manufacturers, importers, and processors of toxic chemicals. The WIPP is not a manufacturer or a processor of chemical products; therefore, most of the provisions of TSCA do not apply. However, three sections of this act pertain to existing commercial toxic substances, rather than to the development of new chemicals. These sections deal with asbestos, indoor radon abatement, and polychlorinated biphenyls (PCBs).

9.1.1 Asbestos Hazard Emergency Response Act of 1986

Because of the potential for serious health hazards associated with asbestos, Congress amended TSCA in 1986 by adding Title II, *The Asbestos Hazard Emergency Response Act* (AHERA). AHERA requires the EPA to establish a comprehensive regulatory framework of inspection, management, planning, operations and maintenance activities, and appropriate abatement responses for controlling asbestos-containing materials in schools. Under AHERA, EPA promulgated its "AHERA-in-Schools Rule" on October 17, 1987. The 1988 AHERA amendments provided additional time for local educational agencies to submit asbestos management plans to the State governors and to begin the implementation of these plans.

Under AHERA, the EPA was also required to conduct a study to determine the extent of danger to human health posed by asbestos in public and commercial buildings and the means to respond

to such danger. This study has been submitted to Congress. At the present time, the EPA does not recommend a regulatory program modeled on AHERA for public and commercial buildings.

9.1.2 Indoor Radon Abatement

The Title III TSCA amendment, *Indoor Radon Abatement*, was added to address the national long-term goal "with respect to radon levels in buildings, that the air within the buildings in the United States should be as free of radon as the ambient air outside of buildings." One of the goal-driven requirements that Title III sets forth in § 309, *Study of Radon in Federal Buildings*, directs each Federal department or agency that owns a Federal building to conduct a study to determine the extent of radon contamination in such buildings. The WIPP has responded to this requirement.

9.1.3 Polychlorinated Biphenyls (PCBs)

Section 6(e) of TSCA, *Polychlorinated Biphenyls*, directed the EPA to phase out PCB manufacture and use according to a statutorily mandated timetable. This timetable directed the EPA to promulgate rules for the disposal and marking of PCBs within 6 months of the enactment of TSCA: by 1 year after the passage of this act, no one was allowed to manufacture, process, distribute, or use any PCB in the United States except in "a totally enclosed manner." Furthermore, unless the EPA did not find any unreasonable risk of injury to public health or the environment, no one was allowed to manufacture PCBs at all after 2 years, or to distribute them after 2 1/2 years after TSCA's passage.

The regulations in 40 CFR Part 761, *Environmental Protection Agency Regulations for Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions for Polychlorinated Biphenyls under the Toxic Substances Control Act*, implement the PCB provisions of TSCA. This part applies to all parties who manufacture, process, distribute in commerce, use, or dispose of PCBs or PCB items. The purpose of these regulations is to establish prohibitions of, and requirements for, the manufacture, processing, distribution in commerce, use, disposal, storage, and marking of PCBs and PCB items. DOE policy now prohibits the use of PCB items or equipment in DOE-installed equipment at facilities such as WIPP. However, prior to the enactment of TSCA prohibiting PCBs, these chemicals were used in fluids of electrical systems all over the country, including DOE sites. Therefore, surveys have been done at DOE sites to identify any PCB or PCB-containing equipment and to eliminate the fluids and equipment in accordance with EPA standards. Requirements for storage and disposal of PCBs have also been established under TSCA (e.g., see 40 CFR 761.60, *Disposal Requirements*, and 40 CFR 761.65, *Storage for Disposal*).

9.2 Compliance Status of the Regulatory Requirements

Table 9-1 summarizes the applicable regulatory requirements and their compliance status under TSCA. The text gives more detail on the compliance status of each requirement.

TABLE 9-1. Toxic Substances Control Act - Summary of Regulatory Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
Title II, *Asbestos Hazard Emergency Response Act*		
TSCA, §§ 201 et seq.	Hazards of friable asbestos-containing material	**ACHIEVED** Asbestos-containing material restricted at WIPP [Section 9.2.1]
Title III, *Indoor Radon Abatement*		
TSCA, § 309	Study of radon in Federal buildings	**ACHIEVED** Study conducted [Section 9.2.2]
40 CFR Part 761, *EPA Regulations for Manufacturing Processing, Distribution in Commerce, and Use Prohibitions for Polychlorinated Biphenyls under the Toxic Substances Control Act*		
40 CFR 761.20	Prohibition of PCBs	**ACHIEVED** Survey and removal of PCB-contaminated equipment; PCBs prohibited at WIPP [Section 9.2.3]

TABLE 9-1 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
40 CFR 761.60	Disposal requirements for PCBs	NOT APPLICABLE PCBs prohibited from TRU waste to be received at WIPP from generator sites [Section 9.2.4]

9.2.1 Hazards of Friable Asbestos-Containing Materials, TSCA, §§ 201 et seq.

> *Because of the hazards to human health inherent in friable asbestos-containing materials, Congress specified a number of requirements pertaining to asbestos specified in Title II of TSCA.*

Asbestos is a restricted material at the WIPP. Therefore, in accordance with WIPP's Hazard Communication Program, asbestos-free insulating material must be used throughout the facility when insulation is being replaced or installed. The removal of any previously installed material that might contain asbestos requires the coordination of WID safety and compliance personnel.

9.2.2 Study of Radon in Federal Buildings, TSCA, § 309

> *Each Federal agency that owns a building must conduct a study of radon contamination in the building(s).*

The DOE conducted an indoor radon study in response to this requirement and submitted the findings in *Results of the U.S. Department of Energy Indoor Radon Study* (DOE, 1990e).

9.2.3 Prohibition of PCBs, 40 CFR 761.20

> *No person may use any PCB or any PCB item regardless of concentration in any way other than in a totally enclosed manner within the United States.*

The DOE has conducted surveys of electrical equipment, such as transformers, that could house PCB-containing fluids. Such a survey was conducted at WIPP. Any equipment containing PCBs

was identified and has been replaced by non-PCB-containing equipment. All PCB-containing equipment identified was disposed of in accordance with the regulations described in Section 9.2.4.

9.2.4 Disposal Requirements for PCBs, 40 CFR 761.60

> *In most circumstances, PCBs must be incinerated as stipulated in 40 CFR 761.70 or placed in chemical-waste landfills that meet the requirements of 40 CFR 761.75 and that have been approved as a landfill for PCBs by the EPA.*

Any DOE equipment identified at WIPP that contained PCB fluids was decontaminated as described in the regulations and disposed of as required.

The WIPP WAC states that only those wastes identified in the RCRA Part A and Part B applications as acceptable for emplacement at WIPP may be shipped to WIPP. As indicated in Chapter K of the *WIPP RCRA Permit Application* (Rev. 3), there are currently no plans to ship PCB-contaminated wastes from the generator sites to WIPP.

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10.0 FEDERAL INSECTICIDE, FUNGICIDE, AND RODENTICIDE ACT

10.1 Summary of the Law

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA; 7 USC §§ 136 et seq.) authorizes the EPA to regulate the registration, certification, use, storage, disposal, transportation, and recall of pesticides. Section 18 of FIFRA authorizes the EPA to exempt State and Federal agencies from any provision of the act if emergency conditions requiring an exemption have been determined to exist, and the regulations of 40 CFR Part 166, *Exemption of Federal and State Agencies for Use of Pesticides under Emergency Conditions*, provide guidelines for urgent, non-routine situations that require the use of pesticides and for which exemptions may be authorized. Sections 19(a) and 25(a) of FIFRA authorize the EPA to establish regulations and procedures regarding the disposal or storage of packages and containers of pesticides and the disposal or storage of excess amounts of such pesticides. The regulations of 40 CFR Part 165, *Regulations for the Acceptance of Certain Pesticides and Recommended Procedures for the Disposal and Storage of Pesticides and Pesticides Containers*, established procedures for the acceptance, disposal, or storage of packages and containers of pesticides and for the disposal or storage of excess amounts of such pesticides. The standards of FIFRA are considered mandatory for DOE facilities. All uses and applications of restricted-use pesticides at WIPP are conducted only by commercial pesticide applicators who are under contract with WID and are required to meet Federal and State standards (see also Chapter 38).

10.2 Compliance Status of the Regulatory Requirements

The two major requirements of FIFRA and the compliance status of each are summarized in Table 10-1. More detail is provided in the text.

TABLE 10-1. Federal Insecticide, Fungicide and Rodenticide Act - Summary of Regulatory Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
40 CFR 152.15	Registration of pesticide products	**NOT APPLICABLE** Pesticide applications done by contractors; pesticides and contracts reviewed by WID safety and regulatory compliance personnel [Section 10.2.1]
40 CFR 165.8-.11	Recommended procedures for disposal or storage of pesticides	**UP TO DATE** General-use product stored at WIPP complies with storage instructions on label [Section 10.2.2]

10.2.1 Registration of Pesticide Products, 40 CFR 152.15

No person may distribute or sell any pesticide product that is not registered under FIFRA. The pesticide must be registered if the person who distributes or sells the substance knows that it will be used as a pesticide.

Restricted-use pesticides are neither stored at WIPP, nor are they applied by WIPP personnel. All applications of restricted-use pesticides are conducted according to existing contract(s) negotiated with pesticide applicators; WID safety and regulatory compliance personnel review all pesticide application contracts before they are awarded. The DOE requires that any pesticide contractor be licensed with the State as a certified pesticide applicator and submit a list of pesticides utilized and their respective EPA numbers to WID prior to awarding the contract. The current agreement requires that the applicator perform scheduled quarterly applications and respond to unscheduled "special situations" such as occurrences of wasp swarming and ant infestation. Before an application is performed, the contractor submits information consisting of the application date, location, method of application, the generic pesticide name, and a Material Safety Data Sheet (MSDS) for review by WID, which confirms that adequate protective equipment is available and that the pesticides to be used are not on the EPA restricted-pesticide

list. After the application, the contractor must submit such information to WID as the type and amount of pesticide used and the dilution factor.

CINCH, a general-use wasp and hornet killer used on site by WIPP personnel, is properly registered with the State of New Mexico.

10.2.2 Recommended Procedures for the Disposal or Storage of Packages and Containers of Pesticides, 40 CFR Part 165

Recommendations for the storage and disposal of pesticides are specified in 40 CFR 165.8 through 165.11.

WIPP currently makes a general-use wasp and hornet killer available to its personnel. The product is stored in the warehouse according to label instructions. Used, empty cans are discarded by WIPP personnel into satellite accumulation area containers and managed as hazardous waste.

Because WIPP personnel do not use, store, or dispose of restricted-use pesticides on site, the majority of these requirements are not applicable. All restricted-use pesticide applications are made by contractors, who are responsible for storing and disposing of pesticides off site.

All applications of restricted-use pesticides at WIPP are performed by commercial, State-licensed applicators. The DOE requires applicators under contract to comply with the requirements of the New Mexico Pesticide Control Act and the implementing regulations set forth by the New Mexico State University Board of Regents. More information on the State requirements is provided in Chapter 38.

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11.0 NOISE CONTROL ACT OF 1972

11.1 Summary of the Law

In the Noise Control Act of 1972 (42 USC §§ 4901 et seq.), the EPA declared its policy of promoting an environment for all Americans that is free from noise jeopardizing public health or welfare. According to the act's policy clause in § 2(a)(3), the primary responsibility for noise control is vested in State and local governments. Federal regulation is deemed essential only for commercial noise sources requiring national uniformity of treatment (e.g., aircraft noise). However, Federal agencies are directed to carry out the programs within their control in a manner that furthers the act's policy. Each agency having jurisdiction over any property or facility, or engaged in any activity resulting or which may result in the emission of noise, shall comply with Federal, State, interstate, and local requirements regarding the control and abatement of environmental noise "to the fullest extent consistent with their authority." Facilities under the DOE are required to comply with the Occupational Safety and Health Administration (OSHA) regulations that address occupational noise exposure standards under 29 CFR Part 1910, *Occupational Safety and Health Standards*.

The regulations under 29 CFR 1910.95, *Occupational Noise Exposure*, define the permissible noise exposure levels to which employees may be subjected. The regulations also include requirements for the development and implementation of a monitoring program, the establishment and maintenance of an audiometric testing program, the measurement of noise, the provision of personal hearing-protection equipment when necessary, and the administration of a hearing conservation program.

11.2 Compliance Status of the Regulatory Requirement

Table 11-1 summarizes the applicable requirement and its compliance status. More information is provided in the text.

TABLE 11-1. Noise Control Act of 1972 - Summary of Regulatory Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
29 CFR 1910, *Occupational Safety and Health Standards*		
29 CFR 1910.95	Compliance with hearing protection standards	**ACHIEVED** Testing, controls, equipment, training, procedures, and contracted specialist in place; Hearing Conservation Program [Section 11.2.1]

11.2.1 Compliance with Hearing Protection Standards, 29 CFR 1910.95

Employers must take measures to protect the hearing of employees.

The DOE administers a full program in accordance with the Noise Control Act and the implementing regulations. Program activities include the following: a hearing conservation program; an audiometric testing program; administrative and engineering controls (e.g., noise mufflers in the area of underground exhaust fans; posted signs); noise measurement (e.g., sound meters, dosimetry); and the provision of personal hearing-protection equipment (e.g., ear plugs, ear muffs). Furthermore, the DOE maintains a certified ear, nose, and throat specialist on contract, requires hearing protection training for WIPP employees, and has developed procedures such as the Hearing Conservation Program. The WIPP Safety Manual and the Occupational Health Manual and their implementing procedures address the requirements of and activities conducted under this program.

12.0 NATIONAL ENVIRONMENTAL POLICY ACT

12.1 Summary of the Law

The National Environmental Policy Act (NEPA; 42 USC §§ 4321 et seq.) establishes policy, sets goals, and provides means for carrying out the policy. Congress created the Council on Environmental Quality (CEQ) to administer the NEPA program. Within NEPA are (1) "action-forcing" provisions to ensure that Federal agencies act according to the letter and spirit of the act and (2) NEPA requirements for identifying reasonable courses of action, along with the environmental consequences of all proposed actions, for all major Federal actions under consideration. The purpose of NEPA is not to generate paperwork but to foster action. The NEPA process is intended to help public officials (1) make decisions based on understanding possible environmental consequences to actions and (2) take the appropriate steps to protect, restore, and improve the environment. Because public involvement in the decision-making process is mandated, NEPA has often been referred to as a "public disclosure law."

The CEQ's regulations in 40 CFR Parts 1500 through 1508 implement § 102(2) of NEPA, informing Federal agencies about what they must do to comply with the procedures and to achieve the goals of NEPA. These regulations outline specific requirements with regard to the integration of the NEPA process early in a process to ensure timely planning and decision-making, the preparation of environmental impact statements (EISs) or Environmental Assessments (EAs), public review and solicitation of comments on EISs, decisions with respect to an EIS or EA, and the implementation of the decisions.

12.2 Compliance Status of the Regulatory Requirements

Table 12-1 summarizes the regulatory requirements and their compliance status under NEPA. Additional information is provided in the text.

TABLE 12-1. National Environmental Policy Act - Summary of Regulatory Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
40 CFR Parts 1500-1508	Provision of environmental information to public officials and private citizens; use as a decision-making tool; need for Environmental Impact Statements (EISs), Environmental Assessments (EAs), and categorical exclusions	**UP TO DATE** Final Environmental Impact Statement (FEIS) and FEIS Record of Decision (ROD); Final Supplement Environmental Impact Statement (SEIS) and SEIS ROD; numerous categorical exclusions [Section 12.2.1]

12.2.1 Provision of Environmental Information to Public Officials and Private Citizens, 40 CFR Parts 1500-1508.

Environmental information must be made available to the public before decisions are made and actions are taken and must include a detailed statement on environmental impacts of major Federal actions significantly affecting the quality of the human environment.

Pursuant to the requirements of NEPA, the DOE published the *Final Environmental Impact Statement* (FEIS) for the WIPP in 1980 (DOE, 1980). The FEIS analyzed and compared the environmental impacts of various alternatives for demonstrating the safe disposal of TRU waste resulting from national defense activities. Based on the environmental analyses in the FEIS, the DOE published a Record of Decision (ROD) to the FEIS in 1981 to proceed with the phased development of the WIPP (DOE, 1981). This ROD noted that the FEIS would be supplemented as appropriate if new environmental data resulted from the Site and Preliminary Design Validation (SPDV) program or from other WIPP activities.

Consistent with this commitment, the DOE prepared additional NEPA documentation to address changes in the proposed action and the development of new geologic and hydrologic information. Changes addressed in the 1990 *Final Supplement Environmental Impact Statement* (SEIS) (DOE, 1990a) included alterations in the composition of the waste inventory, the transportation of waste to the WIPP, conducting a test phase at WIPP, and management of mixed waste (TRU waste with hazardous constituents). The DOE published a ROD to the SEIS in 1990 (DOE, 1990b). One of the commitments made in this second ROD was that the DOE will prepare another Supplemental Environmental Impact Statement (and ROD) prior to initiating the disposal phase at WIPP.

In order to ensure compliance with NEPA as administered by the CEQ and by the DOE (see also Chapter 14), Westinghouse Waste Isolation Division (WID) personnel prepared the WIPP NEPA Compliance Program. This program consists of the *NEPA Compliance Plan* and implementing procedures.

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13.0 ATOMIC ENERGY ACT AND THE U.S. DEPARTMENT OF ENERGY

13.1 Summary of the Law

The Atomic Energy Act of 1954 as amended (AEA; 42 USC §§ 2011 et seq.) established a national program for research, development, and use of atomic energy for national defense and civilian purposes. Section 161 of the AEA authorized the Atomic Energy Commission (AEC) to establish rules, regulations, and orders to govern any activity regulated under the AEA to protect health and minimize hazards to life or property. Activities included standards and restrictions pertaining to the design, location, and operation of facilities.

The AEC has been succeeded by two organizations: the U.S. Department of Energy (DOE) for national defense and the U.S. Nuclear Regulatory Commission (NRC) for domestic civilian purposes (see Chapter 15 for the compliance status of NRC-related requirements). Thus, the AEA gave the DOE its authority to develop policies, issue Orders, and promulgate regulations that address environmental, safety, and health protection aspects of radioactive waste and nuclear materials. The radioactive constituents of the TRU waste to be shipped to WIPP are regulated under the AEA by a DOE system of Orders, notices, and directives which carries out the AEA mandate to implement effective and consistent programs to protect the public, the environment, and workers from adverse consequences from DOE operations. Thus, TRU waste[1] is regulated under the AEA and, by extension, by the DOE system.

Regulation of mixed waste is more complex. Radioactive waste and constituents are not regulated by the U.S. Environmental Protection Agency (EPA) under the Resource Conservation and Recovery Act (RCRA): in fact, RCRA specifically excludes "source, special nuclear, or by-product material as defined by the Atomic Energy Act of 1954, as amended" [§ 1004(27) of RCRA; see also § 1006(a)]. Therefore, TRU mixed waste is subject to dual regulation under the AEA and RCRA: the radioactive constituents are regulated under the AEA, whereas the hazardous constituents are regulated under RCRA.

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[1]The AEA defined "transuranic waste" as

> . . .material contaminated with elements that have an atomic number greater than 92, including neptunium, plutonium, americium, and curium, and that are in concentrations greater than 10 nanocuries per gram, or in such other concentrations as the Nuclear Regulatory Commission may prescribe to protect the public health and safety [AEA, § 11(ee)].

In 1982, TRU waste was redefined as having half lives greater than 20 years and concentrations greater than 100 nanocuries per gram of waste. (Wastes with TRU concentrations between 10 and 100 nanocuries per gram have been reclassified as low-level wastes.)

13.2 Compliance Status of the Regulatory Requirements

As indicated in the previous section, the DOE has used a system of Orders, notices, and directives to implement its programs under the AEA and to ensure compliance with other statutes and regulations. These implementing documents are not considered to be at the same levels as are those in the Code of Federal Regulations (CFR).

The DOE has recently issued regulations in the 10 CFR series in addition to the regulations that pertain to NEPA (see Chapter 14). On December 14, 1993, 10 CFR Part 835, *Occupational Radiation Protection*, was published in the *Federal Register*. These regulations became effective on January 13, 1994.

Because radioactive waste has not yet been received at WIPP, these regulations are not applicable. However, a number of programs are in place at WIPP to meet the requirements upon receipt of TRU waste.

14.0 NATIONAL ENVIRONMENTAL POLICY ACT AND THE U.S. DEPARTMENT OF ENERGY

14.1 Summary of the Law

As discussed in Chapter 12, the National Environmental Policy Act (NEPA) establishes policy, sets goals, and provides a process for carrying out the policy. The NEPA process requires the identification of reasonable courses of action, along with the environmental consequences of all proposed actions, for all major Federal actions under consideration The NEPA process is intended to help public officials make decisions based on understanding possible environmental consequences to actions and to take the appropriate steps to protect, restore, and improve the environment. The establishment of this national policy ensures that consideration is given to environmental values and factors in Federal planning and decision making. The U.S. Department of Energy's (DOE) policy is to comply fully with the letter and spirit of NEPA.

The Council on Environmental Quality (CEQ) regulations in 40 CFR Parts 1500-1508 implement § 102(2) of NEPA and inform Federal agencies as to what they must do to comply with the procedures and achieve the goals of NEPA. These parts provide regulations applicable to and binding on all Federal agencies for implementing the procedural provisions of NEPA. The DOE adopted the CEQ regulations and established 10 CFR Part 1021, *National Environmental Policy Act Implementing Procedures*, to implement the procedural provisions of NEPA pursuant to the CEQ regulations. By issuing its guidelines as regulations published in the CFR, the DOE ensures that its NEPA procedures are more accessible to the public.

The implementing procedures in 10 CFR Part 1021 detail requirements for the preparation and circulation of NEPA documents, including the Environmental Impact Statement (EIS) and the Supplemental Environmental Impact Statement (SEIS), the related Records of Decision (RODs), the Mitigation Action Plan (MAP), and the Environmental Assessment (EA). The DOE requires that a MAP be prepared for the implementation of any commitments made in an EIS/ROD for mitigation of environmental impacts associated with an action. A MAP is also required of any Finding of No Significant Impact (FONSI) to an EA that contains mitigative actions prior to initiating the proposed action.

Subpart D, *Typical Classes of Actions*, of this part lists typical types of actions that require NEPA documentation and those that are categorically excluded from the need to prepare an EIS or an EA. Classes of actions that the DOE has determined do not individually or cumulatively have a significant effect on the human environment are *categorical exclusions*. The classes of actions identified in Subpart D are: (1) *Categorical Exclusions Applicable to General Agency Actions*, such as routine administrative actions; (2) *Categorical Exclusions Applicable to Specific Agency Actions*, such as installation of data-processing equipment; (3) *Classes of Actions That Normally Require EAs but Not Necessarily EISs*, such as field demonstration projects for

wetlands mitigation; and (4) *Classes of Actions That Normally Require EISs*, such as the siting, construction, and operation of a facility, such as the WIPP, for the disposal of TRU waste.

14.2 Compliance Status of the Regulatory Requirements

Table 14-1 summarizes the regulatory requirements and their compliance status under the DOE's *National Environmental Policy Act Implementing Procedures* in 10 CFR Part 1021. Additional detail is presented in the text.

TABLE 14-1. DOE's National Environmental Policy Act Implementing Procedures, 10 CFR Part 1021 - Summary of Regulatory Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
10 CFR Part 1021, *Implementing Procedures*		
10 CFR Part 1021	Supplements and clarifies the requirements contained in 40 CFR Parts 1500-1508; adds requirement for Mitigation Action Plans (MAPs); delineates specific categorical exclusions for use by the DOE	**UP TO DATE** Final Environmental Impact Statement (FEIS) and FEIS Record of Decision (ROD) issued in 1980 and 1981, respectively; Final Supplement Environmental Impact Statement (SEIS) and SEIS ROD issued in 1990; MAP issued in July 1991, with annual MAP reports submitted in July 1992 and 1993; numerous categorical exclusions; WIPP NEPA Compliance Program [Section 14.2.1]

14.2.1 Implementing Procedures, 10 CFR Part 1021

DOE's regulations that implement NEPA (10 CFR Part 1021) supplement and clarify the requirements contained in 40 CFR Parts 1500-1508 (see also Chapter 12). The DOE regulations add a requirement for Mitigation Action Plans (MAPs) for EISs, supplemental EISs, and

RODs. They also delineate specific categorical exclusions for DOE facilities.

In 1980, the DOE published the *Final Environmental Impact Statement* (FEIS) for the WIPP (DOE, 1980). The FEIS analyzed and compared the environmental impacts of various alternatives for demonstrating the safe disposal of TRU waste resulting from DOE national defense-related activities. The FEIS for the WIPP project includes responses to the comments received in writing and at the public hearings, as is required.

Based on the environmental analyses presented in the FEIS, the DOE published a Record of Decision (ROD) in 1981 to proceed with the phased development of the WIPP. The ROD was published in the *Federal Register* on January 28, 1981 (DOE, 1981). A number of mitigative commitments were specified.

Since publication of the FEIS in 1980, new geological and hydrological information led to changes in the understanding of the hydrogeological characteristics of the WIPP site as they relate to the long-term performance of the underground waste repository. In addition, there have been changes in the information and assumptions used to analyze the environmental impacts in the FEIS. Consequently, the Final Supplement Environmental Impact Statement (SEIS), which updated the environmental record established in 1980 by evaluating the environmental impacts associated with new information, new circumstances, and proposal modifications, was published in 1990 (DOE, 1990a).

Based on the analysis presented in the SEIS, the SEIS ROD accepted the proposed action in the SEIS to proceed with the phased WIPP development. The DOE published the SEIS ROD in the *Federal Register* on June 22, 1990 (DOE, 1990b). A number of mitigative commitments were specified in the ROD, including the commitment to prepare another supplemental Environmental Impact Statement prior to the initiation of the disposal phase at WIPP.

The DOE issued the *Mitigation Action Plan for the Records of Decision for the Waste Isolation Pilot Plant* (DOE, 1991e) on July 10, 1991. This document addresses the mitigative commitments stated in the RODs to the 1980 FEIS and the 1990 SEIS and discusses mitigative actions, organizations responsible for implementing these actions, and the status of each commitment. The Annual Mitigation Report (AMR) is prepared annually to track the status of each commitment that has not yet been closed. To date, AMRs have been issued in July 1992 and July 1993; the July 1994 AMR is currently in preparation.

Numerous categorical exclusions have been used at WIPP in accordance with 10 CFR Part 1021. The determination that a given project falls under a categorical exclusion as identified by the DOE is based upon a NEPA checklist that assists in the proper selection and application of NEPA documentation. The methods used are based upon the WIPP NEPA Compliance

Program, which contains the *WIPP NEPA Compliance Plan*, two procedures for implementing NEPA at WIPP, and a training module that will be used to train appropriate personnel.

The WIPP NEPA Compliance Program is in the final technical review stage. It has been audited by personnel from Westinghouse Environmental Affairs and DOE-Headquarters and is considered to be a model NEPA program. The NEPA Compliance Program is consistent with other WIPP and Sandia National Laboratories procedures, including those relating to procurement, engineering, and work control.

15.0 ATOMIC ENERGY ACT AND THE U.S. NUCLEAR REGULATORY COMMISSION

15.1 Summary of the Law

As discussed in Chapter 13, the Atomic Energy Act of 1954 as amended (AEA; 42 USC §§ 2011 et seq.) gives the U.S. Nuclear Regulatory Commission (NRC) its authority to develop policies, issue orders, and promulgate regulations that address environmental, safety, and health protection aspects of radioactive waste and nuclear materials in the civilian sector. Regulations promulgated by the NRC under the AEA appear in the first portion of Title 10 of the Code of Federal Regulations (CFR) and establish standards for the management of nuclear material and the protection of the public against radiation. Additional NRC requirements apply to the licensing, packaging, preparation, and transportation of radioactive materials.

15.2 Compliance Status of the Regulatory Requirements

Generally, the NRC does not have regulatory authority over the DOE. The only portion of the NRC's implementing regulations that applies to WIPP is 10 CFR Part 71, *Packaging and Transportation of Radioactive Material*. These regulations pertain to the NRC's certification of packaging such as the Transuranic Package Transporter Model II (TRUPACT-II) shipping container designed to transport TRU wastes from the generator sites to WIPP. The compliance status of each of the applicable NRC regulatory requirements is summarized in Table 15-1. Details are provided in the text.

TABLE 15-1. Atomic Energy Act and the U. S. Nuclear Regulatory Commission (NRC) - Summary of Regulatory Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
10 CFR Part 71, *Packaging and Transportation of Radioactive Material*		
10 CFR 71.12	General license: NRC-approved package Note: The NRC issued the DOE a certificate of compliance for the TRUPACT-II instead of a license.	**ACHIEVED** *TRUPACT-II Certificate of Compliance (C of C) No. 9218, Section 14.* [Section 15.2.1]

TABLE 15-1 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
10 CFR 71.31-71.39	Contents of application and package description, evaluation, and QA	**ACHIEVED** *TRUPACT-II Safety Analysis Report for Packaging (SARP)* [Section 15.2.2]
10 CFR 71.41	Demonstration of compliance	**ACHIEVED** TRUPACT-II SARP, Section 1.2 [Section 15.2.3]
10 CFR 71.43 and 71.45	Requirements for all packages	**ACHIEVED** TRUPACT-II SARP, Sections 2.4 and 2.5 [Section 15.2.4]
10 CFR 71.47	External radiation standards for all packages	**ACHIEVED** TRUPACT-II SARP, Section 5.0 [Section 15.2.5]
10 CFR 71.51	Additional requirements for Type B packages	**ACHIEVED** TRUPACT-II SARP, Section 4.0 [Section 15.2.6]
10 CFR 71.55-71.61	Requirements for all fissile material packages	**ACHIEVED** TRUPACT-II SARP, Section 6.0 [Section 15.2.7]
10 CFR 71.63	Special requirements for plutonium shipments in excess of 20 Ci/shipment	**ACHIEVED** TRUPACT-II SARP, Section 1.2 and Appendix 1.3.7 [Section 15.2.8]

TABLE 15-1 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
10 CFR 71.71	Tests under normal conditions of transport	**ACHIEVED** TRUPACT-II SARP, Section 2.6 [Section 15.2.9]
10 CFR 71.73	Tests under hypothetical accident conditions	**ACHIEVED** TRUPACT-II SARP, Section 2.7 [Section 15.2.10]
10 CFR 71.81	Compliance with general requirements (71.00-.6a), operating controls and procedures (71.81-.99), and quality assurance requirements (71.101-.137)	**ACHIEVED** TRUPACT-II SARP, Sections 7.0, 8.0, and 9.0 [Section 15.2.11]
10 CFR 71.83	Assumptions as to unknown properties: assume credible values that will cause the maximum nuclear reactivity	**ACHIEVED** TRUPACT-II SARP, Appendix 1.3.7 [Section 15.2.12]
10 CFR 71.85	Preliminary determinations of integrity of packaging, pressure testing, and marking	**ACHIEVED** TRUPACT-II SARP, Section 8.1 [Section 15.2.13]
10 CFR 71.87	Routine determinations prior to each shipment	**ACHIEVED** TRUPACT-II SARP, Section 7.0 [Section 15.2.14]
10 CFR 71.89	Any special opening instructions for the consignee	**ACHIEVED** TRUPACT-II SARP, Section 7.2 [Section 15.2.15]

TABLE 15-1 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
10 CFR 71.91	Records to be kept at least 3 years after shipment	**UP TO DATE** WID record-keeping procedures in place for TRUPACT-II containers [Section 15.2.16]
10 CFR 71.93	Inspections and tests to be performed or allowed to be performed by the NRC	**ACHIEVED** NRC inspections during and after fabrication [Section 15.2.17]
10 CFR 71.95	Reports regarding (1) any decreased effectiveness of an authorized packaging during use and (2) details of any defects with safety significance	**UP TO DATE** Records maintained by TRUPACT-II Maintenance Engineer; no reports to date [Section 15.2.18]
10 CFR 71.97	Advance notification of shipment of nuclear waste as described	**UP TO DATE** TRANSCOM satellite tracking system for advance notification [Section 15.2.19]
10 CFR 71.101-71.137	NRC quality assurance requirements	**ACHIEVED** NRC inspection of WID's QA program [Section 15.2.20]

15.2.1 General License, 10 CFR 71.12

A general license is issued to any licensee of the NRC to transport licensed material in a package for which a license, certificate of compliance, or other approval has been issued by the NRC.

The TRUPACT-II container is approved for use under the general license provisions of 10 CFR 71.12 [Certificate of Compliance (C of C) No. 9218, Section 14]. The DOE is registered with the NRC as a user. The NRC's issuance of C of C No. 9218 confirms that the TRUPACT-II packaging meets the applicable requirements of 10 CFR §71.12.

15.2.2 Contents of Application and Package Description/Evaluation, 10 CFR 71.31-71.39

The required contents of an application are described. The application must include a package description/evaluation and description of the packaging and proposed contents as described in 10 CFR 71.33 and must demonstrate that the package meets the appropriate NRC standards. In addition, the quality assurance (QA) program for the design, fabrication, assembly, testing, maintenance, repair, modification, and use of the package must be described, along with established codes and standards. Any additional information requested by the NRC must be provided.

The *Safety Analysis Report for Packaging* (SARP) for the TRUPACT-II packaging describes the design, specifications, and safety evaluation in accordance with the NRC's requirements (DOE, 1989a). The NRC's issuance of C of C No. 9218 confirms that the TRUPACT-II is in compliance with all applicable requirements of 10 CFR §71.31-71.39.

15.2.3 Demonstration of Compliance, 10 CFR 71.41

The tests specified in 10 CFR 71.71 and 71.73 must be performed on the package to demonstrate compliance under normal conditions and hypothetical accident conditions, respectively.

Section 1.2 of the TRUPACT-II SARP describes the analysis and testing to demonstrate compliance with both normal and hypothetical accident conditions of transport. The NRC's issuance of C of C No. 9218 confirms that the TRUPACT-II meets the applicable requirements of 10 CFR §71.41.

15.2.4 Standards for all Packages, 10 CFR 71.43 and 71.45

Standards for all packages must be met. These include general standards such as size, seals and fastening devices, materials and construction of the package, valves, temperature, and prohibition

of continuous venting during transport as well as lifting and tie-down standards.

Sections 2.4 and 2.5 of the TRUPACT-II SARP describe the packaging features, including tie-downs. The NRC's issuance of C of C No. 9218 confirms that the TRUPACT-II meets the applicable requirements of 10 CFR §71.43 and 71.45.

15.2.5 External Radiation Standards for all Packages, 10 CFR 71.47

A package must be designed and prepared for shipment so that the radiation level at any external surface of the package does not exceed 200 millirem per hour and the transport index does not exceed 10.

Section 5.0 of the TRUPACT-II SARP discusses the fact that the TRUPACT-II has no special shielding; the contents are limited to less than 200 millirem per hour at the surface of the payload containers. The NRCs issuance of C of C No. 9218 confirms that the TRUPACT-II meets the applicable requirements of 10 CFR §71.47.

15.2.6 Additional Requirements for Type B Packages, 10 CFR 71.51

Type B packages must be designed, constructed, and prepared for shipment so as to prevent loss or disposal of radioactive material, significant increase in external radiation levels, or substantial reduction in the effectiveness of the packaging (see also Section 15.2.1.9) during normal transport. In addition, release of krypton-85 may not exceed 10,000 curies in 1 week, release of other radioactive material may not exceed a total amount A_2 in 1 week, and no external radiation dose rate may exceed 1 rem per hour at 1 meter from the external surface of the package during hypothetical accident conditions. Compliance with these requirements must not be predicated upon the use of filters or of a mechanical cooling system.

Section 4.0 of the TRUPACT-II SARP discusses containment design and an acceptance criterion (a leak rate of less than 1×10^{-7} standard cubic centimeters per second). The NRC's issuance of C of C No. 9218 confirms that the TRUPACT-II meets the applicable requirements of 10 CFR §71.51.

15.2.7 Requirements for all Fissile Material Packages, 10 CFR 71.55-71.61

All packages used to ship fissile material must be designed and constructed in accordance with 10 CFR 71.41 through 71.51. In addition, each package must be designed and constructed and its contents so limited that the contents will remain subcritical during normal and accident transportation conditions and that the packaging will remain effective during normal transportation conditions. Specific standards for Fissile Class I, II, and III packages are described in 10 CFR 71.57, 71.59, and 71.61, respectively. A Fissile Class I package must be designed and constructed and its contents so limited that (1) any number of undamaged packages would be subcritical in any arrangement and with optimal interspersed hydrogenous moderation and (2) 250 packages, if each were subjected to the tests specified in 10 CFR 71.73, would be subcritical if stacked together in any arrangement, closely reflected on all sides by water, and with optimal interspersed hydrogenous moderation.

Section 6.0 of the TRUPACT-II SARP discusses criticality; the contents are controlled to limit the amount of fissile material that may be shipped. The TRUPACT-II is a Fissile Class I package. The NRC's issuance of C of C No. 9218 confirms that the TRUPACT-II meets the applicable requirements of 10 CFR §71.55-71.61.

15.2.8 Special Requirements for Plutonium Shipments, 10 CFR 71.63

Plutonium in excess of 20 curies per package must be shipped as a solid and must be packaged in a separate inner container placed within outer packaging that meets the requirements of 10 CFR 71.41 through 71.77. In addition, the restrictions limiting plutonium under normal and accident conditions must be met.

Section 1.2 of the TRUPACT-II SARP describes the double containment feature of the TRUPACT-II; Appendix 1.3.7 of the TRUPACT-II SARP requires the contents to be in a non-dispersable form. The NRC's issuance of C of C No. 9218 confirms that the TRUPACT-II meets the applicable requirements of 10 CFR §71.63.

15.2.9 Tests Under Normal Conditions of Transport, 10 CFR 71.71

The behavior of each package design under tests and conditions simulating normal transportation conditions must be evaluated. The tests include free drop, compression, and penetration tests. Conditions include heat, cold, change in external pressure (reduced and increased), vibration, and water spray.

Section 2.6 of TRUPACT-II SARP describes the analysis and/or tests performed to demonstrate compliance with the normal conditions of transport. The NRC's issuance of C of C No. 9218 confirms that the TRUPACT-II meets the applicable requirements of 10 CFR §71.71.

15.2.10 Tests Under Hypothetical Accident Conditions, 10 CFR 71.73

Evaluation of a package for hypothetical accident conditions is based upon the sequential application of tests in the order specified to determine their cumulative effect on a package or array of packages. Tests include free drop, puncture, thermal, and immersion as specified in 10 CFR 71.73.

Section 2.7 of TRUPACT-II SARP describes the analysis and/or tests performed to demonstrate compliance with the hypothetical accident conditions of transport. The NRC's issuance of C of C No. 9218 confirms that the TRUPACT-II meets the applicable requirements of 10 CFR §71.73.

15.2.11 Compliance with Operating Controls and Procedures, 10 CFR 71.81

A licensee who is subject to this part and who transports licensed material must comply with requirements of the general provisions (71.00-71.6a), operating controls and procedures (71.81-71.99), and quality assurance requirements (71.101-71.137).

Sections 7.0, 8.0, and 9.0 of the TRUPACT-II SARP describe acceptance and maintenance, operating instructions, and quality assurance. The NRC's issuance of C of C No. 9218 confirms that the TRUPACT-II meets the applicable requirements of 10 CFR §71.81.

15.2.12 Assumptions Regarding Unknown Properties, 10 CFR 71.83

When the isotopic abundance, mass, concentration, degree of irradiation, degree of moderation, or other relevant property of fissile material in a package is not known, the fissile material will be packaged as if the unknown properties have credible values that will cause the maximum nuclear reactivity.

Section 6.0 of the TRUPACT-II SARP assumes the worst case for the criticality assumptions; Appendix 1.3.7 limits the amount of fissile material that may be shipped in the TRUPACT-II packaging. The NRC's issuance of C of C No. 9218 confirms that the TRUPACT-II meets the applicable requirements of 10 CFR §71.83.

15.2.13 Preliminary Determination of Integrity of Packaging, Pressure Testing, and Marking, 10 CFR 71.85

Prior to the first use of any packaging for the shipment of licensed material, the licensee shall ensure the integrity of the packaging, conduct pressure testing, and mark the packaging as required.

Prior to the first use of the TRUPACT-II packaging for the shipment of TRU waste, the integrity of the packaging will be ensured, pressure testing will be conducted as required, and the packagings will be marked with the TRUPACT-II model number, gross weight, and the package identification number assigned by the NRC. Section 8.1 of the TRUPACT-II SARP describes preliminary determinations.

15.2.14 Routine Determinations Prior to each Shipment, 10 CFR 71.87

Prior to each shipment of licensed material, the licensee must ensure that the package and its contents satisfy the applicable requirements of this part and the license. These routine determinations include appropriateness and integrity of packaging; closure devices; liquid containment; pressure relief devices; loading and closure procedures; moderator/neutron absorbers, if appropriate; lift/tie-down devices; external radiation levels (on external surfaces of the package and around vehicle); and accessible package surface temperatures.

Routine Westinghouse Waste Isolation Division (WID) procedures and Operating and Maintenance Instructions are in place to ensure that these requirements are met. Section 7.0 of the TRUPACT-II SARP describes routine determinations.

15.2.15 Special Opening Instructions, 10 CFR 71.89

Any special opening instructions must be sent or otherwise made available to the consignee prior to delivery of a package.

WIPP has provided copies of its procedures for handling an empty TRUPACT-II packaging to each waste-generating site that may ship wastes to WIPP. These procedures provide the requirements and foundations for each site to develop its own procedure(s), taking local facilities and needs into account. Section 7.2 of the TRUPACT-II SARP describes opening the TRUPACT-II.

15.2.16 Maintenance of Records, 10 CFR 71.91

A record of each shipment of licensed material must be kept at least 3 years after shipment. The records to be kept include identification of the packaging by model number, verification of integrity of the packaging, coolant information, type and quantity of licensed material, specific information regarding irradiated fissile material, date of shipment, any special controls, name and address of transferee and of recipient, and results of the determinations required by 10 CFR 71.87. Records demonstrating the quality of packaging must also be retained.

Each WID procedure pertaining to the TRUPACT-II identifies the specific records required for retention. Retention times are also identified for each record. Records are retained at the working location and submitted to the WIPP Records Center for safe and retrievable storage.

15.2.17 NRC Inspections and Tests, 10 CFR 71.93

The licensee or certificate holder shall allow the NRC to inspect the licensed material, packaging, premises, and facilities in which the material or packaging is used, provided, constructed, listed, stored, or shipped; perform (and allow the NRC to perform) tests deemed necessary by the NRC; and notify the NRC at least 45 days prior to the fabrication of a package to be used to ship licensed

material that exceeds the allowed heat load (5 kilowatts) or the maximal normal operating pressure (15 psi gauge).

The DOE has and will continue to allow NRC to inspect or conduct tests, or will perform those tests deemed necessary by the NRC, on TRU waste transportation packages. The TRUPACT C of C requires DOE to meet Subpart G requirements (see Sections 15.2.11 through 15.2.19). Currently there are no TRUPACT-IIs in production. At least 45 days prior to the resumption of construction, the DOE will notify the NRC as required by the TRUPACT C of C.

15.2.18 Reports Regarding Decreased Effectiveness or Defects with Safety Significance, 10 CFR 71.95

Within 30 days, the licensee will report the following to the NRC: (1) any instance in which there was decreased effectiveness of any authorized packaging during use and (2) details of any defects with safety significance in packaging after first use and the means used to prevent recurrence.

The packaging maintenance program is defined and detailed in a WID procedure that addresses such topics as control of material, spare parts, and nonconformance reports. Maintenance records are maintained by the TRUPACT-II Maintenance Engineer. No conditions causing decreased effectiveness have occurred to date.

15.2.19 Advance Notification of Shipment of Nuclear Waste, 10 CFR 71.97

Advance written notification of a shipment of nuclear waste will be provided to the governor of any State to be traversed by the shipment. Notification must be provided at least 7 days or 4 days before the beginning of the 7-day period during which departure of the shipment is expected if notification is by mail or by messenger, respectively. The information required by 10 CFR 71.97(d) will be provided.

Advance notification to State officials will be made using the TRANSCOM satellite tracking system. Operations personnel and designated State officials will be notified regarding WIPP shipments and other selected high-visibility shipments. State officials designated for receipt of this information have been provided with the requisite TRANSCOM computer software and have been trained in its use.

15.2.20 NRC Quality Assurance Requirements, 10 CFR 71.101-71.137

Subpart H of 10 CFR Part 71 (71.101-71.137) established the NRC quality assurance (QA) requirements for packagings. The QA requirements pertain to design, purchase, fabrication, handling, shipping, storage, cleaning, assembly, inspections, testing, operation, maintenance, repair, and modification of components of packaging that are important for safety. The requirements address the licensee's QA organization (71.103); QA program (71.105); package design control (71.107); procurement document control (71.109); instructions, procedures, and drawings (71.111); document control (71.113); control of purchased material, equipment, and services (71.115); identification and control of material parts and components (71.117); control of special processes (71.119); internal inspections (71.121); test control (71.123); control of measuring and test equipment (71.125); handling, storage, and shipping control (71.127); inspection test and operating status (71.129); nonconforming materials, parts, or components (71.131); corrective action (71.133); QA records (71.135); and audits (71.137).

The *WID QA Plan for Procurement, Use, Maintenance and Repair of TRUPACT-II* (WID, 1991b) addresses the 18 criteria specified within Annex 2 of the NRC's Regulatory Guide 7.10, promulgated by the Office of Nuclear Regulatory Research. The title of this document is *Establishing Quality Assurance Programs for Packaging Used in the Transport of Radioactive Material*. The NRC has inspected the WID's QA program and found that it meets the requirements of 10 CFR 71, Subpart H.

15.3 Compliance Status of the Certificate of Compliance

The NRC has issued C of C No. 9218 to the DOE for the TRUPACT-II container and registered the DOE as a user. A number of conditions are specified in the C of C. The conditions from the latest revision of the C of C (dated November 19, 1992) are summarized in Table 15-2. Additional detail is presented in the text.

TABLE 15-2. The U. S. Nuclear Regulatory Commission's Certificate of Compliance (C of C) for the TRUPACT-II Container - Compliance Status of Conditions and Restrictions

CITATION	CONDITION OR RESTRICTION	COMPLIANCE STATUS
Description of TRUPACT-II		
C of C, p. 1, 5(2), para. 1	Overall specifications for the TRUPACT-II	**ACHIEVED** TRUPACT-II SARP, Section 1.2.1.1 and Appendix 1.3.2 [Section 15.3.1]
C of C, p. 1, 5(2), para. 1	Weight specifications	**ACHIEVED** TRUPACT-II SARP, Section 1.2.1.2 and Appendix 1.3.2 [Section 15.3.2]
C of C, p. 1, 5(2), para. 2	Outer containment assembly specifications	**ACHIEVED** TRUPACT-II SARP, Section 1.2.1.1 [Section 15.3.3]
C of C, p. 1, 5(2), para. 3, ICV	Inner containment vessel specifications	**ACHIEVED** TRUPACT-II SARP, Section 1.2.1.1.2 and Appendix 1.3.2 [Section 15.3.4]

TABLE 15-2 (continued)

CITATION	CONDITION OR RESTRICTION	COMPLIANCE STATUS
	Packaging - Drawings	
C of C, p. 2, 5(a)(3), para. 1	Packaging construction	**ACHIEVED** TRUPACT-II SARP, Appendix 1.3.2 [Section 15.3.5]
C of C, p. 2, 5(a)(3), para. 2	Positioning of contents within packaging	**ACHIEVED** TRUPACT-II SARP, Appendix 1.3.2 [Section 15.3.6]
	Contents - Type and Form of Material	
C of C, p. 2, 5(b)(1)	Allowable materials	**UP TO DATE** TRUPACT-II SARP, Appendix 1.3.7, *TRUPACT-II Authorized Methods for Payload Control* (TRAMPAC); *WIPP Waste Acceptance Criteria* (WAC) [Section 15.3.7]
C of C, p. 2, 5(b)(1)	Explosives, corrosives, nonradioactive pyrophorics, and pressurized containers prohibited	**UP TO DATE** TRAMPAC; WAC [Section 15.3.8]
C of C, p. 2, 5(b)(1)	Radioactive pyrophorics not to exceed 1 percent by weight within a drum, standard waste box (SWB), or bin	**UP TO DATE** TRAMPAC; WAC [Section 15.3.9]

TABLE 15-2 (continued)

CITATION	CONDITION OR RESTRICTION	COMPLIANCE STATUS
C of C, p. 2, 5(b)(1)	Free liquids not to exceed 1 percent by volume within a drum, SWB, or bin	**UP TO DATE** TRAMPAC; WAC [Section 15.3.10]
C of C, p. 2, 5(b)(1)	Flammable organics limited to 500 ppm in headspace of any drum, SWB, or bin	**UP TO DATE** TRAMPAC; WAC [Section 15.3.11]
Contents - Maximal Quantity of Material per Package		
C of C, p. 2, 5(b)(2), para. 1	Maximum allowable weight	**UP TO DATE** TRAMPAC; WAC [Section 15.3.12]
C of C, p. 2, 5(b)(2), para. 2	Maximal number of payload containers per package and authorized packaging configurations	**UP TO DATE** TRAMPAC; WAC [Section 15.3.13]
C of C, p. 2, 5(b)(2), para. 3	Amount of allowable fissile material	**UP TO DATE** TRAMPAC; WAC [Section 15.3.14]
C of C, p. 2, 5(b)(2), para. 4	Allowable decay heat	**UP TO DATE** TRUPACT-II SARP, Section 1.2.3.33; TRUPACT-II Content Codes (TRUCON) [Section 15.3.15]

TABLE 15-2 (continued)

CITATION	CONDITION OR RESTRICTION	COMPLIANCE STATUS
	Fissile Class	
C of C, p. 2, 5(c)	Fissile Class I	**UP TO DATE** TRUPACT-II SARP, Section 6.0 [Section 15.3.16]
C of C, p. 3, 6	Restrictions of form, properties, and other parameters	**UP TO DATE** TRAMPAC; WAC [Section 15.3.17]
C of C, p. 3, 7	Shipping category designations	**UP TO DATE** TRUCON [Section 15.3.18]
C of C, p. 3, 8	Labeling requirements	**UP TO DATE** TRAMPAC; WAC [Section 15.3.19]
C of C, p. 3, 9	Pre-shipping venting or aspirating requirements	**UP TO DATE** TRAMPAC; WAC; TRUCON [Section 15.3.20]
C of C, p. 3, 10	Requirements of Subpart G of 10 CFR Part 71	**UP TO DATE** WID QA program [Section 15.3.21]

TABLE 15-2 (continued)

CITATION	CONDITION OR RESTRICTION	COMPLIANCE STATUS
C of C, p. 3, 10(a)	Preparation of packages for shipment and operations	**UP TO DATE** TRUPACT-II SARP, Section 7.0 [Section 15.3.22]
C of C, p. 3, 10(b)	Testing and maintenance of packaging	**UP TO DATE** TRUPACT-II SARP, Section 8.0 [Section 15.3.23]
C of C, p. 3, 11	Contents of each package	**UP TO DATE** TRAMPAC; WAC [Section 15.3.24]
C of C, p. 3, 12	Leak testing	**UP TO DATE** TRUPACT-II SARP, Section 8.0 [Section 15.3.25]
C of C, p. 3, 13	Removal of free-standing water	**UP TO DATE** TRUPACT-II SARP, Section 7.0 [Section 15.3.26]
C of C, p. 3, 14	Approval of TRUPACT-II	**ACHIEVED** NRC'S C of C No. 9218 [Section 15.3.27]

TABLE 15-2 (continued)

CITATION	CONDITION OR RESTRICTION	COMPLIANCE STATUS
C of C, p. 3, 15	Expiration date: August 31, 1994	**UP TO DATE** Will submit application to the NRC for timely renewal prior to expiration [Section 15.3.28]

15.3.1 Overall Specifications for the TRUPACT-II, Certificate of Compliance (C of C), p. 1, 5(2), para. 1

The TRUPACT-II consists of an unvented, 1/4-inch-thick stainless steel inner containment vessel (ICV) positioned within an outer containment assembly (OCA).

The OCA is an unvented 1/4-inch-thick stainless steel outer containment vessel (OCV) with a 10-inch-thick layer of polyurethane foam and a 1/4- to 3/8-inch-thick outer stainless steel shell.

The package is a right circular cylinder with outside dimensions of about 94 inches in diameter and 122 inches in height.

The TRUPACT-II packaging is composed of the ICV positioned within the OCA. As shown in the drawings in Appendix 1.3.2 of the TRUPACT-II SARP and discussed in Section 1.2.1.1 of that document, the ICV is unvented and is fabricated primarily of 1/4-inch Type 304 stainless steel. The OCA is also unvented and is bounded by a 1/4- to 3/8-inch-thick Type 304 stainless steel shell. Within the outer shell of the OCA is the OCV, which has a 3/16-inch-thick Type 304 stainless steel shell. Between the outer shell of the OCA and the outer shell of the OCV is a layer of polyurethane foam to provide insulation and absorb energy; this layer is up to 9 13/16 inches thick.

The TRUPACT-II is a right cylinder. The OCA is 94 3/8 inches in diameter and 121 3/4 inches high (Section 1.2.1.1.1 of the TRUPACT-II SARP).

15.3.2 Overall Weight, C of C, p. 1, 5(2), para. 1

The package weighs no more than 19,250 pounds when loaded, with the maximal allowable contents of 7,265 pounds.

According to Section 1.2.1.2 of the SARP, the maximum gross shipping weight of the TRUPACT-II package is 19,250 pounds. The maximal payload weight is 7,265 pounds.

15.3.3 Outer Containment Assembly of the TRUPACT-II, C of C, p. 1, 5(2), para. 2

The OCA has a domed lid secured to the OCA body with a locking ring.

The OCV containment seal is provided by a butyl rubber O-ring (bore seal).

The OCV is equipped with a seal test port and a vent port.

As shown and described in Section 1.2.1.1 of the TRUPACT-II SARP, the OCA has a domed lid which is secured to the body of the OCA with a locking ring assembly. The containment O-ring is made of butyl rubber. The location of the OCV seal test port and the vent port are shown in Appendix 1.3.2 of the TRUPACT-II SARP (Sheet 2 of Drawing 2077-500 SNP).

15.3.4 Inner Containment Vessel of the TRUPACT-II, C of C, p. 1, 5(2), para. 3

The ICV is a right circular cylinder with domed ends. Its outside dimensions are approximately 73 inches in diameter and 98 inches high.

The lid is secured to the ICV body with a locking ring.

The containment seal is provided by a butyl rubber O-ring (bore seal).

The ICV is equipped with a seal test port and vent port. Aluminum spacers are placed in the top and bottom domed ends of the ICV during shipping. The cavity available for the contents is a cylinder of approximately 73 inches in diameter and 75 inches in height.

The ICV is a right cylinder with domed ends. According to Section 1.2.1.1.2 of the TRUPACT-II SARP, the ICV has a maximal external diameter of 76 5/16 inches, a minimal

external diameter of 73 1/8 inches, and an overall external length of 99 inches when the lid is installed on the body of the ICV. The lid is secured to the body with a locking ring. Two main O-rings are enclosed between the mating lid and body of the OCV: the upper main O-ring is made of butyl rubber and serves a containment function; the lower (test) seal is made of neoprene or ethylene propylene and allows a vacuum to be established on the exterior side of the containment O-ring for helium and pressure-rise leakage-rate testing.

The locations of the ICV seal test port and the vent port are shown in Appendix 1.3.2 of the TRUPACT-II SARP (Sheet 3 of Drawing 2077-500SNP). The upper and lower aluminum spacer assemblies are shown on Sheet 6 of this same set of drawings in Appendix 1.3.2 of the SARP.

A cylindrical cavity is available for the contents to be placed in the ICV. The dimensions of the cavity are a minimal and maximal diameter of 72 7/16 and 73 7/8 inches (Section 1.2.1.1.2 of the TRUPACT-II SARP) and a height of 74 5/8 inches (Appendix 1.3.2 of the SARP, Drawing 2077-500SNP, Sheet 2).

15.3.5 Drawings Showing Construction of TRUPACT-II, C of C, p. 2, 5(a)(3), para. 1

The packaging is constructed in accordance with Nuclear Packaging Inc. (NuPac) drawing # 2077-500SNP, Sheets 1-11 (Rev. K).

The 11 sheets of Drawing #2077-500SNP are included in the TRUPACT-II SARP. The TRUPACT-II packages are constructed in accordance with these drawings.

15.3.6 Drawings Showing Position of Contents in TRUPACT-II, C of C, p. 2, 5(a)(3), para. 2

The contents are positioned within the packaging in accordance with NuPac drawings # 2077-007SNP (Rev. C) and 2077-008 SNP, Sheets 1 and 2 (Rev. C).

NuPac Drawings 2077-007SNP (one sheet) and 2077-008SNP (two sheets) are included in Appendix 1.3.8 of the TRUPACT-II SARP. The drum assemblies or standard waste boxes (SWBs) are positioned within the package as shown in these drawings.

15.3.7 Physical Form of Allowable Material and Receptacles, C of C, p. 2, 5(b)(1)

Only dewatered, solid, or solidified TRU wastes are allowed. They must be packaged in 55-gallon drums, SWBs, or bins.

According to Section 3.2.1.2 of the *WIPP Waste Acceptance Criteria* (WAC) (DOE, 1991b), standard 55-gallon metal drums, SWBs, 55-gallon drums overpacked in an SWB, and an experimental bin overpacked in an SWB are authorized for shipping contact-handled TRU wastes in a TRUPACT-II packaging. The prohibition of free liquids is discussed in Section 15.3.10 of this BECR. (See also Section 5 of Appendix 1.3.7 to the TRUPACT-II SARP.)

15.3.8 Prohibition of Explosives, Corrosives, Nonradioactive Pyrophorics, and Pressurized Containers, C of C, p. 2, 5(b)(1)

Explosives, corrosives, nonradioactive pyrophorics, and pressurized containers are prohibited.

Section 3.3.4 of the WAC prohibits the acceptance of explosives or pressurized canisters at WIPP. The WAC stipulates that any nonradioactive pyrophoric materials must be rendered safe by mixing them with chemically stable materials (e.g., concrete, glass) or by processing them to remove their hazardous properties; thus, they will be rendered nonpyrophoric prior to shipment to WIPP (Section 3.3.3). (See also Section 5 of Appendix 1.3.7 to the TRUPACT-II SARP.)

Corrosive wastes are prohibited on two counts. They are prohibited on the basis of the definition of corrosive waste used in the WAC (i.e., aqueous materials with a pH less than 2 or higher than 12.5[1]). Furthermore, since corrosive wastes are aqueous by definition, they are prohibited as free-standing liquids (see Section 15.3.10).

15.3.9 Restriction of Radioactive Pyrophorics, C of C, p. 2, 5(b)(1)

Radioactive pyrophorics must not exceed 1 percent by weight within a drum, SWB, or bin.

Section 3.3.3 of the WAC restricts pyrophoric forms of radionuclides to 1 percent by weight of the waste in each waste container with the stipulation that such waste be dispersed in the waste. (See also Section 5 of Appendix 1.3.7 to the TRUPACT-II SARP.)

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[1] The WAC definition of corrosive wastes differs from that of RCRA since the latter includes aqueous materials with a pH of 2 or of 12.5 in its definition of corrosive waste under 40 CFR 261.22(a)(i).

15.3.10 Restriction of Free Liquids, C of C, p. 2, 5(b)(1)

Free liquids must not exceed 1 percent by volume within a drum, SWB, or bin.

Section 3.3.2 of the WAC stipulates that liquid waste will not be emplaced at WIPP and that the total liquid in a waste container will not equal or exceed 1 volume percent of the payload container. (See also Section 4 of Appendix 1.3.7 to the TRUPACT-II SARP.)

15.3.11 Restriction of Flammable Organics, C of C, p. 2, 5(b)(1)

Flammable organics are limited to 500 ppm in the headspace of any drum, SWB, or bin.

Section 3.4.7.2 of the WAC limits the total concentration of potentially flammable volatile organic compounds (VOCs) to 500 ppm in the headspace of a waste package; this value includes error measurement.

15.3.12 Maximal Allowable Weight, C of C, p. 2, 5(b)(2), para. 1

Contents must not exceed 7,265 pounds including shoring and secondary containers, with no more than 1,000 pounds per 55-gallon drum and 4,000 pounds per SWB.

Section 3.4.1.2 of the WAC specifies the following weight limits for waste package assemblies transported in the TRUPACT-II package:

1,000 lbs per drum
1,450 lbs per drum overpacked in an SWB
4,000 lbs per SWB
7,265 lbs per TRUPACT-II payload
19,250 lbs per TRUPACT-II payload, including the weight of the TRUPACT-II packaging

15.3.13 Maximal Number of Payload Containers Per Package and Authorized Configurations, C of C, p. 2, 5(b)(2), para. 2

The maximal number of payload containers per package and authorized packaging configurations are:

14 55-gal drums
2 SWBs
2 SWBs, each containing one bin
2 SWBs, each containing four 55-gal drums
1 10-drum overpack (TDOP) containing ten 55-gal drums
1 TDOP containing one SWB
1 TDOP containing one bin within an SWB
1 TDOP containing four 55-gal drums within an SWB.

According to the WAC (Section 3.2.2.2), the authorized loading configurations for shipment in the TRUPACT-II package are standard 55-gallon metal drums in two seven-pack configurations or two SWBs. Up to four drums or one experimental bin may be overpacked in an SWB. If only one seven-pack or one SWB of waste is scheduled for shipment in the TRUPACT-II, a dunnage seven-pack or SWB must be added to the package for transport, as specified in Appendix 1.3.7 of the TRUPACT-II SARP. In addition, drums, SWBs and experimental bins may be overpacked in a TDOP for shipment within the TRUPACT-II.

15.3.14 Amount of Allowable Fissile Material, C of C, p. 2, 5(b)(2), para. 3

Fissile material must not exceed 325 grams Pu-239 equivalent, with no more than 200 grams Pu-239 equivalent per 55-gal drum or 325 grams Pu-239 equivalent per SWB (for Pu-239 equivalent, see Appendix 1.3.7 of the TRUPACT-II SARP).

Section 3.4.2.1 of the WAC specifies that the fissile or fissionable radionuclide content of contact-handled TRU waste packages will not exceed the following values, in Pu-239 fissile-gram equivalents:

- 200 grams per 55-gallon drum
- 5 grams per cubic foot in boxes, up to a 350-gram maximum.

However, the TRUPACT-II package limit for the SWB cited in the WAC is less than 325 grams. Thus, the sum of the fissile equivalents of all waste packages in the entire payload of a quantity including two times the error may not exceed 325 grams (see the calculational methods described in Appendix 1.3.7 of the TRUPACT-II SARP).

15.3.15 Allowable Decay Heat, C of C, p. 2, 5(b)(2), para. 4

Decay heat must not exceed the values given in Tables 6.1 through 6.3 of the TRUPACT-II Content Codes (TRUCON) (DOE, 1989b).

According to Section 3.4.6.2 of the WAC, there are two thermal limits for decay heat: the total decay heat from radioactive decay of the radioisotopes within an individual payload container and the total decay heat from all payload containers in a TRUPACT-II package. The total decay heat limits per TRUPACT-II for each shipping category are presented in Table 1.2.3.33 of the TRUPACT-II SARP. In determining whether or not a waste package or group of waste packages meets the limits, the error must be added to the measured value. The design limit for the TRUPACT-II is 40 watts.

15.3.16 Fissile Class, C of C, p. 2, 5(c)

The C of C identifies the TRUPACT-II as a Fissile Class I package.

The C of C identified the TRUPACT-II as a Fissile Class I packaging. Therefore, the requirements specified in 10 CFR 71.57 must be met.

15.3.17 Restrictions of Form, Properties, and other Parameters, C of C, p. 3, 6

The physical form, chemical properties, chemical compatibility, configuration of the payload containers and contents, isotopic inventory, fissile content, decay heat, weight and center of gravity, and radiation dose rate must be determined and limited in accordance with the TRUPACT-II Authorized Methods for Payload Control (TRAMPAC) (TRUPACT-II SARP, Appendix 1.3.7).

The methods for determining and controlling the physical form of the wastes are visual examination, real-time radiography (RTR), records and data-base information, and sampling (SARP, Appendix 1.3.7, Section 4). The chemical properties of the waste (SARP, Appendix 1.3.7, Section 5) are determined by the allowable chemical constituents within a given waste type and are restricted so that all the payload containers are safe for handling and transport. Chemical compatibility (SARP, Appendix 1.3.7, Section 6; see also SARP Appendix 2.10.12) within the waste and between the waste and the packaging ensures that no chemical process will occur that might pose a threat to the safe transport of the payload in the TRUPACT-II package. The configuration of the payload container and content is controlled as described in Section 8

of the SARP's Appendix 1.3.7; this section also describes specifications for filter vents and pre-shipping venting and aspiration requirements.

The isotopic inventory for each payload container and the fissile content are discussed in Section 9 of the TRAMPAC. Decay heat is discussed in Section 10 of the TRAMPAC.

The allowable weights for individual payload containers and for the total payload are presented in Section 11 of the TRAMPAC, along with methods of determining and controlling weight. The methods for determining the center of gravity of the loaded TRUPACT-II package are also described in this section for 55-gallon drums and for SWBs.

External radiation dose rates are presented in Section 12 of the TRAMPAC. These rates may not exceed 200 mrem per hour at the surface of the payload container and 10 mrem per hour at 2 meters (see also Section 5.0 of the TRUPACT-II SARP).

15.3.18 Shipping Category Designations, C of C, p. 3, 7

Each drum, SWB, or bin must be assigned a shipping category in accordance with Table 5 from TRUCON (Rev. 6) or tested for gas generation and must meet the acceptance criteria in accordance with Attachment 2.0 to Appendix 1.3.7 of the TRUPACT-II SARP.

Section 1.2.3.2 of the TRUPACT-II SARP discusses the payload shipping categories developed specifically for the TRUPACT-II package. The primary difference among the categories is their potential for gas generation and internal bagging configuration. For waste with an adequate margin of safety, an analytical prediction suffices. Wastes without such a margin of safety require testing as described in Section 1.23.3.12 and Attachment 2 to Appendix 1.3.7 of the TRUPACT-II SARP.

15.3.19 Labeling Requirements, C of C, p. 3, 8

Each drum, SWB, or bin must be labeled to indicate its shipping category. All drums, SWBs, or bins within a package must be of the same shipping category.

As described in Section 3.4.8 of the WAC, each waste package will be labeled with the shipping category after all payload parameters have been verified. Furthermore, all waste packages within a single TRUPACT-II package must belong to the same shipping category (WAC, Section 3.6.1.2). (See also Section 13.1 of Appendix 1.3.7 to the TRUPACT-II SARP.)

15.3.20 Pre-Shipment Venting or Aspirating Requirements, C of C, p. 3, 9

Each drum, SWB, bin, or TDOP must be equipped with filtered vents prior to shipment in accordance with Appendix 1.3.7 to the TRUPACT-II SARP; drums not equipped with filtered vents during storage must be aspirated before shipment; the minimal aspiration time may be determined from Tables 7.1 through 9.3 in TRUCON.

Section 3.4.7.2 of the WAC stipulates that all payload containers, including any overpacks, must be vented with filters that meet the specifications described in the TRUPACT-II SARP. At least one filter will be used per drum, two per overpacked experimental bin in an SWB, and two per SWB. Any rigid drum liners will be filtered or punctured. (See also Section 8.1 of Appendix 1.3.7 and Appendix 3.6.11 to the TRUPACT-II SARP.)

15.3.21 Requirements of Subpart G of 10 CFR Part 71, C of C, p. 3, 10

Compliance with the requirements of Subpart G of 10 CFR Part 71 is required.

Subpart G invokes Subpart H, *Quality Assurance*. (See Section 15.2.20.)

15.3.22 Preparation of Packages for Shipment and Operations, C of C, p. 3, 10(a)

Each package must be prepared for shipment and operated in accordance with procedures described in Section 7, "Operating Procedures," of the TRUPACT-II SARP.

Section 7 of the TRUPACT-II SARP contains procedures for loading and unloading the TRUPACT-II container and for preparing an empty packaging for transport. In addition, the payload assembly criteria are presented in Section 13 of Appendix 1.3.7 to the TRUPACT-II SARP.

15.3.23 Testing and Maintenance of Packages, C of C, p. 3, 10(b)

Each package must be tested and maintained in accordance with procedures described in Section 8, Acceptance Tests and Maintenance Program, of the TRUPACT-II SARP.

The required acceptance tests and the maintenance program are included in Section 8 of the TRUPACT-II SARP. The acceptance tests are those tests that must be performed prior to the first use of the TRUPACT-II and include visual inspection and structural and pressure, leakage, component, and thermal acceptance tests. (No shielding is provided in the TRUPACT-II container; therefore shielding integrity tests are not appropriate.) The maintenance program consists of procedures and tests used to ensure the continuation of proper performance of the TRUPACT-II packaging. It comprises structural and pressure tests; leak tests and subsystems maintenance of fasteners; the ICV; the OCA; seal areas and grooves; and valves, rupture discs, and gaskets on the containment vessel. No shielding or thermal inspections or tests are necessary to ensure continued performance of the TRUPACT-II container.

15.3.24 Contents of Packages, C of C, p. 3, 11

The contents of each package must be in accordance with Appendix 7.4.1, "Payload Control Procedures," of the TRUPACT-II SARP.

The payload control procedure appears in Appendix 7.4.3 and is summarized in Section 13 of Appendix 1.3.7 of the TRUPACT-II SARP. Section 3.6.1.2 of the WAC specifies that the payload control procedures provided in Section 7.4.3 of the TRUPACT-II SARP will be followed for shipping contact-handled TRU waste in the TRUPACT-II package.

15.3.25 Leak Testing, C of C, p. 3, 12

Prior to each shipment, lid and vent port seals on inner and outer containment vessels must be leak tested to 1 x 10^{-7} standard cubic centimeter per second in accordance with Section 7 of the TRUPACT-II SARP.

The assembly verification leak test and other leak tests that must be performed on the TRUPACT-II package are described in Appendix 7.4.2 and Section 8 of the TRUPACT-II SARP. All such mandatory tests will be run on each package prior to shipment.

15.3.26 Removal of Free-Standing Water, C of C, p. 3, 13

All free-standing water must be removed from the ICV cavity and the OCV cavity before shipment.

The operating procedures of Section 7 of the TRUPACT-II package include instructions for inspecting for free-standing water and removing it from the package (i.e., Sections 7.1.2.3.2,

7.1.2.3.3, and 7.1.2.3.6 through 7.1.2.3.9). These procedures must be used for loading the TRUPACT-II container.

15.3.27 Approval of the TRUPACT-II Packaging, C of C, p. 3, 14

The TRUPACT-II packaging must be approved for use under general license provisions of 10 CFR 71.12.

See Section 15.2.1.

15.3.28 Expiration Date, C of C, p. 3, 15

The expiration date of this C of C is August 31, 1994.

In order to use the TRUPACT-II packaging for shipping TRU waste, the C of C must be updated prior to its expiration date of August 31, 1994. This will be accomplished by submitting an application for timely renewal to the NRC.

16.0 HAZARDOUS MATERIALS TRANSPORTATION ACT

16.1 Summary of the Law

The Hazardous Materials Transportation Act (HMTA; 49 USC §§ 1801 et seq.), as amended, is the major transportation-related statute that affects the DOE. The objective of the HMTA is "to improve the regulatory and enforcement authority of the Secretary of Transportation to protect the Nation adequately against risks to life and property which are inherent in the transportation of hazardous materials in commerce." The HMTA provides for safe intra- and inter-state transportation of hazardous materials (including nuclear materials).

The Hazardous Materials Transportation Uniform Safety Act (HMTUSA; PL 101-615) was enacted on November 16, 1990. This public law, which amends the HMTA, required the U.S. Department of Transportation (DOT) to set standards for designating routes for the transportation of hazardous materials, establish regulations on training standards for all hazardous materials transportation workers, issue safety permits to motor carriers for certain hazardous materials, and perform a railroad transportation safety study for certain highly radioactive materials. DOT is also required to participate in international forums dealing with recommendations or legislation relating to mandatory standards and requirements pertaining to the transportation of hazardous materials and to consult with interested agencies to facilitate consistency in international law with respect to hazardous materials transportation. In addition, HMTUSA requires registration and an annual registration fee for shippers and carriers of certain hazardous materials such as radioactive materials and establishes planning and training grants to the States for developing, improving, and implementing emergency plans.

In the Second Modification to the Agreement for Consultation and Cooperation, dated August 4, 1987, the DOE agreed to comply with all applicable DOT regulations and corresponding regulations of the U.S. Nuclear Regulatory Commission (NRC). The following regulations are applicable to WIPP.

49 CFR Part 171, *General Information, Regulations, and Definitions*, sets forth the DOT requirements that are applicable to the transportation of hazardous materials and the packaging used in the transportation of those materials.

49 CFR Part 172, *Hazardous Materials Table, Special Provisions, Hazardous Materials Communications Requirements and Emergency Response Information Requirements*, lists and classifies the materials that the DOT has designated as hazardous for the purpose of transportation and describes the communications regulations that apply when those materials are shipped.

In 49 CFR Part 173, *Shippers - General Requirements for Shipments and Packagings*, the DOT defines hazardous materials for the purpose of transportation; establishes requirements in preparing materials for shipment; sets forth inspection, testing, and retesting responsibilities

concerning containers built, repaired, or conditioned for use in the transportation of hazardous materials; sets forth requirements for transporting radioactive material; classifies materials having more than one hazard; and describes criteria for instructing those responsible for preparing hazardous materials for shipment.

In 49 CFR Part 175, *Carriage by Aircraft*, the DOT prescribes additional requirements to those in Parts 171, 172, and 173 concerning the transportation of hazardous material by air.

In 49 CFR Part 177, *Carriage by Public Highway*, the DOT sets forth requirements to promote the uniform enforcement of law to minimize danger to life and property in the transportation of hazardous materials by public highway.

49 CFR Part 178, *Specifications for Packagings*, describes manufacturing and testing specifications for packaging and containers used for the transportation of hazardous materials.

16.2 Compliance Status of the Regulatory Requirements

Table 16-1 summarizes the regulatory requirements and their compliance status under the Hazardous Materials Transportation Act. The text gives more detail on the compliance status for each requirement.

TABLE 16-1. Hazardous Materials Transportation Act - Summary of Regulatory Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
49 CFR Part 171, *General Information, Regulations, and Definitions*		
49 CFR 171.2	General requirements	**UP TO DATE** Being addressed in *Transportation Management Plan* and WID procedures [Section 16.2.1]

TABLE 16-1 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
49 CFR 171.3	Transport of hazardous material requiring manifests, labeling, and shipper/generator and transporter identification	**UP TO DATE** Being addressed in *Transportation Management Plan* [Section 16.2.2]
49 CFR 171.14	Materials poisonous by inhalation; segregation requirements	**UP TO DATE** Being addressed in *Transportation Management Plan* [Section 16.2.3]
49 CFR 171.15/16	Notice and report of hazardous material incidents	**UP TO DATE** Being addressed in *Transportation Management Plan* [Section 16.2.4]
49 CFR Part 172, *Hazardous Materials Table, Special Provisions, Hazardous Materials Communication Requirements and Emergency Response Information Requirements*		
49 CFR 172.101	Hazardous materials table	**UP TO DATE** Addressed in WID procedure [Section 16.2.5]
Subpart C, 49 CFR 172.200-.205	Shipping paper requirements	**UP TO DATE** Addressed in WID procedure [Section 16.2.6]

TABLE 16-1 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
Subpart D, 49 CFR 172.300-.338	Marking of hazardous materials/substances for transport	**UP TO DATE** Addressed in WID procedure [Section 16.2.7]
Subpart E, 49 CFR 172.400-.450	Labeling of hazardous materials/substances for transport	**UP TO DATE** Addressed in WID procedure [Section 16.2.8]
Subpart F, 49 CFR 172.500-.560	Placarding of hazardous materials/substances for transport	**UP TO DATE** Addressed in WID procedure [Section 16.2.9]
Subpart G, 49 CFR 172.600	Emergency response	**UP TO DATE** Addressed in WID procedure [Section 16.2.10]
Subpart H, 49 CFR 172.700-.704	Training requirements for the transportation of hazardous materials	**UP TO DATE** Training conducted and attended by appropriate personnel [Section 16.2.11]
49 CFR Part 173, *Shippers - General Requirements for Shipments and Packagings*		
Subpart A, 49 CFR 173.12	General requirements for shipments and packagings	**UP TO DATE** Addressed in WID procedure [Section 16.2.12]

TABLE 16-1 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
Subpart B, 49 CFR 173.21-.40	Preparation of hazardous materials for transport	**UP TO DATE** Addressed in WID procedure [Section 16.2.13]
Subpart C, 49 CFR 173.50-.63	Definitions, classification, and packaging of Class 1 materials	**NOT APPLICABLE** Addressed in WID procedure [Section 16.2.14]
Subpart D, 49 CFR 173.115-.156	Classification, packing group assignments, and exceptions for hazardous materials other than Classes 1 and 7	**UP TO DATE** Addressed in WID procedure [Section 16.2.15]
Subpart E, 49 CFR 173.158-.230	Non-bulk packaging of hazardous materials other than Classes 1 and 7	**UP TO DATE** Addressed in WID procedure [Section 16.2.16]
Subpart I, 49 CFR 173.401-.478	Transportation of radioactive materials (including empty packaging)	**UP TO DATE** Addressed in WID procedures [Section 16.2.17]
49 CFR Part 175, *Carriage by Aircraft*		
49 CFR 175	Transportation of hazardous material by aircraft	**UP TO DATE** Addressed in WID Procedure [Section 16.2.18]
49 CFR Part 177, *Carriage by Public Highway*		

TABLE 16-1 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
49 CFR 177.800, .816, and .825	Training responsibilities and requirements for Class 7 material	**UP TO DATE** Training conducted and attended by appropriate personnel [Section 16.2.19]
49 CFR Part 178, *Specifications for Packagings*		
49 CFR 178	Packagings and containers used for transportation of hazardous materials	**UP TO DATE** Certificate of Compliance (C of C) for TRUPACT-II packaging [Section 16.2.20]

16.2.1 General Requirements, 49 CFR 171.2

General requirements regarding the offering or acceptance of hazardous material for transportation in commerce are described. Material to be shipped must be properly classed, described, packaged, marked, labeled, and in condition for shipment.

General requirements for the shipment of hazardous material are being addressed in the draft WID *Transportation Management Plan* and in Westinghouse Waste Isolation Division (WID) procedures. The *Transportation Management Plan* is being developed from the *TRUPACT-II Transportation Management Plan* (DOE, 1993a) in order to broaden the scope of the existing document. The plan will identify the WID organizations and positions that are responsible for ensuring compliance with the HMTA. The completion and certification of several worksheets (e.g., "Shipping Request," "Shipment Worksheet for Ground Transportation," and "Shipment Worksheet for Air Transportation") ensure compliance through careful documentation of all required actions.

16.2.2 Hazardous Waste, 49 CFR 171.3

Requirements for the shipment of hazardous wastes include the preparation of manifests or other shipping papers, motor vehicle marking and placarding, waste packaging and labeling, and identification numbers for the generators and the transporters.

Manifests, marking and placarding, and other labeling requirements are being addressed in the WID *Transportation Management Plan*. Completion of step-by-step worksheets ensure the proper execution of these tasks in shipping hazardous wastes from WIPP to an off-site treatment/storage/disposal facility (TSDF).

16.2.3 Transitional Provisions for Implementing Requirements Based on the United Nations (UN) Recommendations, 49 CFR 171.14

This subchapter provides an orderly transition to the new requirements incorporated as part of a comprehensive revision to this subchapter based on the UN Recommendations. Specified are requirements for new explosives, materials that are poisonous by inhalation, and infectious substances.

A WID procedure addresses materials that are poisonous by inhalation. Prescribed methods for shipping poisonous-by-inhalation materials will be included in the *Transportation Management Plan*.

16.2.4 Immediate Notice of Certain Hazardous Materials Incidents and Detailed Hazardous Materials Incident Reports, 49 CFR 171.15-171.16

Section 171.15 specifies the requirements of immediate notification by each carrier who transports hazardous materials (including hazardous wastes) and is involved in a hazardous material incident during the course of transportation. Section 171.16 specifies the requirements for the submission of a written hazardous materials incident report by the carrier.

Requirements for transportation emergency notifications are specified in the *Transportation Management Plan*. This plan and WID procedures define reportable incident and reporting requirements, including the identification of organizations and other entities that receive reports.

16.2.5 Table of Hazardous Materials, 49 CFR 172.101

The Hazardous Materials Table designates all materials listed as hazardous for the purpose of transporting those materials.

These requirements are covered in a WID procedure that is directed to any "... material, including its mixtures and solutions that...is listed in the Appendix to 49 CFR 172.101, *List of Hazardous Substances and Reportable Quantities.*"

16.2.6 Shipping Papers, Subpart C, 49 CFR 172.200-172.205

This subpart describes the requirements for the provision of shipping papers by persons who offer hazardous material for transportation. The shipping papers must include a description of the hazardous material, shipper's certification, and a hazardous waste manifest.

Requirements concerning shipping papers, including manifests, for hazardous materials, are described in a WID procedure. Each required record is identified and defined by forms attached to this procedure.

16.2.7 Marking, Subpart D, 49 CFR 172.300-172.338

Marking requirements for the transportation of hazardous materials or substances are described in this subpart.

According to a WID procedure, the Transportation Engineer marks and labels the shipment in accordance with either Subparts D and E of 49 CFR Part 172 or the International Air Transport Association (IATA) 7.1 and 7.2.

16.2.8 Labeling, Subpart E, 49 CFR 172.400-172.450

This subpart describes the requirements for the labeling of packages or containment devices by persons who offer hazardous material for transport.

According to a WID procedure, the Transportation Engineer marks and labels the shipment in accordance with either Subparts D and E of 49 CFR Part 172 or IATA 7.1 and 7.2.

16.2.9 Placarding, Subpart F, 49 CFR 172.500-172.560

This subpart describes the requirements for the placarding of hazardous material by persons who offer hazardous material for transport.

According to a WID procedure, the Transportation Engineer ensures that the vehicle that will transport hazardous waste from WIPP is properly placarded.

16.2.10 Emergency Response Information, Subpart F, 49 CFR 172.600

This subpart describes the requirements for the provision of emergency response information during transportation and at facilities where hazardous materials are loaded for transportation, stored incidental to transportation, or otherwise handled during any phase of transportation.

According to a WID procedure, the Transportation Engineer delivers the shipping papers and the *Carrier/Driver Instructions, Emergency Response Plan during Transportation*, to the driver and releases the shipment. This plan specifies driver actions to be taken in the event of an incident during transportation.

16.2.11 Training Requirements, Federal/State Relationship, and Applicability and Responsibility for Training and Testing, 49 CFR 172.700-.702 and 172.704

These sections prescribe minimal training requirements for the transportation of hazardous materials and specify requirements that TSDF owners or operators must meet to ensure that their hazardous materials (hazmat) employees are trained in a systematic program. The following requirements are included: States may impose more stringent training requirements under certain conditions; the training curriculum must include general awareness and familiarization, hazardous material recognition and identification, function-specific topics, and safety and emergency response information; and current hazmat employee training records must be maintained and contain specific training documentation including certification of training.

WIPP employees having job duties that require them to attend the Hazardous Material Training Course (HMT-102) have done so or work under the direct supervision of another trained hazmat

employee. Through the training programs, hazmat employees become familiar with the applicable hazardous material regulations, are able to recognize and identify hazardous materials, are knowledgeable of function-specific hazardous material regulations, and are knowledgeable of emergency response information and hazardous material communications requirements. The WIPP provides each hazmat employee with initial and recurrent training in accordance with established schedules. Each employer maintains records of current training, inclusive of the preceding 2 years. The training records are maintained in accordance with existing requirements.

16.2.12 General Requirements for Shipments and Packagings, Subpart A, 49 CFR 173.1-173.12

This subpart includes the requirements for preparing hazardous materials for shipment by air, highway, rail, or water and definitions and classifications of hazardous materials for transportation purposes.

A WID procedure specifies that shipments of hazardous materials must comply with these requirements.

16.2.13 Preparation of Hazardous Materials for Transportation, Subpart B, 49 CFR 173.21-173.40

This subpart describes the requirements for the preparation of hazardous materials for transportation. The shipper's responsibilities are described and include the classification and description of hazardous material and the determination that the packaging or container is an authorized packaging and that it has been manufactured, assembled, and marked properly.

According to WID procedures, the Transportation Engineer and the generator determine who will perform the packaging and where the packaging will be performed. Personnel packaging hazardous materials must be familiar with the packaging requirements for these materials, commensurate with the complexity of the packaging and the degree, nature, and quantity of hazard. The Transportation Engineer prepares a written work instruction for the packaging of the material, if required. WID personnel package the hazardous material.

16.2.14 Definitions, Classification, and Packaging for Class 1 Materials, Subchapter C, 49 CFR 173.50-173.63

Definitions, classifications, and requirements for packaging of Class 1 materials (explosives) are described.

A WID procedure includes two worksheets (a shipment worksheet for ground transportation and one for air transportation) and a shipper's declaration of dangerous goods. A hazardous waste manifest or bill-of lading is used for ground transport. All actions that would be required for the classification and packaging of Class 1 materials are included in these worksheets. However, Class 1 materials are not used, packaged, or shipped from the WIPP; therefore, this section does not apply.

16.2.15 Definitions, Classification, Packaging Group Assignments, and Exceptions for Hazardous Materials other than Class 1 and Class 7, Subpart D, 49 CFR 173.115-173.156

Definitions, classifications, packing group assignments, and exceptions for hazardous materials, including flammable, non-flammable, poisonous and non-poisonous gases, flammable liquids and solids, and toxic material are specified.

A WID procedure includes two worksheets (a shipment worksheet for ground transportation and one for air transportation) and a shipper's declaration of dangerous goods. All actions required for the classification and packaging of hazardous materials other than Classes 1 and 7 are included in these worksheets.

16.2.16 Non-Bulk Packaging Requirements for Hazardous Materials other than Class 1 and Class 7, Subpart E, 49 CFR 173.158-173.230

Non-bulk packaging requirements for hazardous materials other than Class 1 and Class 7 materials are described. Specific requirements are described in 49 CFR 173.158 through 173.198 for nitric acid; wet batteries; corrosive non-explosive smoke bombs; chemical kits; gallium; hydrogen fluoride; mercury; smokeless powder for small arms; aircraft hydraulic power unit fuel tanks; paint, paint-related material, adhesives, and ink; refrigerating machines; liquid pyrophoric materials; barium azide; nitrocellulose-based film; highway or rail fuses; lithium batteries and cells; matches; pyrophoric solids, metals, or alloys; white or

yellow phosphorus; certain Group 1 poisonous materials; mixtures of bromoacetone, methyl bromide, chloropicrin, and methyl chloride or of chloropicrin and methyl chloride or of chloropicrin and compressed gas; hydrogen cyanide; infectious substances; and nickel carbonyl.

A WID procedure indicates that the Transportation Engineer classifies the shipment with the information provided in the shipping request by completing the shipment worksheet. If required, the requestor and/or the Transportation Engineer obtain additional information to classify the shipment properly. The Transportation Engineer determines the packaging requirements.

16.2.17 Radioactive Materials, Subpart I, 49 CFR 173.401-173.478

This subpart sets forth requirements for the transportation of radioactive materials by carriers and shippers and includes requirements for package design, package testing, empty radioactive materials packaging, and NRC-approved packages.

A WID procedure identifies both general and specific requirements to be implemented at WIPP. Other procedures provide instructions for shipping empty TRUPACT-II containers from WIPP by truck and for shipping radioactive materials to WIPP from the generator sites. The procedures also show how packaging requirements are determined, including verification that the quantity and form of material to be shipped meet the requirements of the Certificate of Compliance and/or tested parameters of the intended package.

More detail is specified in Chapter 15 under the NRC's regulations implementing transportation requirements under the Atomic Energy Act.

16.2.18 Carriage by Aircraft, 49 CFR Part 175

This part describes requirements that must be observed with respect to the transportation of hazardous materials in air craft. Included are provisions relating to unacceptable hazardous materials shipments; acceptance and inspection of shipments; discrepancy reports; notification of the pilot in command; shipping papers; keeping and replacement of labels; reporting hazardous materials incidents; quantity limitation; orientation, securing, and location of cargo containing hazardous materials; compatibility of packages; damaged shipments; and specific regulations applicable according to the classification of the material, including special

limitations and requirements for Class 7 (i.e., radioactive) materials.

A WID procedure provides guidance for shipping hazardous materials by air. Hazardous materials shipped from WIPP are in accordance with the International Air Transport Association (IATA).

The transportation options studied in the Comparative Transportation Alternatives Study did not consider transportation of TRU wastes to WIPP by air.

16.2.19 Training Responsibilities and Requirements for Class 7 (Radioactive) Materials, 49 CFR 177.800, 177.816, and 177.825

These sections set forth requirements for training, including the following: a carrier may not transport or cause to be transported hazardous material by motor vehicle unless each of its hazmat employees has received the appropriate specialized training. Each of the carrier's hazmat employees must have the appropriate State-issued commercial driver's license with the proper endorsement and must have in his/her immediate possession a certificate of training that includes a proper statement of authentication.

All transportation of radioactive or mixed waste will be contracted to a local carrier. The carrier's employees have been properly trained, and their records include all certification information. The carrier's drivers all possess a commercial driver's license with either a tank vehicle or hazardous material endorsement, and each is trained and certified to transport highway route-controlled-quantity radioactive materials. Each driver has a properly authenticated training certificate in his/her possession.

16.2.20 Specifications for Packagings, 49 CFR Part 178

This part contains prescribed manufacturing and testing specifications and inspection requirements for packaging and for containers used for the transportation of hazardous materials.

WIPP quality assurance procedures define the methodology by which specified criteria are verified. The TRUPACT-II container has been developed to transport contact-handled TRU waste to WIPP from the generator sites. The specifications for this packaging and conditions of the Certificate of Compliance granted by the NRC are described in more detail in Chapter 15. All the hazardous material shipped from WIPP is packaged in performance-oriented packaging in accordance with 49 CFR and United Nations packing standards and regulations.

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17.0 MATERIALS ACT OF 1947

17.1 Summary of the Law

The Materials Act of 1947 (30 USC §§ 601 et seq.) establishes policy that directs the Bureau of Land Management (BLM) of the U.S. Department of the Interior (DOI) to prescribe rules and regulations for the disposal of mineral material resources (including, but not limited to, sand, stone, gravel, pumice, cinders, and clay) on public lands under the BLM's jurisdiction at fair market value while ensuring that adequate measures are taken to protect the environment and to minimize damage to public health and safety during the authorized removal of such minerals. Under the act, no mineral material shall be disposed of if the Secretary of the Interior determines that the aggregate damage to public lands and resources would exceed the benefits to be derived from the proposed sale or free use of the material.

The policy of the Materials Act of 1947 is addressed in the 1992 Waste Isolation Pilot Plant Land Withdrawal Act (LWA). In the LWA, the DOE was given statutory authority and responsibility for the management of the withdrawn land at WIPP consistent with the Materials Act of 1947 and other applicable laws such as the Federal Land Policy and Management Act and the Public Rangelands Improvement Act (see Chapters 18 and 19, respectively). Furthermore, the LWA directs the DOE to produce a WIPP land management plan to provide for the disposal of salt tailings subject to the Materials Act of 1947 and the act's implementing regulations.

The regulations in 43 CFR Part 3600, *Mineral Materials Disposal: General*, implement the Materials Act of 1947 and establish procedures for the exploration, development, and disposal of mineral material resources as well as for the protection of the environment of the public lands under permit or contract for sale or free use. These regulations are applicable to the WIPP because of the need to dispose of excess salt tailings extracted from the withdrawal area.

17.2 Compliance Status of the Regulatory Requirement

Table 17-1 summarizes the single applicable requirement and its compliance status under the Materials Act of 1947. The text provides more detail on the compliance status of the requirement.

TABLE 17-1. Materials Act of 1947 - Summary of Regulatory Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
43 CFR Part 3600, *Mineral Materials Disposal: General*		
43 CFR 3601.1-3	Protection of environment: disposal of salt tailings	**UP TO DATE** Addressed in the *WIPP Land Management Plan* [Section 17.2.1]

17.2.1 Environmental Protection During Disposal of Mineral Material, 43 CFR 3601.1-3

Authorized land managers must take steps to prevent unnecessary or undue environmental degradation resulting from mineral material disposal operations.

Salt from the underground mining operations at WIPP is brought to the surface and stored in the salt pile just north of the surface facilities. This salt storage pile has the capacity to store the 2 million tons of material projected to be excavated during the lifetime of the WIPP project. There is also an inactive salt storage pile at WIPP. This salt pile is a result of the Site and Preliminary Design Validation (SPDV) phase.

According to the planned actions addressed in the *WIPP Land Management Plan* (DOE, 1993c), salt tailings extracted from the withdrawal area that are not needed for backfill at WIPP will be disposed of in accordance with the requirements of §§ 2 and 3 of the Materials Act of 1947. These requirements specify that if the appraised value of the salt exceeds $1,000, disposal will be performed by the highest responsible qualified bidder by competitive bidding and publication of notice of the proposed disposal as described in § 2 of the Materials Act. If the appraised value of the salt is $1,000 or less, it may be disposed of at the discretion of the Secretary. Any money received from the disposal of the salt will be disposed of in the same manner as money received from the sale of public lands (Materials Act, § 3).

18.0 FEDERAL LAND POLICY AND MANAGEMENT ACT

18.1 Summary of the Law

One of the objectives of the Federal Land Policy and Management Act (FLPMA; 43 USC §§ 1701-1782) is to ensure that

> ". . . public lands be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values; that, where appropriate, will preserve and protect certain public lands in their natural condition; that will provide food and habitat for fish and wildlife and domestic animals; and that will provide for outdoor recreation and human occupancy and use."

Title II under FLPMA, *Land Use Planning; Land Acquisition and Disposition*, directs the Secretary of the Interior to prepare and maintain an inventory of all public lands and to develop and maintain, with public involvement, land-use plans regardless of whether subject public lands have been classified as withdrawn, set aside, or otherwise designated. Under Title V, *Rights-of-Way*, the Secretary of the Interior is authorized to grant, issue, or renew rights-of-way over, upon, under, or through public lands.

The policy and commitment of the FLPMA are addressed in the 1992 Waste Isolation Pilot Plant Land Withdrawal Act (LWA). The LWA gave the DOE statutory authority and responsibility for the management of the withdrawn land consistent with FLPMA and other applicable laws such as the Public Rangelands Improvement Act and the Taylor Grazing Act (see also Chapters 19 and 20, respectively). Furthermore, the LWA directed the DOE to produce a WIPP land-management plan to provide for grazing, hunting and trapping, wildlife habitat, the disposal of salt tailings, and mining, subject to the applicable implementing regulations of FLPMA.

A process was established in the implementing regulations of 43 CFR Part 1600, *Planning, Programming, Budgeting,* for the development, approval, maintenance, amendment, and revision of resource management plans for public lands administered by the Bureau of Land Management (BLM). This part states that the objective of resource management planning is to guide and control future management actions and the development of subsequent more detailed and limited scope plans for resources and uses consistent with the principles of Title II of FLPMA. The DOE must develop and maintain a land management plan consistent with the processes and requirements for resource management plans as described in these regulations.

Other regulations implementing FLPMA established procedures for the orderly and timely processing of applications, grants, permits, amendments, assignments, and terminations for rights-of-way and permits over, upon, under, or through public lands. In particular, 43 CFR Part 2800, *Rights-of-Way, Principles and Procedures*, provides guidelines for the use of right-of-way and temporary-use permit areas and establishes requirements for the submission and

processing of right-of-way grant/reservation and temporary-use permit applications. These regulations remain applicable to the WIPP because of the necessity to establish rights-of-way for the construction and phased operation of this facility.

18.2 Compliance Status of the Regulatory Requirements

Table 18-1 summarizes each applicable requirement and its compliance status under FLPMA. The text provides more detail on the compliance status of each requirement.

TABLE 18-1. Federal Land Policy and Management Act - Summary of Regulatory Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
43 CFR Part 1600, *Planning, Programming, Budgeting*		
43 CFR 1610.1	Resource management planning guidance	**ACHIEVED** *WIPP Land Management Plan* [Section 18.2.1]
43 CFR 1610.2	Public participation	**ACHIEVED** Public review of *WIPP Land Management Plan*, 30 days [Section 18.2.2]
43 CFR 1610.3-2	Consistency of management plan with applicable laws	**ACHIEVED** *WIPP Land Management Plan* [Section 18.2.3]

TABLE 18-1 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
43 CFR Part 2800, *Rights-of-Way, Principles and Procedures*		
43 CFR 2801.2(a)	Common terms and conditions of right-of-way reservations and temporary-use permits: • Compliance with regulations • Non-discrimination • Repair of roads, fences, trails • Fire prevention and suppression	**ACHIEVED** Compliance status in BECR; non-discrimination policy; repairs as needed; fire-fighting equipment, personnel, and agreement [Section 18.2.4]
43 CFR 2801.2(b)	Mandatory conditions for right-of-way reservations and temporary-use permits: • Restoration • Air- and water-quality standards • Scenic, cultural, and environmental values • Local inhabitants • State standards that are more stringent than the Federal ones	**UP TO DATE** *Final Environmental Impact Statement* (FEIS); *WIPP Land Management Plan*; *Final Supplement Environmental Impact Statement* (SEIS) and SEIS for disposal; no local inhabitants who rely on biota of the area for subsistence; operation and maintenance in accordance with reservations (see Section 18.3); and permit conditions met (see other chapters in BECR) [Section 18.2.5]
43 CFR 2802.2	Application requirements for a right-of-way reservation or temporary-use permit	**ACHIEVED** Several reservations and permits obtained (see Sections 18.3 and 35.3) [Section 18.2.6]

18.2.1 Resource Management Planning Guidance, 43 CFR 1610.1

Guidance in preparing resource management plans may be provided to the District and Area BLM Managers by the Director and State Director of the BLM.

Since the land that is the subject of the *Waste Isolation Pilot Plant (WIPP) Land Management Plan* (DOE, 1993c) was transferred to the DOE, the plan was prepared by Westinghouse Waste Isolation Division (WID) personnel at the request of the DOE. However, considerable input to the plan was obtained from BLM personnel, particularly from the BLM office in Carlsbad. Therefore, the *WIPP Land Management Plan* represents a joint effort between BLM and WID personnel. The plan parallels the general guidelines used in the development of BLM's Area Resource-Management Plan.

18.2.2 Public Participation, 43 CFR 1610.2

The public shall be provided an opportunity to review and comment on land management plans.

Public meetings were held in Carlsbad and Hobbs, New Mexico, and members of the public were given 30 days to review and comment on the *WIPP Land Management Plan*. A copy of the draft plan was also sent to the State Land Office, the Environmental Evaluation Group (EEG), and the New Mexico Environment Department (NMED) for their review. The comments obtained were incorporated as appropriate into the final document.

18.2.3 Consistency of Management Plans, 43 CFR 1610.3-2

Land-use plans shall be consistent with the purposes, policies, and programs of Federal laws and regulations that apply to public lands.

As a requirement of the LWA, the *WIPP Land Management Plan* was developed for the withdrawal area consistent with FLPMA. The plan was drafted by WID personnel in consultation with the BLM and the State of New Mexico and was submitted to Congress in October 1993. The development of this plan parallels the general guidelines used in formulating the BLM's Area Resource-Management Plan.

18.2.4 Common Terms and Conditions of Right-of-Way Reservations and Temporary-Use Permits, 43 CFR 2801.2(a)

By accepting a right-of-way reservation or a temporary-use permit, the applicant agrees and consents to comply with the following terms and conditions in addition to those terms and conditions that are specified in the reservation(s) or permit(s). The common terms and conditions are:

- *To comply with all applicable State and Federal laws and the implementing regulations to the extent practicable;*
- *To protect employees and applicants for employment who will be or are involved in the construction, operation, maintenance, and termination of the authorized use against discrimination because of race, creed, color, sex, or national origin and to ensure that all subcontracts include an identical provision;*
- *To rebuild and repair roads, fences, and established trails that may be destroyed or damaged by the construction, operation, or maintenance of the project and to build and maintain suitable crossings for existing roads and significant trails that intersect the project; and*
- *To prevent and suppress fires on or in the immediate vicinity of the right-of-way areas.*

Compliance with all applicable State and Federal laws and their implementing regulations is discussed throughout this document. See the specific regulations and the compliance status section of each for more detailed information.

The DOE and its contractors have a non-discrimination policy in effect for their employees and for hiring. In addition, contracts and subcontracts awarded by the DOE and by its contractors include such a non-discrimination clause.

Any roads, fences, or established trails destroyed or damaged by the construction, operation, or maintenance of any of the structures for which WIPP has received a right-of-way reservation or temporary-use permit are repaired as required.

WIPP maintains fire-fighting equipment. Some of the WIPP emergency response personnel are trained in fire-fighting methods. WIPP also has an agreement with the Carlsbad Fire Department to provide fire-fighting service if necessary.

18.2.5 Conditions to be Incorporated within all Right-of-Way Reservations and Temporary-Use Permits, 43 CFR 2801.2(b)

All right-of-way reservations and temporary-use permits must contain requirements to ensure:

- *Restoration, revegetation, and curtailment of land erosion;*
- *Compliance with applicable air- and water-quality standards;*
- *Protection of scenic, aesthetic, cultural, and environmental values as well as Federal property and public health and safety;*
- *Protection of the interests of local inhabitants who rely on the fish, wildlife, and biota of the area for subsistence;*
- *Maintenance and operation of facilities on the prescribed location in a manner that is consistent with the reservation or permit; and*
- *Compliance with any State standards for public health and safety; environmental protection; and siting, construction, operation, and maintenance that are more stringent than the Federal standards.*

Each area that is the subject of a right-of-way reservation will be reclaimed and revegetated as described in the *WIPP Land Management Plan*.

Compliance with applicable air- and water-quality standards is discussed in Chapters 6 through 8, 29, and 30 of this report. See these chapters for more specific information pertaining to the air- and water-quality standards.

Protection of scenic, aesthetic, cultural, and environmental values was addressed in the *WIPP Final Environmental Impact Statement* (FEIS) (DOE, 1980) and in the *Supplement Environmental*

Impact Statement (SEIS) (DOE, 1990a). A second SEIS will be prepared prior to the initiation of disposal of TRU waste at WIPP; any changes in these values or in the potential impact of WIPP operations on these values will be addressed in this document.

The people who live in the vicinity of WIPP are ranchers. There are no local inhabitants who rely on fish, wildlife, or other biota of the area for subsistence. Therefore, this condition does not apply to WIPP.

Each "facility" (road, pipeline, railroad, etc.) is maintained and operated in accordance with the stipulations provided in the respective right-of-way reservation. See Section 18.3 for more specific information.

State standards or permit conditions imposed by the State are being met. For example, see Section 29.3 on the air-quality permit issued to WIPP by the NMED.

18.2.6 Requirements for Applications for Right-of-Way Reservations and Temporary-Use Permits, 43 CFR 2802.2

> *Parties seeking a right-of-way reservation or temporary-use permit involving the use of public lands shall file an application for the reservation or permit with either the Area Manager, the District Manager, or the State Director having jurisdiction over the affected public lands.*

To date, several right-of-way reservations and land-use permits have been granted to the DOE. These reservations and permits are listed below.

Right-of-way Reservation No. NM 53809 for a water pipeline was granted on August 17, 1983, and is still active. There is no expiration date. (See Section 18.3.2.)

Right-of-way Reservation No. NM 55676 for the north access road at WIPP was granted on August 24, 1983, and is still active. There is no expiration date. (See Section 18.3.3.)

Right-of-way Reservation No. NM 55699 for the railroad spur at WIPP was granted on September 27, 1983, and is still active. There is no expiration date. (See Section 18.3.4.)

Right-of-way Reservation No. NM 63136 for dosimetry and aerosol sampling sites was granted on July 31, 1986, and is still active. There is no expiration date. (See Section 18.3.5.)

Right-of-way Reservation No. NM 65801 for seven subsidence monuments was granted on November 7, 1986, and is still active. There is no expiration date. (See Section 18.3.6.)

Right-of-way Reservation No. NM 82245 for the installation of a survey monument was granted on December 13, 1989, and is still active. The permit expires on December 13, 2019. (See Section 18.3.7.)

Right-of-way Reservation No. NM 77921 for an aerosol sampling site was granted on August 18, 1989, and is still active. The permit will expire on August 18, 2019. (See Section 18.3.8.)

Free-Use Caliche Permit No. NM-FU-91183 was renewed on August 18, 1993, and is still active. The permit expires on August 18, 1994. (See Section 18.3.9.)

A right-of-way permit for a high-volume air sampler has also been issued to WIPP. Because this permit was issued by the New Mexico Commissioner of Public Lands, it is discussed in more detail in Section 35.3.

18.3 Compliance Status of the Permit Conditions

Table 18-2 summarizes the conditions in the right-of-way reservations and the temporary-use permit awarded to WIPP by the BLM. The table also includes the compliance status. The text provides more detail on the compliance status of each reservation or permit condition.

TABLE 18-2. Federal Land Policy and Management Act - Summary of Permit Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
Common Conditions (CC) of Right-of-Way Reservations		

TABLE 18-2 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
CC 1	Control and jurisdiction of DOE	**ACHIEVED** DOE jurisdiction and control [Section 18.3.1]
CC 2	Right of access and use	**ACHIEVED** DOE and BLM and authorized personnel [Section 18.3.1]
CC 3	Products or resources on lands within the right-of-way	**NOT APPLICABLE** Superseded by WIPP Land Withdrawal Act [Section 18.3.1]
CC 4	Compliance with 43 CFR Part 2800	See Sections 18.2.4 through 18.2.6 [Section 18.3.1]
CC 5	BLM seeding requirements for BLM Roswell District	**UP TO DATE** Sites prioritized for reclamation and reseeding [Section 18.3.1]
Right-of-Way Reservation No. NM 53809, *Water Pipeline*		
Sec. 13; Standard Stipulations (SS) 1, 2, 5, 6, 8	Preconstruction and construction conditions	**ACHIEVED** Notification and construction activities [Section 18.3.2.1]

TABLE 18-2 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
Sec. 13E	Water access for livestock	**ACHIEVED** Water tap on pipeline installed [Section 18.3.2.2]
SS 3	Road construction	**ACHIEVED** Only essential roads; traffic confined to authorized right of way [Section 18.3.2.3]
SS 4	Posting of BLM number	**ACHIEVED** BLM No. NM 53809 posted [Section 18.3.2.4]
SS 7	Gates or cattleguards on public lands	**UP TO DATE** Gates and cattleguards on public lands not locked [Section 18.3.2.5]
Right-of-Way Reservation No. NM 55676, *North Access Road*		
SS 2	Polychlorinated biphenyls (PCBs)	**NOT APPLICABLE** All PCB-containing fluids and equipment removed from WIPP; no known PCB spills at WIPP [Section 18.3.3.1]
SS 3-5	SS for the construction of overhead electric distribution lines	**ACHIEVED** All stipulations met [Section 18.3.3.2]

TABLE 18-2 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
SS 6	Posting of BLM serial number	**ACHIEVED** BLM No. NM 55676 posted [Section 18.3.3.3]
Term/Condition (T/C) 7	Damage or injury to private property	**UP TO DATE** Personal responsibility of DOE and DOE contractor employees [Section 18.3.3.4]
T/C 7 and 8	Actions required upon abandonment, relinquishment, or expiration of right-of-way reservation	**NOT APPLICABLE** Right-of-way reservation active [Section 18.3.3.5]
Amendment (April 22, 1988)	Fencing	**ACHIEVED** Fencing standards met [Section 18.3.3.6]
Right-of-Way Reservation No. NM 55699, *Access Railroad*		
SS 1-4, 7, 9, 11	Preconstruction and construction requirements for railroad spur	**ACHIEVED** Agreement among BLM, DOE, and Corps of Engineers [Section 18.3.4.1]
SS 5	Reseeding upon completion of construction	**ACHIEVED** BLM seeding requirements for Roswell District [Section 18.3.4.2]

TABLE 18-2 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
SS 6	Abandonment of the site	**NOT APPLICABLE** Site not abandoned [Section 18.3.4.3]
SS 8	Responsibility for damage or injury to private property	See Section 18.3.3.4 [Section 18.3.4.4]
SS 10	Access to water for livestock	**ACHIEVED** Water taps and related equipment provided by DOE [Section 18.3.4.5]
SS 12	Removal of caliche and/or other mineral material	**ACHIEVED** Free-use caliche permit in effect (see Section 18.3.9) [Section 18.3.4.6]
SS 13	Application for free-use permits	**ACHIEVED** Free-use permit application filed; permit granted by BLM (see also Section 18.3.9) [Section 18.3.4.7]
Amendment	Notification of BLM regarding the access road parallel to the railroad	**ACHIEVED** BLM notified [Section 18.3.4.8]
Right-of-Way Reservation No. NM 63136, *Dosimetry and Aerosol Sampling Sites*		

TABLE 18-2 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
Attachment A	Establishment of dosimeter stations and air samplers	**ACHIEVED** Aerosol samplers installed; operated and maintained by WID personnel [Section 18.3.5.1]
Amendment	Air monitoring and data collection site	**ACHIEVED** Trailer, tower, and instruments installed as agreed [Section 18.3.5.2]
Right-of-Way Reservation No. NM 65801, *Seven Subsidence Monuments*		
Right-of-way reservation	No unique conditions	See Section 18.3.1 [Section 18.3.6]
Right-of-Way Reservation No. NM 82245 for Two Subsidence Monuments		
#1	Construction and maintenance of the monuments	**ACHIEVED** Installed as described in application [Section 18.3.7.1]
#3	Security and maintenance of the monuments	**UP TO DATE** DOE responsible for security; WID maintains monuments [Section 18.3.7.2]
#5	Rehabilitation of the land	**NOT APPLICABLE** Right-of-way active [Section 18.3.7.3]

TABLE 18-2 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
Right-of-Way Reservation No. NM 77921, *Aerosol Sampling Site*		
#1	Construction, operation, and maintenance	**ACHIEVED** Constructed, operated, and maintained as described in application [Section 18.3.8.1]
#3	Security and operation of aerosol sampling station	**UP TO DATE** DOE responsible for security; WID operates and maintains station [Section 18.3.8.2]
#5	Rehabilitation of the land occupied by the aerosol sampling station	**NOT APPLICABLE** See Section 18.3.7.3 [Section 18.3.8.3]
Letter from El Paso Natural Gas Company	Use of the abandoned concrete slab	**ACHIEVED** Discussions with El Paso Natural Gas Company personnel [Section 18.3.8.4]
Free-Use Permit No. NM-FU3-91183 for Use of Caliche		
Approval of request to mine 35,000 cubic yards of caliche	Withdrawal of caliche	**UP TO DATE** WIPP still removing allotted caliche [Section 18.3.9.1]

TABLE 18-2 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
Attachment 2, Reclamation	Reclamation of caliche borrow pit	NOT APPLICABLE Withdrawal area to be recontoured to a slope of 3:1 [Section 18.3.9.2]

18.3.1 Common Conditions of the Right-of-Way Reservations

Several conditions are common to all the right-of-way reservations awarded to WIPP by the BLM. These common conditions are:

(1) That the subject of the reservation be under the control and jurisdiction of the DOE;

(2) That right of access and use is reserved to DOE personnel and those authorized by DOE and to BLM personnel and their authorized permittees, licensees, and leasees;

(3) That any products or resources on lands within the right-of-way remain under the jurisdiction of the issuing agency;

(4) That all applicable regulations under 43 CFR Part 2800 be followed; and

(5) That the BLM seeding requirements for the Roswell district be met.

The subjects of each of the right-of-way reservations are under the control and jurisdiction of the DOE. Right of access and use of these structures is reserved to the DOE and the BLM and their authorized personnel.

In October 1992, the WIPP LWA was passed. This legislation transferred WIPP lands from the U. S. Department of the Interior to the DOE. These lands were also withdrawn from all forms of entry, appropriation, and disposal under the public land laws, including the mineral leasing laws.

The applicable portions of 43 CFR Part 2800 and the compliance status of each are described in Sections 18.2.4 through 18.2.6. They are also summarized in Table 18-1.

Reclamation of disturbed areas is an ongoing project at WIPP and is performed as described in the *WIPP Land Management Plan* (DOE, 1993c). Seeding is conducted in accordance with the requirements for the BLM Roswell district.

18.3.2 Right-of-Way Reservation No. NM 53809, Water Pipeline

The conditions specified for the water-pipeline right-of-way reservation are described in Section 18.3.2, along with the compliance status of each condition. Since the pipeline was built approximately 10 years ago, the conditions required for its construction are not discussed individually.

The reservation was awarded on August 17, 1983, and extends to perpetuity.

18.3.2.1 Pre-Construction and Construction Conditions for the Water Pipeline, Section 13 and SS Nos. 1, 2, 5, 6, 8

Pre-construction notification and conditions for construction (e.g., minimization of blading and clearing of vegetation; protection of scenic values; permits; livestock barriers) were specified in the right-of-way reservation and in the Standard Stipulations for Pipeline and Underground Cable Rights of Way in the Roswell District, BLM.

All conditions were met when the water pipeline was constructed.

18.3.2.2 Livestock Water, Section 13.E

The DOE has agreed to provide water access (taps) off the waterline for livestock in the area. The DOE will also provide water meters and all necessary materials, equipment, and labor to install new water troughs in the four sections specified.

The DOE installed a water tap on the water pipeline for use by ranchers. The tap is located 0.6 mile south of the intersection of the DOE north access road (NAR) and Highway 62/180.

18.3.2.3 Road Construction, SS No. 3

Roads will not be constructed where terrain features allow vehicles to maneuver without the aid of such construction. All vehicular traffic and construction activities will be confined to the authorized right-of-way.

No roads have been constructed where the terrain allows vehicles to maneuver adequately. All traffic is confined to the authorized right-of-way.

18.3.2.4 Posting of the BLM Number Assigned to This Right-of-Way, SS No. 4

The grantee will post the BLM serial number assigned to this right-of-way in a conspicuous place where the right-of-way intersects existing roads or highways. If the right-of-way parallels existing roads, the BLM number will be posted where the right-of-way first crosses the public lands and where it leaves the public lands.

The BLM number assigned to this right-of-way (i.e., NM 53809) is posted as required.

18.3.2.5 Gates or Cattleguards on Public Lands, SS No. 7

Gates or cattleguards on public lands will not be locked or closed to the public.

Gates and cattleguards on public lands are not locked and remain open to the public.

18.3.3 Right-of-Way Reservation No. NM 55676, North Access Road

The conditions specified for the NAR right-of-way reservation are described in this section, along with the compliance status of each condition. Since the road was built approximately 10 years ago, the conditions required for its construction are not discussed individually.

This reservation was awarded on August 24, 1983, and extends to perpetuity.

18.3.3.1 Polychlorinated Biphenyls (PCBs), SS No. 2

Any PCBs shall be used in a totally enclosed manner in accordance with the provisions of the Toxic Substances Control Act. Any release of PCBs in excess of the reportable quantity shall be reported as required under the Comprehensive Environmental Response, Compensation, and Liability Act, with a copy of any report required by the Federal or State agency being provided to the Authorized Officer within 5 working days of the occurrence of the spill or release.

As described in Chapter 9, all PCB-containing equipment and fluids have been removed from the WIPP site and have been disposed of in accordance with the regulations. No PCBs are allowed on site. No release or spill of PCBs or PCB-containing fluids is known to have ever occurred at WIPP. Therefore, these conditions do not apply at WIPP.

18.3.3.2 Standard Stipulations for the Construction of Overhead Electric Distribution Lines, SS Nos. 3-5

Upon DOE's request, BLM authorized the DOE to install an auxiliary electrical line and 10-13 poles along the right-of-way for the NAR. This authorization was accompanied by standard stipulations for overhead electrical distribution lines in the Roswell District. The standard stipulations for the construction of power lines included a prohibition of clearing or blading of the right-of-way unless agreed to in writing by the Authorized Officer, construction of the power lines to ensure the safety of raptors, and minimization of damage to existing fences and other improvements on public lands.

All stipulations for the construction of power lines were met.

18.3.3.3 Posting of BLM Serial Number, SS No. 6

The BLM serial number assigned to this authorization (i.e., NM 55676) shall be posted in a permanent, conspicuous manner where the power line crosses roads and at all serviced facilities. Numbers must be at least 2 inches high and will be affixed to the pole nearest the road crossing and at the facilities served.

The BLM Serial Number (NM 55676) is posted as required.

18.3.3.4 Damage or Injury to Private Property, Term/Condition No. 7

The DOE and/or its authorized agents will be responsible for any damage or injury to private property, including livestock, and will financially reimburse the allottee for any such loss in accordance with applicable law.

In the event that the vehicle of an employee of the DOE or a DOE contractor injures or kills livestock near the WIPP site or causes other damage to private property, that employee is responsible for reimbursing the owner of the livestock or property.

18.3.3.5 Actions Required Upon Abandonment, Relinquishment, or Expiration of Right-of-Way Reservation, Terms/Conditions, Nos. 7 and 8

Upon cancellation, relinquishment, or expiration of the reservation, the holder of the reservation will comply with those abandonment procedures prescribed by the BLM Authorized Officer. All surface structures (poles, lines, transformers, etc.) will be removed within 180 days of abandonment, relinquishment, or termination of use of the reservation or of the use of the serviced facility or facilities. This will not apply where the power line extends service to an active adjoining facility or facilities.

These conditions will be met upon termination of the reservation or abandonment of the site by the DOE.

18.3.3.6 Fencing, Amendment (April 22, 1988)

The DOE requested that it be allowed to install fencing on the east and west sides of the WIPP NAR for a distance of 12.125 miles to allow for a safe travel route when entering or leaving the site via Highway 62/180. The BLM allowed this installation, subject to the BLM fencing standards.

The BLM fencing standards were met in installing the fence along the NAR.

18.3.4 Right-of-Way Reservation No. NM 55699, Railroad

The conditions specified for the railroad right-of-way reservation are described in this section, along with the compliance status of each condition. Since the railroad spur at WIPP was constructed a number of years ago, the conditions pertaining to the construction of the spur are not discussed individually.

This right-of-way reservation was awarded on September 27, 1983, and extends to perpetuity.

18.3.4.1 Preconstruction and Construction Requirements for the Railroad Spur, SS Nos. 1-4, 7-9, and 11

The preconstruction and construction conditions for the railroad spur were listed in the "Special Stipulation for WIPP Railroad Access." These conditions include preconstruction notification and a prework conference, notification of any anticipated changes, notification of grazing permittees or lessees prior to entering public lands on grazing allotments, barriers and fences for livestock, road or stock trail crossings, mitigation of cultural resources, and installation of fences.

Agreement was reached among members of the BLM, the DOE, and the Army Corps of Engineers with respect to the DOE's meeting all preconstruction and construction requirements.

18.3.4.2 Reseeding Upon Completion of Construction, SS No. 5

The right-of-way must be reseeded upon completion of railroad construction according to BLM seeding requirements for the Roswell District.

The right-of-way was reseeded upon completion of railroad construction in accordance with the BLM seeding requirements for the Roswell District.

18.3.4.3 Abandonment of the Site, SS No. 6

If the WIPP is abandoned for any reason, the railroad bed will be ripped and returned as much as possible to its original terrain. The area will be reseeded as discussed in Section 18.3.4.2.

If the site is abandoned, these actions will be conducted. Until such time, these conditions are not applicable.

18.3.4.4 Responsibility for Damage or Injury to Private Property, SS No. 8

See Section 18.3.3.4.

18.3.4.5 Access to Water for Livestock, SS No. 10

The DOE will provide a water tap and a livestock watering facility in one section, a livestock drinker and related pipeline in a second section, and a water pipeline to tie into an existing water tub in a third. This action is separate and apart from the railroad reservation and will be implemented after completion of the Cooperative Agreement among the DOE, the BLM, and the rancher.

Water taps and related equipment have been provided by the DOE. See also Section 18.3.2.2.

18.3.4.6 Removal of Caliche and/or other Mineral Material, SS No. 12

The grantee and its subcontractor will remove caliche and/or other mineral material from BLM-approved sites only. The DOE will submit a pit development and rehabilitation plan to the BLM for its approval before removing any caliche.

An application for a free-use caliche permit was submitted to the BLM by the DOE. The permit was awarded by the BLM (see also Section 18.3.9).

18.3.4.7 Application for Free-Use Permits, SS No. 13

The DOE will sign applications for BLM free-use permits for the borrowing of caliche, sand, gravel, and other construction materials in quantities that may be reasonably required for this project. WIPP contractors will be responsible for locating the source; obtaining, completing, and processing the applications; and complying with all BLM requirements.

The DOE submitted an application to the BLM for a free-use permit for caliche. The permit was granted by the BLM. (See also Section 18.3.9.)

18.3.4.8 Notification of the BLM Regarding the Access Road Parallel to the Railroad, Amendment

An access road parallel to the railroad was deemed necessary. Since the existing access road, constructed in conjunction with the railroad, is located within 75 feet of the railroad centerline (i.e., within the railroad right-of-way), no new right-of-way was required. However, notification to the BLM was needed.

The BLM was notified as specified.

18.3.5 Right-of-Way Reservation No. NM 63136, Dosimetry and Aerosol Sampling Sites

The conditions specified for the right-of-way reservation for the aerosol sampling site are described in this section, along with the compliance status of each condition. The reservation was awarded on July 31, 1986, and amended in August 1988. The reservation is to remain in effect for 25 years (i.e., until July 31, 2011).

18.3.5.1 Establishment of Dosimeter Stations and Air Samplers, Attachment A

The reservation allowed the installation of 21 thermoluminescent dosimeters (TLDs) and four aerosol sampling stations at 20 and two locations, respectively. The DOE and its operating contractor are technically and financially responsible for the installation, maintenance, and operation of these monitoring systems.

Air samplers have been installed. WID personnel operate and maintain the monitoring system. The environmental dosimetry program that used the TLDs was discontinued in 1990 on the basis of two studies performed, one internally, the other by University of Michigan personnel for the Environmental Evaluation Group (EEG). Both studies concluded that the environmental dosimetry program could be discontinued because it measures gamma or x-ray radiation rather than alpha radiation, such as that emitted by TRU material, and because it is much less sensitive than other sampling programs used at WIPP.

18.3.5.2 Air Monitoring and Data Collection Site, Amendment

Right-of-way reservation No. 63136 was modified to allow an air monitoring and data collection site.

An instrumentation trailer (8 feet by 16 feet), a 10-meter-tall meteorological tower, and various environmental monitoring instruments were installed as agreed to between the DOE and the BLM. The installation required clearing an area of vegetation, constructing a concrete foundation for the trailer and tower, burying instrumentation wires, and constructing an access road. The 0.25-acre area was enclosed by a chain-link security fence as specified in the request to amend the right-of-way reservation.

18.3.6 Right-of-Way Reservation for Subsidence Monuments, No. NM 65801

No unique conditions were specified for the right-of-way reservation for seven geological subsidence monuments. Therefore, only the common conditions described in Section 18.3.1 apply and have been met.

The right-of-way reservation was awarded on November 7, 1986. It is to be held in perpetuity.

18.3.7 Right-of-Way Reservation for Two Subsidence Monuments, No. NM 82245

The conditions of the right-of-way reservation for two subsidence monuments are described in this section, along with the compliance status of each condition.

The reservation was granted on December 13, 1989. It has a 30-year term and is renewable.

18.3.7.1 Construction and Maintenance of the Monuments, #1

The monuments will be constructed and maintained in accordance with the details specified in the application submitted on December 4, 1989.

Two concrete survey monuments were installed on the right-of-way. The monuments are approximately 18 inches in diameter and 36 inches deep. Installation of the monuments was performed as described in the application.

18.3.7.2 Security and Maintenance of the Monuments, #3

The DOE is responsible for the security and maintenance of the monuments.

The DOE is responsible for the security of the monuments. WID maintains the monuments.

18.3.7.3 Rehabilitation of the Land, #5

Upon cancellation or termination of this reservation, the DOE will rehabilitate the land. All structures, improvements, debris, etc., will be removed. All disturbed surfaces will be reseeded in accordance with BLM specifications using Seed Mixture 2.

Upon cancellation or termination of this right-of-way reservation, the DOE will ensure that the land is rehabilitated as specified. All structures, improvements, and debris will be removed and all disturbed surfaces reseeded with pure live seed (Seed Mixture 2) containing no weeds as specified in the *BLM Seeding Requirements in the Roswell District*. Until the reservation is cancelled or terminated, these conditions are not applicable.

18.3.8 Right-of-Way Reservation for an Aerosol Sampling Site, No. NM 77921 (NM 77860)

The conditions for the right-of-way reservation for an aerosol sampling site are discussed in this section, along with the compliance status of each condition. Right-of-way reservation No. NM 77921 was granted on August 18, 1989. (It was originally granted as No. NM 77860, but the number was subsequently changed because it had already been issued.) The reservation was made for a 30-year term and is renewable.

18.3.8.1 Construction, Operation, and Maintenance, #1

The facility will be constructed, operated, and maintained in accordance with the details specified in the application submitted on July 31, 1989.

The application (dated July 13, 1989) specified that a 6-foot metallic stand would be positioned on an existing concrete pad, an electrical hookup would be made to an existing power line, and a chain-link security fence would be emplaced. It also indicated that the monitoring station

would be used throughout the life of the project and would be operated throughout each year of the project. These conditions have been met.

18.3.8.2 Security and Operation of the Aerosol Sampling Station, #3

The DOE will be responsible for the security and day-to-day operation of the facility.

The DOE is responsible for the security of the aerosol sampling station. WID personnel operate and maintain the station.

18.3.8.3 Rehabilitation of the Land Occupied by the Aerosol Sampling Station, #5

The conditions specified (and the response to the conditions) specified are identical to those described in Section 18.3.7.3. See this section for specific information pertaining to rehabilitation of the land upon cancellation or termination of a right-of-way reservation.

18.3.8.4 Use of the Abandoned Concrete Slab

A concrete slab was present at the location of the right-of-way land. The slab had been owned by the El Paso Natural Gas Company. WID personnel requested the use of the slab for radiation monitoring. El Paso Natural Gas Company personnel stated that the slab could be used if their personnel in Jal, New Mexico, were notified prior to initiating construction and if the BLM gave its consent.

Discussions were held with personnel from the El Paso Natural Gas Company. No additional conditions were specified, and notifications were made as requested by El Paso Natural Gas.

The BLM's issuance of this right-of-way reservation consists of its tacit approval of use of the concrete slab.

18.3.9 Caliche Free-Use Permit, NM-FU3-91183

The conditions specified under this permit are discussed in this section, along with the compliance status of each condition. The permit was renewed on August 18, 1993, and expires on August 18, 1994.

18.3.9.1 Withdrawal of Caliche

Under this permit, WIPP is entitled to withdraw 35,000 cubic yards of caliche.

The WIPP has not yet finished withdrawing the allotted 35,000 cubic yards of caliche from the borrow pit as allowed by the permit. It is anticipated that this activity will have been completed by the time the permit expires on August 18, 1994.

18.3.9.2 Reclamation of the Caliche Borrow Pit

Upon completion of its withdrawal of caliche from the caliche borrow pit, the DOE will perform reclamation and other closure activities, including reseeding, as specified under the permit.

WIPP and BLM personnel have agreed that the only closure activity to be performed by the DOE is to recontour the slope of the withdrawal area to a 3:1 slope. The reason for the other conditions being cancelled (e.g., reseeding the area) is that the pit is a community borrow pit; several other parties are removing caliche from the pit and will continue to do so past the expiration date of the WIPP caliche free-use permit.

19.0 PUBLIC RANGELANDS IMPROVEMENT ACT

19.1 Summary of the Law

Congress has recognized that vast segments of public rangelands produce less than their potential for livestock, wildlife habitat, recreation, forage, and water and soil conservation benefits. The 1978 Public Rangelands Improvement Act (43 USC §§ 1901 et seq.) was enacted to address the concerns that such rangelands could remain in such an unsatisfactory condition and that some areas could decline further under existing levels of management.

With the passage of this act, Congress reaffirmed a national policy and commitment to:

- Inventory and identify current public rangeland conditions and trends;
- Manage, maintain, and improve the condition of public rangelands so that they become as productive as is feasible; and
- Continue the policy of protecting wild free-roaming horses and burros while facilitating the removal and disposal of excess wild free-roaming horses and burros that pose a threat to themselves, their habitat, and other rangeland values.

This policy and commitment are echoed in other statutes that address public-land use and management. One such act, the Federal Land Policy and Management Act (FLPMA), directs the Secretary of the Interior to prepare and maintain an inventory of all public lands and to develop and maintain land-use plans with public involvement regardless of whether the public lands have been classified as withdrawn, set aside, or otherwise designated (see Chapter 18). Another statute, the Waste Isolation Pilot Plant Land Withdrawal Act (LWA), transferred jurisdiction over, and statutory authority and responsibility for, the management of the withdrawn lands at WIPP from the U.S. Department of the Interior to the DOE. Section 4 of the LWA, *Establishment of Management Responsibilities*, directs the DOE to conduct the management of grazing consistent with such laws as the Public Rangelands Improvement Act, the Taylor Grazing Act (Chapter 20), and other applicable laws such as Title IV, *Range Management,* of FLPMA (Chapter 18).

The implementing regulations under Subchapter D, *Range Management*, 43 CFR Part 4100, *Grazing Administration - Exclusive of Alaska*, provide uniform guidance for the administration of grazing on public lands. The objectives of these regulations include the following: orderly use, improvement, and development; enhancement of productivity by prevention of overgrazing and soil deterioration; and provision of inventory and categorization of public rangelands on the basis of range conditions and trends. The regulations specify that grazing on administered public lands must be managed in accordance with applicable land-use plans. These plans must set forth program constraints and the general management practices needed to achieve the management objectives.

19.2 Compliance Status of the Regulatory Requirement

Table 19-1 summarizes the applicable requirement and its compliance status under the Public Rangelands Improvement Act. The text discusses the compliance status of the requirement in more detail.

TABLE 19-1. Public Rangelands Improvement Act - Summary of Regulatory Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
43 CFR Part 4100, *Grazing Administration - Exclusive of Alaska*		
43 CFR 4100.0-8	Land-use plan, including grazing management	**UP TO DATE** Authorized range-management activities ongoing; *WIPP Land Management Plan.* [Section 19.2.1]

19.2.1 Management of Grazing Per Land-Use Plan, 43 CFR 4100.0-8

> *Grazing on administered public lands shall be managed under the principle of multiple use and sustained yield and must be in accordance with the applicable land-use plan.*

As addressed in the *WIPP Land Management Plan* (DOE, 1993c), the DOE's intent is to continue current range-management practices with no immediate changes. Grazing will continue on the withdrawn lands as it has since the inception of the WIPP project. Range-management plans include (1) continued management of two affected grazing allotments under multiple-use management and sustained yield; (2) continued vegetative monitoring, which will include collecting data on actual livestock use, wildlife use, and degree of use of key forage species; and (3) continued monitoring studies to determine range condition and trends. In accordance with the *WIPP Land Management Plan*, the Bureau of Land Management (BLM) will administer all range management activities.

20.0 TAYLOR GRAZING ACT

20.1 Summary of the Law

Although the United States does not and cannot hold property for private or personal purposes, it controls public lands under constitutional grant, acting through Congress. Control over public lands is in the hands of Congress; with this power, Congress may prohibit or fix the terms under which public lands may be used.

The Taylor Grazing Act of 1934 (43 USC §§ 315 et seq.) was enacted by Congress for the purpose of establishing a means for Federal management of public lands used for grazing. The intent of Congress was to aid the livestock industry by defining grazing rights and to protect these rights by regulation. This act is intended to prohibit injury to public grazing lands from unregulated grazing and directs the orderly use of and improvement to public grazing lands by establishing grazing districts and a grazing permit system.

The Waste Isolation Pilot Plant Land Withdrawal Act of 1992 (LWA) withdrew public lands and transferred jurisdiction over WIPP site lands from the U.S. Department of the Interior (DOI) to the DOE. As a result of the LWA, the DOE was given statutory authority and responsibility for the management of the withdrawn land consistent with the Federal Land Policy and Management Act (see Chapter 18) and other applicable laws such as the Taylor Grazing Act. Under the LWA, the DOE may allow grazing to continue where it was established before the enactment of the LWA, consistent with the applicable implementing regulations of the Taylor Grazing Act such as 43 CFR Part 4100, *Grazing Administration - Exclusive of Alaska*, although the Bureau of Land Management (BLM) continues to administer the grazing-permit program and collects the grazing fee. The WIPP withdrawal area affects two grazing allotments (i. e., land designated and managed for the grazing of livestock).

The implementing regulations of 43 CFR Part 4100 provide uniform guidance for the administration of grazing on public lands exclusive of Alaska. The objectives of these regulations are as follows: orderly use, improvement, and development of public grazing lands; enhancement of grazing land productivity by the prevention of overgrazing and soil deterioration; stabilization of the livestock industry dependent upon the public range; and provision of inventory and categorization of public rangelands on the basis of range conditions and trends. These objectives must be consistent with land-use plans, multiple use, sustained yield, environmental values, and other general objectives as stated by the Taylor Grazing Act.

20.2 Compliance Status of the Regulatory Requirements

Table 20-1 summarizes the two applicable regulatory requirements and their compliance status under the Taylor Grazing Act. The text gives more detail on the compliance status of each requirement.

TABLE 20-1. Taylor Grazing Act - Summary of Regulatory Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
43 CFR Part 4100, *Grazing Administration*		
43 CFR 4100.0-8	Management of grazing lands under principles of multiple use and sustained yield and in accordance with applicable land-use plans	**UP TO DATE** Bureau of Land Management (BLM) authorized to manage ongoing grazing activities; ***WIPP Land Management Plan*** [Section 20.2.1; see also Section 19.2.1]
43 CFR 4120.2	Preparation of allotment management plan	**ACHIEVED** BLM authorized to manage land use for two allotments [Section 20.2.2]

20.2.1 Management of Grazing Lands, 43 CFR 4100.0-8

> *Grazing on public lands shall be managed under the principles of multiple use and sustained yield in accordance with applicable land-use plans.*

In accordance with the *WIPP Land Management Plan* (DOE, 1993c), the BLM will ensure that range management activities are carried out under the authority of the Taylor Grazing Act of 1934, the Federal Land Policy and Management Act (FLPMA, Chapter 18), and the Public Rangelands Improvement Act (Chapter 19). The principles of multiple use and sustained yield are basic to the management of these activities. The DOE's intent is to continue current

management practices with no immediate changes in current operations. (See also Section 19.2.1.)

20.2.2 Allotment Management Plans, 43 CFR 4120.2

> *An allotment management plan shall be prepared in careful and considered consultation, cooperation, and coordination with BLM personnel, the landowners involved, the district grazing advisory board, and any other affected interests.*

The WIPP withdrawal area affects two grazing allotments administered by the BLM: the Livingston Ridge and Antelope Ridge. Portions of both allotments lie within the withdrawal area. No formal grazing system has been implemented for the Livingston Ridge; however, a recent review by the BLM of actual-use data indicates that there is pasture rotation, with some pastures being rested for at least a portion of the growing season. The Antelope Ridge allotment is leased to a livestock rancher; in consultation with the BLM, an allotment management plan has been developed for this allotment. The plan includes a five-pasture rotation system, with some pastures being rested for full years and others receiving growing-season rest. WIPP is contained within an area of 300 acres within the Antelope Range allotment that is posted against trespass and fenced to prevent grazing. This 300-acre area is the only portion of the withdrawal area that is not currently used for livestock activity.

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21.0 BALD AND GOLDEN EAGLE PROTECTION ACT

21.1 Summary of the Law

The Bald and Golden Eagle Protection Act (16 USC § 668-668d) makes it unlawful to take (i.e., capture, kill, or destroy), possess, molest, or disturb bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*), alive or dead, their nests, or their eggs anywhere in the United States. A permit must be obtained from the U.S. Department of the Interior to relocate any nest that interferes with resource development or recovery operations. The Bald and Golden Eagle Protection Act is implemented by several parts under CFR Title 50, Subchapter B, *Taking, Possession, Transportation, Sale, Purchase, Barter, Exportation, and Importation of Wildlife and Plants*. These implementing regulations are found in 50 CFR Parts 13, 17, 21, and 22.

The regulations in 50 CFR Part 13, *General Permit Procedures,* provide uniform rules, conditions, and procedures for the application for and the issuance, denial, suspension, revocation, and general administration of all permits issued pursuant to 50 CFR Subchapter B. The provisions in this part are in addition to other regulations such as the Migratory Bird Treaty Act (Chapter 22) and the Endangered Species Act (Chapter 23) and apply to all permits issued under these regulations, including 50 CFR Parts 17, 21, and 22.

The regulations of 50 CFR Part 17, *Endangered and Threatened Wildlife and Plants*, which also implement the Endangered Species Act and are discussed in Chapter 23, could apply to WIPP because of the potential for the presence of the endangered bald eagle. The regulations in this part outline permit requirements for activities involving endangered wildlife and identify those species of wildlife and plants recognized as endangered or threatened with extinction.

The purpose of the regulations in 50 CFR Part 21, *Migratory Bird Permits*, is to supplement the general permit regulations of Part 13 of Subchapter B with respect to permits for the taking, possession, transportation, sale, purchase, barter, importation, exportation, and banding or marking of migratory birds. Section 21.22 of 50 CFR Part 21 outlines the requirements and procedures for permitting the banding or marking of bald and golden eagles. The requirements under 50 CFR Part 21 are discussed in Chapter 22.

The purpose of the regulations in 50 CFR Part 22, *Eagle Permits*, is to govern the taking, possession, and transportation of bald and golden eagles for scientific, educational, and depredation-control purposes and for the religious purposes of Indian tribes. The import, export, purchase, sale, or barter of bald or golden eagles, their parts, nests, or eggs is not permitted by any regulation of Subchapter B.

21.2 Compliance Status of the Regulatory Requirements

Table 21-1 summarizes some of the applicable requirements and their compliance status under the Bald and Golden Eagle Protection Act. The text provides more detail on the compliance status of these requirements.

TABLE 21-1. Bald and Golden Eagle Protection Act - Summary of Regulatory Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
50 CFR Part 13, *General Permit Procedures*		
50 CFR 13.11	Permit application procedures	**NOT APPLICABLE** No nesting eagles at WIPP [Section 21.2.1]
50 CFR Part 22, *Eagle Permits*		
50 CFR 22.11	General permit requirements	**NOT APPLICABLE** No nesting eagles at WIPP [Section 21.2.2]
50 CFR 22.25	Permits to take golden eagle nests	**NOT APPLICABLE** No nesting eagles at WIPP [Section 21.2.3]

21.2.1 Permit Application Procedures, 50 CFR 13.11

Applicants must submit separate applications for each permit on prescribed forms and must follow prescribed forwarding instructions.

At present, no bald or golden eagles are nesting on the WIPP site. WIPP personnel will file an application for an eagle permit as required if the need for such a permit is perceived. Other permit requirements under 50 CFR Part 13, which would become applicable were a need to arise to disturb or relocate a bald or golden eagle, are discussed in Chapter 22.

21.2.2 General Permit Requirements, 50 CFR 22.11

> *No person shall take, possess, or transport any bald or golden eagle, living or dead, or the parts, nest, or eggs of such birds except as authorized under terms of a valid issued permit.*

WIPP personnel will apply for a permit and will comply with the permit conditions if such a permit is ever needed.

21.2.3 Permits to Take Golden Eagle Nests, 50 CFR 22.25

> *Persons desiring to take golden eagle nests during a resource-development or recovery operation must file a permit application in accordance with prescribed procedures. The nests may be taken only when they are inactive.*

At present, no golden eagles are nesting on the WIPP site. If it becomes necessary to move or remove a golden eagle nest, a permit application will be filed. All permit conditions will be met, and the nest(s) will be moved only when inactive.

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22.0 MIGRATORY BIRD TREATY ACT

22.1 Summary of the Law

The Migratory Bird Treaty Act (16 USC §§ 703-712) is intended to protect birds that have common migratory flyways between the United States and Canada, Mexico, Japan, and Russia. The act stipulates that it is unlawful "at any time, by any means or in any manner, to pursue, hunt, take, capture, kill, or attempt to take, capture, or kill . . . any migratory bird, any part, nest, or eggs of any such bird" unless specifically authorized by the Secretary of the Interior by direction or through regulations permitting and governing these actions. Although WIPP is not located within a major migration corridor, there is the potential for migratory birds to be present on WIPP lands.

The regulations in 50 CFR Part 13, *General Permit Procedures,* provide uniform rules, conditions, and procedures for the application for and the issuance, denial, suspension, revocation, and general administration of all permits issued pursuant to 50 CFR Subchapter B, *Taking, Possession, Transportation, Sale, Purchase, Barter, Exportation, and Importation of Wildlife and Plants*. The provisions in this part are in addition to other regulations, including 50 CFR Parts 17, 21, and 22, and apply to all permits issued under these regulations.

The regulations of 50 CFR Part 17, *Endangered and Threatened Wildlife and Plants,* also implement the Migratory Bird Treaty Act and could apply to WIPP because of the potential for the presence of migratory endangered and threatened species of birds at the WIPP. These regulations, discussed in Chapter 23, outline the requirements for permits for activities involving endangered wildlife and identify those species of wildlife that are recognized as endangered or threatened with extinction.

Under the Migratory Bird Treaty Act, the DOE is required to consult annually with the U. S. Fish and Wildlife Service (FWS) with respect to impacts on migratory game birds[1] and crows resulting from the hunting activities permitted on WIPP lands. Hunting privileges for the public within the withdrawal area will continue, except for the areas that are posted against trespass. These hunting activities, whether conducted out of or within the withdrawal area, are subject to regulations implementing the Migratory Bird Treaty Act (i.e., 50 CFR Part 20, *Migratory Bird Hunting*), which regulate the harvest of migratory birds by specifying the mode of harvest, hunting seasons, possession limits, and so on. Furthermore, because certain migratory birds which have been federally recognized and listed as endangered or threatened, such as bald eagles and peregrine falcons, could be present on WIPP lands, the Bald and Golden Eagle Protection

[1]Migratory game birds are migratory birds that belong to the following families: Anatidae (ducks, geese, brant, and swans); Columbidae (doves and pigeons); Gruidae (little brown cranes); Rallidae (rails, coots, and gallinules); and Scolopacidae (woodcock and snipe).

Act (Chapter 21) and the Endangered Species Act (Chapter 23) may also apply, along with their implementing regulations.

The regulations in 50 CFR Part 21, *Migratory Bird Permits*, supplement the general permit regulations of Part 13 of this subchapter with respect to permits for the taking, possession, transportation, sale, purchase, barter, importation, exportation, and banding or marking of migratory birds. The portion that is relevant to WIPP is § 21.22, which outlines the requirements and procedures for obtaining permits to band or mark birds. Part 21 also provides certain exceptions to the permit requirements for public, scientific, or educational institutions and establishes depredation orders that provide limited exceptions to the Migratory Bird Treaty Act.

The purpose of the regulations in 50 CFR 22, *Eagle Permits*, is to govern the taking, possession, and transportation of bald and golden eagles for scientific, educational, and depredation-control purposes and for the religious purposes of Indian tribes. Compliance with these regulations is discussed in Chapter 21.

22.2 Compliance Status of the Regulatory Requirements

The compliance status of each of the applicable regulatory requirements under the Migratory Bird Treaty Act is summarized in Table 22-1. More detail is provided in the text.

TABLE 22-1. Migratory Bird Treaty Act - Summary of Regulatory Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
50 CFR Part 13, *General Permit Procedures*		
50 CFR 13.11	Permit application procedures	**ACHIEVED** Application submitted to the U.S. Fish and Wildlife Service (FWS) [Section 22.2.1]

TABLE 22-1 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
50 CFR 13.12	Information requirements for permit applications	**ACHIEVED** Prescribed information included in application [Section 22.2.2]
50 CFR 13.44	Display of permit	**ACHIEVED** Permit displayed [Section 22.2.3]
50 CFR 13.45	Filing of reports	**ACHIEVED** Annual report submitted to FWS [Section 22.2.4]
50 CFR 13.46	Maintenance of records	**UP TO DATE** Maintained for at least 5 years [Section 22.2.5]
50 CFR 13.47	Inspection requirement	**NOT APPLICABLE** No inspections requested to date [Section 22.2.6]
50 CFR 13.48	Compliance with permit conditions (see also Sections 22.2.12 and 22.3.1)	**UP TO DATE** All conditions met (see also Sections 22.2.12 and 22.3.1) [Section 22.2.7]
50 CFR 13.50	Acceptance of liability	**UP TO DATE** No action required [Section 22.2.8]

TABLE 22-1 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
50 CFR Part 20, *Migratory Bird Hunting*		
50 CFR Part 20, Subpart C	Compliance with applicable hunting regulations	**UP TO DATE** Hunting allowed in some areas in compliance with applicable regulations [Section 22.2.9]
50 CFR Part 21, *Migratory Bird Permits*		
50 CFR 21.22(a)	Permit for banding or marking migratory birds	**ACHIEVED** Federal permit #22478 for banding obtained [Section 22.2.10]
50 CFR 21.22(b)	Application procedures for banding or marking permits	**ACHIEVED** Prescribed information submitted to FWS [Section 22.2.11]
50 CFR 21.22(c)	Additional permit conditions	**UP TO DATE** Permit conditions met [Section 22.2.12]
50 CFR 21.22(d)	Term of permit	**UP TO DATE** Less than 3 years [Section 22.2.13]

TABLE 22-1 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
50 CFR 21.27	Special-purpose permits	**NOT APPLICABLE** No action required [Section 22.2.14]
50 CFR 21.28	Falconry permits	**NOT APPLICABLE** No falconry activities anticipated at WIPP [Section 22.2.15]
50 CFR 21.41	Depredation permits	**NOT APPLICABLE** No need for a depredation permit anticipated for WIPP [Section 22.2.16]

22.2.1 Permit Application Procedures, 50 CFR 13.11

Applicants must submit a separate application on the prescribed form for each permit and must follow the prescribed forwarding instructions.

The prescribed information has been submitted to the FWS.

22.2.2 Information Requirements for Permit Applications, 50 CFR 13.12

Applicants must provide current information such as organizational affiliation, reason(s) for the permit application, and certification of familiarity with 50 CFR Part 13.

The prescribed permit applications and supporting information have been submitted to the FWS.

22.2.3 Display of Permit, 50 CFR 13.44

Any permit issued under 50 CFR Part 13 will be displayed for inspection upon the request of the Director, his/her agent, or any other person that relies upon the existence of the permit.

The permits are permanently displayed on the door of the freezer in which tissue samples are held at WIPP.

22.2.4 Filing of Reports, 50 CFR 13.45

Recipients of a permit may be required to file reports of the activities conducted under the permit. Any such report must be filed by March 31 for the preceding calendar year ending December 31 or for any portion of the year during which the permit was in force.

Annual reports are submitted to the FWS.

22.2.5 Maintenance of Records, 50 CFR 13.46

From the date of issuance of a permit, the recipient of the permit must maintain complete and accurate records of any taking, possession, transportation, sale, purchase, barter, exportation, or importation of plants obtained from the wild or wildlife covered under the permit. The records must be kept current and must include the names and addresses of any persons involved in the transfer of the plant or wildlife as well as the date of the transaction and any other appropriate information. The records must be legible or reproducible and written in English and must be maintained for 5 years from the date of expiration of the permit.

All applicable records are held for at least 5 years from the date of expiration of the permit.

22.2.6 Inspection Requirement, 50 CFR 13.47

Any person holding a permit under this subpart shall allow the Director's agent to enter his/her premises at any reasonable hour

to inspect any wildlife or plant held or to inspect, audit, or copy any permits, books, or records required under Subpart B.

The Director's agent has not yet requested such an inspection. Should an inspection be requested, full cooperation will be given.

22.2.7 Compliance with Permit Conditions, 50 CFR 13.48

Any person holding a permit under this subpart or acting under the authority of the permittee must comply with all conditions of the permit and with all applicable laws and regulations governing the permitted activity.

Conditions described in the permit have been met. See also Sections 22.2.12 and 22.3.1.

22.2.8 Acceptance of Liability, 50 CFR 13.50

Any person holding a permit under Subpart B assumes all liability and responsibility for the conduct of any activity conducted under the authority of the permit.

The recipients of the permits under Subpart B at WIPP are fully aware of their liabilities and assume responsibility for their activities.

22.2.9 Compliance with Applicable Migratory Bird Hunting Regulations, 50 CFR 20, Subpart C

Hunters of migratory game birds and crows must comply with open-season requirements, including the avoidance of prohibited hunting methods.

Hunting privileges for the public will continue within the withdrawal area, except in areas posted against trespass, in accordance with applicable hunting regulations.

22.2.10 Application for Banding or Marking Permit, 50 CFR 21.22(a)

Persons intending to capture migratory birds for banding or marking must have obtained a permit acquired in accordance with prescribed permit regulations.

A permit (#22478) for banding at WIPP has been granted by the FWS. See also Section 22.3.1.

22.2.11 Application Procedures for Banding or Marking Permits, 50 CFR 21.22(b)

Information to be provided in banding or marking permit applications includes, but is not limited to, the State in which authorization is desired; the species to be banded or marked; and the name and address of the public, scientific, or educational institution that will be recipients of salvaged specimens.

This information was included in the application for the permit.

22.2.12 Additional Permit Conditions, 50 CFR 21.22(c)

In addition to the general permit conditions described in 50 CFR Part 13 (see Sections 22.2.1 through 22.2.8), the following conditions will be met:

- *Only official numbered leg bands issued by the Fish and Wildlife Service will be used to band migratory birds.*
- *All traps or nets used to capture migratory birds for banding or marking will have a tag attached with the name and address of the permittee and the permit number.*
- *The holder of a permit may salvage birds killed or found dead. All such dead birds salvaged under the authority of a banding or marking permit must be donated and transferred to a public, scientific, or educational institution at least every 6 months or within 60 days of the expiration or revocation of the permit unless a special permit that authorizes possession for a longer period of time has been issued.*

- *The permittees must keep accurate records of their operations and must file reports as required.*

The additional permit conditions are met at WIPP.

22.2.13 Term of Permit, 50 CFR 21.22(d)

The term of a banding or marking permit shall not exceed 3 years from the date of issuance or renewal. The expiration date is designated on the permit unless the permit has been amended or revoked.

Permit #22478 does not exceed the 3-year term. The permit was reissued to WID personnel on May 19, 1993, and will expire on June 30, 1995.

22.2.14 Special-Purpose Permits, 50 CFR 21.27

Permits may be issued for special-purpose activities related to migratory birds or their parts, nests, or eggs that are otherwise outside the scope of the standard permits of this part.

No special-purpose permits have been needed at WIPP to date. Should such a permit be deemed necessary, all appropriate requirements will be met as specified under this section.

22.2.15 Falconry Permits, 50 CFR 21.28

A falconry permit is required before any person may take; possess; transport; sell; purchase; barter; or offer to sell, purchase, or barter raptors for falconry purposes.

No falconry activities are anticipated at WIPP. Therefore, this permit is not applicable.

22.2.16 Depredation Permits, 50 CFR 21.41

A depredation permit is required before any person may take, possess, or transport migratory birds for depredation control.

No need for a depredation permit to control migratory birds is anticipated at WIPP. Therefore, this permit does not apply.

22.3 Compliance Status of Permit Conditions

Table 22-2 summarizes the conditions imposed by the FWS for the permit issued. The text provides more detail on the compliance status of the permit conditions.

TABLE 22-2. Migratory Bird Treaty Act - Summary of Permit Compliance Status

CITATION	CONDITION	COMPLIANCE STATUS
Permit No. 22478	Authorization to capture and band or mark birds; excluded for waterfowl, eagles, and endangered or threatened species	**UP TO DATE** No waterfowl, eagles, or endangered species captured, banded, or marked at WIPP [Section 22.3.1]

22.3.1 Permit No. 22478

Permit No. 22478 authorizes the WID employee specified to capture and band or mark all species of birds except waterfowl, eagles, or endangered or threatened species.

Permit No. 22478 provides authority to capture and band or mark all species of birds except waterfowl, eagles, or endangered or threatened species. No waterfowl, eagles, or endangered or threatened species have been captured, marked, or banded at WIPP.

23.0 ENDANGERED SPECIES ACT

23.1 Summary of the Law

The Endangered Species Act (16 USC §§ 1531 et seq.) was enacted in 1973 to prevent the extinction of many species of animals and plants. This act provides strong measures to help alleviate the loss of species and their habitats and places restrictions on a wide range of activities involving endangered and threatened animals and plants to help ensure their continued survival. With limited exceptions, this act prohibits activities using these protected species unless authorized by a permit from the U.S. Fish and Wildlife Service (FWS). Under § 1536 of the act and the implementing regulations in 50 CFR Part 402, *Interagency Cooperation--Endangered Species Act, as Amended,* the U.S. Environmental Protection Agency (EPA) is prohibited from authorizing activities likely to jeopardize the continued existence of any threatened or endangered species or its critical habitat. A biological assessment and "formal consultation," followed by the issuance of a "biological opinion" by the FWS, may be required for any species that is determined to be in potential jeopardy.

The FWS lists five threatened or endangered species of plants and animals that could occur at the WIPP site: the Lee pincushion cactus (*Coryphantha sneedi var. leei*); the gypsum wild buckwheat (*Eriogonum gypsophilum*); the peregrine falcon (*Falco peregrinis anatum*); the bald eagle (*Haliaeetus leucocephalus*); and a fish, the Pecos gambusia (*Gambusia nobilis*). However, the FWS has determined that WIPP activities will have no adverse impacts on these species. In addition, no critical habitat for terrestrial endangered species has been identified at the WIPP site. Consequently, neither formal consultation nor biological opinion processes have been required for the WIPP project by the FWS under § 1536.

The regulations in 50 CFR Part 13, *General Permit Procedures,* provide uniform rules, conditions, and procedures for the application for and the issuance, denial, suspension, revocation, and general administration of all permits issued pursuant to 50 CFR Subchapter B, *Taking, Possession, Transportation, Sale, Purchase, Barter, Exportation, and Importation of Wildlife and Plants*. The provisions in this part are in addition to other regulations and apply to all permits issued under them, including 50 CFR Parts 17, 21, and 22.

The regulations of 50 CFR Part 17, *Endangered and Threatened Wildlife and Plants*, implement the Endangered Species Act as well as the Bald and Golden Eagle Protection Act (see Chapter 21) and could apply to WIPP because of the potential for the presence of the endangered animal and plant species identified above. The regulations in this part outline the requirements for permits for activities involving endangered wildlife and identify those species of wildlife and plants recognized as endangered or threatened with extinction.

Other Federal regulations that implement the Endangered Species Act and that apply to the WIPP include the implementing regulations in 50 CFR Parts 21 and 22. The purpose of the regulations

in 50 CFR Part 21, *Migratory Bird Permits*, is to supplement the general permit regulations of Part 13 of Subchapter B with respect to permits for the taking, possession, transportation, sale, purchase, barter, importation, exportation, and banding or marking of migratory birds, including those listed as threatened or endangered. Compliance with these regulations is discussed in Chapter 22.

The regulations in 50 CFR Part 22, *Eagle Permits*, govern the taking, possession, and transportation of the endangered bald eagle for scientific, educational, and depredation-control purposes and for the religious purposes of Indian tribes. Requirements under these regulations are discussed in Chapter 21.

23.2 Compliance Status of the Regulatory Requirements

Table 23-1 summarizes regulatory requirements and their compliance status under the Endangered Species Act. The text gives more detail on the compliance status of each requirement.

TABLE 23-1. Endangered Species Act - Summary of Regulatory Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
50 CFR Part 13, *General Permit Procedures*		
50 CFR 13.11	Permit application procedures	**NOT APPLICABLE** No work anticipated with endangered or threatened species [Section 23.2.1]

TABLE 23-1 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
50 CFR Part 17, *Endangered and Threatened Wildlife and Plants*		
50 CFR 17.22, 17.32, 17.52, and 17.62	Application for permits for scientific purposes or for the enhancement of propagation or survival of endangered or threatened species	**NOT APPLICABLE** No work anticipated with endangered or threatened species [Section 23.2.2]
50 CFR Part 402, *Interagency Cooperation - Endangered Species Act, as Amended*		
50 CFR 402.12	Biological assessment to evaluate effects of proposed actions on designated species	**NOT APPLICABLE** Determination of no adverse impacts; see Section 23.2.4 [Section 23.2.3]
50 CFR 402.14	Formal consultation with the FWS to determine whether any action will affect listed species	**ACHIEVED** Determination of no adverse impacts [Section 23.2.4]

23.2.1 Permit Application Procedures, 50 CFR 13.11

Applicants must submit separate applications for each permit on prescribed forms and must follow prescribed forwarding instructions.

No permit is required because activities involving endangered species are not conducted at WIPP. Other requirements related to permits under 50 CFR Part 13, which would become applicable only if activities involving endangered species were initiated, are summarized and discussed in Chapter 22.

23.2.2 Application for Endangered or Threatened Species Permit, 50 CFR 17.22 (a)(1), 17.32, 17.52, and 17.62

Applicants for permits for using endangered or threatened species of wildlife or plants for scientific purposes, enhancement of propagation or survival, or for incidental taking must submit an application as prescribed.

To date, taking endangered or threatened wildlife or plants for these purposes, which would require a permit from the FWS, has not been necessary. It is not expected that such a permit will be needed in the future.

23.2.3 Biological Assessment of Impacts on Recognized Species, 50 CFR 402.12

A biological assessment may be required to determine whether construction activities will jeopardize the continued existence of endangered species or the critical habitat of any such species.

On May 29, 1980, the FWS determined that construction of the WIPP would have no adverse impacts on recognized endangered or threatened species. In addition, no critical habitat for terrestrial endangered species has been identified at the WIPP site. Consequently, no biological assessment has been required for the WIPP.

23.2.4 Formal Consultation with the FWS Regarding Impacts on Recognized Species, 50 CFR 402.14

Formal consultation with the FWS to determine whether construction activities will jeopardize the continued existence of endangered species or its critical habitat is required.

On May 29, 1980, the FWS determined that construction of the WIPP would have no adverse impacts on recognized endangered or threatened species. In addition, no critical habitat for terrestrial endangered species has been identified at the WIPP site. Consequently, no formal consultation has been required for the WIPP.

24.0 NATIONAL HISTORIC PRESERVATION ACT

24.1 Summary of the Law

The National Historic Preservation Act (NHPA; 16 USC §§ 470 et seq.) was enacted to protect the nation's cultural resources in conjunction with the States, local governments, Indian tribes, and private organizations and individuals. The policy of the Federal government includes (1) providing leadership in preserving the prehistoric and historic resources of the nation; (2) administering federally owned, administered, or controlled prehistoric resources for the benefit of present and future generations; (3) contributing to the preservation of nonfederally owned prehistoric and historic resources; and (4) assisting State and local governments and the National Trust for Historic Preservation in expanding and accelerating their historic preservation programs and activities. The act also established the National Register of Historic Places ("National Register"). At the State level, the State Historic Preservation Officer (SHPO) coordinates the State's participation in implementating the NHPA.

Section 106 of NHPA requires that a Federal agency head who has jurisdiction over a Federal, federally assisted, or federally licensed undertaking take into account the effects of the agency's undertaking on historic properties included in or eligible for the National Register. Furthermore, the "Section 106 process" requires that the Federal agency head afford the Advisory Council on Historic Preservation ("the Council") a reasonable opportunity to comment on the undertaking prior to initiating the undertaking. Through the Section 106 process, the Council seeks to accommodate historic preservation concerns with the needs of Federal undertakings. The Council encourages this accommodation through consultation among the Federal agency, the SHPO, and other interested parties during the early stages of planning.

The NHPA has been amended by two acts. The Archaeological and Historic Preservation Act (16 USC §§ 469 et seq.) directs Federal agencies to recover and preserve historic and archaeological data that would otherwise be lost as a result of Federal construction or program activities. This statute applies to known cultural resources on WIPP lands or those that may be recorded in the future.

The other act amending the NHPA is the Archaeological Resources Protection Act (16 USC §§ 470aa et seq.). This statute sets forth the requirements for obtaining a permit from the U.S. Department of the Interior (DOI) for the excavation or removal of archaeological resources from public or Indian lands. The act's implementing regulations in 43 CFR Part 7, *Protection of Archaeological Resources*, establish uniform definitions, standards, and procedures to be followed by all Federal land managers in providing protection for archaeological resources located on public lands. The statute and regulations apply to known cultural resources on WIPP lands or those that may be recorded in the future.

Since 1976, cultural resource investigations have recorded 98 archaeological sites and numerous isolated artifacts within the 16-square-mile area enclosed by the WIPP site boundary. Thirty-

three sites recorded within the central 4-square-mile area were determined eligible for inclusion on the National Register as an archaeological district. Investigations since 1980 have recorded an additional 14 individual sites outside the central 4-square-mile area that are considered eligible for inclusion on the National Register. The NHPA's implementing regulations in 36 CFR Part 800, *Protection of Historic and Cultural Properties*, contain provisions for the development of a treatment plan by a Federal agency that identifies historic properties that are likely to be discovered during the implementation of an undertaking and how they will be managed.

24.2 Compliance Status of the Regulatory Requirements

Table 24-1 summarizes the regulatory requirements and their compliance status under the National Historic Preservation Act. The text gives more detail on the compliance status of each requirement.

TABLE 24-1. National Historic Preservation Act - Summary of Regulatory Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
36 CFR Part 800, *Protection of Historic and Cultural Properties*		
36 CFR 800.5	Assessment of effects on historic properties	**ACHIEVED** Determination of No Adverse Effect obtained (May 1980) [Section 24.2.1]
36 CFR 800.11	Development of plan for treatment of historic property	**ACHIEVED** *WIPP Mitigation Plan* submitted to State Historic Preservation Officer (SHPO) and to the Council; SHPO determined No Adverse Effect from WIPP activities in May 1980 [Section 24.2.2]

TABLE 24-1 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
43 CFR Part 7, *Protection of Archaeological Resources*		
43 CFR 7.5	Application for permit to excavate and/or remove archaeological resources	NOT APPLICABLE No excavations or removal of archaeological sites slated [Section 24.2.3]

24.2.1 Assessment of Effects on Historic Properties, 36 CFR 800.5

In consultation with the SHPO, the Federal agency official with jurisdiction over an undertaking is responsible for assessing the effect of an undertaking on affected historic properties, obtaining the SHPO's concurrence when the effect is not considered adverse, and notifying and submitting summary documentation to the Council.

The DOE submitted documentation to the New Mexico SHPO describing excavation activities and the avoidance of any potential historical sites. A determination of No Adverse Effect from WIPP activities on historic properties was made by the SHPO in May 1980. Similar documentation was submitted to the Council.

24.2.2 Development of a Plan for the Treatment of Historical Property Discovered During a Federal Agency Undertaking, 36 CFR 800.11

After a determination by the Federal agency official presiding over an undertaking that the potential for the discovery of historical property exists, the agency official may develop a plan for the treatment of such properties if discovered and include this plan in any documentation prepared to comply with 36 CFR 800.5.

A mitigation plan describing excavation activities at WIPP and the avoidance of historical sites was submitted to the New Mexico SHPO. A determination of No Adverse Effect from WIPP activities on cultural resources was made by the SHPO in May 1980. A similar mitigation plan

was submitted to the Council. The Council concurred that the *WIPP Mitigation Plan* is appropriate to protect cultural resources. The *WIPP Land Management Plan* (DOE, 1993c) also outlines objectives and planned actions for the management of cultural resources within the withdrawal area.

24.2.3 Application for Permits and Information Collection, 43 CFR 7.5

> *Any person proposing to excavate and/or remove archaeological resources from public lands and to carry out activities associated with such excavation and/or removal shall apply for a permit for the proposed work and shall not begin the proposed work until a permit has been issued.*

Avoidance of known archaeological sites will remain as the primary mitigation measure. No known archaeological sites have been slated for excavation.

25.0 NEW MEXICO HAZARDOUS WASTE ACT

25.1 Summary of the Law

The purpose of the Hazardous Waste Act (HWA; §§ 74-4-1 through 74-4-14 NMSA 1978) is to maintain the quality of New Mexico's environment; to confer optimal health, safety, comfort, and economic and social well being on its inhabitants; and to protect the proper utilization of its lands. The Hazardous Waste Act established the program for hazardous waste management and control in the State of New Mexico. Since its initial enactment in 1977, it has been amended substantially three times (in 1981, 1987, and 1989) to make its provisions more consistent with the 1980 and 1984 amendments to RCRA (see Chapter 2). The major provisions of the HWA were taken directly from Subtitles C (*Hazardous Waste Management*) and I (*Regulation of Underground Storage Tanks*) of RCRA.

On January 11, 1985, the State of New Mexico received authorization from the EPA to administer the Federal hazardous waste program, effective January 25, 1985. Additional authorizations that expanded the scope of the initial authorization were granted by the EPA and became effective on April 10, 1990; July 25, 1990; and December 4, 1992. However, New Mexico's authorization for hazardous waste management does not currently extend to the regulations promulgated by the EPA pursuant to the Hazardous and Solid Waste Amendments of 1984 (HSWA).

A State may adopt Federal regulations by reference to those regulations without specifying each of the requirements and provisions of the Federal regulations. On January 11, 1991, the State of New Mexico adopted the entire body of 40 CFR Parts 260 through 266 and Parts 268 through 270 of the EPA's regulations implementing Subtitle C with only a few substitutions and minor exceptions. Table 25-1 shows the correspondence between the Federal and State implementing regulations. The Federal regulations through July 1, 1990, were adopted into the New Mexico Hazardous Waste Management Regulations (HWMR).

On July 11, 1990, the EPA published its acceptance of New Mexico's revised hazardous waste program, effective July 25, 1990. This authorization allows the State of New Mexico to regulate the hazardous constituents of mixed waste under the revised Hazardous Waste Act except for those changes in the regulations made by the EPA subsequent to the authorization. Therefore, this authorization allows the State to regulate the hazardous constituents of the mixed waste to be sent to the WIPP except for changes in the regulations that have been made by the EPA and that have not yet received EPA's authorization in the State program.

On July 23, 1992, New Mexico submitted an application for additional program approvals. The EPA published an immediate final rule on October 5, 1992, in which the decision was made to grant final authorization to New Mexico for the additional program modifications unless adverse comments were received. In the event that no such comments were received, the final authorization would become effective on December 4, 1992.

TABLE 25-1. Correspondence between the Federal Regulations Implementing the Resource Conservation and Recovery Act (RCRA) and the State Regulations Implementing the New Mexico Hazardous Waste Act (HWA)

Implementing Regulations under RCRA	Hazardous Waste Management Regulations (HWMRs) under HWA	Adoptions, Modifications, and Exceptions	BECR Sections
40 CFR Part 260	Section 101	Adopts Part 260 into Part I by reference	—
	Section 102	Modifies several definitions; deletes Sections 260.1(b)(6), 260.22, and 260.30 through 260.33; provides NMED 24-hour emergency-response telephone number	—
40 CFR Part 261	Section 201	Adopts Part 261 into Part II by reference	—
40 CFR Part 262	Section 301	Adopts Part 262 into Part III by reference	Section 25.2.2
40 CFR Part 263	Section 401	Adopts Part 263 into Part IV by reference	Section 25.2.3
	Section 402	Deletes Section 263.20(e)	
40 CFR Part 264	Section 501	Adopts Part 264 into Part V by reference	Not applicable
	Section 501	Deletes Sections 264.149 and 264.150	
40 CFR Part 265	Section 601	Adopts Part 265 into Part VI by reference	Section 25.2.4
	Section 602	Deletes Sections 265.149 and 265.150	
40 CFR Part 266	Section 701	Adopts Part 266 into Part VII by reference	Not applicable

TABLE 25-1 (continued)

Implementing Regulations under RCRA	Hazardous Waste Management Regulations (HWMRs) under HWA	Adoptions, Modifications, and Exceptions	BECR Sections
40 CFR Part 268	Section 801	Adopts Part 268 into Part VIII by reference	Section 2.2.2
40 CFR Part 270	Section 901	Adopts Part 270 into Part IX by reference	Section 25.2.5
	Section 902	Adds New Mexico permitting procedures	
—	Section 1001	Requires compliance with applicable laws	Section 25.2.1
	Section 1002	Effectuates HWA	
	Section 1003	Replaces 40 CFR Part 124 with Section 902 of the HWMRs	
	Section 1004	Severability	
	Section 1005	Effect of stay or invalidation of Federal regulations incorporated by reference	
	Section 1006	Amendment of prior regulations	
	Section 1007	Saving clause	

The State's HWMRs are applicable to WIPP on three counts. First, WIPP is a generator of hazardous waste and is thus required to comply with the RCRA requirements of 40 CFR Part 262 (Part III of the New Mexico HWMRs). As long as WIPP ships its hazardous waste off-site to an EPA-approved TSDF within 90 days, no RCRA permit is required for this activity. Second, when WIPP receives waste from the generator sites, WIPP will be responsible for subcontracting the transporter. This activity will be regulated under the transporter requirements of 40 CFR Part 263 (Part IV of the HWMRs). Third, WIPP will be a disposal, storage, and/or treatment facility for TRU mixed waste, which mandates that WIPP receive a RCRA permit.

The permit will be received from both the NMED and the EPA because the former is not yet authorized for HSWA requirements or for other recent changes made by the EPA in the Federal regulations.

After the State of New Mexico received authorization from the EPA to regulate mixed waste in July 1990, the NMED informed WIPP that the RCRA Part A permit application was due on January 22, 1991, with the Part B application due on February 28, 1991. WIPP submitted its Part A permit application to the NMED and to Region VI of the EPA on January 22, 1991. The Part B permit application was submitted to the NMED on February 26, 1991, and to the EPA Region VI office on February 27, 1991. Since then, three revisions of the permit application have been submitted to the regulatory agencies to provide additional information required and to inform the agencies of changes. The latest revision was completed and submitted in January 1993.

In August 1993, the NMED and the EPA issued a draft RCRA permit for the WIPP, which consisted of six modules. The first five were prepared by the NMED, and the sixth module, based on requirements related to HSWA, was prepared by the EPA. The permit application was based on conducting tests on TRU mixed wastes at WIPP during the test phase. Although DOE decided not to test TRU waste at WIPP during the test phase, DOE has requested that the NMED and the EPA continue the current permitting process.

The New Mexico permitting procedures from Section 902 of HWMR-7 and the miscellaneous provisions covered in Sections 1001 through 1007 of HWMR-7 have been added to the requirements in the Federal regulations. Furthermore, since the New Mexico Underground Storage Tank Regulations (USTRs) differ from the Federal regulations specified in 40 CFR Part 280, these State regulations are also discussed in detail in this chapter (see Section 25.2.6). The UST section includes the results of the environmental compliance assessment that was performed for the UST program at WIPP.

25.2 Compliance Status of Regulatory Requirements

There are two regulatory requirements in the HWA and the implementing HWMRs that do not have direct counterparts in the Federal regulations. Section 25.2.1 discusses one requirement from the HWA that is unique and is not in the State implementing regulations. It also includes a discussion of the New Mexico USTR requirements and their compliance status at WIPP.

25.2.1 Compliance Status of the Hazardous Waste Regulatory Requirement

The New Mexico requirement pertaining to hazardous waste management that differs from the Federal regulations is summarized in Table 25-2, along with a summary of the compliance status of the requirement at WIPP. Additional information is presented in the text.

TABLE 25-2. New Mexico Hazardous Waste Act - Summary of Regulatory Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
New Mexico Hazardous Waste Management Regulations (HWMR-7)		
HWMR-7, Section 1001	Compliance with other regulations	ACHIEVED See other chapters in this report [Section 25.2.1.1]

25.2.1.1 Compliance with other Regulations, Section 1001 of HWMR-7

Compliance with the HWMRs does not relieve a person of the obligation to comply with other applicable State and Federal regulations.

Compliance with the other Federal and State regulations that apply to WIPP is discussed in the other chapters of this BECR.

25.2.2 Compliance with Regulations for Hazardous Waste Generators, 40 CFR Part 262 (HWMR-7, § 301)

Table 25-3 summarizes the applicable regulatory requirements for hazardous waste generators under Part III of HWMR-7, which corresponds to the Federal implementing regulations of 40 CFR Part 262. Because the HWMRs adopt the Federal implementing regulations by reference, the citations given in this table are from the Federal regulations (40 CFR Part 262). The compliance status of each requirement is included. The text provides more detail.

TABLE 25-3. New Mexico Hazardous Waste Management Regulations (HWMRs) for Hazardous Waste Generators - Compliance Status

Citation	Requirement	Compliance Status
40 CFR 262.11 (HWMR-7, § 301)	Hazardous waste determination	**ACHIEVED** WID procedures [Section 25.2.2.1]
40 CFR 262.12 (HWMR-7, § 301)	EPA identification number	**ACHIEVED** NM 4890139088 [Section 25.2.2.2]
40 CFR 262.20 (HWMR-7, § 301)	Manifest requirements	**UP TO DATE** WID procedures; *WIPP Waste Minimization Plan* [Section 25.2.2.3]
40 CFR 262.21 (HWMR-7, § 301)	Acquisition of manifests	**UP TO DATE** State-specific or uniform manifest used [Section 25.2.2.4]
40 CFR 262.22 (HWMR-7, § 301)	Number of copies	**UP TO DATE** Uniform manifest [Section 25.2.2.5]
40 CFR 262.23 (HWMR-7, § 301)	Use of the manifest	**UP TO DATE** WID procedures [Section 25.2.2.6]
40 CFR 262.30 (and 49 CFR Parts 173, 178, and 179) (HWMR-7, § 301)	DOT packaging requirements	**UP TO DATE** WID procedures [Section 25.2.2.7]

TABLE 25-3 (continued)

Citation	Requirement	Compliance Status
40 CFR 262.31 (and 49 CFR Part 172) (HWMR-7, § 301)	Labeling requirements	**UP TO DATE** WID procedures [Section 25.2.2.8]
40 CFR 262.32 (and 49 CFR Part 172) (HWMR-7, § 301)	Marking requirements	**UP TO DATE** WID procedures [Section 25.2.2.9]
40 CFR 262.33 (and 49 CFR Part 172) (HWMR-7, § 301)	Placarding requirements	**UP TO DATE** WID procedures [Section 25.2.2.10]
40 CFR 262.34(a) (HWMR-7, § 301)	90-day or less accumulation time	**ACHIEVED** WID procedures [Section 25.2.2.11]
40 CFR 262.34(a)(1)(i) (HWMR-7, § 301)	Compliance with Subpart I of 40 CFR Part 265 for waste placed in containers	**UP TO DATE** WID procedures [Section 25.2.2.12]
40 CFR 262.34(a)(1)(ii) (HWMR-7, § 301)	Accumulation of hazardous wastes in tanks	**NOT APPLICABLE** Hazardous waste not accumulated in tanks at WIPP [Section 25.2.2.13]
40 CFR 262.34(a)(1)(iii) (HWMR-7, § 301)	Compliance with Subpart W of 40 CFR Part 265 for wastes placed on drip pads	**NOT APPLICABLE** No drip pads at WIPP [Section 25.2.2.14]

TABLE 25-3 (continued)

Citation	Requirement	Compliance Status
40 CFR 262.34(a)(2) (HWMR-7, § 301)	Marking each container with the date of initial accumulation of waste	**UP TO DATE** WID procedures [Section 25.2.2.15]
40 CFR 262.34(a)(3) (HWMR-7, § 301)	Marking each container as hazardous waste	**UP TO DATE** WID procedures [Section 25.2.2.16]
40 CFR 262.34(a)(4) (HWMR-7, § 301)	Compliance with Subpart C of 40 CFR 265 for preparedness and prevention	**UP TO DATE**
	Compliance with Subpart D of 40 CFR Part 265 for contingency plans and emergency procedures	**ACHIEVED** *WIPP Contingency Plan*
	Compliance with 40 CFR 265.16 regarding personnel training	**UP TO DATE** Formal personnel training
	Compliance with 40 CFR 268.7(a)(4) regarding a waste analysis plan for prohibited waste under the land disposal restrictions (LDRs)	**NOT APPLICABLE** No treatment or land disposal at WIPP for WIPP-generated wastes [Section 25.2.2.17]
40 CFR 262.34(b) (HWMR-7, § 301)	Extension of the 90-day storage period due to unforeseen, temporary, and uncontrollable circumstances	**ACHIEVED** January 1991 [Section 25.2.2.18]

TABLE 25-3 (continued)

Citation	Requirement	Compliance Status
40 CFR 262.34(c)(1) (HWMR-7, § 301)	Restrictions and requirements for satellite accumulation areas (SAAs), including: • Limit of 55 gallons of hazardous or 1 quart of acutely hazardous waste [listed in 40 CFR 261.33 (e)] at or near point of generation	**UP TO DATE** WID procedures in place governing the SAAs at WIPP [Section 25.2.2.19]
40 CFR 262.34(c)(1)(i) (HWMR-7, § 301)	• Compliance with 40 CFR 265.171, *Condition of Containers* • Compliance with 40 CFR 265.172, *Compatibility of Waste with Container* • Compliance with 40 CFR 265.173(a) pertaining to keeping hazardous waste containers closed during storage	**UP TO DATE** WID procedures [Section 25.2.2.20]
40 CFR 262.34(c)(1)(ii) (HWMR-7, § 301)	• Labeling of container as "hazardous waste"	**UP TO DATE** WID procedures [Section 25.2.2.21]

TABLE 25-3 (continued)

Citation	Requirement	Compliance Status
40 CFR 262.34(c)(2) (HWMR-7, § 301)	• Management of waste exceeding the 55-gallon (hazardous) or 1-quart (acutely hazardous) waste limit, including required compliance within 3 days and marking container(s) containing the excess waste with the date on which excess waste began accumulating	**UP TO DATE** WID procedures [Section 25.2.2.22]
40 CFR 262.40 (HWMR-7, § 301)	Recordkeeping requirements	**UP TO DATE** WID procedures [Section 25.2.2.23]
40 CFR 262.41 (HWMR-7, § 301)	Generator--biennial report	**UP TO DATE** Biennial report submitted in March 1994 [Section 25.2.2.24]
40 CFR 262.42 (HWMR-7, § 301)	Exception reporting if copy of manifest is not returned to the generator within the specified period of time	**NOT APPLICABLE** No exception report required to date. [Section 25.2.2.25]
40 CFR 262.43 (HWMR-7, § 301)	Additional reporting	**NOT APPLICABLE** No additional reports requested [Section 25.2.2.26]

25.2.2.1 Hazardous Waste Determination, 40 CFR 262.11 (HWMR-7, § 301)

The generator of solid waste is required to determine whether the waste is hazardous as defined under 40 CFR Parts 260 and 261.

Nonradioactive hazardous waste is currently generated from maintenance, construction, and laboratory operations at WIPP. Nonradioactive hazardous waste generated at WIPP is characterized through process knowledge and/or waste sampling and analysis. Procedures to meet these requirements have been implemented. Procedures are also in place for the characterization of mixed waste.

25.2.2.2 EPA Identification Number, 40 CFR 262.12 (HWMR-7, § 301)

An EPA identification number is required for each generator of hazardous waste.

The DOE has obtained a generator identification number for the WIPP. It is NM4890139088.

25.2.2.3 Manifest Requirements, 40 CFR 262.20 (HWMR-7, § 301)

Compliance with the manifest requirements is mandatory for shipping hazardous waste off site. One of the requirements is that the generator have a waste minimization program in place.

Nonradioactive hazardous waste generated at the WIPP is manifested appropriately when it is transported off site. Records are maintained in the operating files for 3 years. Procedures are in place that address these requirements. The Westinghouse Waste Isolation Division (WID) is responsible for implementing these procedures. A waste minimization program is in place.

25.2.2.4 Acquisition of Manifests, 40 CFR 262.21 (HWMR-7, § 301)

The generator must obtain a manifest from the appropriate source.

The WIPP obtains a manifest from consignment States which require a manifest. If the consignment State does not require a specific manifest, a uniform hazardous waste manifest is used. The WIPP uses the current revision of EPA form 8700-22.

25.2.2.5 Number of Copies, 40 CFR 262.22 (HWMR-7, § 301)

The manifest shall consist of sufficient copies to provide two for the generator and one each for the transporter and owner or operator of the facility.

The manifests used by WIPP contain at least the number of copies to fulfill this requirement. The manifest form currently used contains six copies.

25.2.2.6 Use of the Manifest, 40 CFR 262.23 (HWMR-7, § 301)

The generator must sign the manifest certification by hand, obtain the handwritten signature of the initial transporter and date of acceptance on the manifest, and retain one copy. The generator must give the transporter the remaining copies of the manifest.

Other requirements of this regulation pertain to shipments by water, rail, or to a designated facility in an authorized State which has not yet obtained authorization to regulate that particular waste as hazardous.

WID procedures are in place that address compliance with applicable parts of this regulation. Hazardous waste generated at WIPP is sent to TSDFs in States with authorized hazardous-waste programs.

25.2.2.7 Packaging Requirements, 40 CFR 262.30 (HWMR-7, § 301)

EPA and DOT packaging requirements must be met before shipping hazardous waste off site.

A WID procedure is in place that addresses these requirements. WID is responsible for providing oversight and technical assistance in implementing this procedure.

25.2.2.8 Labeling Requirements, 40 CFR 262.31 (HWMR-7, § 301)

EPA and DOT labeling requirements must be met before shipping hazardous waste off site.

A WID procedure is in place that addresses these requirements. WID is responsible for providing oversight and technical assistance in implementing this procedure.

25.2.2.9 Marking Requirements, 40 CFR 262.32 (HWMR-7, § 301)

EPA and DOT marking requirements must be met before shipping hazardous waste off site.

A WID procedure is in place that addresses these requirements. WID is responsible for providing oversight and technical assistance in implementing this procedure.

25.2.2.10 Placarding Requirements, 40 CFR 262.33 (HWMR-7, § 301)

EPA and DOT placarding requirements must be met before shipping hazardous waste off site.

A WID procedure is in place that addresses these requirements. WID is responsible for providing oversight and technical assistance in implementing this procedure.

25.2.2.11 Accumulation Time, 40 CFR 262.34(a) (HWMR-7, § 301)

Accumulation time is limited to 90-day storage of hazardous wastes for a non-permitted facility.

Waste is accumulated in containers in satellite accumulation areas (SAAs) and subsequently moved to the Hazardous Waste Staging Area at WIPP. At this point, the 90-day storage requirement comes into effect. WID procedures are in place that address this requirement for hazardous wastes generated at WIPP and shipped off site to an approved TSDF. WID is responsible for providing oversight and technical assistance in implementing this procedure. Records are maintained at WIPP that document compliance with the 90-day deadline.

25.2.2.12 Compliance with Subpart I of 40 CFR Part 265, 40 CFR 262.34(a)(1)(i) (HWMR-7, § 301)

Compliance with Subpart I of 40 CFR Part 265 is required for waste placed in containers. The requirements of this subpart pertain to the condition of containers, compatibility of waste with the containers, closing containers during storage, inspections, the

location of containers holding ignitable or reactive waste, and the segregation of incompatible wastes. Documentation that the unit is emptied at least once every 90 days is also required.

WID procedures are in place that address compliance with Subpart I of 40 CFR Part 265 (see also Sections 25.2.4.53 through 25.2.4.58). These procedures provide for weekly inspections of containers and segregation of incompatible wastes. The hazardous waste storage area is located more than 50 feet from the WIPP property line for compliance with the requirements for ignitable or reactive waste (40 CFR 265.176). Records are maintained at WIPP that document compliance with the 90-day deadline.

25.2.2.13 Accumulation of Hazardous Wastes, 40 CFR 262.34 (a)(1)(ii) (HWMR-7, § 301)

Except as provided in paragraphs (d), (e), and (f) of this section, a generator may accumulate hazardous waste on site for 90 days or less without a permit or without having interim status, provided that the waste is placed in tanks, and the generator complies with Subpart J of 40 CFR Part 265.0, except §265.197(c) and §265.200.

Hazardous waste is not accumulated in tank systems at WIPP; therefore, this regulation does not apply.

25.2.2.14 Compliance with Subpart W of 40 CFR Part 265, 40 CFR 262.34(a)(1)(iii) (HWMR-7, § 301)

Compliance with Subpart W of 40 CFR Part 265 for wastes placed on drip pads is required.

No drip pads are required at WIPP for hazardous waste accumulation. Therefore, these requirements do not apply.

25.2.2.15 Marking with Date of Initial Accumulation, 40 CFR 262.34(a)(2) (HWMR-7, § 301)

Each container of hazardous waste must be clearly marked with the date of initial accumulation of the waste, and the label must be visible for inspection.

Each container of hazardous waste is labeled with the date of the initial accumulation of the waste as described in WID procedures. Weekly container inspections confirm that this requirement is being met.

25.2.2.16 Marking as Hazardous Waste, 40 CFR 262.34(a)(3) (HWMR-7, § 301)

Each hazardous waste container in an SAA must be labeled or marked as hazardous waste.

Each hazardous waste container in each SAA is clearly labeled as hazardous waste as described in WID procedures. Weekly inspections are performed to verify proper labeling of containers.

25.2.2.17 Compliance with Emergency Response, Training, and Waste Analysis Plan Requirements, 40 CFR 262.34(a)(4) (HWMR-7, § 301)

Compliance with Subparts C (preparedness and prevention) and D (contingency plans and emergency procedures) of 40 CFR Part 265 and with Sections 40 CFR 265.16 (personnel training) and 268.7(a)(4) (waste analysis plan for prohibited waste under the land disposal restrictions) is required.

40 CFR Part 265, Subpart C, Preparedness and Prevention: WIPP is maintained and operated to minimize the possibility of fire, explosions, or any unplanned release of hazardous waste to the environment. Inspections of waste handling areas and equipment are conducted periodically in accordance with procedures in place. Any corrective actions needed are initiated via Plant Work Requests (PWRs).

WID has prepared a contingency plan which provides a list of emergency equipment at WIPP, along with a description and statement of capabilities of the equipment and the cognizant organization responsible for ensuring that the equipment is available and operable.

The following communication and alarm systems are available at the WIPP site: two-way communication by the public address system and its intercom phones and paging channels, an intra-plant telephone system, mine phones, local and facility-wide alarm systems, pagers and plectrons, and portable two-way radios. Inspection procedures are in place for the communication and alarm systems and the fire protection equipment and include provisions for testing and maintenance to ensure that equipment will be operable in an emergency. Spill control and decontamination equipment are inspected weekly, and the results are recorded on an inspection form.

Adequate aisle space is provided in the hazardous waste storage area at WIPP to allow for potential emergency response activities.

The DOE has established Memoranda of Understanding (MOUs) with off-site emergency response agencies for fire fighting, medical assistance, and law enforcement. An example is the mutual aid agreement between the City of Hobbs and the DOE, which provides for mutual ambulance, medical, fire, rescue, and hazardous material response services. All outside agencies with which MOUs have been made have received copies of the *WIPP RCRA Contingency Plan* and the *WIPP Emergency Plan.*

40 CFR Part 265, Subpart D, Contingency Plan and Emergency Procedures: A contingency plan has been developed for the WIPP site and is maintained at all controlled document locations. The purpose of the document is to define responsibilities, provide guidance for the coordination of activities, and minimize hazards to human health and the environment from fires, explosions, or any sudden or non-sudden release of hazardous waste or hazardous waste constituents. The *WIPP RCRA Contingency Plan* describes actions that must be taken in response to fires, explosions, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil, or water. It describes agreements with local authorities; lists names, addresses, and phone numbers of persons qualified to act as Emergency Coordinators; provides a list of emergency equipment at the facility; and includes an evacuation plan.

Copies of the *WIPP RCRA Contingency Plan* have been provided to all outside agencies with which WIPP has agreements for assistance in an emergency situation. A copy of the plan is maintained at WIPP controlled document locations. WID has the distribution list for the plan and is responsible for updating the controlled copies.

The plan will be reviewed and revised if necessary whenever applicable regulations are revised; if the plan fails in an emergency; if the facility changes in a way that materially increases the potential for fires, explosions, or releases of hazardous waste or hazardous waste constituents or changes the response necessary in an emergency; or if the list of Emergency Coordinators or the list of emergency equipment changes.

A RCRA Emergency Coordinator is on site at WIPP 24 hours a day, 7 days a week. The coordinator is responsible for coordinating all emergency response measures. The primary RCRA Emergency Coordinator is the Facility Operations Shift Supervisor (FOSS).

Emergency Coordinators are thoroughly familiar with the *WIPP RCRA Contingency Plan.* The plan has provisions that meet the emergency procedure requirements such as communication of an emergency situation to employees, notification of the appropriate agency if assistance is needed, identification of hazardous materials, assessment of hazards, and notification of any incident that requires implementation of the *WIPP RCRA Contingency Plan.*

40 CFR 265.16, Personnel Training: Formal training at WIPP is conducted in accordance with a WID training procedures manual. Training includes General Employee Training (GET), other classroom training, and on-the-job training. Training is conducted by certified instructors. Certification requirements are established in a WID procedure.

The GET 101 course provides detailed training in such areas as communications, alarm systems, and emergency response. A WID procedure requires all personnel to attend GET 101 within 30 days of employment. WID employees must attend a refresher class annually. Other classroom training is offered for personnel in certain job categories that involve the management of hazardous waste, such as maintenance and waste operations. Annual refreshers are provided. Maintenance personnel are trained to provide repair and replacement services. Inspections are a part of job-specific training and emergency response personnel training.

WID maintains a listing of all hazardous waste management job titles, the names of employees assigned by job title to hazardous waste management jobs, and job descriptions that identify RCRA-related duties. Records on active and inactive personnel are kept in accordance with WID documents.

40 CFR 268.7(1)(4), Waste Analysis for Treating Prohibited Wastes in Tanks or Containers: This requirement for a waste analysis plan for the treatment of wastes prohibited from land disposal in tanks or containers is not applicable to WIPP as WIPP-generated hazardous waste is neither treated nor land disposed at this facility.

25.2.2.18 Extension of Storage Period, 40 CFR 262.34(b) (HWMR-7, § 301)

The 90-day storage period may be extended due to unforeseen, temporary, and uncontrollable circumstances.

WID procedures provide instruction for the shipment of hazardous waste off site prior to the 90-day deadline. However, on January 11, 1991, a 30-day extension was requested of the State because of the unexpected need for a new profile sheet for waste nickel-cadmium batteries. The approved TSDF for WIPP waste informed WID of this need 5 days before the expiration of the 90-day storage period for the batteries. The extension was granted on January 15, 1991. The hazardous waste was shipped off site within the 30-day extension period.

25.2.2.19 Restrictions and Requirements, 40 CFR 262.34(c)(1) (HWMR-7, § 301)

There are a number of restrictions and requirements for satellite accumulation areas. These include the limit of 55 gallons of hazardous or 1 quart of acutely hazardous waste [listed in 40 CFR

261.33(e)] and the requirement that the satellite accumulation area be located at or near the point of generation of the waste.

WID procedures are in place and weekly inspections are conducted to verify that the 55-gallon limit per SAA is not exceeded. None of the SAAs has a capacity that exceeds 55 gallons, and no acutely hazardous waste is generated at WIPP. The SAAs are located at or near the points of generation of the hazardous waste. In addition, WID procedures define the requirements for placing waste in an SAA. These procedures define the responsibilities of the waste generator.

25.2.2.20 Compliance with 40 CFR 265.171, 265.172, and 165.173(a), 40 CFR 262.34(c)(1)(i) (HWMR-7, § 301)

These requirements for hazardous waste generators from 40 CFR Part 265 pertain to the condition of the containers (265.171), compatibility of the waste with the container (265.172), and the necessity to keep the containers closed when not actually adding waste to or removing it from the containers [265.173(1)]. In addition, a container holding hazardous waste must not be opened, handled, or stored in a manner that could rupture the container or cause it to leak.

WID procedures are in place to ensure that containers used to hold hazardous waste in SAAs are in good condition. If a container is found to be damaged, it is repaired, or the waste is removed and transferred to another container. If the container is repaired, the date and nature of the repair are included in the area log. All SAA inspection reports on file at WIPP indicate that the requirement for containers holding hazardous waste to be kept in good condition is met. Weekly inspections confirm that this requirement is being met. No special liners are used in the waste containers. Procedures are in place that address waste/container compatibility and the requirement that containers be closed except when waste is being added or removed. Inspections are conducted on a regular basis to ensure compliance with these regulations for containers.

A WID procedure addresses the requirement that containers not be opened, handled, or stored in a manner that could cause the container to rupture or leak by requiring that containers be inspected before and after transportation from the SAA to the staging area. [See also Sections 25.2.4.53 through 25.2.4.58.]

25.2.2.21 Labeling of Container as "Hazardous Waste," 40 CFR 262.34(c)(1)(ii) (HWMR-7, § 301)

Labeling of each hazardous waste container as "hazardous waste" is required.

WID procedures are in place, and inspections are conducted regularly to verify that each container of hazardous waste is clearly labeled as hazardous waste. Weekly inspections are performed to verify proper labeling of containers.

25.2.2.22 Management of Waste, 40 CFR 262.34(c)(2) (HWMR-7, § 301)

If waste accumulates in one of the SAAs in excess of the 55-gallon or 1-quart limit, the container(s) containing the excess waste must be marked with the date on which excess waste began accumulating, and compliance with the 55-gallon or 1-quart limit must be restored within 3 days.

WID procedures are in place that address the 55-gallon limit in the SAAs. No acutely hazardous wastes are generated at WIPP. WID personnel verify that no SAA waste container is overfilled and that any waste generated at an SAA in excess of the 55-gallon limit is removed within 3 days in accordance with the regulations.

25.2.2.23 Recordkeeping Requirements, 40 CFR 262.40 (HWMR-7, § 301)

Manifests, test results, waste analyses, and reports must be kept on site for at least 3 years.

WID procedures are in place that address these requirements. Required records are maintained by WID on site for a minimum of 3 years, after which they may be retained on site until closure or microfiched and stored indefinitely.

WID is responsible for recordkeeping oversight.

25.2.2.24 Generator-Biennial Report, 40 CFR 262.41 (HWMR-7, § 301)

Each generator of hazardous waste that ships the waste off site to an approved TSDF must file a report to the EPA by March 1 of every even-numbered year, including a description of the results of waste minimization efforts.

WID procedures have been prepared to respond to these requirements. Implementation of these procedures with regard to biennial reporting is the responsibility of WID. The results of waste-minimization activities are included in the hazardous-waste generator biennial report. The most recent report was submitted in March 1994.

25.2.2.25 Exception Reporting, 40 CFR 262.42 (HWMR-7, § 301)

Exception reporting is required if a copy of the manifest is not returned to the generator within 35 days of the date of acceptance of the hazardous waste by the transporter.

A WID procedure addresses exception reporting. At this time, no exception reporting has been required.

25.2.2.26 Additional Reporting, 40 CFR 262.43 (HWMR-7, § 301)

The Administrator, as he/she deems necessary, may require generators to furnish additional reports concerning the quantities and disposition of wastes identified or listed in 40 CFR Part 261.0.

No additional reports have been requested to date.

25.2.3 Compliance with Standards Applicable to Transporters of Hazardous Waste, 40 CFR Part 263 (HWMR-7, § 401)

The standards and requirements specified under 40 CFR Part 263 are not applicable to WIPP because of DOE's decision to eliminate testing of TRU mixed wastes at WIPP. However, the requirements will become applicable when the generator sites begin shipping TRU mixed wastes to WIPP because WID will subcontract transportation of the wastes to a trucking and/or a rail company.

A summary of the requirements for transporters of hazardous or mixed wastes and the compliance status of each requirement is described in Table 25-4. Additional information is provided in the text.

TABLE 25-4. New Mexico Hazardous Waste Management Regulations (HWMRs) for Transporters of Hazardous/Mixed Waste, 40 CFR Part 263 - Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
40 CFR 263.10(a) (HWMR-7, § 401)	Compliance with DOT regulations	**UP TO DATE** *Dawn Enterprises Management Plan*, 6/17/93 [Section 25.2.3.1]
40 CFR 263.11 (HWMR-7, § 401)	EPA identification number	**ACHIEVED** NMD 986669604 [Section 25.2.3.2]
40 CFR 263.20-263.22 (HWMR-7, § 401)	Compliance with the manifest system and recordkeeping	**UP TO DATE** *Dawn Enterprises Management Plan*, 6/17/93 [Section 25.2.3.3]
40 CFR 263.30 (HWMR-7, § 401)	Immediate action after hazardous waste discharges	**NOT APPLICABLE** *Dawn Enterprises Management Plan*, Section 6.0 [Section 25.2.3.4]
40 CFR 263.31 (HWMR-7, § 401)	Discharge cleanup	**NOT APPLICABLE** Dawn's subcontract with RAMP Industries [Section 25.2.3.5]

25.2.3.1 Compliance with Department of Transportation (DOT) Regulations, 40 CFR 263.10(a) (HWMR-7, § 401)

Transporters of hazardous/mixed waste must comply with all applicable DOT regulations.

Dawn Enterprises was to have transported TRU waste to WIPP from the generator sites during the Test Phase that was originally planned for WIPP. The *Dawn Enterprises Management Plan* (Revision X, date June 17, 1993) incorporates the applicable DOT regulations from the Title 49 series of the Code of Federal Regulations.

Any transporter hired to ship TRU and TRU mixed waste from the generator sites to WIPP must comply with the DOT regulations.

25.2.3.2 EPA Identification Number, 40 CFR 263.11 (HWMR-7, § 401)

The transporter must have an EPA identification number from the EPA Administrator.

Dawn Enterprises was contracted to transport TRU and TRU mixed waste from the generator sites to WIPP during the test phase originally planned for WIPP. Their EPA identification number is NMD 986669604. Any transporter hired to ship TRU and TRU mixed waste to WIPP must have an EPA identification number.

25.2.3.3 Compliance with the Manifest System and with Recordkeeping Requirements, 40 CFR 263.20-263.22 (HWMR-7, § 401)

The transporter must comply with all relevant manifest and recordkeeping requirements.

The *Dawn Enterprises Management Plan* indicates that they will comply with requirements of the manifest system and specifies that the following records are maintained as required: "audits, management assessments, inspection reports/checklists, purchase orders, maintenance reports, NDE reports, training, and copies of Hazardous Waste Manifests." Any transporter hired to ship TRU and TRU mixed waste to WIPP must comply with these requirements.

25.2.3.4 Immediate Action after Hazardous Waste Discharges, 40 CFR 263.30 (HWMR-7, § 401)

The transporter will take appropriate immediate action in the event of a discharge of hazardous waste (or hazardous constituents) during transportation.

Section 6 of the *Dawn Enterprises Management Plan* describes emergency response after a hazardous materials spill. The section specifies immediate actions to be taken by the transporter

to protect human health and the environment, such as notifying the local authorities, diking the discharge area, and notifying the National Response Center (by telephone) and the DOT (in writing). Any transporter that ships TRU and TRU mixed waste to WIPP must have these capabilities. Due to DOE's decision not to conduct the test phase at WIPP, no waste has been shipped to WIPP to date; no mixed waste discharges have occurred.

25.2.3.5 Discharge Cleanup, 40 CFR 263.31 (HWMR-7, § 401)

> *A transporter must clean up any hazardous waste discharge that occurs during transportation or must take any action(s) required by Federal, State, or local officials to render the discharge nonhazardous to human health and the environment.*

In the event of a hazardous waste constituent discharge during transportation, Dawn Enterprises has a subcontract in place with RAMP Industries to handle any cleanup activities required. Any transporter of TRU and TRU mixed waste to WIPP must be capable of ensuring adequate cleanup of any hazardous or mixed waste released to the environment during a transportation incident or accident. Due to DOE's decision not to conduct the test phase at WIPP, no waste has been shipped to WIPP to date; no mixed waste discharges have occurred. (See also Section 25.2.3.4.)

25.2.4 Compliance Status of the Regulatory Requirements for Interim-Status Treatment/Storage/Disposal Facilities (TSDFs), 40 CFR Part 265 (HWMR-7, §§ 601 and 602)

The WIPP is an interim-status facility. All applicable requirements for a TSDF are described in this section.

Table 25-5 summarizes each of the applicable requirements under 40 CFR Part 265 and provides the compliance status of each. The text that follows the table provides additional detail.

TABLE 25-5. New Mexico Hazardous Waste Management Regulations (HWMRs) for Interim-Status TSDFs, 40 CFR Part 265 - Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
40 CFR 265.10 (HWMR-7, § 601)	Applicability	[Section 25.2.4.1; see also Sections 25.2.4.2 through 25.2.4.9]

TABLE 25-5 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
40 CFR 265.11 (HWMR-7, § 601)	EPA identification number	**ACHIEVED** NM4890139088 [Section 25.2.4.2]
40 CFR 265.12 (HWMR-7, § 601)	Required notices to the off-site source(s)	**NOT APPLICABLE** None to date [Section 25.2.4.3]
40 CFR 265.13 (HWMR-7, § 601)	General waste analysis	**UP TO DATE** *WIPP Waste Analysis Plan*; *Waste Characterization Sampling and Analysis Guidance Manual*; *Quality Assurance Program Plan for the Experimental Waste Characterization Program* [Section 25.2.4.4]
40 CFR 265.14 (HWMR-7, § 601)	Security	**ACHIEVED** 8-foot-high chain-link fence, 24-hour surveillance system, and signs in Spanish and English posted at 50-foot intervals [Section 25.2.4.5]
40 CFR 265.15 (HWMR-7, § 601)	General inspection requirements	**UP TO DATE** Inspection procedures; inspection logs [Section 25.2.4.6]

TABLE 25-5 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
40 CFR 265.16 (HWMR-7, § 601)	Personnel training	**UP TO DATE** Procedures, manuals, and employer records [Section 25.2.4.7]
40 CFR 265.17 (HWMR-7, § 601)	General requirements for ignitable, reactive, or incompatible wastes	**UP TO DATE** *WIPP Waste Acceptance Criteria*; no incompatible wastes identified [Section 25.2.4.8]
40 CFR 265.18 (HWMR-7, § 601)	Location standards	**NOT APPLICABLE** Allows WIPP to be used as a TSDF [Section 25.2.4.9]
40 CFR 265.31 (HWMR-7, § 601)	Maintenance and operation of facility	**UP TO DATE** *WIPP Waste Acceptance Criteria* and *WID Contingency Plan* [Section 25.2.4.10]
40 CFR 265.32 (HWMR-7, § 601)	Required equipment	**UP TO DATE** WID procedures [Section 25.2.4.11]
40 CFR 265.33 (HWMR-7, § 601)	Testing and maintenance of equipment	**UP TO DATE** WID procedures [Section 25.2.4.12]

TABLE 25-5 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
40 CFR 265.34 (HWMR-7, § 601)	Access to communications or alarm system	**UP TO DATE** Public address system, intercom, phones, telephones, alarm systems, pagers and plectrons, portable two-way radios [Section 25.2.4.13]
40 CFR 265.35 (HWMR-7, § 601)	Required aisle space	**UP TO DATE** Adequate aisle space to be maintained [Section 25.2.4.14]
40 CFR 265.37 (HWMR-7, § 601)	Arrangements with local authorities	**ACHIEVED** MOUs in place with local authorities [Section 25.2.4.15]
40 CFR 265.51 (HWMR-7, § 601)	Purpose and implementation of the contingency plan	**ACHIEVED** *WIPP Contingency Plan* in place to minimize hazards [Section 25.2.4.16]
40 CFR 265.52 (HWMR-7, § 601)	Content of the contingency plan	**ACHIEVED** *WIPP Contingency Plan* [Section 25.2.4.17]
40 CFR 265.53 (HWMR-7, § 601)	Copies of contingency plan	**ACHIEVED** Copy provided to each outside agency with an agreement to provide emergency assistance to WIPP [Section 25.2.4.18]

TABLE 25-5 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
40 CFR 265.54 (HWMR-7, § 601)	Amendment of contingency plan	**UP TO DATE** *WIPP Contingency Plan* [Section 25.2.4.19]
40 CFR 265.55 (HWMR-7, § 601)	Emergency Coordinator	**ACHIEVED** Facility Operations Shift Supervisor [Section 25.2.4.20]
40 CFR 265.56 (HWMR-7, § 601)	Emergency procedures	**UP TO DATE** *WIPP Contingency Plan* [Section 25.2.4.21]
40 CFR 265.71 (HWMR-7, § 601)	Use of manifest system	**NOT APPLICABLE** WID procedures; no shipments to date [Section 25.2.4.22]
40 CFR 265.72 (HWMR-7, § 601)	Manifest discrepancies	**NOT APPLICABLE** WID procedures; no shipments to date [Section 25.2.4.23]
40 CFR 265.73 (HWMR-7, § 601)	Operating record	**UP TO DATE** WID procedures [Section 25.2.4.24]
40 CFR 265.74 (HWMR-7, § 601)	Availability, retention, and disposition of records	**UP TO DATE** WID procedures [Section 25.2.4.25]

TABLE 25-5 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
40 CFR 265.75 (HWMR-7, § 601)	TSDF biennial report	**NOT APPLICABLE** WID procedures [Section 25.2.4.26]
40 CFR 265.76 (HWMR-7, § 601)	Unmanifested waste report	**NOT APPLICABLE** No waste shipments to date [Section 25.2.4.27]
40 CFR 265.77 (HWMR-7, § 601)	Additional reports	**NOT APPLICABLE** No additional reporting to date [Section 25.2.4.28]
40 CFR 265.90 (HWMR-7, § 601)	Applicability of the ground-water monitoring system	**NOT APPLICABLE** Ground-water monitoring waiver [Section 25.2.4.29]
40 CFR 265.91 (HWMR-7, § 601)	Ground-water monitoring system	**NOT APPLICABLE** Ground-water monitoring waiver [Section 25.2.4.30]
40 CFR 265.92 (HWMR-7, § 601)	Sampling and analysis	**NOT APPLICABLE** Ground-water monitoring waiver [Section 25.2.4.31]
40 CFR 265.93 (HWMR-7, § 601)	Preparation, evaluation, and response	**NOT APPLICABLE** Ground-water monitoring waiver [Section 25.2.4.32]

TABLE 25-5 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
40 CFR 265.94 (HWMR-7, § 601)	Recordkeeping and reporting	**NOT APPLICABLE** Ground-water monitoring waiver [Section 25.2.4.33]
40 CFR 265.110 (HWMR-7, § 601)	Applicability of the closure/post-closure requirements	**UP TO DATE** *RCRA Compliance Manual* [Section 25.2.4.34]
40 CFR 265.111 (HWMR-7, § 601)	Closure performance standard	**UP TO DATE** *RCRA Compliance Manual* [Section 25.2.4.35]
40 CFR 265.112 (HWMR-7, § 601)	Closure plan; amendment of plan	**UP TO DATE** *RCRA Compliance Manual* [Section 25.2.4.36]
40 CFR 265.113 (HWMR-7, § 601)	Time allowed for closure	**UP TO DATE** *RCRA Compliance Manual* [Section 25.2.4.37]
40 CFR 265.114 (HWMR-7, § 601)	Disposal or decontamination of equipment, structures, and soils	**UP TO DATE** *RCRA Compliance Manual* [Section 25.2.4.38]
40 CFR 265.115 (HWMR-7, § 601)	Certification of closure	**NOT APPLICABLE** *RCRA Compliance Manual* [Section 25.2.4.39]

TABLE 25-5 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
40 CFR 265.116 (HWMR-7, § 601)	Survey plat	**NOT APPLICABLE** Clean closure [Section 25.2.4.40]
40 CFR 265.117 (HWMR-7, § 601)	Postclosure care and use of property	**NOT APPLICABLE** Clean closure [Section 25.2.4.41]
40 CFR 265.118 (HWMR-7, § 601)	Postclosure plan; amendment of plan	**NOT APPLICABLE** Clean closure [Section 25.2.4.42]
40 CFR 265.119 (HWMR-7, § 601)	Postclosure notices	**NOT APPLICABLE** Clean closure [Section 25.2.4.43]
40 CFR 265.120 (HWMR-7, § 601)	Certification of completion of postclosure care	**NOT APPLICABLE** Clean closure [Section 25.2.4.44]
40 CFR 265.142 (HWMR-7, § 601)	Cost estimate for closure	**NOT APPLICABLE** Exemption as Federal facility [Section 25.2.4.45]
40 CFR 265.143 (HWMR-7, § 601)	Financial assurance for closure	**NOT APPLICABLE** Exemption as Federal facility [Section 25.2.4.46]

TABLE 25-5 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
40 CFR 265.144 (HWMR-7, § 601)	Cost estimate for postclosure care	**NOT APPLICABLE** Exemption as Federal facility [Section 25.2.4.47]
40 CFR 265.145 (HWMR-7, § 601)	Financial assurance for postclosure care	**NOT APPLICABLE** Exemption as Federal facility [Section 25.2.4.48]
40 CFR 265.146 (HWMR-7, § 601)	Use of a mechanism for financial assurance of both closure and postclosure care	**NOT APPLICABLE** Exemption as Federal facility [Section 25.2.4.49]
40 CFR 265.147 (HWMR-7, § 601)	Liability requirements	**NOT APPLICABLE** Exemption as Federal facility [Section 25.2.4.50]
40 CFR 265.148 (HWMR-7, § 601)	Incapacity of owners or operators, guarantors, or financial institutions	**NOT APPLICABLE** Exemption as Federal facility [Section 25.2.4.51]
40 CFR 265.149 [HWMR-5, § 602(A)]	Use of State-required mechanisms	**NOT APPLICABLE** Omission from State regulations and exemption as Federal facility [Section 25.2.4.52]
40 CFR 265.150 [HWMR-5, § 602(B)]	State assumption of responsibility	**NOT APPLICABLE** Omission from State regulations and exemption as Federal facility [Section 25.2.4.53]

TABLE 25-5 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
40 CFR 265.171 (HWMR-7, § 601)	Condition of containers	**UP TO DATE** WID procedures [Section 25.2.4.54]
40 CFR 265.172 (HWMR-7, § 601)	Compatibility of waste with containers	**UP TO DATE** WID procedures [Section 25.2.4.55]
40 CFR 265.173 (HWMR-7, § 601)	Management of containers	**UP TO DATE** WID procedures; training [Section 25.2.4.56]
40 CFR 265.174 (HWMR-7, § 601)	Inspections	**UP TO DATE** WID procedures [Section 25.2.4.57]
40 CFR 265.176 (HWMR-7, § 601)	Special requirements for ignitable or reactive waste	**UP TO DATE** *Waste Acceptance Criteria for WIPP* [Section 25.2.4.58]
40 CFR 265.177 (HWMR-7, § 601)	Special requirements for incompatible wastes	**UP TO DATE** WID procedures [Section 25.2.4.59]
40 CFR 265.190-265.445 (HWMR-7, § 601)	Tank systems; surface impoundments; waste piles; land treatment; incinerators; thermal treatment; chemical, physical, and biological treatment; underground injection; and drip pads	**NOT APPLICABLE** None of these used at WIPP [Section 25.2.4.60]

TABLE 25-5 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
40 CFR 265.1032 (HWMR-7, § 601)	Standards (air emission) for process vents	NOT APPLICABLE No process vents at WIPP [Section 25.2.4.61]
40 CFR 265.1052-265.1062 (HWMR-7, § 601)	Air emission standards for equipment leaks	NOT APPLICABLE [Section 25.2.4.62]

25.2.4.1 Applicability, 40 CFR 265.10 (HWMR-7, § 601)

The regulations in Subpart B apply to owners and operators of all hazardous waste facilities, except as § 265.1 provides otherwise.

The portions of Subpart B applicable to the WIPP are identified in §§ 265.11 through 265.18 as discussed in Sections 25.2.4.2 through 25.2.4.9 below.

25.2.4.2 EPA Identification Number, 40 CFR 265.11 (HWMR-7, § 601)

Each TSDF must have an EPA identification number.

The EPA identification number for WIPP is NM4890139088.

25.2.4.3 Required Notices, 40 CFR 265.12 (HWMR-7, § 601)

Notices required are notification of the Regional Administrator at least 4 weeks in advance of the date of arrival of waste from a foreign source and notification of a new owner or operator of the requirements under 40 CFR Parts 265 and 270.

Before transferring ownership or operation of the facility, the DOE and/or WID will notify the new owner or operator in writing of the requirements of this part and those of Part 270.

25.2.4.4 General Waste Analysis, 40 CFR 265.13 (HWMR-7, § 601)

A detailed chemical and physical analysis of a representative sample of the wastes is required before a TSDF may treat, store, or dispose of waste. The owner/operator of the TSDF must inspect and, if necessary, analyze the waste received to ensure that it matches the identity of the waste described in the accompanying manifest. The owner/operator must follow a written waste analysis plan to ensure compliance with these requirements.

General waste analysis is addressed in the *WIPP Waste Analysis Plan* (DOE, 1993d). Sampling and analysis is conducted in accordance with the *Waste Characterization Program Sampling and Analysis Guidance Manual* (DOE, 1992a). All activities are performed in accordance with the *Quality Assurance Program Plan for the Experimental Waste Characterization Program* (DOE, 1991d). Characterization methods consist of process knowledge; visual examination (including weighing of individual items); real-time radiography; and headspace gas sampling of drums, the inner container in drums, and bins.

25.2.4.5 Security, 40 CFR 265.14 (HWMR-7, § 601)

Security measures are required to prevent the possibility of unknowing and/or unauthorized entry by persons or livestock onto the active portion of the facility. A 24-hour surveillance system or barrier is required, and the facility must be posted.

The WIPP is enclosed within an 8-foot-high chain-link fence, and 24-hour surveillance is conducted by guards trained to minimize unauthorized entry onto the facility. Signs with the legend "Danger--Unauthorized Personnel Keep Out" in both Spanish and English are posted at 50-foot intervals. The perimeter fence, gates, and signs are inspected daily for evidence of tampering or structural damage in accordance with a WIPP procedure.

25.2.4.6 General Inspection Requirements, 40 CFR 265.15 (HWMR-7, § 601)

The owner/operator must inspect the facility for malfunctions, deterioration, operator errors, and discharges that cause actual or potential releases of hazardous constituents to the environment or a threat to human health. A written schedule must be developed and followed for inspecting all monitoring, safety, and emergency equipment; security devices; and operating/structural equipment

needed to prevent, detect, or respond to environmental or human health hazards. The inspections must be recorded in an inspection log or summary and kept for at least 3 years.

The WID implements inspection procedures for all monitoring, safety, and emergency equipment; security devices; and operating and structural equipment. Written schedules have been developed that indicate the frequency of routine inspections. Inspections may be conducted more frequently than indicated but are not performed less frequently.

Each group develops procedures that outline the types of problems that will be examined during inspections of its equipment and systems and maintains its own inspection information.

Completed inspection sheets include a signature, date, and time of inspection; observations made; and the date and nature of any repairs or other remedial actions. All log sheets are maintained for at least 3 years.

25.2.4.7 Personnel Training, 40 CFR 265.16 (HWMR-7, § 601)

Personnel training must be provided to facility personnel within 6 months of their employment or new assignment; personnel must not work in unsupervised positions until the training has been completed. The training program must be designed to ensure that facility personnel can respond effectively to an emergency. The program must be directed by a person trained in hazardous waste management procedures. The job title for each position at the facility that is related to hazardous waste management, the name of the employee filling the position, a written description of the training required, and records that document that the training and/or job experience has been completed are also required. These records must be kept until closure for current personnel and for at least 3 years for former employees.

Formal training is conducted in accordance with a training manual. The training includes both GET for all WIPP employees, other classroom training, and on-the-job training. Training policy indicates that WIPP training will be conducted by certified instructors. Certification requirements are established in a WID procedure.

GET 101 provides detailed training in such areas as communications, alarm systems, and emergency response. A WID procedure requires all personnel to attend GET 101 within 30 days of employment. A refresher class must be attended annually. Other classroom training is offered for personnel in certain job categories. Annual refresher courses are provided.

Maintenance personnel are trained to provide repair and replacement services. Inspections are a part of job-specific training and emergency response personnel training.

WID maintains a listing of all hazardous waste management job titles, names of employees assigned by job title to hazardous waste management jobs, and job descriptions that identify RCRA duties. Records on active and inactive personnel are kept in accordance with WID documents.

25.2.4.8 General Requirements for Ignitable, Reactive, or Incompatible Wastes, 40 CFR 265.17 (HWMR-7, § 601)

> *Precautions must be taken to prevent accidental ignition or reaction of ignitable or reactive waste. Any mixture or commingling of incompatible wastes must be conducted to avoid the generation of extreme heat or pressure, fire or explosion, violent reaction, uncontrolled toxic airborne materials, uncontrolled flammable fumes or gases, damage to the structural integrity of the device or facility, or threat to human health or the environment.*

WIPP is precluded from accepting ignitable, corrosive, or reactive waste as specified in the *Waste Acceptance Criteria*. In an analysis of the compatibility of the waste categories with each other and with waste containers, no incompatibilities were identified.

"No Smoking" signs have been placed conspicuously at the Hazardous Waste Staging Area and at all SAAs where there could be a hazard from ignitable or reactive wastes. A WID procedure requires a weekly inspection to verify that legible "No Smoking" signs are posted near the SAAs. A WID procedure also prohibits combining incompatible wastes generated at WIPP.

25.2.4.9 Location Standards, 40 CFR 265.18 (HWMR-7, § 601)

> *No hazardous waste may be emplaced in such structures as a salt-bed formation or an underground mine except at the DOE Waste Isolation Pilot Plant in New Mexico.*

WIPP is specified in this requirement as the only facility of this type that may be used for the placement of hazardous waste.

25.2.4.10 Maintenance and Operation of Facility, 40 CFR 265.31 (HWMR-7, § 601)

Facilities must be maintained and operated to minimize the possibility of fire, explosions, or any unplanned release of hazardous constituents to air, soil, or surface water that could threaten human health or the environment.

Section 1 of the *WID Contingency Plan* address this requirement. In addition, the *Waste Acceptance Criteria* document prohibits the receipt of explosive or otherwise reactive waste, liquids, non-radioactive pyrophoric or other ignitable wastes, or compressed gases at WIPP as a TSDF. Inspection of waste-handling areas and equipment are conducted as described by WID procedures. Corrective actions are initiated via Plant Work Requests.

25.2.4.11 Required Equipment, 40 CFR 265.32 (HWMR-7, § 601)

All facilities must be equipped with an internal communications or alarm system for immediate emergency instruction; devices to summon external emergency assistance; fire extinguishers and fire-control, spill-control, and decontamination equipment; and water or foam equipment, sprinklers, or water-spray systems.

WID has prepared a contingency plan which provides a list of emergency equipment at WIPP, along with a description and statement of capabilities of the equipment and the cognizant organization responsible for ensuring that the equipment is available and operable. Procedures are in place for providing guidance to WIPP personnel for testing emergency equipment.

25.2.4.12 Testing and Maintenance of Equipment, 40 CFR 265.33 (HWMR-7, § 601)

All facility communications or alarm systems and fire-control, spill-control, and decontamination equipment must be tested and maintained as needed to ensure its proper operation during an emergency.

The WID maintains inspection procedures in place for communication and alarm systems and for fire protection equipment that include provisions for testing and maintenance to ensure that the equipment will be operable in an emergency. Spill control and decontamination equipment are inspected weekly and the results recorded on an inspection form.

25.2.4.13 Access to Communications or Alarm Systems, 40 CFR 265.34 (HWMR-7, § 601)

Immediate access to a communications or internal alarm system is required for all personnel involved when handling hazardous waste. If just one employee is ever on the premises during operations, he/she must have immediate access to a device (e.g., telephone) for summoning external emergency assistance.

The following communication and alarm systems are available at the WIPP site: two-way communication by the public address system and its intercom phones and paging channels, an intra-plant telephone system, mine phones, local and facility-wide alarm systems, pagers and plectrons, and portable two-way radios. The WIPP RCRA Contingency Plan provides an inspection schedule for this equipment and describes the location of alarms, telephones, etc., at WIPP. All SAA inspection reports on file at WIPP indicate that this requirement is met for hazardous wastes generated at WIPP. There is more than one employee at the site at all times.

25.2.4.14 Required Aisle Space, 40 CFR 265.35 (HWMR-7, § 601)

Aisle space must be maintained to allow the unobstructed movement of personnel and of fire-protection, spill-control, and decontamination equipment to any area of facility operation unless aisle space is not needed for these purposes.

A procedure is in place to address the areas of the WIPP where mixed waste containers will be maintained so that adequate aisle space will be provided for emergency response.

25.2.4.15 Arrangements with Local Authorities, 40 CFR 265.37 (HWMR-7, § 601)

Arrangements with local authorities must be made for the provision of emergency services if needed. Requirements include familiarizing the local authorities with the layout of the facility, properties of hazardous waste to be handled, possible evacuation routes, and other information needed for emergency responses.

The RCRA Contingency Plan addresses this requirement. The DOE has established MOUs with all appropriate off-site emergency response agencies for fire fighting, medical assistance, and law enforcement. Examples include a MOU with the Guadalupe Medical Center Emergency Radiological Treatment Center for the WIPP, which provides for the treatment of radiologically contaminated personnel, and a mutual aid agreement between the City of Hobbs and the DOE,

which provides for mutual ambulance, medical, fire, rescue, and hazardous material response services. All outside agencies with which MOUs have been made have received copies of the RCRA Contingency Plan and the *WIPP Emergency Plan* (WID, 1992). The official MOUs are in the process of being revised.

25.2.4.16 Purpose and Implementation of the Contingency Plan, 40 CFR 265.51 (HWMR-7, § 601)

> *Each owner/operator must have a contingency plan for his/her TSDF. The contingency plan must be designed to minimize hazards to human health or the environment from fires, explosions, or unplanned releases of hazardous constituents to the environment. The provisions of the plan must be carried out whenever a fire, explosion, or release of hazardous constituents could threaten human health or the environment.*

The RCRA Contingency Plan has been developed for the WIPP. It is maintained at all controlled document locations. The purpose of the document is to define responsibilities; provide guidance for coordination of activities; and minimize hazards to human health and the environment from fires, explosions, or any unplanned release of hazardous waste or hazardous waste constituents.

25.2.4.17 Content of the Contingency Plan, 40 CFR 265.52 (HWMR-7, § 601)

> *The contingency plan must describe the actions to be taken by facility personnel in response to fires, explosions, or any unplanned releases of hazardous constituents to the environment. The plan must describe arrangements agreed to by local authorities and emergency response units and must list the current names, addresses, and phone numbers (work and home) of all Emergency Coordinators. All emergency equipment must be listed, along with the location, description, and capabilities of all equipment. An evacuation plan for facility personnel must be included.*

The RCRA Contingency Plan describes actions that must be taken in response to fires, explosions, or any unplanned or sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil, or water and describes agreements with local authorities. It also lists the names, addresses, and phone numbers of persons qualified to act as Emergency Coordinators, provides a list of emergency equipment at the facility, and includes an evacuation

plan. The project also maintains the *WIPP Spill Prevention, Control, and Countermeasures (SPCC) Plan* (WID, 1993a).

The RCRA Contingency Plan also describes the agreements between WIPP and local police and fire department, hospitals, contractors, and State and local emergency response teams. The MOUs in place are currently being revised.

An evacuation plan for WIPP personnel is included in the RCRA Contingency Plan as required.

25.2.4.18 Copies of the Contingency Plan, 40 CFR 265.53 (HWMR-7, § 601)

> *Copies of the contingency plan and all revisions to the plan must be maintained at the facility and submitted to all local police and fire departments, hospitals, and State and local emergency response teams that may be called upon to provide emergency services.*

Copies of the RCRA Contingency Plan are maintained at WIPP. A copy of the plan is maintained at controlled document locations. WID maintains a distribution list for the plan and is responsible for updating the controlled copies. Copies of the RCRA Contingency Plan have been provided to all outside agencies with which WIPP has agreements for assistance in an emergency situation.

25.2.4.19 Amendment of Contingency Plan, 40 CFR 265.54 (HWMR-7, § 601)

> *The contingency plan must be reviewed and immediately revised, if necessary, whenever applicable regulations are revised; the plan fails in an emergency; the facility changes in a way that increases the potential for fire, explosions, or release of hazardous waste; or the list of Emergency Coordinators or emergency equipment changes.*

As described in the RCRA Contingency Plan, the plan will be reviewed and revised if necessary whenever applicable regulations are revised; the plan fails in an emergency; the facility changes in a way that materially increases the potential for fires, explosions, or releases of hazardous waste or hazardous waste constituents or changes the response necessary in an emergency; the list of Emergency Coordinators changes; or the list of emergency equipment changes.

25.2.4.20 Emergency Coordinator, 40 CFR 265.55 (HWMR-7, § 601)

At least one employee (on the facility premises or on call) must be designated as the Emergency Coordinator, with the responsibility for coordinating all emergency response measures. The Emergency Coordinator must be familiar with the contingency plan, all operations and activities at the facility, the location and characteristics of waste handled, location of all facility records, and the facility layout. The Emergency Coordinator must have the authority to commit the resources needed to carry out the contingency plan.

A RCRA Emergency Coordinator is on site at the WIPP facility 24 hours a day, 7 days a week. The coordinator is responsible for coordinating all emergency response measures. The primary RCRA Emergency Coordinator is the Facility Operations Shift Supervisor (FOSS). The FOSS is the coordinator who will be on duty at the time of any incident that requires implementation of the RCRA Contingency Plan.

Persons qualified to act as the RCRA Emergency Coordinator are listed in the RCRA Contingency Plan. These employees have the requisite experience and authorization power to perform their role as Emergency Coordinator.

25.2.4.21 Emergency Procedures, 40 CFR 265.56 (HWMR-7, § 601)

In the event of an imminent or actual emergency situation, the Emergency Coordinator or designee must notify facility personnel via internal alarms or communications systems and must notify State or local agencies if their help is needed. A release, fire, or explosion mandates that the Emergency Coordinator obtain appropriate information, assess possible hazards, make any notifications required, prevent the spread or reoccurrence of the incident, monitor if necessary, recover waste, and record details regarding the incident in the facility's operating record. The owner or operator must note specific information about any incident that requires the contingency plan to be implemented. This information must be recorded in the facility's operating record. A written report must be submitted to the Regional EPA office and the NMED within 15 days of the incident. The State Emergency Response Commission (SERC) must be contacted rather than the NMED in the event of any spill incident that may endanger human health or the environment.

WIPP Emergency Coordinators are thoroughly familiar with the RCRA Contingency Plan. The plan has provisions that meet the emergency procedure requirements such as communicating information about the emergency to employees, notifying appropriate agencies to obtain assistance, identifying hazardous materials, assessing hazards, and making the necessary notifications. The appropriate agencies include the Local Emergency Planning Committee (LEPC), the Carlsbad Police Department, the Carlsbad Fire Department, and the Eddy County Sheriff.

Each department at WIPP is responsible for the cleanup of spills in its area. Disposal of the released material is the responsibility of WID.

All emergency equipment listed in the contingency plan is kept clean and fit for its intended use.

As described in the RCRA Contingency Plan, a daily log is maintained in the Central Monitoring Room (CMR) at WIPP. The FOSS signs into the log before beginning his/her duty shift. All incidents, regardless of whether or not they activate the RCRA Contingency Plan, are recorded in the CMR log, along with routine maintenance activities.

The RCRA Contingency Plan addresses the requirement that the SERC be notified in the event of a spill that would endanger human health or the environment. The SERC will contact the NMED if their assistance is needed.

25.2.4.22 Use of Manifest System, 40 CFR 265.71 (HWMR-7, § 601)

> *If a facility receives hazardous constituents accompanied by a manifest, the owner or operator or designee must sign and date each copy of the manifest to certify receipt of the waste, note any significant discrepancies in the manifest, return at least one copy of the manifest to the transporter, send a copy of the manifest to the generator within 30 days, and retain a copy of the manifest for at least 3 years.*

A WID procedure provides guidance on the proper management and retention of hazardous waste manifests. Another WID procedure provides instructions for receiving, surveying, and inspecting TRUPACT II containers at WIPP, which includes proper disposition of the hazardous waste. Further, the *Waste Acceptance Criteria for the Waste Isolation Pilot Plant* requires generator sites to provide a manifest for shipments of transuranic mixed waste. This requirement will become applicable when the WIPP facility receives a waste shipment.

25.2.4.23 Manifest Discrepancies, 40 CFR 265.72 (HWMR-7, § 601)

Manifest discrepancies are differences between the quantity or type of hazardous waste designated in the manifest and that actually received. Upon discovering a significant discrepancy, the owner or operator must try to reconcile the discrepancy with the generator or transporter. If not resolved within 15 days, the owner or operator must notify the Regional Administrator.

A WID procedure provides instruction and guidance for handling manifest discrepancies. The generator will be notified of all discrepancies, and the discrepancy will be recorded in the "remarks" section of the appropriate form. If the discrepancy cannot be resolved within 15 days, it will be reported in writing to the NMED. This requirement will become applicable when the WIPP facility receives a waste shipment.

25.2.4.24 Operating Record, 40 CFR 265.73 (HWMR-7, § 601)

The owner/operator must keep a written operating record at the facility. Information relating to the type and amount of hazardous waste, its location and quantity at each location, cross references to specific manifest documents and records and the results of waste analyses, summary reports and details of all incidents requiring implementation of the contingency plan, records and results of inspections, monitoring and analytical data and any corrective actions taken, and closure cost estimates must be included. In addition, records pertaining to an off-site treatment, land disposal, or storage facility must be kept in the operating record.

A WID procedure establishes guidelines for maintaining the written operating record. It incorporates applicable conditions of the No-Migration Determination for the WIPP (EPA, 1990b). The information that must be recorded and maintained at the facility, such as the location of each mixed-waste container within the repository and inspection records and results, is specified. These records are maintained at various locations at the facility by different organizations according to the type of record and point of generation.

25.2.4.25 Availability, Retention, and Disposition of Records, 40 CFR 265.74 (HWMR-7, § 601)

All records required under this part, including plans, must be retained and made available for inspection by EPA designees. The retention period for all records required under this part is automatically extended during the course of any unresolved enforcement action or as requested by the Administrator. Records of waste disposal locations and quantities must be submitted to the appropriate agencies upon closure of the facility.

This requirement is addressed in a WID procedure that establishes guidelines for maintaining a written operating record. The procedure includes provisions for furnishing all records upon request to the EPA and NMED, as well as provisions for submitting a copy of waste emplacement locations and quantities to appropriate State and Federal regulators. In the event of an enforcement action, records will be retained indefinitely.

25.2.4.26 TSDF Biennial Report, 40 CFR 265.75 (HWMR-7, § 601)

The owner or operator of a TSDF must submit a copy of a biennial report to the Regional Administrator by March 1 of each even-numbered year using EPA Form 8700-13B.

A WID procedure establishes guidelines for the preparation and submittal of a biennial report for a facility that operates as a generator and a TSD. The procedure indicates that all information needed to meet this requirement shall be provided, including a description and the quantity of each mixed waste received during the reporting year and the method and date of treatment, storage, or disposal at the facility. The TSDF biennial report is not required until after TRU mixed waste is received at WIPP.

25.2.4.27 Unmanifested Waste Report, 40 CFR 265.76 (HWMR-7, § 601)

A report must be submitted to the Regional Administrator for any hazardous waste accepted for treatment, storage, or disposal that is not accompanied by a hazardous waste manifest.

According to the *Waste Acceptance Criteria for the Waste Isolation Pilot Plant*, a hazardous waste manifest shall be transmitted with each shipment of TRU mixed waste to WIPP. Therefore, no mixed waste will be accepted that is not accompanied by a hazardous waste manifest. No waste shipments have been received at WIPP to date.

25.2.4.28 Additional Reports, 40 CFR 265.77 (HWMR-7, § 601)

Additional reports required of the owner or operator of a TSDF by the Regional Administrator are reports relating to releases, fire, or explosions; ground-water contamination and monitoring data; facility closure; and air emissions under Subparts AA and BB of this part.

Releases, fires, and explosions will be reported as specified in the WIPP Contingency Plan. Whenever it becomes necessary to partially close WIPP, the DOE will notify the NMED, in writing, at least 60 days prior to the date on which such partial or final closure will commence, as specified by WID procedure. Subparts AA and BB do not apply at WIPP; therefore no reporting is required at WIPP under these subparts.

25.2.4.29 Applicability of the Ground-Water Monitoring System, 40 CFR 265.90 (HWMR-7, § 601)

A ground-water monitoring system is required by the owner or operator of a surface impoundment, landfill, or land treatment facility used to manage hazardous waste. All or part of the ground-water monitoring requirements may be waived if the owner/operator can demonstrate a low potential for migration of hazardous constituents from the facility via the uppermost aquifer to water supply wells or to surface water. The demonstration, in writing, must be certified by a qualified geologist or geotechnical engineer.

A ground-water monitoring waiver was prepared and is located at WIPP. This waiver contains the information to demonstrate that a very low potential for migration of hazardous waste or hazardous constituents from the WIPP site via ground water exists. This information was also provided to the EPA in the *WIPP No-Migration Variance Petition* (DOE, 1990f).

25.2.4.30 Ground-Water Monitoring System, 40 CFR 265.91 (HWMR-7, § 601)

The ground-water monitoring system required of landfills managing hazardous waste is described in detail.

A ground-water monitoring waiver was prepared and is located at the WIPP facility. This waiver obviates the need for a ground-water monitoring system at WIPP.

25.2.4.31 Sampling and Analysis, 40 CFR 265.92 (HWMR-7, § 601)

Sampling and analytical requirements for the ground-water monitoring system are described in detail.

A ground-water monitoring waiver was prepared and is located at WIPP. This waiver obviates the need for a ground-water monitoring system at WIPP.

25.2.4.32 Preparation, Evaluation, and Response, 40 CFR 265.93 (HWMR-7, § 601)

The owner or operator must prepare an outline of a ground-water quality assessment program, describing a more comprehensive ground-water monitoring program than that described in previous sections of this part.

A ground-water monitoring waiver was prepared and is located at WIPP. This waiver obviates the need for the ground-water quality assessment program described in this section.

25.2.4.33 Recordkeeping and Reporting, 40 CFR 265.94 (HWMR-7, § 601)

Recordkeeping and reporting of the results of ground-water monitoring is required.

A ground-water monitoring waiver was prepared and is located at WIPP. This waiver obviates the need for recordkeeping and reporting the results of ground-water monitoring.

25.2.4.34 Applicability of the Closure/Postclosure Requirements, 40 CFR 265.110 (HWMR-7, § 601)

Closure and postclosure requirements apply to the owners and operators of all hazardous and mixed-waste management facilities.

These requirements will apply to WIPP as a TSDF for mixed waste. Although closure and post-closure are planned after the implementation of the disposal phase at WIPP, plans for closure and postclosure are addressed in the *RCRA Compliance Manual*.

25.2.4.35 Closure Performance Standard, 40 CFR 265.111 (HWMR-7, § 601)

> *A closure performance standard is required to minimize the need for further maintenance; to control, minimize, or eliminate the post-closure escape of hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the environment; and to comply with the other closure requirements of this subpart.*

Closure will be deemed complete when all hazardous waste and hazardous waste residues have been removed from the units, all equipment and structures associated with the operation of the units have been decontaminated, and unit closure certification has been submitted to and approved by the NMED.

25.2.4.36 Closure Plan; Amendment of Plan, 40 CFR 265.112 (HWMR-7, § 601)

> *The owner/operator of a hazardous or mixed-waste management facility must have a written closure plan. The plan, approved by the Regional Administrator or designee, may be amended subject to the Regional Administrator's approval.*

WIPP has prepared a written closure plan to satisfy the RCRA closure plan requirement. The plan includes, but is not limited to, the following:

1) A description of how each hazardous waste management unit at the facility will be closed in accordance with the closure performance standard (see Section 25.2.4.34) and

2) A description of how final closure of the facility will be conducted.

Should it become necessary to amend the closure plan at the WIPP, the DOE will submit a written notification of, or request for, a permit modification describing any change in operation, facility design, or storage/disposal designs that affect the closure plan. Partial and final closure activities are outlined in WID procedures.

The requirements for the removal of wastes and decontamination or dismantling of equipment are addressed by WID procedure.

25.2.4.37 Time Allowed for Closure, 40 CFR 265.113 (HWMR-7, § 601)

Within 90 days after receipt of the final volume of hazardous mixed waste at a hazardous waste management unit or facility, the owner or operator must treat, remove, or dispose of all hazardous/mixed wastes on site in accordance with the approved closure plan. Partial or final closure activities must be complete in accordance with the approved closure plan within 180 days of receipt of the final volume of waste. An extension of time may be allowed if the owner/operator can demonstrate that the activities required will take longer than the allotted time period and has taken and will continue to take all steps necessary to prevent threats to human health and the environment from the unclosed but nonoperational facility.

The time allowed for closure is addressed in the RCRA Compliance Manual. Milestone schedules for final and partial closure are included on the closure plan. The WIPP has applied for a variance from the 180-day closure requirement.

25.2.4.38 Disposal or Decontamination of Equipment, Structures, and Soils, 40 CFR 265.114 (HWMR-7, § 601)

During the partial and final closure periods, all contaminated equipment, structures, and soils must be properly disposed of or decontaminated. By removing all hazardous constituents during closure, the owner/operator may become a mixed or hazardous waste generator and must handle all such waste in accordance with the requirements of 40 CFR Part 262.

The regulatory requirements for the disposal or decontamination of equipment, structures, and soils are addressed in WID procedures. This section is broken down into four subsections, which include the removal of hazardous waste residues; the decontamination of equipment, structures, and soils; personnel decontamination; and sampling and quality assurance.

25.2.4.39 Certification of Closure, 40 CFR 265.115 (HWMR-7, § 601)

Within 60 days of the completion of closure of each landfill unit and within 60 days of completion of final closure, the owner/operator must submit a certification that the hazardous or mixed waste unit has been closed in accordance with the

specifications in the approved closure plan. The certification must be sent to the Regional Administrator by registered mail and must be signed by the owner/operator and by an independent registered professional engineer.

DOE will submit the Certification of Closure to the Secretary of the NMED within 60 days of completion of closure activities.

25.2.4.40 Survey Plat, 40 CFR 265.116 (HWMR-7, § 601)

The owner/operator must submit a survey plat to the Regional Administrator and the authority with jurisdiction over local land use no later than the submittal of the certification of closure. The survey plat must indicate the location and dimensions of landfill cells or other hazardous waste disposal units with respect to permanently surveyed benchmarks. The plat must be prepared and certified by a professional land surveyor.

A survey plat may not be required for WIPP because the facility will be decontaminated at closure.

25.2.4.41 Postclosure Care and use of Property, 40 CFR 265.117 (HWMR-7, § 601)

Postclosure care for each hazardous/mixed-waste unit must begin after completion of closure and continue for 30 years after that date. All postclosure care must be performed in accordance with the postclosure plan for the facility.

Postclosure care and use of property may not be required for WIPP because the facility will be decontaminated at closure.

25.2.4.42 Postclosure Plan; Amendment of Plan, 40 CFR 265.118 (HWMR-7, § 601)

The owner/operator of a hazardous or mixed-waste management facility must have a written postclosure plan. The plan, approved by the Regional Administrator or designee, may be amended subject to the Regional Administrator's approval.

A postclosure plan may not be required for WIPP because the facility will be decontaminated at closure.

25.2.4.43 Postclosure Notices, 40 CFR 265.119 (HWMR-7, § 601)

A record of the type, location, and quantity of hazardous/mixed wastes disposed of within each unit must be submitted to the Regional Administrator and the authority with jurisdiction over local land use no later than 60 days after submittal of the certification of closure. Within the same timeframe, the owner/operator must also record a notation in the deed to the facility that the facility has been used to manage hazardous/mixed wastes and that the record of type, location, and quantity of waste disposal has been filed; the owner/operator must also certify that this notation has been recorded as required.

Postclosure notices may not be required for WIPP because the facility will be decontaminated at closure.

25.2.4.44 Certification of Completion of Postclosure Care, 40 CFR 265.120 (HWMR-7, § 601)

Within 60 days of the completion of postclosure of each landfill unit and within 60 days of completion of final post-closure, the owner/operator must submit a certification that the hazardous or mixed-waste unit has been closed in accordance with the specifications in the approved postclosure plan. The certification must be sent to the Regional Administrator by registered mail and must be signed by the owner/operator and by an independent registered professional engineer.

Postclosure certification may not be required for WIPP because the facility will be decontaminated at closure.

25.2.4.45 Cost Estimate for Closure, 40 CFR 265.142 (HWMR-7, § 601)

The owner/operator must provide a detailed written estimate of the cost of closing the facility.

As a Federal facility, WIPP is exempt from the requirement to provide cost estimates for closure actions.

25.2.4.46 Financial Assurance for Closure, 40 CFR 265.143 (HWMR-7, § 601)

The owner/operator of each facility must establish financial assurance for closure of the facility.

As a Federal facility, WIPP is exempt from the requirement to provide financial assurance for closure actions.

25.2.4.47 Cost Estimate for Postclosure Care, 40 CFR 265.144 (HWMR-7, § 601)

The owner/operator of each TSDF must provide a detailed written cost estimate for postclosure monitoring and maintenance of the facility.

As a Federal facility, WIPP is exempt from the requirement to provide a cost estimate for postclosure care.

25.2.4.48 Financial Assurance for Postclosure Care, 40 CFR 265.145 (HWMR-7, § 601)

The owner/operator of a hazardous or mixed waste disposal unit must establish financial assurance for postclosure care of the disposal unit(s).

As a Federal facility, WIPP is exempt from the requirement to provide financial assurance for postclosure care.

25.2.4.49 Use of a Mechanism for Financial Assurance of both Closure and Postclosure Care, 40 CFR 265.146 (HWMR-7, § 601)

The owner/operator may satisfy the requirements for financial assurance by using a mechanism such as a trust fund, security bond, letter of credit, etc.

As a Federal facility, WIPP is exempt from the requirement to provide mechanisms for financial assurance of both closure and postclosure care.

25.2.4.50 Liability Requirements, 40 CFR 265.147 (HWMR-7, § 601)

An owner/operator of a TSDF must demonstrate financial responsibility for bodily injury and property damage from accident occurrences arising from operations of the TSDF.

As a Federal facility, WIPP is exempt from the requirement to provide liability insurance.

25.2.4.51 Incapacity of Owners or Operators, Guarantors, or Financial Institutions, 40 CFR 265.148 (HWMR-7, § 601)

An owner/operator must notify the Regional Administrator by certified mail of the commencement of a bankruptcy proceeding that names him/her as a debtor within 10 days after commencement of the proceeding. In the event of bankruptcy of the guarantors or financial institutions, the owner/operator must establish financial assurance of liability coverage within 60 days after the event.

As a Federal facility, WIPP is exempt from the requirement to provide financial status information.

25.2.4.52 Use of State-required Mechanisms, 40 CFR 265.149 [HWMR-7, § 602(A)]

For a facility located in a State with financial assurance requirements but where the EPA administers the requirements of this subpart on closure and post-closure, an owner/operator may use State-required financial mechanisms to meet these requirements.

As a Federal facility, WIPP is exempt from the requirement to provide financial status information. Furthermore, this Federal requirement under 40 CFR Part 265 is specifically omitted from the State regulations under § 602(A) of HWMR-7.

25.2.4.53 State Assumption of Responsibility, 40 CFR 265.150 [HWMR-7, § 602(B)]

If a State assumes responsibility for an owner/operator's compliance with the closure, post-closure, or liability requirements of this part, the owner/operator will be in compliance if the Regional Administrator determines that the State's assumption of responsibility is adequate.

As a Federal facility, WIPP is exempt from the requirement to provide financial status information. Furthermore, this Federal requirement under 40 CFR Part 265 is specifically omitted from the State regulations under § 602(B) of HWMR-7.

25.2.4.54 Condition of Containers, 40 CFR 265.171 (HWMR-7, § 601)

If a container holding hazardous or mixed waste is not in good condition or begins to leak, the waste within it must be transferred to a container that is in good condition, or the waste must be managed in another way that complies with the requirements in this part.

Containers must be in good condition (no visible deterioration) in accordance with WID procedures. The date and nature of repairs performed on a container or other remedial action is included in the Area Log.

All SAA inspection reports on file at WIPP indicate that this requirement is met for hazardous wastes generated at WIPP.

25.2.4.55 Compatibility of Waste with Containers, 40 CFR 265.172 (HWMR-7, § 601)

A container made of or lined with materials that will not react with and are compatible with the waste to be stored within it must be used.

No special liners are placed in waste containers to hold hazardous wastes generated at WIPP, but measures are taken to ensure that the containers to be used are compatible with the waste generated. These measures are described in WID procedures.

A chemical compatibility analysis of the waste forms to be sent to WIPP as a TSDF and the container materials to be used was conducted. Each generator and storage site has produced a comprehensive list of all possible chemicals present in its waste. Low carbon steel and

polyethylene were added to evaluate chemical compatibility between the waste materials and the container materials. Potential incompatibilities were analyzed using EPA-600/2-80-076, *A Method for Determining the Compatibility of Hazardous Waste*.

25.2.4.56 Management of Containers, 40 CFR 265.173 (HWMR-7, § 601)

> *A container holding hazardous or mixed waste must be kept closed during storage except when it is necessary to add or remove waste. Containers holding hazardous or mixed waste must not be opened, handled, or stored so as to rupture the container or cause it to leak.*

A WID procedure prohibits opening containers located in the SAAs at WIPP except to add or sample the WIPP-generated hazardous waste.

The requirement that hazardous waste containers not be opened, handled, or stored in a manner that would threaten the integrity of the containers is addressed in the WID procedure that requires that containers be inspected before and after transportation from the SAA to the Hazardous Waste Staging Area.

TRU mixed waste shipped to WIPP will be contained in sealed containers. WID procedures do not provide for accessing containers. None of the procedures directs or allows the removal of lids from the containers.

All TRU mixed-waste-handling operators are thoroughly trained in the safe use of TRU mixed-waste handling and transport equipment to minimize the potential for rupture or leak of a container.

25.2.4.57 Inspections, 40 CFR 265.174 (HWMR-7, § 601)

> *Areas in which containers holding hazardous or mixed wastes are stored must be inspected at least weekly to ensure that there are no leaks or other signs of deterioration caused by corrosion or other factors.*

WID procedures are in place that ensure that the regulatory requirements for inspections are met. Inspections of containers holding hazardous waste are performed weekly, as described in WID procedures. All inspection report files are maintained by WID.

25.2.4.58 Special Requirements for Ignitable or Reactive Waste, 40 CFR 265.176 (HWMR-7, § 601)

Containers holding ignitable or reactive waste must be located at least 15 meters (50 feet) from the facility's property line.

All storage containers holding hazardous waste are located more than 15 meters from the property line at WIPP.

The *Waste Acceptance Criteria for the Waste Isolation Pilot Plant* (DOE, 1991b) is designed to ensure that ignitable or reactive waste will not be accepted at the WIPP. It states that explosives, compressed gases, or non-radionuclide pyrophorics are not allowed. It also says that residual liquids and radionuclides in pyrophoric form are limited to less than 1 percent by volume and weight, respectively.

25.2.4.59 Special Requirements for Incompatible Wastes, 40 CFR 265.177 (HWMR-7, § 601)

Incompatible wastes must not be placed in the same container and must be segregated. Hazardous waste must not be placed in an unwashed container that previously held incompatible waste or material.

A WID procedure prohibits mixing WIPP-generated hazardous wastes with materials that may be incompatible. The procedure includes a list of incompatible wastes that may be generated on site.

WID procedures prohibit placing hazardous waste in any unwashed container that previously held an incompatible material. WID procedures also specify that a storage container holding a hazardous waste that is incompatible with any waste or other materials stored nearby must be separated or protected from the other materials by means of a dike, berm, wall, or other barrier or device. WID procedures state that chemicals/materials must be compatible with any waste materials, container materials, and TRUPACT-II materials. A chemical compatibility analysis of the waste forms and container materials has been performed.

25.2.4.60 Tank Systems; Surface Impoundments; Waste Piles; Land Treatment; Landfills; Incinerators; Thermal Treatment; Chemical, Physical, and Biological Treatment; Underground Injection; and Drip Pads, 40 CFR 265.190-265.445 (HWMR-7, § 601)

Requirements are specified for tank systems; surface impoundments; waste piles; land treatment; incinerators; thermal treatment; chemical, physical, and biological treatment; underground injection; and drip pads.

None of these regulatory requirements is applicable to WIPP because none of these systems will be used at this facility.

25.2.4.61 Air Emission Standards for Process Vents, 40 CFR 265.1032 (HWMR-7, § 601)

Air emission standards have been set for TSDFs with process vents associated with distillation, fractionation, thin-film evaporation, solvent extraction, or air or steam stripping operations managing hazardous wastes with organic concentrations of at least 10 parts per million by weight (ppmw).

WIPP does not have process vents associated with distillation, fractionation, thin-film evaporation, solvent extraction, or air or steam stripping operations managing hazardous wastes with organic concentrations of at least 10 ppmw. Therefore, the requirements in Subpart AA of 40 CFR Part 265 (265.1032 through 265.1035) do not apply.

25.2.4.62 Air Emission Standards for Equipment Leaks, 40 CFR 265.1052-265.1062 (HWMR-7, § 601)

Air emission standards have been promulgated for leaks from TSDF equipment that contains or contacts hazardous wastes with organic concentrations of at least 10 percent by weight.

The air emissions standards for equipment leaks do not apply at WIPP because the types of equipment listed, such as pumps in light liquid service and compressors, are not used at WIPP. Therefore, none of the standards and requirements of 40 CFR Part BB (265.1050 through 265.1064) pertains to WIPP.

25.2.5 Compliance with the Hazardous/Mixed Waste Permit Program, 40 CFR Part 270 (HWMR-7, §§ 901 and 902)

The requirements of 40 CFR Part 270 pertain to general RCRA permitting requirements for TSDFs and include provisions for submitting applications, standard permit conditions, and monitoring and reporting requirements. The compliance status of each applicable requirement is summarized in Table 25-6; detailed information is provided in the text.

TABLE 25-6. The New Mexico Hazardous/Mixed Waste Permit Program, 40 CFR Part 270 - Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
40 CFR 270.1 (HWMR-7, § 901)	Purpose and scope of the RCRA permit program regulations	**UP TO DATE** *RCRA Part B Permit Application for the Waste Isolation Pilot Plant* [Section 25.2.5.1]
40 CFR 270.10 (HWMR-7, § 901)	General application requirements	**ACHIEVED** *RCRA Part B Permit Application for the Waste Isolation Pilot Plant* [Section 25.2.5.2]
40 CFR 270.11 (HWMR-7, § 901)	Signatories to permit applications and reports	**ACHIEVED** *RCRA Part B Permit Application for the Waste Isolation Pilot Plant* [Section 25.2.5.3]
40 CFR 270.13 (HWMR-7, § 901)	Contents of Part A of the permit application	**ACHIEVED** *RCRA Part B Permit Application for the Waste Isolation Pilot Plant* [Section 25.2.5.4]

TABLE 25-6 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
40 CFR 270.14 (HWMR-7, §§ 901 and 902)	Contents of Part B: general requirements	**ACHIEVED** *RCRA Part B Permit Application for the Waste Isolation Pilot Plant* [Section 25.2.5.5]
40 CFR 270.15 (HWMR-7, § 901)	Specific Part B information requirements for containers	**ACHIEVED** *RCRA Part B Permit Application for the Waste Isolation Pilot Plant*, Chapters D and F [Section 25.2.5.6]
40 CFR 270.23 (HWMR-7, § 901)	Specific Part B information requirements for miscellaneous units	**ACHIEVED** *RCRA Part B Permit Application for the Waste Isolation Pilot Plant*, Chapter D, Section 9 [Section 25.2.5.7]
40 CFR 270.30 (HWMR-7, § 901)	Conditions applicable to all permits	**NOT APPLICABLE** Will be applicable when a permit is issued [Section 25.2.5.8]
40 CFR 270.31 (HWMR-7, § 901)	Requirements for recording and reporting of monitoring results	**NOT APPLICABLE** Will be applicable when a permit is issued [Section 25.2.5.9]

TABLE 25-6 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
40 CFR 270.42 (HWMR-7, §§ 901 and 902)	Permit modification at the request of the permittee	**NOT APPLICABLE** Will be applicable when a permit is issued [Section 25.2.5.10]
40 CFR 270.71 (HWMR-7, § 901)	Operation during interim status	**UP TO DATE** Interim status achieved by timely filing of Part A; compliance with interim-status requirements [Section 25.2.5.11]
40 CFR 270.72 (HWMR-7, § 901)	Changes during interim status	**UP TO DATE** WID procedure [Section 25.2.5.12]

25.2.5.1 Purpose and Scope of the RCRA Permit Program Regulations, 40 CFR 270.1 (HWMR-7, § 901)

The purpose and scope of the RCRA permit program regulations are defined, and the regulations are summarized.

Prior to the receipt of TRU mixed waste, WIPP must retain interim status or be permitted as a mixed-waste facility. The DOE contends (with the concurrence of the EPA) that WIPP is an interim-status facility. As required for an interim-status facility, the DOE submitted a RCRA permit application to the EPA and to the NMED for the test phase. This application will be revised, amended, or rewritten and resubmitted prior to the disposal phase at the express request of the Secretary of the NMED. The DOE is in the process of preparing a revised permit application but will not submit it until it has been formally requested.

25.2.5.2 General Application Requirements, 40 CFR 270.10 (HWMR-7, § 901)

General application requirements include the requirement that an interim-status facility submit a RCRA Part A permit application within 6 months after the date of publication of regulations requiring its compliance with 40 CFR Part 265. Submittal of the Part B application is required at least 6 months from the date of request. The permit application must be considered complete before a permit may be issued, which includes providing all applicable information described in 40 CFR 270.13 through 270.29, using the appropriate application form. Records must be kept of all data used to complete permit applications (including updates) for at least 3 years from the date of signature on the application.

On July 25, 1990, the NM Environmental Improvement Division (EID; now renamed as the New Mexico Environment Department, NMED) received the EPA's final authorization for the State's mixed-waste program. In a letter to DOE dated August 27, 1990, the EID required the submittal of Parts A and B of the *RCRA Permit Application for the Waste Isolation Pilot Plant* by January 22 and February 28, 1991, respectively. The DOE submitted the Part A portion of the application to the EID and to the Regional EPA office in Dallas, Texas, on January 22, 1991. The Part B portion was submitted to the EID and the EPA Regional Office on February 26 and February 27, 1991, respectively.

The RCRA permit application for the Test Phase was prepared to meet all applicable requirements specified in 40 CFR 270.13 through 270.29. The appropriate form was used for Part A; no form has been generated for Part B. Three revisions of the application have been sent to the regulatory agencies, the latest being the January 1993 revision.

A record of all data used to complete the application for the test phase is being maintained at WIPP. It will be kept for at least 3 years from the date of the signature in the application.

25.2.5.3 Signatories to Permit Applications and Reports, 40 CFR 270.11 (HWMR-7, § 901)

Signatories to permit applications shall be by a senior executive officer with responsibility for overall operations for a Federal agency and/or a responsible corporate officer for a corporation. Reports and plans required by permits (e.g., the annual waste minimization plan) and other information requested shall be signed by a duly authorized representative. Any person signing one of

these documents is required to make the certification statement specified in 40 CFR 270.11(d). (See also Section 2.2.3.3.)

The requirement calling for signatories to permit applications is met on pages 9 and 10 in Part A of the *RCRA Part B Permit Application for the Waste Isolation Pilot Plant* for the test phase.

No reports have been required yet since WIPP is not yet acting as a TSDF for mixed waste, but the proper signatories will be provided in these documents. The certification statement, which was submitted with the *RCRA Part B Permit Application for the Waste Isolation Pilot Plant* for the test phase, will appear as required in reports requested by the appropriate regulatory agency.

25.2.5.4 Contents of Part A of the Permit Application, 40 CFR 270.13 (HWMR-7, § 901)

The contents required for Part A of the RCRA permit application include the activities mandating a RCRA permit, identification of the facility and operator, SIC codes, status of the facility, a scale drawing and photographs of the facility, description of processes to be used, a specification of the hazardous wastes/constituents and the estimated quantity of such wastes, a listing of all permits received or applied for and other environmental permits, a topographic map, and a brief description of the nature of the business.

Part A of the *RCRA Part B Permit Application for the Waste Isolation Pilot Plant* contains all of the information required by 40 CFR 270.13. The *RCRA Part B Permit Application for the Waste Isolation Pilot Plant* has been reviewed by the NMED and was determined to be administratively complete.

25.2.5.5 Contents of Part B: General Requirements, 40 CFR 270.14 (HWMR-7, §§ 901 and 902)

The general requirements for Part B of a RCRA permit application include a facility description, chemical and physical analyses of the hazardous waste to be handled, a copy of relevant plans (e.g., waste analysis plan; contingency plan; closure plan) security procedures and equipment, inspection schedule, procedures/structures/equipment to minimize hazards and releases, traffic patterns, geologic data, training program, ground-water

monitoring information and data, and information regarding solid waste management units.

The *RCRA Part B Permit Application for the Waste Isolation Pilot Plant* for the test phase has been reviewed by the NMED and has been determined to be administratively complete.

25.2.5.6 Specific Part B Information Requirements for Containers, 40 CFR 270.15 (HWMR-7, § 901)

Specific Part B information requirements for containers include a detailed description of the containment system; a demonstration to show that the wastes contain no free liquids; drawings or data showing ignitable, reactive or incompatible wastes; and procedures used for incompatible wastes.

The requirement calling for specific container information is met in Chapters D and F of the *RCRA Part B Permit Application for the Waste Isolation Pilot Plant* for the test phase. The *RCRA Part B Permit Application for the Waste Isolation Pilot Plant* was determined to be administratively complete by the NMED.

25.2.5.7 Specific Part B Information Requirements for Miscellaneous Units, 40 CFR 270.23 (HWMR-7, § 901)

Specific Part B information requirements for miscellaneous units include a detailed description of the unit; detailed hydrologic, geologic, and meteorologic assessments and land-use maps for the region surrounding the site; information on potential exposure pathways to hazardous constituents and the potential magnitude and nature of such exposures; a report on the effectiveness of any treatment methodology proposed; and any additional information requested for evaluating the compliance of the unit with the environmental protection standards of 40 CFR 264.601.

The requirement calling for specific miscellaneous unit information is met in Section 9 of Chapter D of the *RCRA Part B Permit Application for the Waste Isolation Pilot Plant* for the test phase. The *RCRA Part B Permit Application for the Waste Isolation Pilot Plant* was determined to be administratively complete by the NMED.

25.2.5.8 Conditions Applicable to all Permits, 40 CFR 270.30 (HWMR-7, § 901)

Conditions applicable to all permits are specified and include duty to comply, duty to reapply, minimization of releases, proper operation and maintenance, permit actions, property rights, duty to provide information, inspection and entry, monitoring and records, signatory requirements, and reporting requirements.

This requirement will become applicable when a permit is issued by the NMED and the EPA.

25.2.5.9 Requirements for Recording and Reporting of Monitoring Results, 40 CFR 270.31 (HWMR-7, § 901)

Requirements for recording and reporting monitoring results will be specified in the RCRA permit.

These requirements for recording and reporting monitoring results are met and discussed in Section 9e of Chapter D of the *RCRA Part B Permit Application for the Waste Isolation Pilot Plant* for the test phase, which was determined to be administratively complete by the NMED. These requirements will become applicable when a permit is issued by the NMED and the EPA.

25.2.5.10 Permit Modification at the Request of the Permittee, 40 CFR 270.42 (HWMR-7, §§ 901 and 902)

After a RCRA permit has been finalized, the permittee may request that it be modified. Three classes of modifications are identified in Appendix I to 40 CFR 270.42. Class 1, the least significant of the permit modifications, covers minor modifications such as the correction of typographical errors; changes to conform with agency guidelines or regulations; or procedural changes that increase the frequency of monitoring, reporting, sampling, or maintenance activities. Class 1 modifications require notification of the Director within 7 days after the change has been made; all persons on the facility mailing list must be notified within 90 calendar days after the Director approves the request.

Class 2 modifications are more extensive and significant and apply to changes needed to allow timely response to common variations in the types and quantities of wastes managed, technological advancements, and changes in the regulations (e.g., changes in

emergency procedures or removal of equipment from the emergency equipment list). They require that the permittee submit a modification request to the Director, announce a 60-day comment period, notify all persons on the facility mailing list, publish the notice in a major local newspaper of general circulation, and hold a public meeting.

Class 3 modifications are the most significant and potentially impactive and substantially alter the facility or its operation (e.g., extending the closure period or a final compliance date; creating a new landfill or other type of unit or increasing the capacity of a pre-existing one). The notification and other requirements are similar to those for Class 2 modifications.

Permit modification will not be applicable at WIPP until after a RCRA permit has been finalized for this facility.

25.2.5.11 Operation During Interim Status, 40 CFR 270.71 (HWMR-7, § 901)

During interim status, the facility shall not treat, store, or dispose of hazardous waste or employ processes not specified or exceed the design capabilities described in Part A of the permit application. The facility will comply with all applicable standards described in 40 CFR Part 265.

The WIPP has waste analysis and waste acceptance criteria in place to ensure that all waste managed at the facility is within the bounds specified in the Part A permit application. Further, the WIPP has programs and procedures in place that address compliance with the applicable interim-status standards of 40 CFR Part 265. (See Section 25.2.4.)

25.2.5.12 Changes During Interim Status, 40 CFR 270.72 (HWMR-7, § 901)

Changes that may be made during interim status are treatment, storage, or disposal of new wastes; increases in the design capacity of processes used or changes in the processes used; changes in ownership or operational control; changes made in accordance with an interim-status corrective action order; or the addition of newly regulated units if and only if a revised Part A permit application is submitted and approved by the Director. Such changes may not be made if reconstruction of the facility results

(i.e., the capital investment in the changes to the facility may not exceed 50 percent of the capital cost of a comparable, entirely new, hazardous waste management facility).

Until a final RCRA permit is issued, WIPP will remain subject to the interim-status requirements stipulated under 40 CFR Part 265. The WIPP has submitted the required permit application and has a process in place to manage and make appropriate notifications should design or operation processes change; however, no notifications will be issued at this time, until the Secretary of the NMED requests revisions. Any changes to the disposal facility which cannot be made under the guidelines of interim status will be deferred until a permit is issued, or proposed changes will be submitted to NMED for review and approval as required by the interim status provisions. Once a permit is issued, the DOE can propose modifications to the permit to the NMED for approval.

25.2.6 Compliance Status of the Underground Storage Tank (UST) Regulatory Requirements

This section of the report will examine the New Mexico UST requirements as they pertain to the WIPP. Compliance status is summarized in Table 25-7, and additional detail is provided in the text that follows the table.

TABLE 25-7. New Mexico Underground Storage Tank Regulations (USTRs) - Compliance Status Summary

CITATION	REQUIREMENT	COMPLIANCE STATUS
Part I, *General Provisions*		
USTR, Sec. 103	Applicability	**UP TO DATE** Two USTs at WIPP, one for diesel fuel, the other for unleaded fuel [Section 25.2.6.1]
Part II, *Registration of Tanks*		
USTR, Sec. 200	Existing tanks	**ACHIEVED** Two registered USTs [Section 25.2.6.2]

TABLE 25-7 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
USTR, Sec. 201	Transfer of ownership	**NOT APPLICABLE** Original ownership [Section 25.2.6.3]
USTR, Sec. 202	New UST system	**ACHIEVED** Registration for two new USTs: transmitted on June 18, 1992 [Section 25.2.6.4]
USTR, Sec. 203	Substantially modified UST systems	**NOT APPLICABLE** No system modifications made [Section 25.2.6.5]
USTR, Sec. 204	Notification of spill or release	**NOT APPLICABLE** No releases during this period [Section 25.2.6.6]
USTR, Sec. 205	Emergency repairs and tank replacement	**NOT APPLICABLE** No emergencies requiring repair or tank replacement [Section 25.2.6.7]
USTR, Sec. 206	Application forms	**ACHIEVED** Proper application forms used [Section 25.2.6.8]
USTR, Sec. 207	Registration certificate	**ACHIEVED** Certificate displayed [Section 25.2.6.9]

TABLE 25-7 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
Part III, *Annual Fee*		
USTR, Sec. 300	Payment of fee	**ACHIEVED** Fees paid annually by January 31 [Section 25.2.6.10]
USTR, Sec. 301	Amount of fee	**ACHIEVED** $200.00 paid per year ($100 per UST) [Section 25.2.6.11]
USTR, Sec. 302	Late payment penalties	**NOT APPLICABLE** No late payments made [Section 25.2.6.12]
Part IV, *UST Systems: Design, Construction, Installation and Certification*		
USTR, Sec. 400(a)	Performance standards to ensure that new UST systems tanks are properly designed and constructed	**ACHIEVED** ASTM and UL standards met by fiberglass-reinforced plastic tanks [Section 25.2.6.13]
USTR, Sec. 400(b)	Piping to be properly designed and constructed	**ACHIEVED** Fiberglass-reinforced plastic piping [Section 25.2.6.14]
USTR, Sec. 400(c)(1)(i)	Spill prevention equipment	**ACHIEVED** Spill catchment basin [Section 25.2.6.15]

TABLE 25-7 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
USTR, Sec. 400(c)(1)(ii)	Overfill prevention equipment	**ACHIEVED** Model 310 extractor vent valve [Section 25.2.6.16]
USTR, Sec. 400(d)	Installation of tanks and piping	**ACHIEVED** Installer's oath on NMED tank registration form [Section 25.2.6.17]
USTR, Sec. 400(e)	Certificate of installation	**ACHIEVED** Certification of inspector; NMED UST Bureau representative present at installation of new UST systems [Section 25.2.6.18]
USTR, Sec. 401(a)	Upgrading of existing UST systems	**NOT APPLICABLE** Two new USTs installed on February 10, 1992 [Section 25.2.6.19]
USTR, Sec. 401(b)	Upgrading requirements for steel tanks	**NOT APPLICABLE** Single wall fiberglass-reinforced plastic tanks replaced with double-walled plastic tanks on February 10, 1992 [Section 25.2.6.20]

TABLE 25-7 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
USTR, Sec. 401(c)	Upgrading requirements for metal piping	**NOT APPLICABLE** Metal piping replaced with fiberglass-reinforced plastic piping on February 10, 1992 [Section 25.2.6.21]
USTR Sec. 401(d)	Spill and overfill protection equipment	**ACHIEVED** Current spill and overfill protection equipment meets 1998 deadline [Section 25.2.6.22]
USTR, Sec. 402	Certification of compliance with notification requirements	**ACHIEVED** All required notifications made [Section 25.2.6.23]
Part V, *General Operating Requirements*		
USTR, Sec. 500(a)	Spill and overflow control	**ACHIEVED** WIPP procedure [Section 25.2.6.24]
USTR, Sec. 501(a)	Corrosion protection	**ACHIEVED** Rubber boots covering all metal fittings [Section 25.2.6.25]
USTR, Sec. 501(b)	Inspections of cathodic protection systems	**NOT APPLICABLE** No cathodic protection required [Section 25.2.6.26]

TABLE 25-7 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
USTR, Sec. 501(c)	Inspections of impressed-current cathodic protection systems	**NOT APPLICABLE** No cathodic protection required for fiberglass-reinforced systems [Section 25.2.6.27]
USTR, Sec. 501(d)	Records of operation of the cathodic protection system	**NOT APPLICABLE** No cathodic protection required for fiberglass-plastic systems [Section 25.2.6.28]
USTR, Sec. 502	Compatibility	**ACHIEVED** Fiberglass-reinforced plastic system compatible with both diesel and unleaded fuel [Section 25.2.6.29]
USTR, Sec. 503(a)	Repairs allowed	**NOT APPLICABLE** No repairs performed on the UST system [Section 25.2.6.30]
USTR, Sec. 503(b)	Repairs to fiberglass-reinforced plastic tanks	**NOT APPLICABLE** No major repairs performed on the UST system [Section 25.2.6.31]
USTR, Sec. 503(c)	Replacement or repair of pipe sections and fittings	**NOT APPLICABLE** No repairs conducted on the pipes or fittings. [Section 25.2.6.32]

TABLE 25-7 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
USTR, Sec. 503(d)	Tightness testing after repairs	**NOT APPLICABLE** No repairs conducted on the tanks or piping [Section 25.2.6.33]
USTR, Sec. 503(e)	Testing of any repaired cathodically protected UST system	**NOT APPLICABLE** No cathodic protection required [Section 25.2.6.34]
USTR, Sec. 503(f)	Records of all repairs	**UP TO DATE** Records of all repairs maintained for life of the UST system [Section 25.2.6.35]
USTR, Sec. 504(a)	Reporting requirements	**ACHIEVED** All required reports submitted [Section 25.2.6.36]
USTR, Sec. 504(b)	Recordkeeping requirements	**ACHIEVED** All required records maintained [Section 25.2.6.37]
USTR, Sec. 504(c)	Availability and maintenance of records	**ACHIEVED** Records maintained at the site [Section 25.2.6.38]

TABLE 25-7 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
USTR, Sec. 505(a)	Inspections, monitoring, and testing of USTs	**ACHIEVED** NMED personnel allowed to inspect, sample, and monitor the UST system [Section 25.2.6.39]
USTR, Sec. 505(c)	Inspections of UST installations, repairs or modifications, or removals or system closures	**ACHIEVED** NMED representative present at installation of new UST system [Section 25.2.6.40]
Part VI, *Release Detection*		
USTR, Sec. 600(a)	General requirements of all UST systems	**ACHIEVED** Interstitial monitoring system installed [Section 25.2.6.41]
USTR, Sec. 600(b)	Notification of releases	**ACHIEVED** No releases to date [Section 25.2.6.42]
USTR, Sec. 600(c)	Schedule for required release detection	**ACHIEVED** UST system designed so no release detection for piping is required; interstitial monitoring used for tanks [Section 25.2.6.43]

TABLE 25-7 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
USTR, Sec. 600(d)	Failure to comply with release-detection requirements	**NOT APPLICABLE** Release-detection equipment used [Section 25.2.6.44]
USTR, Sec. 601(a)	Requirements for tanks of petroleum UST systems	**ACHIEVED** Interstitial monitoring used [Section 25.2.6.45]
USTR, Sec. 601(b)	Requirements for piping of petroleum UST systems	**ACHIEVED** See Sections 25.2.6.47 and 25.2.6.48 [Section 25.2.6.46]
USTR, Sec. 601(b)(1)	Requirements for pressurized piping	**NOT APPLICABLE** USTs under suction piping [Section 25.2.6.47]
USTR, Sec. 601(b)(2)	Requirements for suction piping	**ACHIEVED** Engineering drawings confirm compliance with this requirement [Section 25.2.6.48]
USTR, Sec. 602	Requirements for hazardous substance UST systems	**NOT APPLICABLE** No UST systems used for hazardous substances at the WIPP [Section 25.2.6.49]

TABLE 25-7 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
USTR, Sec. 603	Methods of release detection for tanks	**ACHIEVED** Interstitial monitoring used [Section 25.2.6.50]
USTR, Sec. 603(a)	Inventory control	**ACHIEVED** Inventory control used as contingency method only [Section 25.2.6.51]
USTR, Sec. 603(b)	Manual tank gauging	**NOT APPLICABLE** [Section 25.2.6.52]
USTR, Sec. 603(c)	Tank tightness testing	**NOT APPLICABLE** Tank tightness testing not necessary when interstitial monitoring is used [Section 25.2.6.53]
USTR, Sec. 603(d)	Automatic tank gauging	**NOT APPLICABLE** Interstitial monitoring used [Section 25.2.6.54]
USTR, Sec. 603(e)	Vapor monitoring	**NOT APPLICABLE** Interstitial monitoring used [Section 25.2.6.55]
USTR, Sec. 603(f)	Ground-water monitoring	**NOT APPLICABLE** Ground-water variance [Section 25.2.6.56]

TABLE 25-7 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
USTR, Sec. 603(g)	Interstitial monitoring	**ACHIEVED** Release from any portion of the tank that regularly contains product detected by interstitial monitoring [Section 25.2.6.57]
USTR, Sec. 603(h)	Other methods of detecting releases	**NOT APPLICABLE** Interstitial monitoring used [Section 25.2.6.58]
USTR, Sec. 604	Methods of release detection for piping	**NOT APPLICABLE** Release detection for piping not required because of design [Section 25.2.6.59]
USTR, Sec. 605	Release detection recordkeeping	**ACHIEVED** Required records maintained [Section 25.2.6.60]
Part VII, *Release Reporting, Investigation, and Confirmation*		
USTR, Sec. 700	Reporting of suspected releases	**NOT APPLICABLE** No releases to date [Section 25.2.6.61]
USTR, Sec. 701	Investigation of off-site impacts	**NOT APPLICABLE** Offsite-impact information not requested by NMED [Section 25.2.6.62]

TABLE 25-7 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
USTR, Sec. 702	Release investigation and confirmation steps	**NOT APPLICABLE** No releases to date [Section 25.2.6.63]
USTR, Sec. 703(a)	Reporting and cleanup of large spills and overfills	**NOT APPLICABLE** No large spills or overfills [Section 25.2.6.64]
USTR, Sec. 703(b)	Reporting and cleanup of small spills and overfills	**ACHIEVED** Small spills and overfills properly controlled and cleaned up [Section 25.2.6.65]
Part VIII, *Out-of-Service UST Systems and Closure*		
USTR, Sec. 800	Temporary closure	**NOT APPLICABLE** No temporary closure [Section 25.2.6.66]
USTR, Sec. 801(a)	Permanent closure and changes-in-service	**ACHIEVED** NMED notified before closure of old UST systems [Section 25.2.6.67]
USTR, Sec. 801(b)	Permanent closure of a tank	**ACHIEVED** Old UST system emptied, cleaned, and removed for permanent closure [Section 25.2.6.68]

TABLE 25-7 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
USTR, Sec. 801(c)	Change in service	**NOT APPLICABLE** No change in service for UST systems [Section 25.2.6.69]
USTR, Sec. 802(a)	Assessing the site	**ACHIEVED** Site assessed prior to permanent closure of old UST systems [Section 25.2.6.70]
USTR, Sec. 802(b)	Corrective action	**UP TO DATE** UST area assessed before change in service [Section 25.2.6.71]
USTR, Sec. 803	Applicability to previously closed UST systems	**NOT APPLICABLE** No UST systems at WIPP closed before December 22, 1988 [Section 25.2.6.72]
USTR, Sec. 804	Closure records	**ACHIEVED** Tank closure; records maintained at the WIPP site [Section 25.2.6.73]
Part IX, *Financial Responsibility*		
USTR, Sec. 900	Applicability	**NOT APPLICABLE** Federal and State government entities exempt [Section 25.2.6.74]

TABLE 25-7 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
Part X, *Administrative Review*		
USTR, Sec. 1000	Informal review	**NOT APPLICABLE** Provision not invoked at WIPP [Section 25.2.6.75]
USTR, Sec. 1001	[illegible]view by Director	**NOT APPLICABLE** Provision not invoked at WIPP [Section 25.2.6.76]
Part XI, *Miscellaneous*		
USTR, Sec. 1100	Compliance with other regulations	See Chapters 2 through 24 and 25 through 38 for compliance with applicable Federal and State regulations, respectively. [Section 25.2.6.77]
USTR, Sec. 1101	Construction	**NOT APPLICABLE** [Section 25.2.6.78]
USTR, Sec. 1102	Severability	**NOT APPLICABLE** [Section 25.2.6.79]
Part XII, *Corrective Action for Petroleum UST Systems*		
USTR Sec. 1200(A)	Cleanup requirements for releases from petroleum UST systems	**NOT APPLICABLE** No releases during this period [Section 25.2.6.80]

TABLE 25-7 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
USTR Sec. 1200(B)-1222	Additional corrective action requirements for petroleum UST systems	**NOT APPLICABLE** No corrective actions necessary for current UST system [Section 25.2.6.81]
Part XIII, *Corrective Action for Hazardous Substance UST Systems*		
USTR Secs. 1300-1320	Corrective action for hazardous substance UST systems	**NOT APPLICABLE** No hazardous substance USTs at WIPP [Section 25.2.6.82]
Part XIV, *Certification for Tank Installers*		
USTR Secs. 1400-1417	Certification of tank installers and repairers	**ACHIEVED** Required certification information maintained [Section 25.2.6.83]
Part XV, *Ground Water Protection Act Regulations*		
USTR Sec. 1505	Priorities	**NOT APPLICABLE** [Section 25.2.6.84]
USTR Sec. 1508	Minimum site assessment	**NOT APPLICABLE** [Section 25.2.6.85]

25.2.6.1 Applicability, USTR Section 103; 40 CFR 280.10

Any owner or operator of an UST that contains a hazardous substance or petroleum product must meet the standards set by the New Mexico Environmental Improvement Board (EIB) in the New Mexico Underground Storage Tank Regulations (USTRs).

The WIPP has two 8,000-gallon USTs. One contains unleaded gasoline, and the other contains diesel fuel.

25.2.6.2 Existing Tanks, USTR Section 200

The owner of any UST must register such tank or tanks with the Underground Storage Tank section of the NMED within 3 months after April 14, 1988, the effective date of this Part II as first adopted, except that any owner who has filed the form of notice entitled "Notification for Underground Storage Tanks," prescribed by the EPA and described in 40 CFR Part 280, is not required to register a tank for which a notice has been filed, provided that the information provided is still current.

Registration becomes effective upon receipt of the first year's annual fee described in Sections 25.2.6.10 and 25.2.6.11. Registration must by renewed annually by payment of the annual fee until the permanent closure of the tank.

Both of the USTs at WIPP are registered with the Underground Storage Tank Bureau section of the NMED.

25.2.6.3 Transfer of Ownership, USTR Section 201

If ownership of the UST system changes, the new owner must re-register the tank with the division within 30 days of ownership transfer, using a form provided by the division.

This section is not applicable since ownership of the tanks has not been transferred.

25.2.6.4 New UST System, USTR Section 202

The owner must notify the division in writing at least 30 days before any new tank or UST system is installed and must register any new tank or UST system with the division prior to placing it in service.

Proper notification was provided to the NMED prior to the February 10, 1992, installation of the new UST system. The application for the new system was submitted on June 18, 1992, and the USTs were placed into service shortly thereafter.

25.2.6.5 Substantially Modified UST Systems, USTR Section 203

When an existing UST system is substantially modified or replaced, the owner must notify the division in writing of such modification or replacement at least 30 days prior to the modification or replacement. Emergency repairs or replacements made as described in Section 25.2.6.7 are exempt from these notification requirements.

Proper notification was provided to the NMED prior to the February 10, 1992, installation of the new UST system. The application for the new system was submitted on June 18, 1992, and the USTs were placed into service shortly thereafter.

25.2.6.6 Notification of Spill or Release, USTR Section 204

Notice of any known or suspected release from a UST system, any spill, or any other emergency situation must be given to the NMED by telephone within 24 hours. The owner or operator making the report shall provide the information specified under Section 204(A).

Written notice describing the spill, release, or suspected release and any investigation or follow-up action taken or to be taken must be mailed or delivered to the NMED within 7 days of the incident. The written notice shall verify the prior oral notification as to each of the items of information listed in subsection A and provide any appropriate additions or corrections to the information contained in the prior oral notification.

No releases have occurred during this reporting period. However, if this should occur, WIPP procedures discuss the requirements for the proper handling of spills and releases.

25.2.6.7 Emergency Repairs and Tank Replacement, USTR Section 205

Immediate repairs or replacement of an UST system may be made in the event an emergency situation presents a threat to the public health, provided notice is given to the NMED as described in Section 25.2.6.6.

No such emergency repair or replacement of an UST system has been necessary at WIPP to date.

25.2.6.8 Application Forms, USTR Section 206

All USTs must be registered on application forms provided by the NMED unless the EPA form ("Notification for Underground Storage Tanks") has been submitted to the NMED and all information contained therein is still accurate. An application submitted by a municipal, State, or other public facility must be signed by either a principal executive officer, ranking elected official, or other duly authorized employee.

The New Mexico UST registration form is used to register the USTs at WIPP. It has been submitted under the name of the DOE WIPP Project Manager, who is the principal executive officer for DOE at WIPP.

25.2.6.9 Registration Certificate, USTR Section 207

Upon submittal of a complete registration application or the EPA form and payment of the annual fee, the NMED shall issue a validated registration certificate which is current and valid and must be displayed on the premises of the UST system at all times. In the event that any information provided on the registration form or the EPA form changes or is no longer accurate, the change must be reported to the NMED on the appropriate form within 30 days.

The registration certificate from the NMED is displayed.

25.2.6.10 Payment of Fee, USTR Section 300

An annual per-tank fee shall be paid to the NMED no later than January 31 for each current calendar year or portion of a year that a tank is in use. A tank shall be deemed "in use" until notice is received by the NMED that the tank has been removed or otherwise permanently closed in a manner acceptable to the division.

The annual fee for a new tank placed in service after January 31 for any calendar year after 1989 shall be paid within 30 days after the tank is placed in service. The annual fees shall be designated to the Hazardous Waste and Underground Storage Tank Fund.

The annual fee per UST at WIPP is paid by January 31 for each calendar year. The fee for the replacement tanks accompanied the application that was transmitted to the NMED on February 10, 1992.

25.2.6.11 Amount of Fee, USTR Section 301

The annual fee for each UST is $100.00 per tank.

The annual fee paid for each UST at WIPP is $100, or $200 for both tanks.

25.2.6.12 Late Payment Penalties, USTR Section 302

In the event that the annual fee is not paid when due, a late fee of $5.00 or 5 percent of the unpaid fee, whichever is greater, and interest charges at the rate of 1.5 percent per month shall be imposed and shall accumulate until the annual fee and all accrued late fees and interest charges are paid.

No late payment penalties have been incurred.

25.2.6.13 Performance Standards for Tanks in New UST Systems, USTR Section 400(a); 40 CFR 280.20(a)

Each tank must be properly designed and constructed, and any portion underground must be protected from corrosion by a nationally recognized association or independent testing laboratory

as specified. Each tank must be constructed of fiberglass-reinforced plastic; steel, with cathodic protection; or steel-fiberglass-reinforced-plastic composite. The tank may be constructed of metal without additional corrosion protection if the conditions apply as described in Section 400(a)(4) of the USTRs.

The tanks are designed and constructed of fiberglass-reinforced plastic in accordance with Underwriters Laboratories Standard 1316, *Standard for Glass-Fiber-Reinforced Plastic Underground Storage Tanks for Petroleum Products*, and with the American Society for Testing and Materials (ASTM) Standard D4021-86, *Standard Specification for Glass-Fiber-Reinforced Polyester Underground Petroleum Storage Tanks.*

25.2.6.14 Design and Construction of Piping, USTR Section 400(b); 40 CFR 280.20(b)

The piping that routinely contains regulated substances and is in contact with the ground must be property designed, constructed, and protected from corrosion in accordance with a code of practice developed by a nationally recognized association or independent testing laboratory as specified. The piping is constructed of fiberglass-reinforced plastic; or steel, with cathodic protection; or metal without additional corrosion protection measures provided that the piping is installed at a non-corrosive site and records are maintained that demonstrate the noncorrosivity of the site for the remaining life of the piping. The piping construction and corrosion protection are determined by the implementing agency to be designed to prevent the release or threatened release of any stored regulated substance in a manner that is no less protective of human health and the environment.

The piping is constructed of fiberglass-reinforced plastic as designed by the Xerxes Corporation in accordance with the appropriated standards.

25.2.6.15 Spill Prevention Equipment, USTR Section 400(c)(1)(i); 40 CFR 280.20(c)(1)(i)

Owners and operators must use spill prevention equipment that will prevent the release of product to the environment when the transfer hose is detached from the fill pipe (for example, a spill catchment basin).

The WIPP's UST system uses a spill catchment basis.

25.2.6.16 Overfill Prevention Equipment, USTR Section 400(c)(1)(ii); 40 CFR 280.20(c)(1)(ii)

Overfill-prevention equipment must be used that will automatically shut off flow into the tank when the tank is no more than 95 percent full; alert the transfer operator when the tank is no more than 90 percent full by restricting the flow into the tank or triggering a high-level alarm; or restrict the flow 30 minutes prior to overfilling, alert the operator with a high-level alarm 1 minute before overfilling, or automatically shut off flow into the tank so that none of the fittings located on top of the tank is exposed to product due to overfilling. Owners and operators may use alternative equipment if it is determined by the implementing agency to be no less protective of human health and the environment than the equipment specified above or if the UST system is filled by transfers of no more than 25 gallons at one time.

The model 310 extractor vent valve is used to automatically shut off the flow into the tank when the tank is no more than 95 percent full. This valve is a permanent part of the system.

25.2.6.17 Installation of Tanks and Piping, USTR Section 400(d); 40 CFR 280.20(d)

All tanks and piping must be properly installed in accordance with a code of practice developed by a nationally recognized association or independent testing laboratory and in accordance with the manufacturer's instructions.

The installer (Cline Pump Co.) certified on the NMED application that the methods used to install the tanks and piping comply with the requirements. Cline Pump has supplied the WIPP with copies of qualified certification.

25.2.6.18 Certificate of Installation, USTR Section 400(e); 40 CFR 280.20(e)

All owners and operators must ensure that one or more of the specified methods of certification, testing, or inspection was used to demonstrate compliance with Section 25.2.6.17 by providing a certification of compliance on the UST notification form required

by USTR Part II. The allowable methods of certification for the installer are: certification by the tank and piping manufacturers; certification or licensing by the implementing agency; inspection and certification of the installation by a registered professional engineer with education and experience in UST system installation, inspection and approval by the implementing agency, or the presence of a representative from the UST Bureau of the NMED at the installation; completion of all work listed on the manufacturer's installation checklists; or compliance with another method for ensuring compliance with this section that is determined by the implementing agency to be no less protective of human health and the environment.

Cline Pump Company is certified by the NMED. The installation of the new systems was inspected and approved by an NMED representative who was present during the installation.

25.2.6.19 Upgrading Existing UST Systems, USTR Section 401(a); 40 CFR 280.21(a)

All existing UST systems must be upgraded to meet the new performance standards (see Sections 25.2.6.13 through 25.2.6.18), the requirements described in Sections 25.2.6.20 through 25.2.6.22, or the closure requirements described in Sections 25.2.6.66 through 25.2.6.73 by December 22, 1998.

The UST system formerly used at the WIPP has been replaced. The new system meets the new performance standards (see Sections 25.2.6.13 through 25.2.6.18); therefore, upgrading is not appropriate at this time.

25.2.6.20 Tank Upgrading Requirements, USTR Section 401(b); 40 CFR 280.21(b)

Steel tanks must be upgraded to have an interior lining and/or cathodic protection.

The new tanks are constructed of fiberglass-reinforced plastic and are not constructed of steel. (See Section 25.2.6.19.)

25.2.6.21 Piping Upgrading Requirements, USTR Section 401(c); 40 CFR 280.21(c)

Metal piping that routinely contains regulated substances and is in contact with the ground must be cathodically protected.

The piping for the UST system at WIPP is made of double-walled fiberglass-reinforced plastic. (See Section 25.2.6.19.)

25.2.6.22 Spill and Overfill Prevention Equipment, USTR Section 401(d); 40 CFR 280.21(d)

To prevent spilling and overfilling associated with the transfer of product to the UST system, all existing UST systems must comply with the new UST system spill and overfill prevention equipment requirements specified in USTR Section 400(c).

Spill and overfill prevention equipment has been incorporated into the new UST system as described in Sections 25.2.6.15 and 25.2.6.16.

25.2.6.23 Certificate of Compliance and Notification Requirements, USTR Section 402; 40 CFR 280.22

In the registration application required by USTR Part II, all owners and operators of new UST systems must certify compliance with the installation requirements of USTR Section 400(e), cathodic protection requirements for steel tanks and piping under Sections 400(a) and (b), financial responsibility under USTR Part IX, and release detection under Sections 601 and 602. The owners and operators must also ensure that the installer certifies that the methods used to install the tanks and piping comply with the requirements in Section 400(d).

The notification requirements pertain to the person who sells a tank intended to be used as an UST.

As outlined in the registration form, the certification requirements were met. The cathodic protection requirements are not applicable since neither the tank nor the piping is made of steel. The financial responsibility requirements are not applicable because WIPP is owned by the DOE. The notification requirements apply only to the person who sold the tank to be used as an UST and therefore do not apply to WIPP.

25.2.6.24 Spill and Overflow Control, USTR Section 500; 40 CFR 280.30

Owners and operators must ensure that any releases due to spilling or overfilling do not occur, that the volume available in the tank is greater than the volume of product to be transferred to the tank before the transfer is made, and that the transfer operation is monitored constantly to prevent overfilling and spilling. Any spills or overfills must be reported, cleaned up, and investigated in accordance with USTR Sections 204 and 703.

The new tanks are equipped with spill and overfill protection equipment. WIPP procedures are in place that govern the transfer of product to the tanks and that specify requirements for reporting, cleaning up, and investigating spills or overfills.

25.2.6.25 Operation and Maintenance of Corrosion Protection, USTR Section 501(a); 40 CFR 280.31(a)

All corrosion protection systems must be operated and maintained to continuously provide corrosion protection to the metal components of that portion of the tank and piping that routinely contain regulated substances and are in contact with the ground.

The corrosion protection consists of rubber boots around the metal fittings.

25.2.6.26 Inspections of Cathodic Protection System, USTR Section 501(b); 40 CFR 280.31(b)

All UST systems equipped with cathodic protection systems must be inspected for proper operation by a qualified cathodic protection tester in accordance with requirements regarding the frequency of inspections and specific inspection criteria.

Cathodic protection is required only for steel tanks and metal parts. The metal fittings in the UST system are protected by rubber boots. Therefore, cathodic protection is not required.

25.2.6.27 Inspections of Impressed-Current Cathodic Protection Systems, USTR Section 501(c); 40 CFR 280.31(c)

UST systems with impressed-current cathodic protection systems must be inspected every 60 days to ensure that the equipment is running properly.

No cathodic protection systems are required for fiberglass-reinforced plastic systems.

25.2.6.28 Records of Operation of the Cathodic Protection System, USTR Section 501(d); 40 CFR 280.31(d)

For UST systems using cathodic protection, records of the operation of the cathodic protection system must be maintained in accordance with 40 CFR 280.34 to demonstrate compliance with the performance standards in this section. These records must provide the results of inspections.

No cathodic protection is required for fiberglass-reinforced plastic UST systems. Therefore, this requirement does not apply.

25.2.6.29 Compatibility, USTR Section 502; 40 CFR 280.32

Owners and operators must use an UST system made of or lined with materials that are compatible with the substance stored in the UST system.

Fiberglass-reinforced plastic is compatible with unleaded and diesel fuel.

25.2.6.30 Repairs Allowed, USTR Section 503(a); 40 CFR 280.33(a)

Repairs to UST systems must be properly conducted in accordance with a code of practice developed by a nationally recognized association or an independent testing laboratory.

As of March 31, 1994, no major repairs have been required.

25.2.6.31 Repairs to Fiberglass-Reinforced Plastic Tanks, USTR 503(b); 40 CFR 280.33(b)

Repairs to fiberglass-reinforced plastic tanks may be made by the manufacturer's authorized representatives or in accordance with a code of practice developed by a nationally recognized association or an independent testing laboratory.

As of March 31, 1994, no major repairs have been required.

25.2.6.32 Repairs of Pipe Sections and Fittings, USTR Section 503(c); 40 CFR 280.33(c)

Metal pipe sections and fittings that have released product as a result of corrosion or other damage must be replaced. Fiberglass pipes and fittings may be repaired in accordance with the manufacturer's specifications.

No repairs have been conducted on the pipes or fittings.

25.2.6.33 Tightness Testing after Repairs, USTR Section 503(d); 40 CFR 280.33(d)

Repaired tanks and piping must be tightness tested in accordance with USTR Sections 603(d) and 604(b) within 30 days after the date of the completion of the repair except as provided in this section.

No repairs have been conducted on the tanks or piping.

25.2.6.34 Testing of Repaired Cathodically Protected UST System, USTR Section 503(e); 40 CFR 280.33(e)

Within 6 months following the repair of any cathodically protected UST system, the cathodic protection system must be tested in accordance with USTR Sections 501(b) and (c) to ensure that it is operating properly.

The current UST system does not require cathodic protection.

25.2.6.35 Records of all Repairs, USTR Section 503(f); 40 CFR 280.33(f)

UST system owners and operators must maintain records of each repair for the remaining operating life of the UST system to demonstrate compliance with the requirements of this section.

No repairs have been performed on the current system. However, when UST system repairs are necessary, the records will be maintained at WIPP for the life of the UST system.

25.2.6.36 Reporting, USTR Section 504(a); 40 CFR 280.34(a)

Owners and operators must submit the following information to the NMED: registration of all UST systems, including certification of installation for new UST systems (USTR, Part II); reports of all releases (including suspected releases, spills, and overfills) and confirmed releases; corrective actions planned or taken; and a notification before permanent closure or change in service.

The information in this requirement has been submitted to the NMED. Spill, overfill, and release reporting requirements are addressed by WIPP procedures.

25.2.6.37 Recordkeeping Requirements, USTR Section 504(b); 40 CFR 280.34(b)

Owners and operators must maintain the following information: a corrosion expert's analysis of site corrosion potential if corrosion protection equipment is not used, documentation of operation of corrosion protection equipment, documentation of UST system repairs, recent compliance with release detection requirements, and the results of the site investigation required prior to permanent closure.

The rubber boots are considered adequate to meet the corrosion protection requirements since the tank and piping consist of fiberglass-reinforced plastic. Metal flex elbow fittings are contained within the rubber boots, which separate them from contact with the ground.

WIPP procedures specify the retention time for record of UST system repairs.

A WIPP procedure addresses the retention of monitoring results. Correspondence WD 93:00280 contains the tank closure form as an attachment.

25.2.6.38 Availability and Maintenance of Records, USTR Section 504(c); 40 CFR 280.34(c)

The applicable records must be kept either at the UST site and immediately available for inspections by the NMED or at a readily available alternative site and be provided to the NMED upon request.

The UST records are maintained at the WIPP site.

25.2.6.39 Inspections, Monitoring, and Testing of USTs, USTR Section 505(a)

Any owner or operator of an UST shall, upon the request of the director or authorized NMED representatives, furnish information relating to the UST(s), conduct monitoring or testing, and allow the NMED representative to have access to the USTs and to copy all records relating to such tanks at all reasonable times. NMED officers, employees, or representatives will be allowed to inspect the UST system(s) and obtain samples of its contents and to conduct monitoring or testing of the tanks and its associated equipment or the surrounding soils, air, surface water, or ground water.

NMED personnel are allowed to inspect the UST systems at any reasonable time. They are also allowed to sample the contents of the USTs. Monitoring or testing of the tanks and associated equipment and contents or the surrounding soils, air, or surface or ground water may also be performed.

25.2.6.40 Inspections of UST Installations, Repairs or Modifications, or Removals or System Closures, USTR Section 505(c)

The owner and operator must allow the Director or authorized NMED representatives to be present at and inspect all UST system installations, replacements, repairs, substantial modifications, installations of leak detection systems, and UST system closures. To ensure that the inspector has an opportunity to be present during the steps in these procedures which are important to the prevention of releases, the owner or operator must give the NMED oral notice of the dates on which critical junctures in the installation, repair, substantial modification, or closure of the UST

system are to take place. Oral notice must be given at least 24 hours in advance of the commencement of the procedure. The inspector may require that critical junctures be performed from Monday through Friday during regular business hours.

A representative of the NMED UST Bureau was present at the installation of the new UST systems on February 10, 1992.

25.2.6.41 General Requirements for all UST Systems, USTR Section 600(a); 40 CFR 280.40(a)

Owners and operators of new and existing UST systems must provide a method, or combination of methods, of release detection that can detect a release from any portion of the tank and the connected underground piping that routinely contains product; is installed, calibrated, operated, and maintained in accordance with the manufacturer's instructions, including routine maintenance and service checks for operability or running condition; meets the performance requirements; and must be capable of detecting the leak rate or quantity specified for that method in the corresponding section of the rule with a probability of detection (pd) of 0.95 and a probability of false alarm (pfa) of 0.05.

The UST system uses interstitial monitoring to detect for releases. There are sensors between the walls at the lowest end of the piping and tank. Interstitial monitoring is adequate because it can detect a release through the inner wall in any portion of the double-walled tank and/or piping that regularly contains product.

25.2.6.42 Notification of Releases, USTR Section 600(b); 40 CFR 280.40(b)

When a release detection method operated in accordance with the performance standards in USTR Sections 603 and 604 indicates that a release may have occurred, owners and operators must notify the NMED in accordance with USTR Section 204 and Part VII.

No releases or suspected releases have occurred with the current UST system.

25.2.6.43 Schedule for Required Release Detection, USTR Section 600(c); 40 CFR 280.40(c)

Owners and operators of all UST systems must comply with the release-detection requirements of this part by December 22 of the year listed in a table.

New UST systems were installed on February 10, 1992. The new systems meet the release-detection requirements of this part.

25.2.6.44 Failure to Comply with Release-Detection Requirements, USTR Section 600(d); 40 CFR 280.40(d)

Any existing UST system that cannot apply a release-detection method that complies with the requirements of this part must complete the closure procedures for the system by the date indicated in USTR Section 600(c) (Section 25.2.6.43).

The new UST system at WIPP uses a release-detection method that complies with the requirements of this part. Therefore, Section USTR 600(d) does not apply to the WIPP UST systems.

25.2.6.45 Requirements for Tanks of Petroleum UST Systems, USTR Section 601(a); 40 CFR 280.41(a)

Tanks must be monitored at least every 30 days for releases using one of the methods listed in USTR Sections 603(d)-(h) (see Sections 25.2.6.54 through 25.2.6.58) except that UST systems that meet the performance standards and the monthly inventory control requirements may use tank tightness testing at least every 5 years until December 22, 1998, or until 10 years after the tank is installed or upgraded, whichever is later; UST systems that do not meet the performance standards may use monthly inventory controls and annual tank tightness testing until December 22, 1998, when the tank must be upgraded or permanently closed; and tanks with a capacity of 550 gallons or less may use weekly tank gauging.

The interstitial monitoring system meets the release-detection requirement. Should the interstitial system become inoperable, monthly inventory controls will be used. In this contingency situation, tank tightness testing will be performed every 5 years.

25.2.6.46 Requirements for Piping of Petroleum UST Systems, USTR Section 601(b); 40 CFR 280.41(b)

Underground piping that routinely contains regulated substances must be monitored for releases in a manner that meets the requirements for pressurized or suction piping.

See Section 25.2.6.48, which specifies the requirements for suction piping as used in the UST systems at WIPP.

25.2.6.47 Requirements for Pressurized Piping, USTR Section 601(b)(1); 40 CFR 280.41(b)(1)

Underground piping that conveys regulated substances under pressure must be equipped with an automatic line leak detector and have an annual line-tightness test or have monthly monitoring conducted.

This requirement is not applicable since the current UST system operates under suction piping.

25.2.6.48 Requirements for Suction Piping, USTR Section 601(b)(2); 40 CFR 280.41(b)(2)

Underground piping that conveys regulated substances under suction must either have a line tightness test conducted at least every 3 years in accordance with USTR Section 604(b) or use a monthly monitoring method conducted in accordance with USTR § 604(c). No release detection is required for suction piping that is designed and constructed to meet the following standards: the below-grade piping operates at less than atmospheric pressure; the below-grade piping is sloped so that the contents of the pipe will drain back into the storage tank if the suction is released; only one check valve is included in each suction line; the check valve is located directly below and as close as practical to the suction

pump; and a method is provided that allows compliance with this section to be readily determined.

No release detection is required on the piping since the system was designed and constructed to meet each of the above requirements.

25.2.6.49 Requirements for Hazardous Substance UST Systems, USTR Section 602; 40 CFR 280.42

A number of release-detection requirements are specified for UST systems that contain hazardous substances.

WIPP has no UST systems that contain hazardous substances. Therefore, these requirements do not apply to this facility.

25.2.6.50 Methods of Release Detection for Tanks, USTR Section 603; 40 CFR 280.43

A number of requirements for the acceptable release-detection methods are specified. The release-detection methods described are: inventory control, manual tank gauging, tank-tightness testing, automatic tank gauging, vapor monitoring, ground-water monitoring, interstitial monitoring, and other methods.

See Sections 25.2.6.51 through 25.2.6.59.

25.2.6.51 Inventory Control, USTR Section 603(a); 40 CFR 280.43(a)

Product inventory control (or another test of equivalent performance) must be conducted monthly to detect a release of at least 1.0 percent of flow-through plus 130 gallons on a monthly basis in the following manner: inventory volume measurements for regulated substance inputs, withdrawals, and the amount still remaining in the tank are recorded each operating day; the equipment used is capable of measuring the level of product over the full range of the tank's height to the nearest one-eighth of an inch; the regulated substance inputs are reconciled with delivery receipts by measurement of the tank inventory volume before and after delivery; deliveries are made through a drop tube that extends to within 1 foot of the tank bottom; product dispensing is metered

and recorded within the local standards for meter calibration or an accuracy of 6 cubic inches for every 5 gallons of product withdrawn; and the measurement of any water level in the bottom of the tank is made to the nearest one-eighth of an inch at least once a month.

Inventory control is a "contingency" method used only if the interstitial monitoring system fails. If this situation arises, there is a WIPP procedure addressing the requirements for using this method. Compliance with the requirement for a drop tube extending to within 1 foot of the tank bottom has been verified through discussions with the installing organization. The stick reading can measure to the nearest one-eighth of an inch.

25.2.6.52 Manual Tank Gauging, USTR Section 603(b); 40 CFR 280.43(b)

Manual tank gauging must meet the following requirements: tank liquid level measurements are taken at the beginning and ending of a period of at least 36 hours during which no liquid is added to or removed from the tank; level measurements are based on an average of two consecutive stick readings at both the beginning and ending of the period; the equipment used is capable of measuring the level of product over the full range of the tank's height to the nearest one-eighth of an inch; a leak is suspected and subject to the requirements of USTR Part VII if the variation between beginning and ending measurements exceeds the weekly or monthly standards in the table provided.

This requirement is not applicable since the UST system uses interstitial monitoring as the primary method of release detection.

25.2.6.53 Tank Tightness Testing, USTR Section 603(c); 40 CFR 280.43(c)

Tank tightness testing (or another test of equivalent performance) must be capable of detecting a 0.1-gallon-per-hour leak rate from any portion of the tank that routinely contains product while accounting for the effects of thermal expansion or contraction of the product, vapor pockets, tank deformation, evaporation or condensation, and the location of the water table.

Tank tightness testing is not required to be performed for the current UST setup. If the interstitial monitoring method fails, tank tightness testing will be performed every 5 years as part of the inventory control method.

25.2.6.54 Automatic Tank Gauging, USTR Section 603(d); 40 CFR 280.43(d)

Equipment for automatic tank gauging that tests for the loss of product and conducts inventory control must meet the following requirements: the automatic product level monitor test can detect a 0.2-gallon-per-hour leak rate from any portion of the tank that routinely contains product, and inventory control (or another test of equivalent performance) is conducted in accordance with the requirements of USTR Section 603(a).

This method is not applicable for the current UST system. See Sections 25.2.6.51, 25.2.6.53, and 25.2.6.57.

25.2.6.55 Vapor Monitoring, USTR Section 603(e); 40 CFR 280.43(e)

Testing or monitoring for vapors within the soil gas of the excavation zone must meet the following requirements: the materials used as backfill are sufficiently porous (e.g., gravel, sand, crushed rock) to readily allow diffusion of vapors from releases into the excavation area; the stored regulated substance (e.g., gasoline), or a tracer compound placed in the tank system, is sufficiently volatile to result in a vapor level that is detectable by the monitoring devices located in the excavation zone in the event of a release from the tank; the measurement of vapors by the monitoring device is not rendered inoperative by the ground water, rainfall, soil moisture, or other known interferences so that a release could go undetected for more than 30 days; the level of background contamination in the excavation zone will not interfere with the method used to detect releases from the tank; the vapor monitors are designed and operated to detect any significant increase in concentration above background of the regulated substance stored in the tank system, a component or components of that substance, or a tracer compound placed in the tank system; in the UST excavation zone, the site is assessed to establish the number and positioning of monitoring wells that will detect releases within the excavation zone from any portion of the tank that

routinely contains product; and monitoring wells are clearly marked and secured to avoid unauthorized access and tampering.

This method is not applicable for the current UST system. See Sections 25.2.6.51, 25.2.6.53, and 25.2.6.57.

25.2.6.56 Ground-Water Monitoring, USTR Section 603(f); 40 CFR 280.43(f)

Testing or monitoring for liquids in the ground water must meet the following requirements: the regulated substance stored is immiscible in water and has a specific gravity of less than 1; ground water is never more than 20 feet from the ground surface, and the hydraulic conductivity of the soil(s) between the UST system and the monitoring wells or devices is not less than 0.01 cm/sec (e.g., the soil should consist of gravels, coarse to medium sands, coarse silts, or other permeable materials); the slotted portion of the monitoring well casing must be designed to prevent the migration of natural soils or filter pack into the well and to allow the entry of regulated substances on the water table into the well under both high and low ground-water conditions; monitoring wells shall be sealed from the ground surface to the top of the filter pack; monitoring wells or devices intercept the excavation zone or are as close to it as is technically feasible; the continuous monitoring devices or manual methods used can detect the presence of at least one-eighth of an inch of free product on top of the ground water in the monitoring wells; within and immediately below the UST system excavation zone, the site is assessed to ensure compliance with the first five requirements of this section and to establish the number and positioning of the monitoring wells or devices that will detect releases from any portion of the tank that routinely contains product; and monitoring wells are clearly marked and secured to avoid unauthorized access and tampering.

The WIPP site has a variance from ground-water requirements. See Sections 25.2.6.51, 25.2.6.53, and 25.2.6.57.

25.2.6.57 Interstitial Monitoring, USTR Section 603(g); 40 CFR 280.43(g)

Interstitial monitoring between the UST system and a secondary barrier immediately around or beneath it may be used, but only if the system is designed, constructed, and installed to detect a leak from any portion of the tank that routinely contains product and also meets one of the following requirements: for double-walled UST systems, the sampling or testing method can detect a release through the inner wall in any portion of the tank that routinely contains product; for UST systems with a secondary barrier within the excavation zone, the sampling or testing method used can detect a release between the UST system and the secondary barrier; the secondary barrier around or beneath the UST system consists of artificially constructed material that is sufficiently thick and impermeable (at least 10^{-6} cm/sec for the regulated substance stored) to direct a release to the monitoring point and permit its detection; the barrier is compatible with the regulated substance stored so that a release from the UST system will not cause a deterioration of the barrier, allowing a release to pass through undetected; for cathodically protected tanks, the secondary barrier must be installed so that it does not interfere with the proper operation of the cathodic protection system; the ground water, soil moisture, or rainfall will not render the testing or sampling method used inoperative so that a release could go undetected for more than 30 days; the site is assessed to ensure that the secondary barrier is always above the ground water and is not located in a 25-year flood plain, unless the barrier and monitoring designs are for use under such conditions; monitoring wells are clearly marked and secured to avoid unauthorized access and tampering; and, for tanks with an internally fitted liner, an automated device can detect a release between the inner wall of the tank and the liner, and the liner is compatible with the substance stored.

The interstitial monitoring system is the primary method of release detection for the UST system. The as-built engineering drawings verify that this method can detect a release through the inner wall in any portion of the tank that routinely contains product.

25.2.6.58 Other Methods of Detecting Releases, USTR Section 603(h); 40 CFR 280.43(h)

Any other method may be used if it can detect a 0.2-gallon-per-hour leak rate or a release of 150 gallons within a month with a probability of detection of 0.95 and a probability of false alarm of 0.05, and it has been approved by the NMED.

The WIPP does not use any methods of release detection other than the ones described in Sections 25.2.6.51 and 25.2.6.57.

25.2.6.59 Methods of Release Detection of Piping, USTR Section 604; 40 CFR 280.44

Each method of release detection for piping used to meet the requirements of USTR Section 601 must be conducted in accordance with specific requirements for automatic line leak detectors, line tightness testing, or applicable tank methods.

Since the system meets the requirements of USTR Section 601(b)(2), line leak detectors are not required.

25.2.6.60 Release Detection Recordkeeping, USTR Section 605; 40 CFR 280.45

All UST system owners and operators must maintain records in accordance with USTR Section 504 that demonstrate compliance with all applicable requirements in Part VI. All written performance claims pertaining to any release detection system used, and the manner in which these claims have been justified or tested by the equipment manufacturer or installer, must be maintained for 5 years, or for another reasonable period of time determined by the NMED, from the date of installation. The results of any sampling, testing, or monitoring must be maintained for at least 1 year, or for any reasonable period of time determined by the NMED, except that the results of tank tightness testing conducted in accordance with USTR Section 603(c) must be retained until the next test is conducted. Written documentation of all calibration, maintenance, and repair of release-detection equipment permanently located on site must be maintained for at least 1 year after the servicing work has been completed or for any reasonable time period determined by the NMED. Any schedules

of required calibration and maintenance provided by the release-detection equipment manufacturer must be retained for 5 years from the date of installation.

The WID Purchasing Department maintains the manufacturer's equipment and performance claims records. The Records Inventory and Disposition Schedule (RIDS) discusses the maintenance of these records. The RIDS adequately addresses the record retention requirements of this section. According to the manufacturer of the tanks, no calibration or maintenance is required for the current configuration. However, if modifications are made, these functions will need to be performed.

25.2.6.61 Reporting of Suspected Releases, USTR Section 700; 40 CFR 280.50

Owners and operators of UST systems must report suspected releases to the NMED within 24 hours and follow the procedures in USTR Section 702 for any of the following conditions:

- *The discovery by owners and operators or others of released regulated substances at the UST site or in the surrounding area*
- *Unusual operating conditions*
- *Monitoring results from a release detection method that indicate that a release may have occurred unless the monitoring device is found to be defective and is immediately repaired and subsequent monitoring does not confirm the initial results or, in the case of inventory control, a second month of data does not confirm the initial result.*

No releases or suspected releases have occurred from the current UST system. Should a suspected release occur, a WIPP procedure outlines the required steps above.

25.2.6.62 Investigation of Off-Site Impacts, USTR Section 701; 40 CFR 280.51

When required by the NMED, owners and operators of UST systems must follow the procedures in USTR Section 702 to determine if the UST system is the source of off-site impacts.

NMED has not requested off-site impact information.

25.2.6.63 Release Investigation and Confirmation Steps, USTR Section 702; 40 CFR 280.52

Unless corrective action is initiated in accordance with USTR Parts XII and XIII, owners and operators must immediately investigate and confirm all suspected releases of regulated substances that require reporting under USTR Section 700 within 7 days using a system test and/or a site check as described in more detail in this part of the regulations. If a leak in the UST system is found to exist, the system must be repaired, replaced, or upgraded as needed.

WID procedures indicate the appropriate testing, investigating, reporting, and corrective action to be taken if a release of regulated substances is suspected. To date, there have been no leaks in the current UST system.

25.2.6.64 Reporting and Cleanup of Large Spills and Overfills, USTR Section 703(a); 40 CFR 280.53(a)

Owners and operators of UST systems must contain and immediately clean up a spill or overfill and report it to the NMED within 24 hours. Corrective action must be initiated in accordance with USTR Section 204. If a spill or overfill of a petroleum product results in a release to the environment that exceeds 25 gallons [or a hazardous substance spill results in a release to the environment that equals or exceeds its reportable quantity under CERCLA (40 CFR Part 302)], corrective action must be initiated in accordance with USTR Part XII or XIII.

There have been no large spills or overfills with the current UST setup. WID procedures address the requirements with respect to petroleum UST systems (i.e., as specified in USTR Part XII). No hazardous substances are contained in UST systems at WIPP; therefore, USTR Part XIII does not apply.

25.2.6.65 Reporting and Cleanup of Small Spills and Overfills, USTR Section 703(b); 40 CFR 280.53(b)

Owners and operators of UST systems must contain and immediately clean up a spill or overfill of a petroleum product that is less than 25 gallons and a spill or overfill of a hazardous substance that is less than the reportable quantity. If cleanup cannot be accomplished within 24 hours, owners and operators must immediately notify the implementing agency.

Small spills and overfills have been properly contained and cleaned up. WID procedures address this requirement with respect to petroleum UST systems. No UST systems are used to contain hazardous substances at WIPP.

25.2.6.66 Temporary Closure, USTR Section 800; 40 CFR 280.70

When an UST system is temporarily closed, owners and operators must continue operation and maintenance of corrosion protection in accordance with USTR Section 501 and any release detection in accordance with USTR Part VI. USTR Parts VII, XII, and XIII and Section 204 must be complied with if a release is suspected or confirmed. However, release detection is not required as long as the UST system is empty. When an UST system is temporarily closed for 3 months or more, the vent lines must be left open and functioning, and all other lines, pumps, manways, and axillary equipment must be capped and secured.

Documentation of the original tank closures was submitted to NMED. No temporary closure took place.

25.2.6.67 Permanent Closure and Changes in Service, USTR Section 801(a); 40 CFR 280.71(a)

At least 30 days before beginning either permanent closure or a change in service, owners and operators must notify the NMED unless such action is in response to corrective action.

The closure documentation for the old UST systems was submitted to the NMED within the 30-day requirement for beginning permanent closure.

25.2.6.68 Permanent Closure of a Tank, USTR Section 801(b); 40 CFR 280.71(b)

To permanently close a tank, the owners and operators must empty and clean it by removing all liquids and accumulated sludges. The tanks must be either removed from the ground or filled with an inert solid material.

The closure documentation for the old UST system is maintained at the WIPP site. These USTs were emptied, cleaned, and removed from the ground as required.

25.2.6.69 Change in Service, USTR Section 801(c); 40 CFR 280.71(c)

Before a change in service in which the use of a UST system is continued for the storage of a nonregulated substance, owners and operators must empty and clean the tank by removing all liquid and accumulated sludge and conduct a site assessment in accordance with USTR Section 802.

There was no change in service for the old UST system.

25.2.6.70 Assessing the Site, USTR Section 802(a); 40 CFR 280.72(a)

Before permanent closure or a change in service is completed, owners and operators must measure for the presence of a release where contamination is most likely to be present at the UST site as required under this subsection.

The UST site was assessed prior to permanent closure of the old UST system. The closure documentation for the old UST systems is maintained at the WIPP site.

25.2.6.71 Corrective Action, USTR Section 802(b); 40 CFR 280.72(b)

If contaminated soils, contaminated ground water, or free product as a liquid or vapor are discovered, owners and operators must begin corrective action in accordance with USTR Parts XII or XIII.

The WIPP has procedures in place which address the required actions to take if a release or suspected release is identified. See 25.2.6.80 for further information.

25.2.6.72 Applicability to Previously Closed UST Systems, USTR Section 803; 40 CFR 280.73

When directed by the NMED, the owner and operator of an UST system permanently closed before December 22, 1988, must assess the excavation zone and close the UST system if releases from the UST may pose a current or potential threat to human health and the environment.

No UST systems at WIPP were permanently closed before December 22, 1988.

25.2.6.73 Closure Records, USTR Section 804; 40 CFR 280.74

Owners and operators must maintain records in accordance with USTR Section 504 that demonstrate compliance with closure requirements under this part. The results of the excavation zone assessment required in USTR Section 802 (Section 25.2.6.70) must be maintained for at least 3 years after completion of permanent closure or change in service.

A tank closure for the old UST systems was submitted to NMED. The records are maintained at WIPP.

25.2.6.74 Applicability of Financial Responsibility, USTR Section 900; 40 CFR 280.90

State and Federal government entities whose debts and liabilities are the debts and liabilities of a State or the United States are exempt from the requirements of USTR Part IX, "Financial Responsibility."

As the owner of WIPP, the DOE is exempt from the financial responsibility requirements of this part because DOE is a Federal government entity whose debts and liabilities are the debts and liabilities of the United States.

25.2.6.75 Informal Review, USTR Section 1000

Any owner or operator of an UST who disagrees with a decision made by NMED personnel pursuant to the USTRs may have the decision reviewed by submitting a written request for informal

review to the NMED. The request must be postmarked within 15 days of the date of the decision. The grounds for the petitioner's objection must be specified.

This provision has not been invoked at WIPP.

25.2.6.76 Review by the Director on Written Memoranda, USTR Section 1001

Within 20 days after the NMED has made a determination under USTR Section 1000, the petitioner may appeal the determination to the NMED Director by requesting a review on written memoranda in writing. The grounds for the objection to the determination must be specified. The request must be accompanied by all written information, documentation, and arguments that the petitioner wants the Director to consider.

This provision has not been invoked at WIPP.

25.2.6.77 Compliance with other Regulations, USTR Section 1100

Compliance with the USTRs does not relieve a person of the obligation to comply with other applicable State and Federal regulations.

Compliance with the other applicable Federal and State regulations is discussed elsewhere in this document (see Chapters 2 through 24 and 25 through 38, respectively).

25.2.6.78 Construction, USTR Section 1101

The USTRs shall be liberally construed to effectuate the purpose of the New Mexico Hazardous Waste Act.

The USTRs are liberally construed to effectuate the purpose of the New Mexico Hazardous Waste Act with respect to the sections in this act that pertain to managing UST systems containing hazardous (i.e., regulated) substances.

25.2.6.79 Severability, USTR Section 1102

If any part, section, or application of the USTRs is held invalid, the remainder (or its application to other situations or persons) shall not be affected.

No action is required.

25.2.6.80 Cleanup Requirements for Releases from Petroleum UST Systems, USTR Section 1200(A)

All releases must be cleaned up through soil remediation, ground- and surface-water remediation, and any other appropriate procedures in a manner protective of health, public welfare, and the environment.

No releases have occurred with the current UST system to date.

25.2.6.81 Additional Corrective Action Requirements for Petroleum UST Systems, USTR Sections 1200(B)-1222

Additional corrective action requirements specify types of releases, notification and reporting requirements, types of actions required for remediation and reclamation involving specific releases, and provisions for monitoring.

No releases have occurred during this reporting period. Consequently, these requirements are not applicable to WIPP, and no action is required. WID procedures are in place to address them, however, should corrective actions involving petroleum USTs become necessary in the future.

25.2.6.82 Corrective Action for Hazardous Substance UST Systems, USTR Sections 1300-1320 (Part XIII)

Requirements for corrective actions for hazardous substance UST systems are specified in this part of the USTRs.

There are no hazardous substance UST systems at WIPP. Furthermore, it is very unlikely that such systems would be installed at this facility. Therefore, Part XIII of the USTRs (Sections 1300-1320) does not apply to WIPP.

25.2.6.83 Certification Requirements for Tank Installers and Repairers, USTR Sections 1400-1417 (Part XIV)

Certification by the NMED is required for all individuals and companies that install or repair UST systems in New Mexico. Certification is based on field experience, training, and a written and an on-site examination.

Documentation of certification of the contractor that installed the new UST systems at WIPP is retained at the WIPP.

25.2.6.84 Priorities, USTR Section 1505

NMED priorities for corrective action at sites contaminated by releases of regulated substances from USTs are established in this section.

If a release is detected from the UST systems at WIPP, the action to be taken by the NMED will depend on the extent and nature of the release.

See Section 25.2.6.85 for the requirements for a minimum site assessment.

25.2.6.85 Minimum Site Assessment, USTR Section 1508

Owners and operators are strictly liable for the NMED's costs of taking corrective action at a site unless the owner or operator has conducted a minimum site assessment as required by these regulations. To complete such an assessment, the owner and operator must report, investigate, and confirm the release pursuant to USTR Part VII and determine the immediate extent, magnitude, and impact of contamination by conducting investigations and reporting to the NMED (USTR Sections 1203 through 1206). The owner or operator shall include with the report of the on-site investigation a copy of any insurance policies which are in effect on the date of the report and any policies in existence at the time

the release may have occurred. The NMED shall notify the owner or operator of any inadequacies in the report within 30 days of its receipt of the on-site investigation report. The owner or operator shall, within 15 days of such notice of inadequacy, modify the report and resubmit it to the NMED for review and written approval. If the modified report does not meet the requirements of USTR Section 1205, the owner and operator shall be deemed not to have conducted a minimum site assessment.

If a minimum site assessment is deemed necessary, it will be prepared and submitted to meet the requirements specified. The transmittal of insurance policies is not required for a Federal facility; therefore, the report would not be accompanied by a copy of such policies.

26.0 NEW MEXICO SOLID WASTE ACT

26.1 Summary of the Law

With the enactment of the Solid Waste Act (SWA) in 1990, the Legislature of the State of New Mexico authorized and directed the establishment of a comprehensive and integrated solid waste management program at both the State and local levels. This legislation directs the planning and regulation of the reduction, storage, collection, transportation, and disposal of solid waste and authorizes the establishment of a system of permits for the construction, operation, and, if applicable, closure and postclosure maintenance of solid waste facilities.

The SWA is implemented by the New Mexico Solid Waste Management Regulations (SWMRs). These regulations are applicable to WIPP because of the presence of a construction landfill and infectious wastes at the facility.

26.2 Compliance Status of the Regulatory Requirements

Table 26-1 summarizes the applicable requirements and their compliance status under the State of New Mexico's Solid Waste Act. The text provides more detail on the compliance status of each requirement.

TABLE 26-1. New Mexico Solid Waste Act - Summary of Regulatory Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
Solid Waste Management Regulations (SWMR-3), § 104	Applicability of regulations	**UP TO DATE** Landfill on WIPP site [Section 26.2.1]
SWMR-3, § 106	General requirements	**UP TO DATE** Landfill managed as required [Section 26.2.2]

Table 26-1 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
SWMR-3, § 107	Prohibited acts	**UP TO DATE** Wastes specified that are excluded from the landfill [Section 26.2.3]
SWMR-3, § 109	Recordkeeping and annual reports	**UP TO DATE** Documentation process in place [Section 26.2.4]
SWMR-3, §§ 201, 202, 209, 210	Permit application requirements	**NOT APPLICABLE** Landfill exempt [Section 26.2.5]
SWMR-3, Part IV	Solid waste facility operation requirements	**UP TO DATE** Operated as required [Section 26.2.6]
SWMR-3, Part V	Closure and postclosure requirements	**NOT APPLICABLE** Landfill exempt [Section 26.2.7]
SWMR-3, Part VI	Operator certification	**NOT APPLICABLE** Landfill exempt [Section 26.2.8]
SWMR-3, § 706(C)	Storage and containment requirements for infectious waste	**UP TO DATE** Storage and containment procedures established [Section 26.2.9]

Table 26-1 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
SWMR-3, § 706(D)	Operational requirements for infectious waste treatment, storage, and disposal facilities	**ACHIEVED** Operational procedures established [Section 26.2.10]
SWMR-3, § 706(E)	Treatment and disposal of infectious waste	**ACHIEVED** Off-site incineration or steam sterilization used [Section 26.2.11]
SWMR-3, § 706(F)	Requirements for infectious waste transporters	**NOT APPLICABLE** Transport by off-site contractor [Section 26.2.12]
SWMR-3, § 711	Manifest requirements (to accompany each load of infectious waste)	**UP TO DATE** Manifest provided [Section 26.2.13]

26.2.1 Applicability of Regulations, SWMR-3, § 104

Subpart 104 specifies that these regulations apply to all transporters of solid waste and to owners and operators of storage, transfer, processing, transformation, recycling, or disposal facilities.

A construction landfill is located on the WIPP site. The landfill is used only for nonhazardous waste from construction activities; no hazardous wastes or materials are allowed.

26.2.2 General Requirements for Processing and Disposal of Solid Waste, SWMR-3, § 106

All solid waste must be processed or disposed of by means in accordance with Environmental Improvement Board regulations, including recycling, composting, transformation, or landfilling. Generators of solid waste must provide containers for the solid waste except for construction and demolition debris, yard refuse, and white goods.

The construction landfill is managed in accordance with applicable State and Federal requirements. The requirements and rules of operation are described in a WIPP procedure that provides guidelines for the operation of the construction landfill in a manner that is protective of human health and the environment and ensures compliance with applicable local, State, and Federal laws and regulations. Because the landfill is limited to construction debris and nonhazardous solid waste, no containers are provided.

26.2.3 Prohibited Acts, SWMR-3, § 107

Subpart 107 specifies prohibited acts including the following: disposal of solid waste in places other than a permitted solid waste facility; disposal of regulated waste such as special waste, hazardous waste, radioactive materials, and petroleum waste; disposal of bulk liquids; and disposal of any solid wastes that are known to be harmful to the environment or hazardous to public health or safety.

The following wastes are excluded from the WIPP landfill:

- Radioactive materials
- Hazardous or other regulated materials, including petroleum products
- Liquids, or containers that contain liquids
- Any recyclable materials as determined by the Westinghouse Waste Isolation Division (WID).

Construction debris that may be disposed of in the landfill are timers, pipes, excavation soil (if not contaminated with hazardous materials/wastes), concrete, packing materials, sheet metal, glass, and wood.

26.2.4 Recordkeeping and Annual Reports, SWMR-3, § 109

Operators of solid waste facilities shall make and maintain records during the active life of the facility. Operators shall submit annual reports to the Secretary of the New Mexico Environment Department (NMED) within 45 days after each anniversary date of any permit or other approval given.

The records required are found on the WID Construction Debris Disposal Form (WP Form 1633), which requires the name, company, date, description and estimated volume of debris, and signatures of the landfill user and of the landfill custodian. No permit is required (see Section 26.2.5). Therefore, an annual report is not necessary.

26.2.5 Permit Application Requirements, SWMR-3, §§ 201, 202, 209, 210

Any person seeking a permit to construct, operate, or modify a solid waste facility must file an application.

This landfill is exempted from permit application requirements because it receives construction debris only and because it is located at the same site where the construction debris is generated. Therefore, a permit is not required for this landfill.

26.2.6 Solid Waste Facility Operation, SWMR-3, Part IV

A solid waste facility must be operated so that it does not cause a public nuisance or create a potential hazard to public health or welfare.

The construction landfill is operated according to WID procedures that ensure protection of public health and welfare.

26.2.7 Landfill Closure and Postclosure Requirements, SWMR-3, Part V

Part V of the SWMRs specifies a number of landfill closure and postclosure requirements including the installation of a final cover, preparing and implementing a land-use plan, a schedule for completing all closure work, an approved postclosure care and monitoring plan, and annual reports.

This landfill is exempted from these requirements because it receives construction debris only and because it is located at the same site (i.e., WIPP) where the construction debris is generated. Therefore, closure and postclosure requirements are not applicable.

26.2.8 Operator Certification, SWMR-3, Part VI

Part VI of SWMR-3 provides requirements for operator certification: certification of operators is required as of January 31, 1994. The amount and type of personnel training and experience are specified for landfills and for other types of facility.

This landfill is exempted from these requirements because it receives construction debris only and because it is located at the same site (i.e., WIPP) where the construction debris is generated. Therefore, operator certification is not required.

26.2.9 Storage and Containment of Infectious Waste, SWMR-3, § 706(C)

Subpart 706 (C) specifies infectious waste storage and containment requirements, including waste segregation; specifications for container integrity; container labeling and marking; and storage and containment area access, integrity, and marking.

The following practices are ongoing at WIPP:

- Access to the collection and storage area is limited to trained medical personnel who are vaccinated against hepatitis.
- Special containers are easily identifiable through the use of enclosed red-lined bio-hazard bags.
- All sharps are sealed in containers that are leak-proof, puncture-proof, and tamper-proof. These containers are then enclosed in plastic bio-hazard bags.
- All containment bags are clearly identifiable with red lining as specified by 29 CFR 1910.145(f)(4).
- No infectious waste containers are reused.

- Storage and containment areas are in an enclosed, clearly marked environment.
- No compaction or grinding devices are used to reduce the volume of infectious waste.

26.2.10 Infectious Waste Treatment, Storage, and Disposal Facilities, SWMR-3, § 706(D)

Section 706(D) specifies operational requirements for infectious waste treatment, storage, and disposal facilities. Included is a requirement for the preparation and maintenance of a management plan that identifies the type of waste generated or handled; the segregation, packaging, labeling, collection, storage, and transportation procedures to be implemented; the treatment or disposal methods to be used; the transporter and disposal facility to be used; and the person responsible for the management of the infectious waste.

The WID Transportation Manual and the Occupational Health Manual address the operational requirements for infectious waste as specified in this part.

26.2.11 Treatment and Disposal of Infectious Waste, SWMR-3, § 706(E)

Several methods are specified for the treatment and disposal of infectious waste. These methods include controlled incineration, heat sterilization, discharge to a sewage treatment system, and landfilling.

The method of treatment and disposal is incineration or steam sterilization at an off-site facility. Transportation is provided by an off-site subcontractor. Transfer is monitored by WID personnel.

26.2.12 Infectious Waste Transporters, SWMR-3, § 706(F)

Requirements for the transportation of infectious waste are specified in this section.

WIPP does not transport infectious waste. Transportation is accomplished by an off-site subcontractor.

26.2.13 Manifest Requirements, SWMR-3, § 711

A manifest must accompany each shipment of infectious waste. Each manifest must include information on the waste generator, transporter, waste treatment facility, the type of waste, and any special instructions.

Medical waste shipments are accompanied by a shipment manifest that includes the required information.

27.0 NEW MEXICO ENVIRONMENTAL IMPROVEMENT ACT

27.1 Summary of the Law

The enactment of the New Mexico Environmental Improvement Act (EIA; §§ 74-1-1 through 74-1-10 NMSA 1978) created the Environmental Improvement Board (EIB) to promulgate regulations and standards to protect health and safety and the environment. The EIA also created the Environmental Improvement Division, now known as the New Mexico Environment Department (NMED). The act directs the NMED to assume responsibility for environmental management and protection in order to ensure an environment that confers optimal health, safety, comfort, and economic and social well-being on its inhabitants. In carrying out its responsibilities, the NMED is directed to maintain, develop, and enforce regulations and standards in areas including water supply, liquid waste, air quality, radiation control, health and safety, hazardous wastes, and underground storage tanks. As discussed in Chapters 25 through 31 of this report, many of these regulations and standards are applicable to WIPP. These include the Hazardous Waste Act and the implementing hazardous waste management and underground storage tank regulations (Chapter 25), the Solid Waste Act (Chapter 26), the Ground Water Protection Act (Chapter 28), the Air Quality Control Act (Chapter 29), the Water Quality Act (Chapter 30) and Water Supply Regulations (Chapter 31).

27.2 Compliance Status of the Law

The DOE will continue to comply with all applicable New Mexico environmental regulations and standards as demonstrated in the following chapters.

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28.0 NEW MEXICO GROUND WATER PROTECTION ACT

28.1 Summary of the Law

The Ground Water Protection Act (GWPA; § 74-6B NMSA 1978) was enacted in 1990 in response to the threat facing public health and safety and the environment from pollution of ground-water resources from leaking underground storage tanks (USTs). The purpose of this act includes the provision of substantive direction that allows the State of New Mexico to take corrective action at sites contaminated by leakage from USTs.

The GWPA is implemented by the regulations of the New Mexico Environment Department (NMED), NMED-92-1, *Ground Water Protection Act Corrective Action Fund Regulations*. These regulations provide guidelines for the payment or reimbursal of the costs of a minimum site assessment and corrective action and specify the requirements for owners or operators of leaking USTs.

The GWPA is also implemented by the Ground Water Protection Act Regulations that are provided in the New Mexico Underground Storage Tank Regulations (USTR) as Part XV. These regulations are discussed in Chapter 25. WIPP has installed two new UST systems that meet the new standards and requirements for USTs. Procedures are in place for routine operations regarding the tanks and for dealing with any spills or releases from the UST systems. Two sections in Chapter 25 (Sections 25.2.6.84 and 25.2.6.85) deal specifically with the applicable New Mexico Ground Water Protection Act Regulations.

28.2 Compliance Status of the Regulatory Requirement

Table 28-1 summarizes the general regulatory requirement and its compliance status under the implementing regulation of the New Mexico Ground Water Protection Act. See also Sections 25.2.2.84 and 25.2.2.85 for the applicable portions of the Ground Water Protection Act Regulations.

TABLE 28-1. New Mexico Ground Water Protection Act - Summary of Regulatory Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
New Mexico Environment Department 92-1, *Ground Water Protection Act Corrective Action Fund Regulations*		
NMED 92-1	Reimbursement of costs from corrective actions for spills/releases from USTs	**NOT APPLICABLE** No spills or leaks from new UST systems [Section 28.2.1]

28.2.1 Corrective Action for Spills/Releases from USTs, NMED-92-1

The owners or operators of USTs that release a regulated substance must take appropriate corrective action. The NMED will reimburse certain costs associated with performing a minimum site assessment and other corrective actions taken for spills or releases from USTs.

NMED-92-1 provides a vehicle for reimbursing the owners and operators of leaking UST systems with some of the costs spent on corrective action and minimum site assessments performed. As a Federal agency, it is doubtful that the DOE would seek to be reimbursed for any such corrective actions taken at WIPP.

29.0 NEW MEXICO AIR QUALITY CONTROL ACT

29.1 Summary of the Law

The New Mexico Air Quality Control Act (§§ 74-2-1 through 74-2-22 NMSA 1978), based primarily on the Clean Air Act (CAA; see Chapter 6), is not generally more stringent than the CAA except in areas of air pollution prevention that have not been preempted by the CAA and are not precluded by the limiting provisions of the Air Quality Control Act. The Air Quality Control Act is implemented by the Air Quality Control Regulations (AQCRs).

Under 40 CFR Part 70, operating permits are required for both area and major sources. The New Mexico Environment Department (NMED) will implement the Federal requirements under AQCR 770, and AQCR 771 will contain the fee structure for the operating permit program. However, these AQCRs have not yet been issued. At this time, emission limits for area sources have not been established, and major source emission thresholds are being used to determine which facilities require operating permits for both area and major sources under 40 CFR Part 70.

29.2 Compliance Status of the Regulatory Requirements

Table 29-1 summarizes the compliance status of the AQCR requirements that are potentially applicable to WIPP. The text provides more detail on the compliance status of each requirement. It should be noted that AQCRs 770 and 771 will deal with the State operating permit program; however, these AQCRs have not yet been issued and, therefore, are not included in this section. Furthermore, based on major source emission thresholds, emissions from WIPP are significantly below the emission levels that require the submittal of an operating permit application.

TABLE 29-1. Air Quality Control Act - Summary of Regulatory Compliance Status

CITATION	REQUIREMENTS	COMPLIANCE STATUS
New Mexico Air Quality Control Regulations (AQCRs)		
Air Quality Control Regulation (AQCR) 301	Regulations to control open burning	**ACHIEVED** Open-burning permit (see also Section 29.3.1) [Section 29.2.1]
AQCR 401	Regulations to control smoke and visible emissions	**ACHIEVED** [Section 29.2.2]
AQCR 507	Oil-burning equipment--particulate matter	**NOT APPLICABLE** Oil-burning equipment below rated heat capacity of regulated equipment [Section 29.2.3]
AQCR 605	Oil-burning equipment--sulfur dioxide	**NOT APPLICABLE** Oil-burning equipment below rated heat capacity of regulated equipment [Section 29.2.4]
AQCR 606	Oil-burning equipment--nitrogen dioxide	**NOT APPLICABLE** Oil-burning equipment below rated heat capacity of regulated equipment [Section 29.2.5]
AQCR 700	Permit fees	**ACHIEVED** Fee sent with permit application (see AQCR 702) [Section 29.2.6]

TABLE 29-1 (continued)

CITATION	REQUIREMENTS	COMPLIANCE STATUS
AQCR 702	Permits	**ACHIEVED** Application for permit for generators filed July 13, 1993; permit issued on December 7, 1993 (see Section 29.3.2) [Section 29.2.7]
AQCR 703.1	Annual emission inventory from permitted facility or if more than 1 ton of lead or 10 tons of particulates, SO_2, NO_2, CO, or volatile organic compounds (VOCs) are emitted from the facility in any calendar year	**UP TO DATE** Requirement for the submittal of 1993 emission data from diesel generators completed by submittal of sampling compliance plan (see Section 29.3.2) [Section 29.2.8]
AQCR 710	Stack height requirements	**ACHIEVED** Stack height approved by State [Section 29.2.9]
AQCR 751	NESHAPs - radionuclides (40 CFR Part 61, Subpart H) NESHAPs - other HAPs (40 CFR Part 61, Subpart A)	**NOT APPLICABLE** Radionuclides (Subpart H): not present; EPA-regulated; see Chapter 6 Other HAPs (Subpart A): WID HAPs inventory: HAP emissions not present or significantly below regulatory limits [Section 29.2.10]
AQCR 752	Application for registration of toxic air pollutants (TAPs)	**NOT APPLICABLE** WID HAPs inventory: emissions of TAPs significantly below threshold levels for registration application [Section 29.2.11]

TABLE 29-1 (continued)

CITATION	REQUIREMENTS	COMPLIANCE STATUS
AQCR 801	Excess emissions during malfunction, startup, shutdown, or scheduled maintenance	**UP TO DATE** Any excess emissions that occur to be reported in accordance with AQCR 801 [Section 29.2.12]
AQCR 901	Controlling emissions leaving New Mexico	**ACHIEVED** Emissions do not exceed NAAQS [Section 29.2.13]
AQCR 1001	Sampling equipment	**UP TO DATE** Addressed in AQCR 702 permit [Section 29.2.14]

29.2.1 Regulations to Control Open Burning, AQCR 301

Open burning is allowed for the instruction and training of fire-fighting and -rescue personnel when a permit is obtained from the NMED.

The DOE has applied for, and received, a permit to allow open burning for fire-fighter training. More specific information about the permit is provided in Section 29.3.1.

29.2.2 Regulations to Control Smoke and Visible Emissions, AQCR 401

No person owning or operating stationary combustion equipment shall permit, cause, or allow visible emissions from stationary combustion equipment to equal or exceed an opacity of 20 percent. No emissions of smoke with an opacity greater than 30 percent shall be released into the open air for any period greater than 10 seconds from any diesel-powered vehicle operating below 8000 feet mean sea level. Opacity emissions shall be determined using Method 9 described in Appendix A of 40 CFR Part 60 (minimum time period for taking opacity readings: 10 minutes).

Opacity measurements are not required for the backup diesel generators because no opacity measurements are specifically required under the permit (see Section 29.3.2). However, opacity testing has been performed on the generators and was found to be less than the 20-percent opacity limit.

Other diesel equipment is present on site that does not require a permit under AQCR 702 because this equipment represents such a small source of emissions. The inventory on the equipment was submitted to the NMED with the permit application for the backup generators. The emissions from this diesel equipment fall well below the permit thresholds; however, the equipment is scheduled for opacity testing. Method 9 will be used with at least 10-minute opacity readings.

29.2.3 Oil-Burning Equipment--Particulate Matter, AQCR 507

Standards have been established for particulate-matter emissions from oil-burning equipment with a rated heat capacity exceeding 250 million British thermal units (BTUs) per hour.

No oil-burning equipment at WIPP exceeds this rated heat capacity. The rated heat capacity of each of the generators is only 139.6 million BTUs per hour.

29.2.4 Oil-Burning Equipment--Sulfur Dioxide, AQCR 605

Standards have been established for sulfur dioxide emissions from oil-burning equipment with a rated heat capacity exceeding 1 million million (i.e., 10^{12}) BTUs per hour.

No oil-burning equipment at WIPP exceeds this rated heat capacity. The rated heat capacity of each of the two generators is only 139.6 million BTUs per hour (i.e., 1.4×10^8 BTUs per hour).

29.2.5 Oil-Burning Equipment--Nitrogen Dioxide, AQCR 606

Standards have been established for nitrogen dioxide emissions from oil-burning equipment with a rated heat capacity of 10^{12} BTUs per hour.

No oil-burning equipment at WIPP exceeds this rated heat capacity. The rated heat capacity of each of the two generators is only 139.6 million BTUs per hour (i.e., 1.4×10^8 BTUs/hour).

29.2.6 Permit Fees, AQCR 700

Permit fees must be paid with the submittal of a permit application.

The only permits required at WIPP under the AQCRs are for open burning and for the generators (see also Sections 29.2.6, 29.3.1, and 29.3.2). The permit fee for the diesel generators ($10,100) was submitted with the permit application in July 1993.

29.2.7 Permits, AQCR 702

A permit is required for facilities that emit criteria pollutants or toxic air pollutants at rates that meet or exceed the threshold levels specified in AQCR 702.

Preliminary calculations for the backup diesel generator emissions exceed the hourly thresholds for nitrogen dioxide that require the submittal of a permit application under AQCR 702. Therefore, the WIPP submitted an AQCR 702 permit application to the NMED for the diesel generators, which was received by the State on July 13, 1993. The WIPP received notification from the State on August 24, 1993, that modeling information was needed to complete the application. The information was submitted within the 10-day window specified by the State. The State has since concurred that the permit application is complete. The permit was issued by the NMED on December 7, 1993 (see Section 29.3).

29.2.8 Annual Emission Inventory, AQCR 703.1

An annual emission inventory is required annually for any stationary source permitted under AQCR 702 (except for those sources that are permitted only for TAP emissions). Other sources that are required to file an annual emission inventory are those that must file a Notice of Intent under AQCR 703.1 or that emit in excess of 1 ton of lead or 10 tons of total suspended particulates, particulate matter with an aerodynamic diameter of 10 μ or less (i.e., PM_{10}), sulfur dioxide, nitrogen dioxide, carbon monoxide, or volatile organic compounds (VOCs) in any calendar year including and subsequent to 1990.

The requirement for the 1994 submittal of an annual emission inventory was fulfilled by the submittal of the 1993 diesel generator emission data to the NMED in the sampling compliance plan. WIPP will file annual inventories if the NMED should determine that such annual reports are required.

29.2.9 Stack Height Requirements, AQCR 710

Stack height requirements must be met.

WIPP meets the requirement for stack height. The State has approved WIPP's calculations and modeling.

29.2.10 National Emission Standards for Hazardous Air Pollutants (NESHAPs), AQCR 751

NESHAPs requirements must be met.

The State is authorized to administer the NESHAPs program except for radionuclide emissions. Therefore, the EPA regulates these emissions under Subpart H of 40 CFR Part 61 (see Chapter 6). The State is currently performing an inventory of hazardous air pollutant (HAP) emissions within New Mexico, particularly of the 181 HAPs that were added to the list in the Clean Air Act Amendments of 1990. After the inventory has been completed, the State will begin the process of promulgating regulations to control these emissions. WIPP will be required to comply with these new regulations for any HAPs emitted from a major or an area source.

In 1993, the WIPP completed a HAPs emission inventory (WID, 1993c) The HAP inventory included calculations of the maximal potential hourly and annual emissions of criteria pollutants, all 189 regulated NESHAP pollutants, and the New Mexico toxic air pollutants (TAPs) specified under New Mexico Air Quality Control Regulations (AQCR) 751 and Part III of 702. Emission estimates were used to determine if the WIPP is required to obtain any air permits under State or Federal regulations. Based on the HAPs inventory calculations, WIPP operations are significantly below the 10-ton per year (tpy) emission limit for any individual HAP or the 25-tpy limit for combined HAPs emissions established in Subpart A of NESHAPs. Thus, the WIPP does not have any NESHAP Subpart A permitting or reporting requirement at this time. However, 40 CFR 61.09(a)(1) requires that the EPA be notified of WIPP's anticipated date of initial startup of the source no more than 60 days or less than 30 days before that date.

29.2.11 Application for Registration, AQCR 752

An application for the registration of toxic air pollutants (TAPs) must be submitted to the State if any are or could be emitted at levels that meet or exceed the levels specified in Appendix A of AQCR 752.

As indicated in Section 29.2.10, the WIPP HAPs emission inventory that was completed in 1993 included calculations of the maximal potential hourly and annual emissions of the New Mexico

TAP identified under AQCR 751 and Part III of 702. Emission estimates were used to determine if the WIPP is required to obtain air permits under State or Federal regulations. Based on HAPs inventory calculations, WIPP operations are significantly below the emission limit specified for any TAP; therefore, WIPP is not required to register any air pollutant emissions under AQCR 752.

29.2.12 Excess Emissions During Malfunction, Startup, Shutdown, or Scheduled Maintenance, AQCR 801

Excess emissions during malfunction, startup, shutdown, or scheduled maintenance must be minimized.

Special attention will be paid during startup, shutdown, scheduled maintenance, and any malfunction of the generators to ensure that emissions are minimized. The release of excess emissions is unlikely, however, because a redundant system is in place, and the second backup generator will be used to reduce potential emissions. If excess emissions occur, reporting will be performed as required by AQCR 801.

29.2.13 Controlling Emissions Leaving New Mexico, AQCR 901

Emissions leaving New Mexico must not exceed the standards and regulations of the receiving State.

Emissions calculations and modeling that have been completed reveal that the emissions do not exceed the NAAQs.

29.2.14 Sampling Equipment, AQCR 1001

Sampling equipment on stacks or other openings through which emissions are released to the atmosphere will be used as required.

The sampling equipment required for measuring emissions from the WIPP backup diesel generators was specified by the State in § 3(b) of the permit. Sampling ports, safe sampling platforms, safe access to sampling platforms, and utilities for sampling and testing equipment have been provided. A 0.25-inch stainless steel sampling line adjacent to the sampling ports which extends down to within 4 feet above ground level has been installed as required by the permit. This sampling line provides access for future audits by the NMED (see Section 29.3.2).

29.3 Compliance Status of Permit Conditions

Two permits issued under the AQCRs are in place at WIPP: the open-burning permit and the permit for the backup diesel generators, which was issued to WIPP on December 7, 1993. The permit conditions and the compliance status of each are summarized in Table 29-2. More detailed information is provided in the text.

TABLE 29-2. Air Quality Permits at WIPP - Summary of Regulatory Compliance Status

CONDITION	REQUIREMENTS	COMPLIANCE STATUS
Open-Burning Permit		
Conditions	Application and permit	**ACHIEVED** Permit obtained [Section 29.3.1]
Air Quality Permit No. 310-M-2 for the Two Backup Diesel Generators		
Condition 1	Construction and operation	**UP TO DATE** Equipment installed and operated [Section 29.3.2.1]
Condition 2	Emission rates (NO_2, CO_2, SO_2, and particulate matter)	**UP TO DATE** Compliance tests [Section 29.3.2.2]
Conditions 3-4	Compliance test methods	**UP TO DATE** Completion of compliance tests and submittal of the final *Emission Sampling Report* to the NMED in March 1994 [Section 29.3.2.3]

TABLE 29-2 (continued)

CONDITION	REQUIREMENTS	COMPLIANCE STATUS
Condition 5	Revisions and modifications	**NOT APPLICABLE** Revised permit application and NMED inspections [Section 29.3.2.4]
Condition 6	Notification to subsequent owners	**NOT APPLICABLE** Notification to new owner/operator and to NMED [Section 29.3.2.5]
Condition 7	Right to access property and review records	**UP TO DATE** NMED request to inspect and/or to receive records [Section 29.3.2.6]
Condition 8	Posting of the permit	**ACHIEVED** Posting of permit [Section 29.3.2.7]
Condition 9	Recordkeeping	**UP TO DATE** Records retained; WID procedure [Section 29.3.2.8]
Condition 10	Reporting	**UP TO DATE** Reports and notifications to NMED [Section 29.3.2.9]
Additional condition, p. 8	Permit cancellations	**NOT APPLICABLE** Submittal of new permit application [Section 29.3.2.10]

TABLE 29-2 (continued)

CONDITION	REQUIREMENTS	COMPLIANCE STATUS
Additional condition, p. 8	Notice of intent and emission inventory	UP TO DATE See Section 29.2.8 [Section 29.3.2.11]

29.3.1 Conditions of Open-Burning Permit, Application and Permit

Open burning is allowed monthly for up to 1 year. Up to 500 gallons of propane, diesel, gasoline, wood products, and standard automotive vehicles are to be burned; plywood and tires are excluded. All burning must take place during the time period of 3 hours after sunrise to 1 hour before sunset. The direction of the wind at the burning site must be such that the smoke is generally carried away from public roads and areas of human habitation. All burning must cease whenever an air stagnation advisory is issued for the area by the U.S. Weather Service. All material to be burned must be as dry as possible, and the amount of dirt on the material must be minimized. No natural or synthetic rubber or petroleum products shall be burned. All applicable restrictions, codes, and ordinances shall be met.

All conditions specified in the application and in the permit are met. The permit is valid from March 1, 1994, to March 1, 1995.

29.3.2 Permit for Backup Diesel Generators, Permit No. 310-M-2

The conditions specified by Air Quality Permit No. 310-M-2 for the backup diesel generators at WIPP are described in this section.

29.3.2.1 Construction and Operation, Condition 1

The plant [i.e., the diesel generators] shall be constructed and operated as described in the permit application dated June 18, 1993, and with the air quality monitoring information that was submitted on September 22, 1993, unless modified by the

conditions of this permit. The facility consists of two Caterpillar diesel generators with a rated capacity of 1500 horsepower. Only one Caterpillar diesel engine may operate at one time, and the sum of hours of operation for both engines shall not exceed 480 hours per year. Changes in plans, specifications, and other representations provided in the application documents shall not be made if they change the method of emissions control or in the character of the emissions or if they would increase the discharge of emissions. Any such proposed change must be submitted as a proposal revision or modification of the permit accordance with the condition described in Section 29.3.2.4.

The equipment described in the permit application was installed and is operated in accordance with the application and with the terms and conditions of the permit.

29.3.2.2 Emission Rates, Condition 2

The NMED has specified maximal emission rates for nitrogen oxide, carbon monoxide, sulfur dioxide, and particulate matter (see Table 29-3). The rates specified are in terms of pounds per hour and tons per year from each engine and from the facility (i.e., both engines).

The amounts of emissions were based upon calculations for the equipment installed. The equipment is operated and maintained in accordance with the manufacturer's specification.

TABLE 29-3. Allowable Emission Rates from the Diesel Generator Engines at WIPP

Pollutant	Allowable Emission Rates			
	Allowable Emission Rates from Each Diesel Engine		Total Allowable Rates from Both Diesel Engines	
	Pounds per Hour	Tons per Year	Pounds per Hour	Tons per Year
Nitrogen dioxide	46.3	5.6	46.3	11.2
Carbon monoxide	10.1	1.2	10.1	2.4
Sulfur dioxide	3.1	0.4	3.1	0.8
Particulate matter	3.3	0.4	3.3	0.8

29.3.2.3 Compliance Test Methods, Conditions 3-4

Initial compliance tests for all four pollutants described for Condition 2 (Section 29.3.2) are required for one of the diesel generators. Compliance tests may be reimposed if noncompliance is indicated or if the tests were technically unsatisfactory. The tests shall be conducted within 60 days after achieving the maximal production rate at which the generator will normally be operated. If the maximal production rate does not occur within 120 days of source startup, the tests must be conducted no later than 180 days after the initial startup of the source.

The tests shall be conducted in accordance with EPA Reference Methods 1-4, Method 5 (particulate matter), Method 6 (sulfur dioxide), Method 7(A-E) (nitrogen dioxide), and Method 10 (carbon monoxide) contained in 40 CFR Part 60, Appendix A, and with the requirements of 40 CFR 60.8(f). The oxygen in the stack gas shall be determined by using EPA Method 3.

The NMED shall be notified of the date and time of compliance testing at least 30 days before the planned test date so that the NMED may have an observer present during testing. The permittee will arrange a pretest meeting with the NMED at least 30 days prior to the anticipated test date and shall observe the pre-testing and testing procedures described in detail under this condition. These requirements include submitting a written test protocol to the NMED at least 1 week prior to the testing date for approval and providing appropriate equipment and access to the NMED observer for sampling. Several parameters (i.e., engine revolutions per minute, exhaust static pressure, exhaust manifold temperature, fuel consumption, and horsepower as indicated by kilowatt output] shall be monitored and recorded during the test and the results included with the test report. Flow straighteners shall be installed where necessary to prevent cyclonic flow in the stack. The tests shall be conducted at 90 percent of full load or greater and at additional loads as specified by NMED personnel at the test or pre-test meeting.

Two copies of the compliance test report must be submitted to the NMED within 30 days after completion of testing.

Compliance with these conditions was achieved. The compliance test report (*Emission Sampling Report, Backup Diesel Generator*) was submitted to the NMED Air Quality Bureau on March 6, 1994, and was approved on May 12, 1994.

29.3.2.4 Revisions and Modifications, Condition 5

Any future changes shall be preceded by the submittal of a permit application to the NMED in accordance with AQCR 702. No modifications shall be made prior to the issuance of the revised permit.

There have been no revisions or modification to the equipment or its operation.

29.3.2.5 Notification to Subsequent Owners, Condition 6

If there is any change in control or ownership of the diesel generators, the permittee shall notify the succeeding owner of the permit and its conditions and shall notify the NMED of the change in ownership within 15 days of the change.

There has been no change in ownership or control of the permitted equipment.

29.3.2.6 Right to Access Property and Review Records, Condition 7

The NMED will be given the right to enter the facility at all reasonable times to verify the terms and conditions of the permit. Upon receipt of a verbal or written request from any authorized representative of the NMED, the company will produce any records or information necessary to demonstrate that the terms and conditions of the permit are being met.

Upon request, NMED representatives will be allowed non-restricted entry to the site and will be provided with appropriate records and information.

29.3.2.7 Posting of the Permit, Condition 8

A copy of the permit will be posted and in view of the plant site at all times. It will be made available to NMED personnel for inspection upon request.

A copy of the permit is posted in the office of the Facility Operations Shift Supervisor.

29.3.2.8 Recordkeeping, Condition 9

DOE will maintain an operational log in which the date, time, and hours of operation will be recorded for each engine. The records will be maintained on site for at least 2 years from the time of recording and will be made available to NMED personnel upon request.

Completion and maintenance of operational logs are carried out as prescribed by WID procedure.

29.3.2.9 Reporting, Condition 10

The permittee will notify the NMED in writing or provide the NMED with the following information:

- *The anticipated date of the initial startup of each new or modified emission source at least 30 days prior to that date*
- *The actual date of the initial startup of each new or modified source within 15 days after the startup date*
- *The date when each new or modified source reaches the maximal production rate at which it will operate within 15 days after that date*
- *Any change of operators within 15 days after the change*

- *Any necessary update or correction no more than 60 days after the operator knows or should have known of the condition necessitating the update or correction of the permit.*

Notice of the initial startup of each source was submitted to the Air Quality Bureau in December 1993. Subsequent reports will be filed as needed.

29.3.2.10 Permit Cancellations (Permit, p. 8)

The NMED will cancel the permit automatically if any source ceases operation for at least 5 years or if the construction or modification of a source is not initiated within 2 years from the date of issuance or if work on construction or modification is suspended for a total of 1 year.

If the generator ceases operation for at least 5 years and is to be reactivated, a new permit application will be filed. The generators will not be operated until the permit has been issued.

29.3.2.11 Notice of Intent and Emission Inventory (Permit, p. 8)

Requirements related to Notice of Intent and emission inventory are contained in AQCR 703.1.

See Section 29.2.8, which pertains to compliance with AQCR 703.1.

30.0 NEW MEXICO WATER QUALITY ACT

30.1 Summary of the Law

With the enactment of the New Mexico Water Quality Act (WQA; 74-6-1 through 74-6-17 NMSA 1978), a mechanism was provided at the State level to establish water-quality standards that are consistent with the Federal Clean Water Act (CWA). The State act created the Water Quality Control Commission (WQCC) and directed the WQCC, as the State's water-pollution-control agency for all purposes of the CWA, to adopt a comprehensive water quality management program and water quality standards. The *New Mexico Water Quality Control Commission Regulations* include water-quality standards for ground and surface water and regulations regarding discharges to surface-water courses and ground water. Pursuant to the regulations of § 3-109, *Director Approval, Disapproval, Modification, or Termination of Proposed Discharge Plans*, the discharge plan submitted by the DOE for the discharge of 23,000 gallons per day (gpd) of sewage effluent and up to 1,500 gpd of nonhazardous brine water from the WIPP was approved in 1992.

30.2 Compliance Status of the Regulatory Requirements

Table 30-1 summarizes the regulatory requirements and their compliance status under the New Mexico Water Quality Act. Following the table, the text gives more detail on the compliance status for each requirement.

TABLE 30-1. New Mexico Water Quality Act - Summary of Regulatory Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
WQCC 82-1, *New Mexico Water Quality Control Commission Regulations*		
WQCC 82-1, § 1-201	Notice of Intent (NOI) to discharge	**ACHIEVED** NOI filed as required [Section 30.2.1]

TABLE 30-1 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
WQCC 82-1, § 1-202	Filing of plans and specifications--sewerage systems	**ACHIEVED** Submitted to New Mexico Environment Department (NMED) [Section 30.2.2]
WQCC 82-1, § 1-203	Notification of discharge--removal: requirements for notification, corrective action, and reporting in the event of an unauthorized discharge of oil or other water contaminant that could have adverse effects	**UP TO DATE** *RCRA Contingency Plan* [Section 30.2.3]
WQCC 82-1, § 2-101	General discharge limitations and sampling/analytical requirements	**UP TO DATE** Specified in NMED Discharge Plan Approval [Section 30.2.4]
WQCC 82-1, § 3-104	Authorization only of effluent(s)/leachate(s) as specified in discharge plan	**UP TO DATE** Authorization granted [Section 30.2.5]
WQCC 82-1, § 3-106	Application for discharge plan approval	**ACHIEVED** Application sent to NMED [Section 30.2.6]

TABLE 30-1 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
WQCC 82-1, § 3-107	Monitoring, reporting, and other requirements	**UP TO DATE** Monitoring reports filed [Section 30.2.7]
WQCC 82-1, § 3-108	Public notice and participation	**ACHIEVED** Public notice published [Section 30.2.8]
WQCC 82-1, § 3-109	Director approval, disapproval, modification, or termination of proposed discharge plans	**UP TO DATE** Discharge Plan to be revised if necessary [Section 30.2.9]
WQCC § 91-1	Water quality standards for interstate and intrastate streams in New Mexico	**NOT APPLICABLE** No streams affected by WIPP [Section 30.2.10]

30.2.1 Notice of Intent to Discharge, WQCC 82-1, § 1-201

Any party intending to make a new water contaminant discharge or to alter the character or location of an existing water contaminant discharge, unless the discharge is being made or will be made into a community sewer system or subject to the Liquid Waste Disposal Regulations adopted by the New Mexico Environmental Improvement Board, shall file a notice with the Water Pollution Control Bureau of the New Mexico Environment Department (NMED).

Notices of Intent to discharge have been filed as required. The latest filing occurred on January 8, 1992.

30.2.2 Filing of Plans and Specifications - Sewerage Systems, WQCC 82-1, § 1-202

Any party proposing to construct a sewerage system or proposing to modify any sewerage system in a manner that will change the quantity or quality of the discharge from the system substantially must file plans and specifications for the construction or modification with the Water Pollution Control Bureau of the NMED.

Sewerage system plans and specifications were included in the transmittal of the Discharge Plan application to the NMED.

30.2.3 Notification of Discharge - Removal, WQCC 82-1, § 1-203

Requirements for reporting, notifications, and corrective action with respect to any discharge from any facility of oil or other water contaminant, in such quantity as may with reasonable probability injure or be detrimental to human health, animal or plant life, or property, or unreasonably interfere with the public welfare or the use of property are specified.

In the event of an unauthorized discharge of oil or other potentially harmful water contaminants, notification and reporting will be performed and corrective action taken according to WID procedures and the *RCRA Contingency Plan*. The discharge will be reported to the Chief of the Groundwater Bureau of the NMED within 24 hours. A written report will be submitted within 7 days, as required under this regulation.

30.2.4 General Requirements, WQCC 82-1, § 2-101

General discharge limitations and sampling/analytical requirements for the discharge of effluents to a watercourse must be met.

These limitations and requirements are specified in the NMED's Discharge Plan Approval DP-831. The discharge limitations and the sampling/analytical requirements are met. Reports are submitted quarterly to the NMED.

30.2.5 Discharge Plan Required, WQCC 82-1, § 3-104

No party shall cause or allow effluent or leachate to discharge so that it may move directly or indirectly into ground water unless the discharge meets the requirements of a discharge plan approved by the Director. When a plan has been approved, discharges must be consistent with the terms and conditions of the plan.

The discharge of 1,500 gallons per day of nonhazardous brine water at WIPP is authorized by NMED Discharge Plan Approval DP-831.

30.2.6 Application for Discharge Plan Approval, WQCC 82-1, § 3-106

Any party who intends to begin discharging any listed water contaminants or any toxic pollutant so that they may move directly or indirectly into ground water must submit a discharge plan as required.

The Discharge Plan application was submitted to the NMED on November 14, 1991. The NMED approved the Discharge Plan on January 16, 1992; it will expire on January 16, 1997.

30.2.7 Monitoring, Reporting, and other Requirements, WQCC 82-1, § 3-107

Requirements include notification of the NMED of any facility expansion, production increase, or process modifications that would result in the discharge of water contaminants.

Monitoring reports are filed quarterly according to the following schedule: January 16, April 16, July 16, and October 16.

30.2.8 Public Notice and Participation, WQCC 82-1, § 3-108

Within 30 days of filing of a proposed discharge plan, or modification or renewal of an approved discharge plan, the NMED must ensure that the public and affected governmental agencies are notified.

The NMED published public notice of the Discharge Plan on December 15, 1991. No comments were received from the public.

30.2.9 Director Approval, Disapproval, Modification, or Termination of Proposed Discharge Plans, WQCC 82-1, § 3-109

If the monitoring data submitted indicate that these regulations are being or may be violated or that the standards in WQCC 82-1, § 3-102, "Standards for Ground Water of 10,000 mg/L TDS [total dissolved solid] Concentration or Less," are being or will be exceeded in ground water at any place of withdrawal for the present or reasonably foreseeable future due to the discharge, it may be necessary to modify the discharge plan.

If the monitoring data submitted indicate that the Discharge Plan conditions or the standards are being or will be exceeded, it may be necessary to revise the Discharge Plan.

Since the approval of discharge may not exceed 7 years from the date of issuance of the Discharge Plan approval, it will be necessary to find an alternative means of disposal for the nonhazardous brine solution currently being discharged.

30.2.10 Water Quality Standards for Interstate and Intrastate Streams in New Mexico, WQCC 91-1

The State has set a number of water-quality standards for interstate and intrastate streams in New Mexico.

The water-quality standards for interstate and intrastate streams in New Mexico do not apply to WIPP because there are no streams, either intermittent or permanent, that will be affected by WIPP.

30.3 Compliance Status of the Permit Requirements

Table 30-2 summarizes the specific and general requirements from the Discharge Plan for WIPP and their compliance status. Additional information is provided in the text.

TABLE 30-2. New Mexico Water Quality Act - Summary of Compliance Status of Permit Requirements

CITATION	REQUIREMENT	COMPLIANCE STATUS
Approval DP-831, *New Mexico Discharge Plan for the WIPP*		
DP-831 Specific Requirement (SR) #1	Monitoring and quarterly reports	**UP TO DATE** Monitoring conducted and reports submitted quarterly [Section 30.3.1]
DP-831 SR #2	Submittal of water quality analysis with quarterly report	**UP TO DATE** Analysis submitted quarterly [Section 30.3.2]
DP-831 SR #3	Quarterly sampling of each evaporation lagoon	**UP TO DATE** Sampling and results reported quarterly [Section 30.3.3]
DP-831 SR #4	Maintenance of berms protecting the lagoon system from precipitation runoff and runon	**UP TO DATE** Performed quarterly [Section 30.3.4]
DP-831 SR #5	Completion of proposed evaporation ponds	**ACHIEVED** Completed July 16, 1993 [Section 30.3.5]

TABLE 30-2 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
DP-831 General Requirement (GR)-- Recordkeeping	Records to be kept and made available to the NMED upon request	**UP TO DATE** Information recorded and available [Section 30.3.6]
DP-831 GR - Inspection and Entry	Allowing inspections, entry, sampling, and monitoring by NMED personnel	**UP TO DATE** Activities allowed on site [Section 30.3.7]
DP-831 GR - Duty to Provide Information	Providing information relevant to discharge plan/records required by Discharge Plan that has been requested by NMED	**UP TO DATE** [Section 30.3.8]
DP-831 GR - Spills, Leaks, and Other Unauthorized Discharges	Reporting and remediation of any spills, leaks, and any other unauthorized discharges	**UP TO DATE** Reports to be made if unauthorized discharges occur; no reporting required to date [Section 30.3.9]
DP-831 GR - Retention of Records	Retention of all monitoring information, discharge plan reports, and data used to complete the discharge plan application for at least 5 years	**UP TO DATE** Documentation being retained [Section 30.3.10]

TABLE 30-2 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
DP-831 GR - Modifications and/or Amendments	Notification of NMED of any modifications or additions to the wastewater disposal system; approval by NMED required prior to increasing the quantity or concentration of constituents in waste water above those approved in the plan	**UP TO DATE** Approval to be obtained as required [Section 30.3.11]

30.3.1 Requirements for Monitoring and Quarterly Reports, DP-831 Specific Requirement (SR) #1

The applicant shall monitor the quantity of brine water pumped into the evaporation ponds monthly and submit a quarterly report to the Ground Water Section's Office.

The monitoring required by the NMED Discharge Plan Approval (DP-381) has been conducted as required. The results have been submitted in the quarterly Discharge Monitoring Reports required by the Discharge Plan, which are prepared in accordance with a Westinghouse Waste Isolation Division (WID) procedure.

30.3.2 Requirement for Water Quality Analysis Submitted with Quarterly Report, DP-831 SR #2

A water quality analysis shall be submitted with the quarterly report mentioned above in SR #1.

Water quality analyses have been submitted with the quarterly reports.

30.3.3 Requirement that the Evaporation Lagoon be Sampled and the Results Reported, DP-831 SR #3

Each evaporation lagoon shall be sampled quarterly for total dissolved solids (TDS) and the results submitted in the quarterly report.

Each evaporation lagoon has been sampled quarterly. The results have been reported in the quarterly reports.

30.3.4 Requirement for Berm Maintenance, DP-831 SR #4

Berms protecting the lagoon system shall be maintained to protect it from precipitation runoff and runon.

Maintenance of the berms is performed quarterly.

30.3.5 Requirement for Completion of Proposed Evaporation Ponds, DP-831 SR #5

The applicant has 18 months from the date of approval to complete construction of the proposed evaporation ponds. The applicant can discharge brine waters into the existing salt pile evaporation pond until the new evaporation ponds are completed.

The evaporation ponds were completed by July 16, 1993, as required.

30.3.6 General Requirement, *Recordkeeping*, DP-831

The discharger must maintain a written record of ground-water and wastewater quality analyses at the facility. The information must be recorded and made available to the NMED upon request.

Monitoring, reporting, and recordkeeping requirements are met as specified in the Discharge Plan.

30.3.7 General Requirement, *Inspection and Entry*, DP-831

The discharger shall allow the NMED Secretary or her authorized representative, upon the presentation of credentials, to enter the discharger's facility during regular business hours or at other reasonable times under the conditions of this discharge plan.

NMED personnel are allowed on site to conduct inspections, sampling, and monitoring during normal business hours.

30.3.8 General Requirement, *Duty to Provide Information*, DP-831

The discharger shall furnish to the NMED, within a reasonable time frame specified by the NMED, any relevant information which it may request to determine whether cause exists for modifying, terminating, and/or renewing this discharge plan or to determine compliance with this plan. The discharger shall furnish to the NMED, upon request, copies of records required to be kept by this discharge plan.

No requests have been received from the NMED to provide information relevant to the Discharge Plan. Similarly, the NMED has not requested copies of the records to be maintained under the terms of the Discharge Plan.

30.3.9 General Requirement, *Spills, Leaks, and other Unauthorized Discharges*, DP-831

Any unauthorized discharges must be reported to the NMED and remediated as required. This requirement applies to all seeps, spills, and/or leaks discovered from the sewerage lagoons or that may directly or indirectly leave the boundaries of the WIPP site.

Any spills, leaks, and other unauthorized discharges will be reported to NMED and remediated in accordance with WIPP procedures.

30.3.10 General Requirement, *Retention of Records*, DP-831

The discharger shall retain records of all monitoring information, including all calibration and maintenance records, copies of all reports required by this discharge plan, and records of all data used to complete the application for this discharge plan, for a period of at least 5 years from the date of the sample collection, measurement, report, or application.

All monitoring information, analytical results, discharge plan reports, and data used to complete the discharge plan application will be retained for at least 5 years.

30.3.11 General Requirement, *Modifications and/or Amendments*, DP-831

The discharger must notify the NMED of any modifications or additions to the applicant's wastewater disposal system, including any increase in wastewater flow rate and wastewater storage and disposal management changes to the system as approved under this discharge plan. The discharger shall obtain the NMED's approval, as a discharge plan modification, prior to any increase in the quantity or concentration of constituents in the wastewater above those approved in this plan.

If any modifications or additions to the wastewater disposal system are planned for WIPP that would increase the quantity and/or the concentration of constituents in the waste water above those approved in the discharge plan, the NMED will be notified. No work will be initiated until the NMED approves the modification or addition.

31.0 NEW MEXICO WATER SUPPLY REGULATIONS

31.1 Summary of the Regulations

Like the Safe Drinking Water Act (SDWA), the New Mexico Water Supply Regulations (WSRs) provide a regulatory strategy for protecting public water-supply systems within the State. The WSRs identify the various categories of water-supply systems and establish operating requirements for each system. The WSRs establish the maximum contaminant levels (MCLs) for water-supply systems and implement monitoring and analytical requirements for each system.

31.2 Compliance Status of the Regulatory Requirements

The New Mexico Environment Department (NMED) notified the WIPP on September 9, 1992, that the WIPP water-line system is considered a public water supply and classified the system as a non-transient, non-community water supply for reporting and testing under the requirements of the SDWA. The DOE has corresponded with the NMED since the original letter of September 9, 1992, which identified the WIPP as a non-transient, non-community water supply system, to obtain a determination of the specific SDWA sampling requirements for the site. This direction was requested because the WIPP obtains raw water from the Double Eagle Water Line, which is owned and operated by the City of Carlsbad.

On March 11, 1994, the NMED-Carlsbad Field Office provided specific direction on the type of SDWA sampling required for the WIPP water supply system. The letter references Part III, § 310, of the New Mexico Water Supply Regulations, which states:

> When a public water system supplies water to one or more other public water supply systems, the Department may modify the compliance sampling requirements imposed by the regulations to the extent that the interconnection of the systems justifies treating them as a single system for compliance sampling purposes.

The NMED went on to determine that "since the Carlsbad Municipal Public Water Supply (WSS# 206-08) provides WIPP with its water and since Carlsbad already tests the various constituents at each Double Eagle wellfield source, WIPP is exempted from taking these samples." The NMED then determined that the WIPP is required to obtain entry-point system samples including lead, copper, and total coliform bacteria.

The specific requirements that are applicable to WIPP and the compliance status of each are summarized in Table 31-1. More detailed information is provided in the text.

TABLE 31-1. New Mexico Water Supply Regulations (WSR-3) - Summary of Regulatory Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
WSR 3, § 107(A)(1)	Use of chlorinated materials as disinfectants or oxidants	**ACHIEVED** Chlorination of raw water from Carlsbad [Section 31.2.1]
WSR 3, § 202(A)	Maximum contaminant levels (MCLs) for inorganic chemicals	**ACHIEVED** Preliminary sampling of inorganics: below MCLs [Section 31.2.2]
WSR 3, § 205(A)	MCL for total coliform bacteria	**UP TO DATE** Monthly sampling: below MCL [Section 31.2.3]
WSR 3, § 208(I)	Cross connections	**UP TO DATE** Inspections, corrective actions [Section 31.2.4]
WSR 3, § 301(E)	Certification of sampling personnel	**ACHIEVED** Certification of personnel involved with sampling [Section 31.2.5]
WSR 3, § 302(A)	Compliance sampling of coliforms	**UP TO DATE** At least one sample of total coliform bacteria collected per month; WIPP Water Sampling Plan in WID procedure [Section 31.2.6]

TABLE 31-1 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
WSR 3, § 305(A)(2)	Requirements for organic chemicals other than total trihalomethanes	**NOT APPLICABLE** No analyses for organic compounds required by NMED [Section 31.2.7]
WSR 3, § 309	Laboratories	**ACHIEVED** Contracts with laboratories; QA/QC [Section 31.2.8]
WSR 3, § 310	Sampling of consecutive public water-supply systems	**ACHIEVED** Modified sampling requirements [Section 31.2.9]
WSR 3, § 401(A)	Reporting requirements	**UP TO DATE** Submittal of analytical reports [Section 31.2.10]
WSR 3, § 403(A)	Record maintenance	**UP TO DATE** Maintenance of analytical results as quality records [Section 31.2.11]
WSR 3, § 404(B)	Public notice requirements pertaining to lead	**UP TO DATE** Results of analyses for lead to be posted at WIPP [Section 31.2.12]

31.2.1 Use of Chlorinated Materials as Disinfectants or Oxidants, WSR 3, § 107(A)(1)

The EPA Administrator has identified several options for chlorinated materials to be used as alternate or supplemental disinfectants or oxidants as the best technology, treatment techniques, or other means that are generally available for achieving compliance with the maximum contaminant level (MCL) for total trihalomethanes.

Raw water received at WIPP from the Carlsbad water-supply systems is chlorinated with sodium hypochlorite (NaClO).

31.2.2 Maximum Contaminant Levels (MLCs) for Inorganic Chemicals, WSR 3, § 202(A)

The NMED requires that the water-supply entry point at WIPP be sampled for lead and copper. The MCLs for lead and copper are 0.05 and 1.3 mg/L, respectively.

The sampling of inorganic chemicals required at WIPP is in progress. The results of previous analyses suggest that the concentrations of the inorganic chemicals of concern will fall below the respective MCLs.

31.2.3 MCL for Total Coliform Bacteria, WSR 3, § 205(A)

The MCL for total coliform bacteria is based on the presence or absence of total coliforms in a sample rather than on coliform density. For a system that collects fewer than 40 samples per month, the system is in compliance with the total coliform MCL if no more than one sample collected during the month is total coliform positive.

Analyses for total coliform bacteria (i.e., *Escherichia coli*) are being performed at WIPP on a monthly basis. The laboratory submits the results to WIPP and to the NMED. To date, the MCL for total coliforms has been met.

31.2.4 Cross Connections, WSR 3, § 208(I)

No physical connection between a public water supply and any water-supply source not regulated by the NMED is allowed unless the public water-supply system is protected by a backflow prevention device that has been reviewed by the NMED and is listed by an appropriate listing agency.

WIPP personnel are working with the City of Carlsbad to prepare and implement a WIPP Waterline Cross-Connection Plan. Inspections of the system's cross connections are under way. Corrective actions are being implemented as needed.

31.2.5 Certification of Sampling Personnel, WSR 3, §301(E)

All persons who collect compliance samples for water-supply samples must possess a current Sampling Certificate issued by the Secretary of the NMED. Sampling Certificates are issued only to persons who have successfully completed an approved training course and have passed an examination that is administered periodically by the NMED. Sampling Certificates are issued for up to 3 years.

All WIPP personnel who are involved with water-supply sampling to ensure compliance with the WSRs have completed the New Mexico water-sampling training course and have received Sampling Certificates.

31.2.6 Compliance Sampling of Coliforms, WSR 3, § 302(A)

Public water-supply systems must collect total coliform samples at sites that are representative of water throughout the distribution system according to their approved written sampling plan.

The minimal number of samples required per month is based on the population served by the system. Only one sample per month is required by a water-supply system that serves an average daily population of 25 to 1,000.

Samples are collected at a site that is representative of water throughout the distribution system, which is described in the WIPP Water Sampling Plan. This plan is contained within a WID

procedure and has been approved by the NMED. It is currently being revised to incorporate the lead and copper monitoring requirements from the Discharge Plan Approval.

Fewer than 1,000 people are served by the water-supply system at WIPP. Therefore at least one sample is collected per month for total coliform bacteria analysis.

31.2.7 Requirements for Organic Chemicals other than Total Trihalomethanes, WSR 3, § 305(A)(2)

For community water systems using only ground-water sources, analysis for organic insecticides and herbicides shall be completed by those systems that have been specified by the NMED.

The NMED does not require that WIPP sample for insecticides, herbicides, or any other organic compound(s).

31.2.8 Laboratories, WSR 3, § 309

Compliance samples may be considered only if they have been analyzed by a laboratory that is acceptable to the NMED.

WIPP has contracts in place with two off-site EPA-certified laboratories to complete all microbiological and inorganic analyses required by the NMED for WIPP. Both laboratories have undergone quality assurance/quality control (QA/QC) review and approval. Each laboratory has an approved Quality Assurance Project Plan (QAPjP) in place and is listed on the WIPP Qualified Supplier List (QSL).

31.2.9 Sampling of Consecutive Public Water-Supply Systems, WSR 3, § 310

When a public water-supply system provides water to one or more other public water-supply systems, the NMED may modify the compliance sampling requirements imposed by these regulations. Any modified compliance sampling shall be conducted in accordance with the schedule specified by the NMED.

The water-supply system at WIPP receives its water from the public water-supply system of the City of Carlsbad. Carlsbad is responsible for all well-source sampling. Therefore, the NMED has modified the compliance sampling requirements for WIPP and requires sampling only for

lead, copper, and total coliform bacteria. The schedule mandated by the NMED for sampling is presented in Table 31-2.

TABLE 31-2. Required Sampling at WIPP for Compliance with the Safe Drinking Water Act and the New Mexico Water Supply Regulations

Contaminant	Frequency of Water-Supply Sampling
Lead and copper (for water systems for populations of 501 to 3,300)	Initial sampling requires 20 sample sites for two 6-month periods beginning on July 1, 1993; requirements may be reduced when action levels are met for two consecutive sampling periods.
Total coliform bacteria	Once per month

31.2.10 Reporting Requirements, WSR 3, § 401(A)

Unless a shorter period is specified, the water supplier shall provide a copy of the results and data required to the appropriate NMED field office within 10 days after analysis.

Analytical reports for inorganic chemicals are submitted to the appropriate NMED field office within 10 days of their receipt by WID personnel. The analytical laboratory that analyzes total coliform bacteria sends a copy of the results and data directly to WIPP and to the appropriate NMED field office.

31.2.11 Record Maintenance, WSR 3, § 403(A)

A water supplier shall retain the appropriate records on or near the premises of the public water-supply system. Records of bacteriological and chemical analyses shall be kept for at least 5 and 10 years, respectively. The information that must be retained includes the date, place, and time of sampling; the name of the person who collected the sample; identification of the sample; date of analysis and name of the laboratory and person who performed the analysis; the analytical method used; and the results of the analysis.

All applicable records pertaining to the sampling and analysis and the analytical results are maintained as quality records by WID.

31.2.12 Public Notice Requirements Pertaining to Lead, WSR 3, § 404(B)

> *Notice pertaining to lead concentrations in drinking water shall be given to persons served by the system. For non-transient, non-community water systems, notice may be given by continuous posting. If posting is used, the notice shall be posted in a conspicuous place in the area served by the system, and the posting shall continue for 3 months.*

On March 11, 1994, the NMED provided a determination that copper and lead sampling is required at WIPP. Sampling is expected to occur in April 1994. Upon receipt of the analytical results pertaining to lead, the analytical results (i.e., the lead concentrations) will be posted at WIPP. Because WIPP is the end user of the WIPP water-supply system, no other public notice is required.

32.0 NEW MEXICO HAZARDOUS CHEMICALS INFORMATION ACT

32.1 Summary of the Law

The New Mexico Hazardous Chemicals Information Act (HCIA; §§ 74-4E-1 through 74-4E-9 NMSA 1978) was enacted to ensure that current information on the nature and location of hazardous chemicals is available to Local Emergency Planning Committees (LEPCs), emergency responders, and the public as required by Title III. The HCIA created the State Emergency Response Commission (SERC) and directs facility owners or operators to notify the New Mexico Department of Public Safety under certain conditions, including the presence of extremely hazardous substances at or above a specified quantity at a facility and the release of any chemical substance that has occurred at or above reportable quantities determined by the State. The HCIA specifies reports to be submitted to the State, including toxic chemical release and hazardous material inventory reports.

32.2 Compliance Status of the Regulatory Requirements

Table 32-1 summarizes each applicable requirement and its compliance status under the Hazardous Chemical Information Act. The text provides more detail on the compliance status of each requirement.

TABLE 32-1. Hazardous Chemicals Information Act - Summary of Regulatory Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
Hazardous Chemicals Information Act, §§ 74-4E-1 to 74-4E-9 NMSA 1978		
§ 74-4E-5(A)(1)	Notification to the State that an extremely hazardous substance, at or above a specified quantity, is present at a facility	**UP TO DATE** Notifications and revised listing submitted [Section 32.2.1]
§ 74-4E-5(A)(2)	Notice of release of chemical substance(s) when release is at or above the reportable quantity of the substance	**UP TO DATE** Notification of releases of ethylene glycol submitted [Section 32.2.2]

TABLE 32-1 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
§ 74-4E-5(A)(3)	Submittal of an inventory form covering each hazardous material on or before March 1 of each year	**UP TO DATE** Chemical inventory submitted in March 1993 and 1994 [Section 32.2.3]
§ 74-4E-5(A)(4)	Submittal of Toxic Chemical Release Inventory (TRI) forms to Public Safety Department for facilities employing at least 10 employees and with SIC code between 20-39 classification	**NOT APPLICABLE** TRI reporting not currently required due to certain exemptions [Section 32.2.4]

32.2.1 Notice of Extremely Hazardous Substance, § 74-4E-5(A)(1)

Facility owners or operators must notify the State safety department that an extremely hazardous substance, at or above the threshold planning quantity, is present at a facility.

The requirement to notify the SERC of the WIPP's being subject to emergency planning requirements has been met.

The WIPP submits a list of hazardous chemicals to the SERC, the LEPC, and the local fire department whenever additional substances are received or if significant new information is received about an item for which a list was provided. In March and August 1993 and March 1994, a revised list of hazardous chemicals was submitted to these organizations. The listing comprised extremely hazardous substances present in amounts equal to or greater than the Threshold Planning Quantity (TPQ) or 500 pounds, whichever is less, and all substances classified as hazardous under the Occupational Safety and Health Act Hazard Communication Standard with site inventories equal to or greater than 10,000 pounds.

32.2.2 Notice of Release of Chemical Substance(s), § 74-4E-5(A)(2)

Facility owners or operators must notify the State safety department of the release of a chemical substance when the release is at or above the reportable quantity of the substance.

During this reporting period, there were three ethylene glycol spills at WIPP that exceeded the reportable quantity of 1 pound. These were reported to the SERC and the LEPC.

32.2.3 Hazardous Material Inventory, § 74-4E-5(A)(3)

Facility owners or operators must submit to the State an inventory form containing Tier II information on or before March 1 of each year.

The WIPP submitted the Emergency and Hazardous Chemical Inventory Report (Tier II Report) in March 1993 and 1994 to the SERC, the LEPC, and the local fire department.

32.2.4 Toxic Chemical Release Inventory, § 74-4E-5(A)(4)

Facility owners or operators employing at least 10 employees and with a SIC code between 20 and 39 must submit a toxic chemical release form on or before July 1 of each year to the State safety department.

During this reporting period, the WIPP was exempt from submitting a Toxic Chemical Release Inventory report because of the use of toxic chemicals at WIPP and the exemptions described in 40 CFR 372.38, *Exemptions*.

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33.0 NEW MEXICO EMERGENCY MANAGEMENT ACT

33.1 Summary of the Law

The New Mexico Emergency Management Act (EMA; §§ 74-4B-1 through 74-4B-14 NMSA 1978) was enacted to ensure the adequacy of hazardous material emergency management capabilities in the State to protect the health and safety of New Mexico citizens and the environment. The act delineates those State agencies that are responsible for responding to hazardous material accidents and providing for control and management of such accidents. Furthermore, the act provides for the formulation of a comprehensive hazardous materials emergency management plan.

33.2 Compliance Status of the Regulatory Requirements

Table 33-1 summarizes each applicable requirement and its compliance status under the EMA. The text provides more detail on the compliance status of each requirement.

TABLE 33-1. New Mexico Emergency Management Act - Summary of Regulatory Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
Emergency Management Act, §§ 74-4B-1 - 74-4B-14 NMSA 1978		
§ 74-4B-2	Findings and purpose	**NOT APPLICABLE** State responsibilities [Section 33.2.1]
§ 74-4B-4	State responsibility for management of accidents; immunity from liability; cooperative agreements; private property	**NOT APPLICABLE** State responsibilities [Section 33.2.2]
§ 74-4B-5	State Police Emergency Response Officer; procedure for notification; cooperation with other State agencies and local governments	**UP TO DATE** WID procedures [Section 33.2.3]

TABLE 33-1 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
§ 74-4B-6	Emergency Management Task Force: powers and duties	NOT APPLICABLE State responsibilities [Section 33.2.4]
§ 74-4B-6.1	Creation and duties of the Hazardous Materials Emergency Response Administrator	NOT APPLICABLE State responsibilities [Section 33.2.5]
§ 74-4B-10	Responsibility for cleanup by owner, shipper, or carrier of the hazardous material	UP TO DATE WID procedures [Section 33.2.6]

33.2.1 Findings and Purpose, § 74-4B-2

The purpose of the EMA is to ensure that adequate hazardous materials emergency management capabilities exist in the State, delineate the State agencies that are responsible for responding to and controlling and managing a hazardous materials accident, and provide for the formulation of a comprehensive statewide hazardous materials emergency management plan.

These are State responsibilities. No action is required at WIPP by this subsection.

33.2.2 State Responsibility for Management of Accidents; Immunity from Liability; Cooperative Agreements; Private Property, § 74-4B-4

The State government has the primary responsibility for managing an accident. The EMA does not waive or alter immunity from liability. The State may enter into cooperative agreements with county and municipal governments for accident management. The State may enter into such agreements with the Federal government, Indian tribes and pueblos, and bordering States for assistance in managing accidents. When an accident has occurred or appears

imminent, responsible State personnel or authorized persons are authorized to enter any buildings or premises to determine whether emergency management procedures should be implemented.

These are State responsibilities. No action is required at WIPP under this subsection.

33.2.3 State Police Emergency Response Officer; Procedure for Notification; Cooperation of other State Agencies and Local Governments, § 74-4B-5

State Police Emergency Response Officers shall be designated, trained, and available to answer an emergency response call from the first responder. The responsibilities of these officers and of the State Police Emergency Response Center are described. Any driver of a vehicle carrying hazardous materials involved in an accident which may cause injury to persons or property or any owner, shipper, or carrier of hazardous materials involved in an accident who has knowledge of such accident or any owner or person in charge of any building, premises, or facility where such an accident occurs shall immediately notify the New Mexico State Police Division of the Public Safety Department by the quickest means of communication available.

Should an accident involving hazardous materials occur, the New Mexico State Police Division of the Public Safety Department will be notified by the driver, owner, shipper, or carrier of the waste as outlined in a Westinghouse Waste Isolation Division (WID) procedure and the *RCRA Contingency Plan*.

WIPP personnel will contact the State Emergency Response Commission (SERC) in the event of a spill that could endanger human health or the environment. The SERC will, in turn, contact the NMED if their assistance is needed.

33.2.4 Emergency Management Task Force: Powers and Duties, § 74-4B-6

The composition and responsibilities of the Emergency Management Task Force are described.

These are State responsibilities. No action is required at WIPP under this subsection.

33.2.5 Creation and Duties of the Hazardous Materials Emergency Response Administrator, § 74-4B-6.1

The creation and responsibilities of the Hazardous Materials Emergency Response Administrator are described in this subsection.

These are State responsibilities. No action is required at WIPP under this subsection.

33.2.6 Clean-up, § 74-4B-10

Nothing in the EMA shall be construed to relieve hazardous materials owners, shippers, or carriers of their responsibilities and liability in the event of an accident. Such persons shall assist the State as requested in responding to an accident and are responsible for restoring the scene of the accident to the satisfaction of the State.

An occurrence involving a TRUPACT II container that is not within the confines of the WIPP does not fall under WID responsibility. The correct line of action for an on-site occurrence that can be cleaned up by site personnel is covered in a WID procedure. However, in the event of an on-site occurrence that is not handled by site personnel, a clean-up contractor will be obtained.

If an off-site occurrence takes place involving a TRUPACT-II container, the DOE will take responsibility for cleaning up the scene of the accident to the State's satisfaction.

34.0 NEW MEXICO PREHISTORIC AND HISTORIC SITES PRESERVATION ACT

34.1 Summary of the Law

The provisions of the Congressional National Historic Preservation Act (NHPA) are furthered by law in the State of New Mexico. The act currently in place is the New Mexico Prehistoric and Historic Sites Preservation Act (§§ 18-8-1 through 18-8-8 NMSA 1978). The purpose of this act is the acquisition, stabilization, restoration, or protection of significant prehistoric and historic sites by the State of New Mexico and corporations. This act is administered by the State Historic Preservation Officer (SHPO) in consultation with the Cultural Properties Review Committee.

The Prehistoric and Historic Sites Preservation Act is implemented by Historic Preservation Division (HPD) Rule 89-2, which established procedures for acquiring, stabilizing, restoring, or protecting significant prehistoric and historic sites. Rule 89-2 also established procedures and guidelines to evaluate alternatives to programs and projects requiring the use of land from significant prehistoric and historic sites and to determine whether all possible planning has been implemented to preserve and protect such sites. Detailed requirements for a long-term management plan for any site acquired, stabilized, restored, or protected are included under this rule.

34.2 Compliance Status of the Regulatory Requirements

The WIPP is not bound by the New Mexico statutes and regulations regarding cultural properties because of the facility's location on federally managed land. However, WIPP personnel contract for archeological surveys and consult with the SHPO each time an action is proposed that would impact a previously undisturbed area. Prior to the transfer of the 16 sections of WIPP from the Department of the Interior to the DOE, the Bureau of Land Management was consulted on all cultural resource issues and, through their programmatic agreement with the SHPO, arranged clearances and work approvals.

During this reporting period, there were no projects proposed that required BLM or SHPO concurrence, therefore, these requirements are not addressed further in this report.

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35.0 NEW MEXICO STATE IMPLEMENTATION OF THE FEDERAL LAND POLICY AND MANAGEMENT ACT

35.1 Summary of the Law

The Federal Land Policy and Management Act (FLPMA) was enacted to ensure that "public lands be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values; that, where appropriate, will preserve and protect certain public lands in their natural condition; that will provide food and habitat for fish and wildlife and domestic animals; and that will provide for outdoor recreation and human occupancy and use." Under the FLPMA, the Secretary of the Interior is authorized to grant, issue, or renew rights-of-way over, upon, under, or through public lands.

The spirit and purpose of the Congressional legislation to protect and preserve the quality of public lands is furthered by law in the State of New Mexico. In 1912, the Legislature of the State of New Mexico created the State Land Office (SLO) and directed that the Office's executive officer, the Commissioner of Public Lands (the Commissioner), execute jurisdiction over, and provide for the management, care, control and disposition of, public lands owned and subsequently acquired by the State. The Commissioner was authorized to grant rights-of-way and easements over, upon, or across State lands for highways, power lines, mining, or other purposes. The Commissioner's authority related to rights-of-way and easements is currently promulgated in New Mexico Statute 19-7-57.

The regulation of right-of-way and easement grants is addressed in the State Land Office's Rule 10, *Relating to Easements and Rights-of-Way*, which outlines the requirements for applying for and maintaining a right-of-way grant.

35.2 Compliance Status of the Regulatory Requirements

Table 35-1 summarizes the applicable requirements under SLO Rule 10 and the compliance status of each requirement. The text provides more detail on the compliance status of the requirements.

TABLE 35-1. New Mexico Implementation of the Federal Land Policy and Management Act - Summary of Regulatory Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
State Land Office Rule No. 10, *Relating to Easements and Rights-of-Way*		
SLO Rule 10.006	Application requirements and fees	**ACHIEVED** Permit issued [Section 35.2.1]
SLO Rule 10.009	Conditions	**ACHIEVED** Right of way: 40 feet wide [Section 35.2.2]
SLO Rule 10.010	Damage bond	**NOT APPLICABLE** Requirement waived for government agencies [Section 35.2.3]
SLO Rule 10.011	Survey plat	**ACHIEVED** Plat included in application [Section 35.2.4]
SLO Rule 10.012	Construction reports for ruins, artifacts, or monuments found	**NOT APPLICABLE** No artifacts found on right-of-way [Section 35.2.5]
SLO Rule 10.013	Affidavit of completion	**ACHIEVED** Affidavit of completion submitted [Section 35.2.6]

TABLE 35-1 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
SLO Rule 10.017	Renewal of right-of-way grants	**NOT APPLICABLE** 35-year term of permit currently deemed adequate [Section 35.2.7]
SLO Rule 10.019	Reclamation and restoration	**NOT APPLICABLE** Right-of-way to be reclaimed and revegetated after use [Section 35.2.8]

35.2.1 Application Requirements and Fees, SLO Rule 10.006

Written application for right-of-way grants (reservations) shall be made upon the proper forms. The application shall be made under oath and be accompanied by the payment of appropriate fees. The application will contain a legal description of the lands to be crossed and a plat (see Section 35.2.4).

The proper application form and the fees required were submitted as required. The application included the legal description of the lands to be crossed and a survey plat.

Permit No. RW-22789 was issued for a high-volume air sampler for the period of October 3, 1985, through October 3, 2020.

35.2.2 Conditions, SLO Rule 10.009

The minimum width of a right-of-way or easement granted under these rules shall be 30 feet.

As described in the application and survey plat, the right-of-way covers a 40-foot-wide strip of land.

35.2.3 Damage Bond, SLO Rule 10.010

The applicant must file a bond with the Commissioner before the right-of-way may be issued. The bond must compensate the State or other appropriate party for any damage done to improvements or other property. The Commissioner may waive this requirement if the applicant is a governmental agency that is prohibited from posting a security bond, the applicant is not immune to suit or is otherwise required by law to pay such damages, or meets other conditions specified.

The DOE is a governmental agency that is required by law to pay compensation for any such damages. Therefore, the requirement for a damage bond was waived.

35.2.4 Survey Plat, SLO Rule 10.011

Specific requirements for the survey plat are described in SLO Rule 10.011

A survey plat was included in the application. The plat met all requirements specified in SLO Rule 10.011.

35.2.5 Construction Reports, SLO Rule 10.012

The holder of a right-of-way shall notify the Commissioner immediately in the event that any historic or prehistoric ruin, monument, or artifact of historical, archeological, or scientific value is discovered upon the right-of-way. The holder of the right-of-way shall refrain from further disturbing the area until the Commissioner has been notified and inspection and clearance have been performed by the proper authorities if deemed necessary by the Commissioner.

No ruins, monuments, or artifacts of historical, archeological, or scientific value were discovered upon the right-of-way.

35.2.6 Affidavit of Completion, SLO Rule 10.013

Upon the completion of construction of any right-of-way, the applicant shall promptly file an affidavit of completion with the Commissioner. Failure to file such an affidavit in accordance with this section shall subject the right-of-way to cancellation in accordance with the provisions of these rules.

The DOE submitted an Affidavit of Completion to the State Land Office certifying the completion of construction and the location of the high-volume air sampler.

35.2.7 Renewal of Right-of-Way Reservations, SLO Rule 10.017

An application may be submitted for a renewal of the reservation prior to the expiration date of any right-of-way.

Permit No. RW-22789 (see Section 35.3) was granted for a term of 35 years. If the right-of-way will still be needed after the expiration date, an application will be submitted as required. However, it is likely that the 35-year period will be adequate.

35.2.8 Reclamation and Restoration, SLO Rule 10.019

Any person who enters upon State land to survey or construct a right-of-way shall take all steps necessary to preserve and protect the natural environmental conditions of the land, including reclaiming disturbed areas by leveling or terracing and revegetation. Revegetation shall include the establishment of suitable grasses and forbs. The grantee of any right-of-way shall consult with the Commissioner's designee regarding reclamation prior to undertaking same and shall abide by all directives of the designee.

The DOE will ensure that all reclamation and revegetation activities requested by the Commissioner or by his/her designee will be performed. Until these activities have been initiated, these requirements do not apply to WIPP.

35.3 Compliance Status of the Permit Conditions

The Commissioner granted Right-of-Way Permit No. RW-22789 to WIPP for a high-volume air sampler. The term of the permit is 35 years (October 3, 1985, through October 3, 2020). Table 35-2 summarizes the applicable permit conditions and the compliance status of each condition. The text provides more detail on the compliance status of the permit conditions.

TABLE 35-2. State Land Office Right-of-Way Permit No. RW-22789 - Summary of Permit Compliance Status

CITATION	CONDITION	COMPLIANCE STATUS
Right-of-Way Permit No. RW-22789 for a High-Volume Air Sampler		
Term/Condition #3	Disposal of brush and other debris	**ACHIEVED** Appropriate disposal of brush and other debris [Section 35.3.1]
Term/Condition #4	Depth of pipelines	**NOT APPLICABLE** No pipelines on right of way [Section 35.3.2]
Term/Condition #5	Prevention of destruction or injury to improvements or livestock	**UP TO DATE** Care taken to avoid damage to improvements or livestock [Section 35.3.3]
Term/Condition #6	Purpose of right-of-way	**UP TO DATE** Used only for high-volume air sampler [Section 35.3.4]

TABLE 35-2 (continued)

CITATION	CONDITION	COMPLIANCE STATUS
Term/Condition #7	Existing rights	**NOT APPLICABLE** No other leases or rights-of-way known for area [Section 35.3.5]
Term/Condition #8	Leases for mineral resources	**NOT APPLICABLE** [Section 35.3.6]
Term/Condition #9	Compliance with all applicable regulations and requirements	**UP TO DATE** See entire BECR for compliance status [Section 35.3.7]
Term/Condition #10	Non-use of the right-of-way	**UP TO DATE** Right-of-way used periodically [Section 35.3.8]
Term/Condition #13	Protection and preservation of natural environmental conditions	**UP TO DATE** Protection of land; best acceptable reclamation practices to be used [Section 35.3.9]
Term/Condition #14	Reclamation of all disturbed areas	**NOT APPLICABLE** Seed mixes of indigenous plants to be used for revegetation [Section 35.3.10]

35.3.1 Disposal of Brush and other Debris, Term/Condition #3

In clearing the right-of-way, the grantee agrees to dispose of brush and other debris so as not to interfere with the movement of livestock of State grazing lessees.

All brush and other debris were disposed of appropriately.

35.3.2 Depth of Pipelines, Term/Condition #4

All pipelines placed on the right-of-way lands under this permit must be buried at least 20 inches deep.

This right-of-way was not obtained for a pipeline. Therefore, this condition is not applicable.

35.3.3 Prevention of Destruction or Injury to Improvements or Livestock, Term/Condition #5

The grantee agrees to carefully avoid causing destruction or injury to any improvements or livestock lawfully upon the premises, to close all gates immediately after passing through them, and to make prompt payment of all reasonable and just damages for any injury or destruction arising from constructing or maintaining the right-of-way.

The DOE carefully avoids causing destruction or injury to any improvements or livestock that are lawfully upon the premises. Gates are closed as soon as possible.

35.3.4 Purpose of Right-of-Way, Term/Condition #6

The right-of-way granted is for the sole purpose of providing egress from and ingress to a high-volume air sampler. The right-of-way may not be used for any other purpose and may not be re-assigned by the grantee.

The right-of-way granted under this permit is used only for accessing the high-volume air sampler.

35.3.5 Existing Rights, Term/Condition #7

The rights granted under Permit RW-22789 are subject to valid existing rights.

No existing leases or rights-of-way of record are known.

35.3.6 Leases for Mineral Resources, Term/Condition #8

The Commissioner reserves the right to execute leases for oil and gas, coal and minerals; to sell or dispose of same; and to grant rights-of-way and easements related to such leasing.

The land subject to the conditions of Permit RW-22789 (i.e., T 19 S, R 27 E, Section 13) is not part of the land that was withdrawn from the U. S. Department of the Interior and transferred to the DOE under the WIPP Land Withdrawal Act (i.e., several sections under T 22 S, R 31 E). Therefore, this term remains applicable although no action is required by WIPP personnel.

35.3.7 Compliance with all Applicable Regulations and Requirements, Term/Condition #9

The grantee and its employees, agents, and contractors shall fully comply with all laws, regulations, and requirements of any governmental authority or agency in all matters that affect the premises and operations pertaining to such issues as conservation, sanitation, aesthetics, pollution, cultural properties, fire, or ecology.

This entire BECR addresses compliance with all such laws, regulations, and requirements at WIPP.

35.3.8 Non-Use of the Right-of-Way, Term/Condition #10

If the right-of-way granted is not used for a period that exceeds 1 year without the prior written permission of the Commissioner, the right-of-way will be considered abandoned. Non-use for shorter periods will require that the grantee prove that there was no intent to abandon the right-of-way.

The right-of-way is used periodically to collect samples and to maintain the sampler.

35.3.9 Protection and Preservation of Natural Environmental Conditions, Term/Condition #13

The grantee agrees to preserve and protect the natural environmental conditions of the land encompassed in this permit and to take such reclamation or corrective actions necessary to protect the land from pollution, erosion, or other forms of environmental degradation.

The land encompassed in this permit is being preserved and protected. In addition, a contemporary reclamation program and a corresponding long-range plan have been implemented at WIPP. When the right-of-way for the high-volume air sampler is to be reclaimed, WIPP personnel will use the best acceptable reclamation practices. (See also Section 35.3.10.)

35.3.10 Reclamation of all Disturbed Areas, Term/Condition #14

The grantee agrees to reclaim all disturbed areas by grading, leveling, or terracing and to landscape these areas at its own expense. Landscaping will include the planting of native grasses, shrubs, or other vegetation so as to return disturbed areas to their natural state and prevent erosion caused by water and/or wind.

The seed mixes to be used to revegetate the area will reflect those species that are indigenous to the vicinity, with priority given to those species of plants that are conducive to soil stabilization and to the needs of livestock and wildlife. (See also Section 35.3.9.) This section is not applicable to WIPP during this reporting period.

36.0 NEW MEXICO STATE IMPLEMENTATION OF THE BALD AND GOLDEN EAGLE PROTECTION ACT

36.1 Summary of the Law

The Bald and Golden Eagle Protection Act makes it unlawful to take (i.e., capture, kill, or destroy), possess, molest, or disturb living or dead bald eagles (*Haliaeetus leucocephalus*) or golden eagles (*Aquila chrysaetos*), their parts, their nests, or their eggs anywhere in the United States. A permit must be obtained from the U.S. Department of the Interior to relocate any nest that interferes with resource development or recovery operations. In addition, a permit may be obtained that authorizes taking, possessing, or transporting eagles or their parts, nests, or eggs.

Chapter 17 of the New Mexico statutes establishes rules and regulations to protect raptors. In particular, § 17-2-14, *Hawks, vultures and owls, taking, possessing, trapping, destroying, maiming or selling prohibited; exception by permit; penalty,* authorizes the Director of the Department of Game and Fish to issue permits to allow any person to take, possess, trap, ensnare, or destroy any bird protected by this section. Permits may be granted for several purposes, including scientific purposes, in accordance with the law and the State Game Commission's regulations. In addition, §§ 17-2-37 through 17-2-46, the Wildlife Conservation Act, also further the purpose of the Bald and Golden Eagle Protection Act with respect to the bald eagle as an endangered species (see Chapter 37).

36.2 Compliance Status of the Regulatory Requirements

At present, no bald or golden eagles are nesting on the WIPP site. Therefore, a permit regarding bald or golden eagles is not needed. If it becomes necessary, a permit application will be submitted, and all applicable permit requirements will be met.

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37.0 NEW MEXICO WILDLIFE CONSERVATION ACT, IMPLEMENTING THE ENDANGERED SPECIES ACT

37.1 Summary of the Law

The Endangered Species Act was enacted in 1973 to prevent the extinction of many species of animals and plants. The act provides strong measures to help alleviate the loss of species and their habitats. It places restrictions on a wide range of activities involving endangered and threatened animals and plants to help ensure their continued survival. With limited exceptions, the act prohibits activities using these protected species unless authorized by a permit from the U.S. Fish and Wildlife Service (FWS).

The intent of the Congressional endangered species legislation is furthered in the State of New Mexico by the Wildlife Conservation Act, which was enacted in 1974. The current sections of the State's act reside in §§ 17-2-37 through 17-2-46 NMSA 1978. The act directs that endangered species of wildlife that are indigenous to New Mexico should be managed and maintained and, to the extent possible, their numbers enhanced within the carrying capacity of the habitat. The State is directed to assist in the management of endangered and threatened species of wildlife, including those that are federally listed.

Protection under the Wildlife Conservation Act extends to species, genera, and families that are listed in § 17-2-3, *Protected wildlife species and game fish defined*. Thus, protection under the Wildlife Conservation Act is extended to game birds such as all members of the family Phasianidae (quail, partridges, and pheasants) and game fish such as all members of the family Ictaluridae (catfish).

Section 17-2-41, *Endangered Species*, states that "except as otherwise provided in this act, it is unlawful to take, possess, transport, export, process, sell or offer for sale, or ship" any species or subspecies of wildlife that appears on the following lists: (1) wildlife indigenous to the State determined to be endangered within the State as set forth by regulations of the Game Commission of the State of New Mexico ("the Commission") and (2) the Federal lists of endangered species as set forth in the Endangered Species Act to the extent that such lists are adopted by regulations of the Commission. In § 17-2-42, *Management Programs*, the Director of the State Department of Game and Fish is directed to perform the following: (1) establish programs deemed necessary by the Commission for the management of endangered species; (2) work with Federal and State entities or with private individuals in the administration and management of programs for the management of endangered species; (3) authorize by permit the taking, possession, transportation, or shipment of species deemed to need management for purposes including scientific and educational; and (4) authorize by permit the removal, capture, and destruction of endangered species where necessary to prevent damage to property or to protect human health.

The intent of the congressional legislation protecting migratory game birds under the Migratory Bird Treaty Act is also addressed in Chapter 17 of the New Mexico statutes. In particular, § 17-2-3, *Protected wildlife species and game fish defined*, specifies that all of the migratory bird family Anatidae (waterfowl) is protected. The hunting, taking, capturing, killing, or possession or the attempt to hunt, take, capture, or kill species of this family is regulated by the Commission. In addition, the Wildlife Conservation Act also implements portions of the Migratory Bird Treaty Act with respect to migratory game birds that are recognized as endangered species.

The Commission's Regulation No. 564, *Governing the Removal, Capture or Destruction of Endangered Species*, was adopted in 1975. This regulation specifies that any person who does not possess a permit and who removes, captures, or destroys any wildlife species classified as endangered by Commission regulations, other than those listed in 50 CFR Part 17, *Endangered and Threatened Wildlife and Plants*, must report any such incident to the New Mexico Department of Game and Fish.

The Commission's Regulation No. 682, *Amending the Listing of Endangered Species and Subspecies of New Mexico*, lists endangered wildlife in the State. Amendment 1 to this regulation adopts the Federal list of endangered species specified in 50 CFR Part 17.

The amended listing of endangered wildlife of New Mexico, which was issued in November 1990, lists a number of endangered or threatened species that could be found at WIPP and were specified in the WIPP FEIS (DOE, 1980) or the SEIS (DOE, 1990a). These include nine species of fish, three species of reptiles, and five species of birds, which are listed in Table 37-1.

The Commission's Regulation No. 705, *Regulation for the Taking and Possession of Protected Wildlife for Scientific and Educational Purposes*, contains the requirements for obtaining and using State permits and authorizations for taking and possessing wildlife for scientific and educational purposes. Permits and authorizations are issued to individuals rather than to parties or organizations; however, a permittee may have qualified subpermittees. "Protected wildlife" is defined as all wild species of mammals, birds, reptiles, amphibians, and fishes and endangered mollusks and crustaceans taken by a non-resident of New Mexico or as pikas, marmots, and game, furbearing, and endangered mammals; all birds except rock doves, European starlings, and house sparrows; horned lizards if sacrificed, retained, and/or transported out of State; endangered reptiles; bullfrogs and endangered amphibians; game and endangered fishes; and endangered mollusks and crustaceans taken by a resident.

TABLE 37-1. Endangered and Threatened Species in the State of New Mexico that May Occur at WIPP

COMMON NAME	SCIENTIFIC NAME
Fish	
Blue sucker	*Cycleptus elongatus*
(Rio Grande) bluntnose shiner	*Notropis simus simus*
Bigscale logperch	*Percina macrolepida*
Gray redhorse	*Moxostoma congestum*
Greenthroat darter	*Etheostoma lepidum*
Mexican tetra	*Astyanax mexicanus*
Pecos gambusia (F)[1]	*Gambusia nobilis*
Pecos pupfish	*Cyprinodon pecosensis*
(Pecos) bluntnose shiner	*N. simus pecosensis*
Reptiles	
Plain-bellied water snake	*Nerodia erythrogaster*
Western ribbon snake	*Thamnophis proximus*
(Dunes) sagebrush lizard	*Sceleroporus graciosus arenicolous*
Birds	
Aplomado falcon	*Falco femoralis*
Peregrine falcon (F)	*Falco peregrinus*
Bald eagle (F)	*Haliaeetus leucocephalus*
Baird's sparrow	*Ammodramus bairdii*
Varied bunting	*Passerina versicolor*

37.2 Compliance Status of the Regulatory Requirements

Table 37-2 summarizes each applicable requirement and its compliance status under the State of New Mexico's Wildlife Conservation Act. The text provides more detail on the compliance status of each requirement. It should be noted that a number of these requirements apply to WIPP because of the potential for the occurrence of recognized endangered or threatened species on WIPP lands.

[1]The presence of "(F)" after a common name indicates that this species is also on the Federal list of endangered or threatened species.

TABLE 37-2. New Mexico Wildlife Conservation Act - Summary of Regulatory Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
State Game Commission Regulation No. 564, *Governing the Removal, Capture, or Destruction of Endangered Species*		
Regulation No. 564	Report of unpermitted removal, capture, or destruction of endangered species	**NOT APPLICABLE** No endangered species removed from, captured, or destroyed at WIPP [Section 37.2.1]
State Game Commission Regulation No. 682, *Amending the Listing of Endangered Species and Subspecies of New Mexico*		
Regulation No. 682	Recognition of State-listed endangered wildlife	**ACHIEVED** Consultation with Game and Fish Department [Section 37.2.2]
State Game Commission Regulation No. 705, *Regulation for the Taking and Possession of Protected Wildlife for Scientific and Educational Purposes*		
Regulation No. 705, Chapter 2	Requirements for obtaining a permit	**ACHIEVED** Two permits obtained at WIPP (see Section 37.3) [Section 37.2.3]
Regulation 705, Chapter 5	Year-end reports	**UP TO DATE** Submitted annually by March 31 [Section 37.2.4]

37.2.1 Report of Unpermitted Removal, Capture, or Destruction of Endangered Species, Regulation No. 564

Persons without an authorized State permit who remove, capture, or destroy a State-listed endangered species must provide detailed information on such incident(s) to the State Game and Fish Department within 30 days.

No incidents requiring reports have occurred. Several permits and authorizations have been issued for various activities involving the taking of wildlife that are neither endangered nor threatened. These permits and authorizations specify that endangered wildlife shall not be taken during these activities (see Section 37.3).

37.2.2 Recognition of State-Listed Endangered Wildlife, Regulation No. 682

The State-listed endangered species that could be present at WIPP and/or affected by WIPP activities must be identified.

In 1989, the DOE consulted with the New Mexico Department of Game and Fish (NMDG&F) regarding the State-listed endangered species in the vicinity of the WIPP site. At that time, the State Game and Fish Department communicated to the DOE their opinion of which State-listed endangered species "occur or are likely to occur at the WIPP site." The species identified were listed in Regulation 657 dated January 9, 1988, and included the following species: Mississippi kite, bald eagle, peregrine falcon, least tern, willow flycatcher, Bell's vireo, Baird's sparrow, and the sagebrush lizard. The NMDG&F subsequently concurred that proposed WIPP activities would probably have no significant impacts on State-listed species in the area. Since 1989, Regulation 682 was updated on November 30, 1990, with Amendment No. 1 issued on July 25, 1991. The list in the updated version of Regulation No. 682 does not include the Mississippi kite.

37.2.3 Permit Application and Requirements to Conduct Activities Authorized Under this Regulation, Chapter 2 of Regulation No. 705

A person must complete and submit a permit or authorization application; after receipt of the permit, permittees and subpermittees must comply with written permit requirements.

To date, two permits for banding birds and taking protected birds (with specific methods for taking protected birds and fishes) have been issued to Westinghouse Waste Isolation Division (WID) personnel. More detail on these permits is provided in Section 37.3.

37.2.4 Year-End Reports, Chapter 5 of Regulation No. 705

An annual report is generally required for permits issued by the Department of Game and Fish. The permits must be filed by March 31.

Annual reports are submitted that describe the activities conducted under each permit issued by the NMDG&F.

37.3 Compliance Status of the Permit Conditions

Table 37-3 summarizes the conditions imposed by the NMDG&F for each of the two permits issued. The text provides more detail on the compliance status of each permit condition.

TABLE 37-3. New Mexico Wildlife Conservation Act - Summary of Permit Compliance Status

CITATION	CONDITION		COMPLIANCE STATUS
Permit No. 1961	(1)	Authorization for live capture and banding of protected birds; excluded for waterfowl, eagles, resident gallinaceous species of gamebirds, and federally endangered or threatened species	ACHIEVED Only authorized birds captured and/or banded; no endangered or threatened species salvaged; disposition of wildlife as required under permit
	(2)	Salvaged endangered or threatened species salvaged to be reported	
	(3)	Disposition of wildlife	[Section 37.3.1]

TABLE 37-3 (continued)

CITATION	CONDITION	COMPLIANCE STATUS
Permit No. 1894	Live trapping; authorization for quail, catfish, and unprotected vertebrates; nonlethal methods for catfish; report for salvaging endangered or threatened vertebrates	ACHIEVED No gill nets used; no more than 50 catfish taken under permit; nonlethal methods used for catfish; no endangered or threatened vertebrates salvaged Quail permit limit exceeded and reported [Section 37.3.2]

37.3.1 Permit No. 1961

Permit No. 1961 authorizes the designated permittee and subpermittees to live-capture, band, and release all protected species of birds except for waterfowl, eagles, resident gallinaceous game birds, and endangered or threatened species. Salvage of any dead, injured, or otherwise incapacitated members of an endangered or threatened species must be reported to the NMDG&F within 14 days. The ultimate disposition of all protected wildlife that is not released is to the Carnegie Museum of Natural History, New Mexico State University, or the University of Arizona.

Permit No. 1961 was issued for the period of April 2, 1993, through March 31, 1994. No waterfowl, eagles, resident gallinaceous game birds, or endangered or threatened species have been live-captured, banded, or salvaged. The ultimate disposition of any protected species allowable under this permit resides in the Carnegie Museum of Natural History, New Mexico State University, or the University of Arizona, as specified in the permit.

37.3.2 Permit No. 1894

Permit No. 1894 authorizes the permittee and subpermittees specified to use live traps, trotlines, and nets (except gill nets) to obtain specimens and to salvage dead, injured, or otherwise incapacitated vertebrates. The authorized WID personnel may take up to 30 specimens of quail, 50 channel/flathead catfish, and unprotected vertebrates as needed in Eddy and Lea counties. Nonlethal methods must be used to take the catfish. Any endangered or threatened species salvaged must be reported to the NMDG&F within 14 days. WIPP is the ultimate disposition location for all specimens retained under this permit.

Permit No. 1894 was issued for the period of April 1, 1993, through March 31, 1994. No gill nets have been used to obtain specimens. The allowable number of specimens of 50 channel/flathead catfish has not been exceeded. Methods used to capture the catfish are not lethal to these fish or to other aquatic vertebrates. No endangered or threatened species have been salvaged.

On February 3, 1994, the WID notified the NMDG&F that the WIPP had exceeded by seven the harvest allotment of 30 quail that is provided in Permit No. 1894. This occurred when the additional quail died in a trap. The WID immediately notified the NMDG&F, and an investigation was initiated. Results of the investigation were reviewed by the NMDG&F enforcement headquarters staff. On March 28, 1994, the NMDG&F notified the WID that no citations would be issued and that no further action would be required.

38.0 NEW MEXICO PESTICIDE CONTROL ACT

38.1 Summary of the Law

The Pesticide Control Act (§§ 76-4-1 through 76-4-30 NMSA 1978) is administered and enforced by the New Mexico State Department of Agriculture under the direction of the Board of Regents of New Mexico State University, Las Cruces, New Mexico. This act provides for the registration, labeling, distribution, storage, transportation, application, use, and disposal of pesticides and pesticide-related devices. It also provides for the licensing of pesticide dealers, consultants, applicators, and operators of pesticide apparatus and imposes penalties to protect the environment and the public health and welfare.

The Pesticide Control Act is implemented by two regulatory orders of the Board of Regents of New Mexico State University. Regulatory Order No. 4, *Regulatory Orders of the Board of Regents of New Mexico State University* (dated September 16, 1978), describes State requirements for the storage of pesticides and the disposal of pesticide wastes. Regulatory Order No. 5, *Definitions, Licensing, Equipment Inspection, Record Keeping of Pesticides by Regulated Applicants* (dated November 2, 1979), describes requirements for licensing and for applying pesticides in New Mexico and applies to all activities involving the distribution and use of pesticides in the State.

38.2 Compliance Status of the Regulatory Requirements

The compliance status of each of the major requirements of the implementing regulations of the Pesticide Control Act is summarized in Table 38-1. Additional detail is provided in the text.

TABLE 38-1. New Mexico Pesticide Control Act - Summary of Regulatory Compliance Status

CITATION	REQUIREMENT	COMPLIANCE STATUS
New Mexico Pesticide Control Act, Regulatory Order No. 4, *Regulatory Order of the Board of Regents of New Mexico State University*		
Section 5	Storage of pesticides and disposal of pesticide wastes	**ACHIEVED** General-use wasp and hornet killer stored on site [Section 38.2.1; see also 10.2.2]

TABLE 38-1 (continued)

CITATION	REQUIREMENT	COMPLIANCE STATUS
New Mexico Pesticide Control Act, Regulatory Order No. 5, *Definitions, Licensing, Equipment Inspections, Record Keeping of Pesticides by Regulated Applicators*		
Section 6	License classifications	**NOT APPLICABLE** Subcontractor: categories 3A, 3B, 7A, 7B, 7D [Section 38.2.2]
Section 10	Protective equipment	**ACHIEVED** Review by WID personnel [Section 38.2.3]
Section 11	Application of pesticides	**UP TO DATE** Review by WID personnel [Section 38.2.4]

38.2.1 Storage of Pesticides and Disposal of Pesticide Wastes, Section 5 of Regulatory Order No. 4

Requirements for storing pesticides and for disposing of pesticide wastes and pesticide containers are described in Section 5 of Regulatory Order No. 4 to the New Mexico Pesticide Control Act.

All restricted-use pesticides are brought on site by the contractor who has been hired to apply them. Storage and disposal of restricted-use pesticides and their containers are the responsibility of the contractors who are licensed by the State and knowledgeable of applicable requirements (see also Section 10.2.2). One general-use pesticide, "CINCH" Wasp and Hornet Killer, is stored at WIPP. "CINCH" is properly stored in accordance with the product label. Used, empty aerosol cans are managed as hazardous waste.

38.2.2 License Classification, Section 6 of Regulatory Order No. 5

There are 17 categories of licenses granted by the State of New Mexico. Each one represents the type and scope of the specific certification examinations that must be taken by commercial, non-commercial, and public applicators and by pest-management consultants for their licenses.

The applicator who is contracted to apply pesticides at WIPP is licensed under the following categories:

3A - Ornamental Pest Control	7A - Structural Pest Control
3B - Turf Pest Control	7B - Rodent Control
	7D - Termite Control

38.2.3 Protective Equipment, Section 10 of Regulatory Order No. 5

All licensed certified applicators must make available properly decontaminated protective equipment which is in proper working order and must advise their employees of its use to meet the safety requirements of the pesticide labeling.

All pesticide application contracts are reviewed and approved by Westinghouse Waste Isolation Division (WID) personnel before the contract is awarded. Provisions in the contract require that WID personnel approve the use of all pesticides prior to application on site. In addition, the applicator is required to submit records of the date of application, specific location, application method, quantity applied, and weather conditions at time of application.

38.2.4 Application of Pesticides, Section 11 of Regulatory Order No. 5

A licensed certified applicator shall apply only those pesticides registered for use in New Mexico under his/her license application. Any person who applies pesticides must follow the directions, rates, and precautions that are stated on the approved label and labeling. Restricted-use pesticides shall be applied only by licensed certified applicators or persons under their direct supervision.

WID personnel review the application method and pesticide(s) to be used by the contractor before the application to ensure that the method is appropriate and that no pesticides on the EPA's restricted list will be used.

A copy of the contractor's current license is maintained by the WID.

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(WID) Westinghouse Waste Isolation Division, 1993d. *Quality Assurance Project Plan for Sampling Emissions of Radionuclides to the Ambient Air at the Waste Isolation Pilot Plant*, August/September, draft.

APPENDIX A

INDEX OF REQUIREMENTS BY AGENCY

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U.S. Environmental Protection Agency		
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Sec. 13; Standard Stipulations	**Right-of-Way Reservation No. NM 65801, Seven Subsidence Monuments**	**18.3**
Right-of-way reservation	No unique conditions	18.3.6
Sec. 13; Standard Stipulations	**Right-of-Way Reservation No. NM 82245 for Two Subsidence Monuments**	**18.3**
#1	Construction and maintenance of the monuments	18.3.7.1
#3	Security and maintenance of the monuments	18.3.7.2
#5	Rehabilitation of the land	18.3.7.3
Sec. 13; Standard Stipulations	**Right-of-Way Reservation No. NM 77921, Aerosol Sampling Site**	**18.3**
#1	Construction, operation, and maintenance	18.3.8.1
#3	Security and operation of aerosol sampling station	18.3.8.2
#5	Rehabilitation of the land occupied by the aerosol sampling station	18.3.8.3
Letter from El Paso Natural Gas Company	Use of the abandoned concrete slab	18.3.8.4
Sec. 13; Standard Stipulations	**Free-Use Permit No. NM-FU3-91183 for Use of Caliche**	**18.3**
Approval of request to mine 35,000 cubic yards of caliche	Withdrawal of caliche	18.3.9.1
Attachment 2, Reclamation	Reclamation of caliche borrow pit	18.3.9.2
43 CFR Part 4100	**Grazing Administration - Exclusive of Alaska**	**19.2**
43 CFR 4100.0-8	Land-use plan, including grazing management	19.2.1
43 CFR Part 4100	**Grazing Administration**	**20.2**

Citation	Requirement	BECR Section
43 CFR 4100.0-8	Management of grazing lands under principles of multiple use and sustained yield and in accordance with applicable land-use plans	20.2.1; see also 19.2.1
43 CFR 4120.2	Preparation of allotment management plan	20.2.2
50 CFR Part 13	**General Permit Procedures**	**21.2**
50 CFR 13.11	Permit application procedures	21.2.1
50 CFR Part 22	**Eagle Permits**	**21.2**
50 CFR 22.11	General permit requirements	21.2.2
50 CFR 22.25	Permits to take golden eagle nests	21.2.3
50 CFR Part 13	**General Permit Procedures**	**22.2**
50 CFR 13.11	Permit application procedures	22.2.1
50 CFR 13.12	Information requirements for permit applications	22.2.2
50 CFR 13.44	Display of permit	22.2.3
50 CFR 13.45	Filing of reports	22.2.4
50 CFR 13.46	Maintenance of records	22.2.5
50 CFR 13.47	Inspection requirement	22.2.6
50 CFR 13.48	Compliance with permit conditions (see also Sections 22.2.12 and 22.3.1)	22.2.7
50 CFR 13.50	Acceptance of liability	22.2.8
50 CFR Part 20	**Migratory Bird Hunting**	**22.2**
50 CFR Part 20, Subpart C	Compliance with applicable hunting regulations	22.2.9
50 CFR Part 21	**Migratory Bird Permits**	**22.2**
50 CFR 21.22(a)	Permit for banding or marking migratory birds	22.2.10
50 CFR 21.22(b)	Application procedures for banding or marking permits	22.2.11
50 CFR 21.22(c)	Additional permit conditions	22.2.12
50 CFR 21.22(d)	Term of permit	22.2.13
50 CFR 21.27	Special-purpose permits	22.2.14

Citation	Requirement	BECR Section
50 CFR 21.28	Falconry permits	22.2.15
50 CFR 21.41	Depredation permits	22.2.16
Permit No. 22478	**Authorization to capture and band or mark birds**	**22.3**
50 CFR Part 13	**General Permit Procedures**	**23.2**
50 CFR 13.11	Permit application procedures	23.2.1
50 CFR Part 17	**Endangered and Threatened Wildlife and Plants**	**23.2**
50 CFR 17.22, 17.32, 17.52, and 17.62	Application for permits for scientific purposes or for the enhancement of propagation or survival of endangered or threatened species	23.2.2
50 CFR Part 402	**Interagency Cooperation - Endangered Species Act, as Amended**	**23.2**
50 CFR 402.12	Biological assessment to evaluate effects of proposed actions on designated species	23.2.3
50 CFR 402.14	Formal consultation with the FWS to determine whether any action will affect listed species	23.2.4
Advisory Council on Historic Preservation		
36 CFR Part 800	**Protection of Historic and Cultural Properties**	**24.2**
36 CFR 800.5	Assessment of effects on historic properties	24.2.1
36 CFR 800.11	Development of plan for treatment of historic property	24.2.2
43 CFR Part 7	**Protection of Archaeological Resources**	**24.2**
43 CFR 7.5	Application for permit to excavate and/or remove archaeological resources	24.2.3
New Mexico Environment Department		
40 CFR Part 262 (HWMR-7, § 301)	**Standards applicable to generators of hazardous waste**	**25.2.2**
40 CFR 262.11	Hazardous waste determination	25.2.2.1

Citation	Requirement	BECR Section
40 CFR 262.12	EPA identification number	25.2.2.2
40 CFR 262.20	Manifest requirements	25.2.2.3
40 CFR 262.21	Acquisition of manifests	25.2.2.4
40 CFR 262.22	Number of copies	25.2.2.5
40 CFR 262.23	Use of the manifest	25.2.2.6
40 CFR 262.30	DOT packaging requirements	25.2.2.7
40 CFR 262.31	Labeling requirements	25.2.2.8
40 CFR 262.32	Marking requirements	25.2.2.9
40 CFR 262.33	Placarding requirements	25.2.2.10
40 CFR 262.34(a)	90-day or less accumulation time	25.2.2.11
40 CFR 262.34(a)(1)(i)	Compliance with Subpart I of 40 CFR Part 265 for waste placed in containers	25.2.2.12
40 CFR 262.34(a)(1)(ii)	Accumulation of hazardous wastes in tanks	25.2.2.13
40 CFR 262.24(a)(1)(iii)	Compliance with Subpart W of 40 CFR Part 265 for wastes placed on drip pads	25.2.2.14
40 CFR 262.34(a)(2)	Marking each container with the date of initial accumulation of waste	25.2.2.15
40 CFR 262.34(a)(3)	Marking each container as hazardous waste	25.2.2.16
40 CFR 262.34(a)(4)	Compliance with Subparts C and D of 40 CFR 265, 40 CFR 265.16, and 40 CFR 268.7(a)(4) for preparedness/prevention, contingency plans/emergency procedures, training, and waste analysis plans	25.2.2.17
40 CFR 262.34(b)	Extension of the 90-day storage period due to unforeseen, temporary, and uncontrollable circumstances	25.2.2.18
40 CFR 262.34(c)(1)(i)	Restrictions and requirements for satellite accumulation areas	25.2.2.19, 25.2.2.20
40 CFR 262.34(c)(1)(ii)	Labeling of container as "hazardous waste"	25.2.2.21
40 CFR 262.34(c)(2)	Management of waste exceeding the 55-gallon or 1-quart limit	25.2.2.22
40 CFR 262.40	Recordkeeping requirements	25.2.2.23
40 CFR 262.41	Generator--biennial report	25.2.2.24

Citation	Requirement	BECR Section
40 CFR 262.42	Exception reporting if copy of manifest is not returned to generator within the specified time period	25.2.2.25
40 CFR 262.43	Additional reporting	25.2.2.26
40 CFR Part 263 (HWMR-7, § 401)	**Standards Applicable to Transporters of Hazardous Waste**	**25.2.3**
40 CFR 263.10(a)	Compliance with DOT regulations	25.2.3.1
40 CFR 263.11	EPA identification number	25.2.3.2
40 CFR 263.20 - 263.22	Compliance with the manifest system and recordkeeping	25.2.3.3
40 CFR 263.30	Immediate action after hazardous waste discharges	25.2.3.4
40 CFR 263.31	Discharge cleanup	25.2.3.5
40 CFR Part 265 (HWMR-7, § 601)	**Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities**	**25.2.4**
40 CFR 265.10	Applicability	25.2.4.1
40 CFR 265.11	EPA identification number	25.2.4.2
40 CFR 265.12	Required notices to the off-site source(s)	25.2.4.3
40 CFR 265.13	General waste analysis	25.2.4.4
40 CFR 265.14	Security	25.2.4.5
40 CFR 265.15	General inspection requirements	25.2.4.6
40 CFR 265.16	Personnel training	25.2.4.7
40 CFR 265.17	General requirements for ignitable, reactive, or incompatible wastes	25.2.4.8
40 CFR 265.18	Location standards	25.2.4.9
40 CFR 265.31	Maintenance and operation of facility	25.2.4.10
40 CFR 265.32	Required equipment	25.2.4.11
40 CFR 265.33	Testing and maintenance of equipment	25.2.4.12
40 CFR 265.34	Access to communications or alarm system	25.2.4.13
40 CFR 265.35	Required aisle space	25.2.4.14

Citation	Requirement	BECR Section
40 CFR 265.37	Arrangements with local authorities	25.2.4.15
40 CFR 265.51	Purpose and implementation of the contingency plan	25.2.4.16
40 CFR 265.52	Content of the contingency plan	25.2.4.17
40 CFR 265.53	Copies of contingency plan	25.2.4.18
40 CFR 265.54	Amendment of contingency plan	25.2.4.19
40 CFR 265.55	Emergency Coordinator	25.2.4.20
40 CFR 265.56	Emergency procedures	25.2.4.21
40 CFR 265.71	Use of manifest system	25.2.4.22
40 CFR 265.72	Manifest discrepancies	25.2.4.23
40 CFR 265.73	Operating record	25.2.4.24
40 CFR 265.74	Availability, retention, and disposition of records	25.2.4.25
40 CFR 265.75	TSDF biennial report	25.2.4.26
40 CFR 265.76	Unmanifested waste report	25.2.4.27
40 CFR 265.77	Additional reports	25.2.4.28
40 CFR 265.90	Applicability of the ground-water monitoring system	25.2.4.29
40 CFR 265.91	Ground-water monitoring system	25.2.4.30
40 CFR 265.92	Sampling and analysis	25.2.4.31
40 CFR 265.93	Preparation, evaluation, and response	25.2.4.32
40 CFR 265.94	Recordkeeping and reporting	25.2.4.33
40 CFR 265.110	Applicability of the closure/post-closure requirements	25.2.4.34
40 CFR 265.111	Closure performance standard	25.2.4.35
40 CFR 265.112	Closure plan; amendment of plan	25.2.4.36
40 CFR 265.113	Time allowed for closure	25.2.4.37
40 CFR 265.114	Disposal or decontamination of equipment, structures, and soils	25.2.4.38
40 CFR 265.115	Certification of closure	25.2.4.39
40 CFR 265.116	Survey plat	25.2.4.40

Citation	Requirement	BECR Section
40 CFR 265.117	Postclosure care and use of property	25.2.4.41
40 CFR 265.118	Postclosure plan; amendment of plan	25.2.4.42
40 CFR 265.119	Postclosure notices	25.2.4.43
40 CFR 265.120	Certification of completion of postclosure care	25.2.4.44
40 CFR 265.142	Cost estimate for closure	25.2.4.45
40 CFR 265.143	Financial assurance for closure	25.2.4.46
40 CFR 265.144	Cost estimate for postclosure care	25.2.4.47
40 CFR 265.145	Financial assurance for postclosure care	25.2.4.48
40 CFR 265.146	Use of a mechanism for financial assurance of both closure and postclosure care	25.2.4.49
40 CFR 265.147	Liability requirements	25.2.4.50
40 CFR 265.148	Incapacity of owners or operators, guarantors, or financial institutions	25.2.4.51
40 CFR 265.149 [HWMR-7, § 602(A)]	Use of State-required mechanisms	25.2.4.52
40 CFR 265.150 [HWMR-7, § 602(B)]	State assumption of responsibility	25.2.4.53
40 CFR 265.171	Condition of containers	25.2.4.54
40 CFR 265.172	Compatibility of waste with containers	25.2.4.55
40 CFR 265.173	Management of containers	25.2.4.56
40 CFR 265.174	Inspections	25.2.4.57
40 CFR 265.176	Special requirements for ignitable or reactive waste	25.2.4.58
40 CFR 265.177	Special requirements for incompatible wastes	25.2.4.59
40 CFR 265.190-.445	Tank systems; surface impoundments; waste piles; land treatment; incinerators; thermal treatment; chemical, physical, and biological treatment; underground injection; and drip pads	25.2.4.60
40 CFR 265.1032	Standards (air emission) for process vents	25.2.4.61
40 CFR 265.1052-.1062	Air emission standards for equipment leaks	25.2.4.62

Citation	Requirement	BECR Section
40 CFR Part 270 (HWMR-7, § 901)	**EPA Administered Permit Programs: the Hazardous Waste Permit Program**	**25.2.5**
40 CFR 270.1	Purpose and scope of the RCRA permit program regulations	25.2.5.1
40 CFR 270.10	General application requirements	25.2.5.2
40 CFR 270.11	Signatories to permit applications and reports	25.2.5.3
40 CFR 270.13	Contents of Part A of the permit application	25.2.5.4
40 CFR 270.14 (HWMR-7, §§ 901 and 902)	Contents of Part B: general requirements	25.2.5.5
40 CFR 270.15	Specific Part B information requirements for containers	25.2.5.6
40 CFR 270.23	Specific Part B requirements for miscellaneous units	25.2.5.7
40 CFR 270.30	Conditions applicable to all permits	25.2.5.8
40 CFR 270.31	Requirements for recording and reporting of monitoring results	25.2.5.9
40 CFR 270.42 (HWMR-7, §§ 901 and 902)	Permit modification at the request of the permittee	25.2.5.10
40 CFR 270.71 (HWMR-7, §§ 901 and 902)	Operation during interim status	25.2.5.11
40 CFR 270.72	Changes during interim status	25.2.5.12
§§ 74-1-1 through 74-1-10	**New Mexico Environmental Improvement Act**	**27.1; see Chapters 25, 26, and 28-31**
New Mexico Environment Department (NMED) 92-1	**New Mexico Environment Department Ground Water Protection Act Corrective Action Fund Regulations**	**28.1**
NMED 92-1	Reimbursement of costs from corrective actions for spills/releases from underground storage tanks	28.2.1
AQCRs	**New Mexico Air Quality Control Regulations**	**29.1**
AQCR 301	Regulations to control open burning	29.2.1
AQCR 401	Regulations to control smoke and visible emissions	29.2.2

Citation	Requirement	BECR Section
AQCR 507	Oil-burning equipment -- particulate matter	29.2.3
AQCR 605	Oil-burning equipment -- sulfur dioxide	29.2.4
AQCR 606	Oil-burning equipment -- nitrogen dioxide	29.2.5
AQCR 700	Permit fees	29.2.6
AQCR 702	Permits	29.2.7; 29.3
AQCR 703.1	Annual emission inventory	29.2.8
AQCR 710	Stack height requirements	29.2.9
AQCR 751	NESHAPs - radionuclides NESHAPs - other HAPs	29.2.10
AQCR 752	Application for registration of toxic air pollutants	29.2.11
AQCR 801	Excess emissions during malfunction, startup, shutdown, or scheduled maintenance	29.2.12
AQCR 901	Controlling emissions leaving New Mexico	29.2.13
AQCR 1001	Sampling equipment	29.2.14
Open-burning permit, Conditions	Application and permit	29.3.1
Air Quality Permit No. 310-M-2, Condition 1	Construction and operation	29.3.2.1
Condition 2	Emission rates	29.3.2.2
Condition 3-4	Compliance test methods	29.3.2.3
Condition 5	Revisions and modifications	29.3.2.4
Condition 6	Notification to subsequent owners	29.3.2.5
Condition 7	Right to access property and review records	29.3.2.6
Condition 8	Posting of the permit	29.3.2.7
Condition 9	Recordkeeping	29.3.2.8
Condition 10	Reporting	29.3.2.9
Additional Condition, p. 8	Permit cancellations	29.3.2.10
Additional Condition, p. 8	Notice of intent and emission inventory	29.3.2.11

Citation	Requirement	BECR Section
Approval DP-831	**New Mexico Discharge Plan for the WIPP**	**30.3**
DP-831 Specific Requirement (SR) #1	Monitoring and quarterly reports	30.3.1
DP-831 SR #2	Submittal of water quality analysis	30.3.2
DP-831 SR #3	Quarterly sampling of each evaporation lagoon	30.3.3
DP-831 SR #4	Maintenance of berms	30.3.4
DP-831 SR #5	Completion of proposed evaporation ponds	30.3.5
DP-831 General Requirement (GR)--Recordkeeping	Records to be kept and made available to the NMED upon request	30.3.6
DP-831 GR--Inspection and Entry	Allowing inspections, entry, sampling, and monitoring by NMED personnel	30.3.7
DP-831 GR--Duty to Provide Information	Providing information relevant to discharge plan/records required by Discharge Plan that has been requested by NMED	30.3.8
DP-831 GR--Spills, Leaks, and Other Unauthorized Discharges	Reporting and remediation of any spills, leaks, and other unauthorized discharges	30.3.9
DP-831 GR--Retention of Records	Retention of all monitoring information, discharge plan reports, and data needed for discharge plan application	30.3.10
DP-831 GR--Modifications and/or Amendments	Notification of NMED of any modifications or additions to the wastewater disposal system; approval by NMED required prior to increasing the quantity or concentration of constituents in waste water above those approved in the plan	30.3.11
HWMR-7	**New Mexico Hazardous Waste Management Regulations**	**25.2.1**
HWMR-7, § 1001	Compliance with other regulations	25.2.1.1
USTR	**New Mexico Underground Storage Tank Regulations**	**25.2.6**
USTR Sec. 103	Applicability	25.2.6.1
USTR Sec. 200	Existing tanks	25.2.6.2
USTR Sec. 201	Transfer of ownership	25.2.6.3

Citation	Requirement	BECR Section
USTR Sec. 202	New UST system	25.2.6.4
USTR Sec. 203	Substantially modified UST systems	25.2.6.5
USTR Sec. 204	Notification of spill or release	25.2.6.6
USTR Sec. 205	Emergency repairs and tank replacement	25.2.6.7
USTR Sec. 206	Application forms	25.2.6.8
USTR Sec. 207	Registration certificate	25.2.6.9
USTR Sec. 300	Payment of fee	25.2.6.10
USTR Sec. 301	Amount of fee	25.2.6.11
USTR Sec. 302	Late payment penalties	25.2.6.12
USTR Sec. 400(a)	Performance standards to ensure that new UST systems tanks are properly designed and constructed	25.2.6.13
USTR Sec. 400(b)	Piping to be properly designed and constructed	25.2.6.14
USTR Sec. 400(c)(1)(i)	Spill prevention equipment	25.2.6.15
USTR Sec. 400(c)(1)(ii)	Overfill prevention equipment	25.2.6.16
USTR Sec. 400(d)	Installation of tanks and piping	25.2.6.17
USTR Sec. 400(e)	Certificate of installation	25.2.6.18
USTR Sec. 401(a)	Upgrading of existing UST systems	25.2.6.19
USTR Sec. 401(b)	Upgrading requirements for steel tanks	25.2.6.20
USTR Sec. 401(c)	Upgrading requirements for metal piping	25.2.6.21
USTR Sec. 401(d)	Spill and overfill protection equipment	25.2.6.22
USTR Sec. 402 (by reference to 40 CFR 280.22)	Certification of compliance and notification requirements	25.2.6.23
USTR Sec. 500(a)	Spill and overflow control	25.2.6.24
USTR Sec. 501(a)	Corrosion protection	25.2.6.25
USTR Sec. 501(b)	Inspections of cathodic protection systems	25.2.6.26
USTR Sec. 501(c)	Inspections of impressed-current cathodic protection systems	25.2.6.27
USTR Sec. 501(d)	Records of operation of the cathodic protection system	25.2.6.28

Citation	Requirement	BECR Section
USTR Sec. 502	Compatibility	25.2.6.29
USTR Sec. 503(a)	Repairs allowed	25.2.6.30
USTR Sec. 503(b)	Repairs to fiberglass-reinforced plastic tanks	25.2.6.31
USTR Sec. 503(c)	Replacement or repair of pipe sections and fittings	25.2.6.32
USTR Sec. 503(d)	Tightness testing after repairs	25.2.6.33
USTR Sec. 503(e)	Testing of any repaired cathodically protected UST system	25.2.6.34
USTR Sec. 503(f)	Records of all repairs	25.2.6.35
USTR Sec. 504(a)	Reporting requirements	25.2.6.36
USTR Sec. 504(b)	Recordkeeping requirements	25.2.6.37
USTR Sec. 504(c)	Availability and maintenance of records	25.2.6.38
USTR Sec. 505(a)	Inspections, monitoring, and testing of USTs	25.2.6.39
USTR Sec. 505(c)	Inspections of UST installations, repairs or modifications, or removals or system closures	25.2.6.40
USTR Sec. 600(a)	General requirements of all UST systems	25.2.6.41
USTR Sec. 600(b)	Notification of releases	25.2.6.42
USTR Sec. 600(c)	Schedule for required release detection	25.2.6.43
USTR Sec. 600(d)	Failure to comply with release-detection requirements	25.2.6.44
USTR Sec. 601(a)	Requirements for tanks of petroleum UST systems	25.2.2.45
USTR Sec. 601(b)	Requirements for piping of petroleum UST systems	25.2.6.46
USTR Sec. 601(b)(1)	Requirements for pressurized piping	25.2.6.47
USTR Sec. 601(b)(2)	Requirements for suction piping	25.2.6.48
USTR Sec. 602	Requirements for hazardous substance UST systems	25.2.6.49
USTR Sec. 603	Methods of release detection for tanks	25.2.6.50
USTR Sec. 603(a)	Inventory control	25.2.6.51

Citation	Requirement	BECR Section
USTR Sec. 603(b)	Manual tank gauging	25.2.6.52
USTR Sec. 603(c)	Tank tightness testing	25.2.6.53
USTR Sec. 603(d)	Automatic tank gauging	25.2.6.54
USTR Sec. 603(e)	Vapor monitoring	25.2.6.55
USTR Sec. 603(f)	Ground-water monitoring	25.2.6.56
USTR Sec. 603(g)	Interstitial monitoring	25.2.6.57
USTR Sec. 603(h)	Other methods of detecting releases	25.2.6.58
USTR Sec. 604	Methods of release detection for piping	25.2.6.59
USTR Sec. 605	Release detection recordkeeping	25.2.6.60
USTR Sec. 700	Reporting of suspected releases	25.2.6.61
USTR Sec. 701	Investigation of off-site impacts	25.2.6.62
USTR Sec. 702	Release investigation and confirmation steps	25.2.6.63
USTR Sec. 703(a)	Reporting and cleanup of large spills and overfills	25.2.6.64
USTR Sec. 703(b)	Reporting and cleanup of small spills and overfills	25.2.6.65
USTR Sec. 800	Temporary closure	25.2.6.66
USTR Sec. 801(a)	Permanent closure and changes in-service	25.2.6.67
USTR Sec. 801(b)	Permanent closure of a tank	25.2.6.68
USTR Sec. 801(c)	Change in service	25.2.6.69
USTR Sec. 802(a)	Assessing the site	25.2.6.70
USTR Sec. 802(b)	Corrective action	25.2.6.71
USTR Sec. 803	Applicability to previously closed UST systems	25.2.6.72
USTR Sec. 804	Closure records	25.2.6.73
USTR Sec. 900	Applicability	25.2.6.74
USTR Sec. 1000	Informal review	25.2.6.75
USTR Sec. 1001	Review by Director	25.2.6.76
USTR Sec. 1100	Compliance with other regulations	25.2.6.77

Citation	Requirement	BECR Section
USTR Sec. 1101	Construction	25.2.6.78
USTR Sec. 1102	Severability	25.2.6.79
USTR Sec. 1200(A)	Cleanup requirements for releases from petroleum UST systems	25.2.6.80
USTR Sec. 1200(B)-1222	Additional corrective action requirements for petroleum UST systems	25.2.6.81
USTR Sec. 1300-1320	Corrective action for hazardous substance UST systems	25.2.6.82
USTR Sec. 1400-1417	Certification of tank installers and repairers	25.2.6.83
USTR Sec. 1505	Priorities	25.2.6.84
USTR Sec. 1508	Minimum site assessment	25.2.6.85
SWMR-3	**Solid Waste Management Regulations**	**26.1**
SWMR-3, § 104	Applicability of regulations	26.2.1
SWMR-3, § 106	General requirements	26.2.2
SWMR-3, § 107	Prohibited acts	26.2.3
SWMR-3, § 109	Recordkeeping and annual reports	26.2.4
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SWMR-3, Part IV	Solid waste facility operation requirements	26.2.6
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SWMR-3, Part VI	Operator certification	26.2.8
SWMR-3, § 706(C)	Storage and containment requirements for infectious waste	26.2.9
SWMR-3, § 706(D)	Operational requirements for infectious waste treatment, storage, and disposal facilities	26.2.10
SWMR-3, § 706(E)	Treatment and disposal of infectious waste	26.2.11
SWMR-3, § 706(F)	Requirements for infectious waste transporters	26.2.12
SWMR-3, § 711	Manifest requirements (to accompany each load of infectious waste)	26.2.13
WQCC 82-1	**New Mexico Water Quality Control Commission Regulations**	**30.1**

Citation	Requirement	BECR Section
WQCC 82-1, 1-201	Notice of Intent to discharge	30.2.1
WQCC 82-1, 1-202	Filing of plans and specifications--sewerage systems	30.2.2
WQCC 82-1, 1-203	Notification of discharge	30.2.3
WQCC 82-1, 2-101	General discharge limitations and sampling/analytical requirements	30.2.4
WQCC 82-1, 3-104	Authorization only of effluent(s)/ leachate(s) as specified in discharge plan	30.2.5
WQCC 82-1, 3-106	Application for discharge plan approval	30.2.6
WQCC 82-1, 3-107	Monitoring, reporting, and other requirements	30.2.7
WQCC 82-1, 3-108	Public notice and participation	30.2.8
WQCC 82-1, 3-109	Director approval, disapproval, modification, or termination of proposed discharge plans	30.2.9
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WSR 3	**New Mexico Water Supply Regulations**	**31.1**
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HCIA § 74-4E-5(A)(2)	Notice of release of chemical substance(s) when release is at or above the reportable quantity of the substance	32.2.2
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New Mexico Commissioner of Public Lands		
State Land Office (SLO) Rule No. 10	**Relating to easements and Rights-of-Way**	**35.1**

Citation	Requirement	BECR Section
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SLO Rule 10.010	Damage bond	35.2.3
SLO Rule 10.011	Survey plat	35.2.4
SLO Rule 10.012	Construction reports for ruins, artifacts, or monuments found	35.2.5
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SLO Rule 10.017	Renewal of right-of-way grants	35.2.7
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TC #5	Prevention of destruction or injury to improvements or livestock	35.3.3
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TC #8	Leases for mineral resources	35.3.6
TC #9	Compliance with all applicable regulations and requirements	35.3.7
TC #10	Non-use of the right-of-way	35.3.8
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50 CFR 13.48	Compliance with permit conditions	37.3
50 CFR 21	**Migratory Bird Permits**	**37.1**
50 CFR 21.22(a)	Permit for banding or marking migratory birds	37.3

Citation	Requirement	BECR Section
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Citation	Requirement	BECR Section
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Regulatory Order No. 5	**Definitions, Licensing, Equipment Inspections, Record Keeping of Pesticides by Regulated Applicators**	**38.1**
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APPENDIX B

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40 CFR Part 61	**National Emission Standards for Hazardous Air Pollutants (NESHAPs)**	**6.1**
40 CFR Part 61, Subpart A	General NESHAPs requirements for nonradioactive emissions	See Chapter 29
40 CFR Part 61, Subpart H	**National Emission Standards for Emissions of Radionuclides Other Than Radon from DOE Facilities**	**6.1**
40 CFR 61.96	NESHAPs application for radionuclides	6.2.2.1
40 CFR 61.93(a),(b)	EPA approval of any alternative methods for monitoring/sampling for radionuclide emissions and air flow rate that differ from those specified under NESHAPs	6.2.2.2
40 CFR 61.93(b) and Appendix B, Method 114, § 4.10	NESHAPs Quality Assurance Project Plan	6.2.2.3
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CITATION	REQUIREMENT	BECR SECTION
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40 CFR Part 165	**Regulations for the Acceptance of Certain Pesticides and Recommended Procedures for the Disposal and Storage of Pesticides and Pesticides Containers**	**10.1**
40 CFR 165.8-.11	Recommended procedures for disposal or storage of pesticides	10.2.2
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HCIA § 74-4E-5(A)(3)	Submittal of an inventory form covering each hazardous material	32.2.3
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Regulatory Order No. 5	**New Mexico Pesticide Control Act: Definitions, Licensing, Equipment Inspections, Record Keeping of Pesticides by Regulated Applicators**	**38.1**
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CITATION	REQUIREMENT	BECR SECTION
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CITATION	REQUIREMENT	BECR SECTION
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SLO Rule 10.009	Conditions	35.2.2
SLO Rule 10.010	Damage bond	35.2.3
SLO Rule 10.011	Survey plot	35.2.4
SLO Rule 10.012	Construction reports for ruins, artifacts, and monuments	35.2.5
SLO Rule 10.013	Affidavit of completion	35.2.6
SLO Rule 10.017	Renewal of right-of-way grants	35.2.7
SLO Rule 10.019	Reclamation and restoration	35.2.8
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TC #8	Leases for mineral resources	35.3.6
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50 CFR 13.12	Information requirements for permit applications	22.2.2
50 CFR 13.44	Display of permit	22.2.3
50 CFR 13.45	Filing of reports	22.2.4
50 CFR 13.46	Maintenance of records	22.2.5
50 CFR 13.47	Inspection requirement	22.2.6
50 CFR 13.48	Compliance with permit conditions (see also Sections 22.2.12 and 22.3.1)	22.2.7
50 CFR 13.50	Acceptance of liability	22.2.8
50 CFR Part 20	**Migratory Bird Hunting**	**22.2**
50 CFR Part 20, Subpart C	Compliance with applicable hunting regulations	22.2.9
50 CFR Part 21	**Migratory Bird Permits**	**22.2**
50 CFR 21.22(a)	Permit for banding or marking migratory birds	22.2.10
50 CFR 21.22(b)	Application procedures for banding or marking permits	22.2.11
50 CFR 21.22(c)	Additional permit conditions	22.2.12
50 CFR 21.22(d)	Term of permit	22.2.13
50 CFR 21.27	Special-purpose permits	22.2.14
50 CFR 21.28	Falconry permits	22.2.15
50 CFR 21.41	Depredation permits	22.2.16

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Permit No. 22478	**Authorization to capture and band or mark birds**	**22.3**
50 CFR Part 13	**General Permit Procedures**	**23.2**
50 CFR 13.11	Permit application procedures	23.2.1
50 CFR Part 17	**Endangered and Threatened Wildlife and Plants**	**23.2**
50 CFR 17.22, 17.32, 17.52, and 17.62	Application for permits for scientific purposes or for the enhancement of propagation or survival of endangered or threatened species	23.2.2
50 CFR Part 402	**Interagency Cooperation - Endangered Species Act, as Amended**	**23.2**
50 CFR 402.12	Biological assessment to evaluate effects of proposed actions on designated species	23.2.3
50 CFR 402.14	Formal consultation with the FWS to determine whether any action will affect listed species	23.2.4
50 CFR 13	**General Fish & Wildlife Permit Procedures**	**36.1, 37.1**
50 CFR 13.48	Compliance with permit conditions	37.3
50 CFR 17	**Endangered and threatened wildlife and plants**	**36.1, 37.1**
§ 17-2-14; §§ 17-2-37 through 17-2-46	**New Mexico State implementation of the Bald and Golden Eagle Protection Act**	**36.1**
§§ 17-2-37 through 17-2-46	**New Mexico Wildlife Conservation Act implementing the Endangered Species Act**	**37.1**
Regulation No. 564	**State Game Commission Regulation, *Governing the Removal, Capture, or Destruction of Endangered Species***	**37.2**

CITATION	REQUIREMENT	BECR SECTION
Regulation No. 564	Report of unpermitted removal, capture, or destruction of endangered species	37.2.1
Regulation No. 682	**State Game Commission Regulation No. 682, *Amending the Listing of Endangered Species and Subspecies of New Mexico***	**37.2**
Regulation No. 682	Recognition of State-listed endangered wildlife	37.2.2
Regulation No. 705	**State Game Commission Regulation, *Regulation for the Taking and Possession of Protected Wildlife for Scientific and Educational Purposes***	**37.2**
Regulation No. 705, Chapter 2	Requirements for obtaining a permit	37.2.3 37.3
Regulation No. 705, Chapter 5	Year-end reports	37.2.4
NMDG&F permits	**New Mexico Department of Game and Fish Permits**	**37.3**
Permit No. 1961	Authorization for live capture and banding of protected birds, reporting of salvaged endangered or threatened wildlife, and disposition of wildlife	37.3.1
Permit No. 1894	Live trapping; authorization for quail, catfish, and unprotected species; nonlethal methods for catfish; report for salvaging endangered or threatened vertebrates	37.3.2
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RCRA § 3016	Inventory of Federal hazardous waste facilities	2.2.1.1
HWMR-7, § 1001	New Mexico Hazardous Waste Management Regulations, HWMR-7	25.2.1.1
40 CFR Part 262 (HWMR-7, § 301)	**Standards applicable to generators of hazardous waste**	**25.2.2**

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40 CFR 262.11	Hazardous waste determination	25.2.2.1
40 CFR 262.12	EPA identification number	25.2.2.2
40 CFR 262.20	Manifest requirements	25.2.2.3
40 CFR 262.21	Acquisition of manifests	25.2.2.4
40 CFR 262.22	Number of copies	25.2.2.5
40 CFR 262.23	Use of the manifest	25.2.2.6
40 CFR 262.30	DOT packaging requirements	25.2.2.7
40 CFR 262.31	Labeling requirements	25.2.2.8
40 CFR 262.32	Marking requirements	25.2.2.9
40 CFR 262.33	Placarding requirements	25.2.2.10
40 CFR 262.34(a)	90-day or less accumulation time	25.2.2.11
40 CFR 262.34(a)(1)(i)	Compliance with Subpart I of 40 CFR Part 265 for waste placed in containers	25.2.2.12
40 CFR 262.34(a)(1)(ii)	Accumulation of hazardous wastes in tanks	25.2.2.13
40 CFR 262.34(a)(1)(iii)	Compliance with Subpart W of 40 CFR Part 265 for wastes placed on drip pads	25.2.2.14
40 CFR 262.34(a)(2)	Marking each container with the date of initial accumulation of waste	25.2.2.15
40 CFR 262.34(a)(3)	Marking each container as hazardous waste	25.2.2.16
40 CFR 262.34(a)(4)	Compliance with Subparts C and D of 40 CFR 265 and with 40 CFR 265.26 and 268.7	25.2.2.17
40 CFR 262.34(b)	Extension of the 90-day storage period due to unforeseen, temporary, and uncontrollable circumstances	25.2.2.18
40 CFR 262.34(c)(1)(i)	Restrictions and requirements for satellite accumulation areas	25.2.2.19 25.2.2.20
40 CFR 262.34(c)(1)(ii)	Labeling of container as "hazardous waste"	25.2.2.21

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40 CFR 262.34(c)(2)	Management of waste exceeding the 55-gallon or 1-quart limit	25.2.2.22
40 CFR 262.40	Recordkeeping requirements	25.2.2.23
40 CFR 262.41	Generator--biennial report	25.2.2.24
40 CFR 262.42	Exception reporting if copy of manifest is not returned to generator within the specified time period	25.2.2.25
40 CFR 262.43	Additional reporting	25.2.2.26
40 CFR Part 263 (HWMR-7, § 401)	**Standards Applicable to Transporters of Hazardous Waste**	**25.2.3**
40 CFR 263.10(a)	Compliance with DOT regulations	25.2.3.1
40 CFR 263.11	EPA identification number	25.2.3.2
40 CFR 263.20 - 263.22	Compliance with the manifest system and recordkeeping	25.2.3.3
40 CFR 263.30	Immediate action after hazardous waste discharges	25.2.3.4
40 CFR 263.31	Discharge cleanup	25.2.3.5
40 CFR Part 265 (HWMR-7, § 601)	**Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities**	**25.2.4**
40 CFR 265.10	Applicability	25.2.4.1
40 CFR 265.11	EPA identification number	25.2.4.2
40 CFR 265.12	Required notices to the off-site source(s)	25.2.4.3
40 CFR 265.13	General waste analysis	25.2.4.4
40 CFR 265.14	Security	25.2.4.5
40 CFR 265.15	General inspection requirements	25.2.4.6
40 CFR 265.16	Personnel training	25.2.4.7
40 CFR 265.17	General requirements for ignitable, reactive, or incompatible wastes	25.2.4.8
40 CFR 265.18	Location standards	25.2.4.9

CITATION	REQUIREMENT	BECR SECTION
40 CFR 265.31	Maintenance and operation of facility	25.2.4.10
40 CFR 265.32	Required equipment	25.2.4.11
40 CFR 265.33	Testing and maintenance of equipment	25.2.4.12
40 CFR 265.34	Access to communications or alarm system	25.2.4.13
40 CFR 265.35	Required aisle space	25.2.4.14
40 CFR 265.37	Arrangements with local authorities	25.2.4.15
40 CFR 265.51	Purpose and implementation of the contingency plan	25.2.4.16
40 CFR 265.52	Content of the contingency plan	25.2.4.17
40 CFR 265.53	Copies of contingency plan	25.2.4.18
40 CFR 265.54	Amendment of contingency plan	25.2.4.19
40 CFR 265.55	Emergency Coordinator	25.2.4.20
40 CFR 265.56	Emergency procedures	25.2.4.21
40 CFR 265.71	Use of manifest system	25.2.4.22
40 CFR 265.72	Manifest discrepancies	25.2.4.23
40 CFR 265.73	Operating record	25.2.4.24
40 CFR 265.74	Availability, retention, and disposition of records	25.2.4.25
40 CFR 265.75	TSDF biennial report	25.2.4.26
40 CFR 265.76	Unmanifested waste report	25.2.4.27
40 CFR 265.77	Additional reports	25.2.4.28
40 CFR 265.90	Applicability of the ground-water monitoring system	25.2.4.29
40 CFR 265.91	Ground-water monitoring system	25.2.4.30
40 CFR 265.92	Sampling and analysis	25.2.4.31
40 CFR 265.93	Preparation, evaluation, and response	25.2.4.32
40 CFR 265.94	Recordkeeping and reporting	25.2.4.33

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40 CFR 265.110	Applicability of the closure/post-closure requirements	25.2.4.34
40 CFR 265.111	Closure performance standard	25.2.4.35
40 CFR 265.112	Closure plan; amendment of plan	25.2.4.36
40 CFR 265.113	Time allowed for closure	25.2.4.37
40 CFR 265.114	Disposal or decontamination of equipment, structures, and soils	25.2.4.38
40 CFR 265.115	Certification of closure	25.2.4.39
40 CFR 265.116	Survey plat	25.2.4.40
40 CFR 265.117	Postclosure care and use of property	25.2.4.41
40 CFR 265.118	Postclosure plan; amendment of plan	25.2.4.42
40 CFR 265.119	Postclosure notices	25.2.4.43
40 CFR 265.120	Certification of completion of post-closure care	25.2.4.44
40 CFR 265.142	Cost estimate for closure	25.2.4.45
40 CFR 265.143	Financial assurance for closure	25.2.4.46
40 CFR 265.144	Cost estimate for postclosure care	25.2.4.47
40 CFR 265.145	Financial assurance for postclosure care	25.2.4.48
40 CFR 265.146	Use of a mechanism for financial assurance of both closure and post-closure care	25.2.4.49
40 CFR 265.147	Liability requirements	25.2.4.50
40 CFR 265.148	Incapacity of owners or operators, guarantors, or financial institutions	25.2.4.51
40 CFR 265.149 [HWMR-7, § 602(A)]	Use of State-required mechanisms	25.2.4.52
40 CFR 265.150 [HWMR-7, § 602(B)]	State assumption of responsibility	25.2.4.53
40 CFR 265.171	Condition of containers	25.2.4.54
40 CFR 265.172	Compatibility of waste with containers	25.2.4.55

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40 CFR 265.173	Management of containers	25.2.4.56
40 CFR 265.174	Inspections	25.2.4.57
40 CFR 265.176	Special requirements for ignitable or reactive waste	25.2.4.58
40 CFR 265.177	Special requirements for incompatible wastes	25.2.4.59
40 CFR 265.190-.445	Tank systems; surface impoundments; waste piles; land treatment; incinerators; thermal treatment; chemical, physical, and biological treatment; underground injection; and drip pads	25.2.4.60
40 CFR 265.1032	Standards (air emission) for process vents	25.2.4.61
40 CFR 265.1052-.1062	Air emission standards for equipment leaks	25.2.4.62
40 CFR Part 268	**Land Disposal Restrictions**	**2.2.2**
40 CFR 268.1	Purpose, scope, and applicability	2.2.2.1
40 CFR 268.6(a)	Submittal of petitions to allow land disposal of a waste prohibited under Subpart C of Part 268	2.2.2.2
40 CFR 268.6(b)	Requirements of demonstration of no-migration in petition	2.2.2.3
40 CFR 268.6(c)	Contents of petition	2.2.2.4
40 CFR 268.6(d)	Submittal of petition to EPA Administrator	2.2.2.5
40 CFR 268.6(e)	Consistency of activities with those described in the petition and notification of EPA of changes in conditions at the unit and/or in the environment	2.2.2.6
40 CFR 268.6(f)	Activities required if hazardous constituents are found to have migrated from the repository	2.2.2.7
40 CFR 268.6(g)	Certification in petition	2.2.2.8

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40 CFR 268.6(h)	Additional information requested by Administrator	2.2.2.9
40 CFR 268.6(k)	Terms of variance	2.2.2.10
40 CFR 268.6(n)	Non-exemption of liquid hazardous wastes containing ≥ 500 ppm PCBs	2.2.2.11
40 CFR 268.7	Waste analysis and recordkeeping	2.2.2.12
40 CFR 268.8	Landfill and surface impoundment disposal restrictions	2.2.2.13
40 CFR 268.9	Special rules regarding wastes that exhibit a characteristic	2.2.2.14
40 CFR 268.10-12	Identification of waste to be evaluated by August 8, 1988; by June 8, 1989; and by May 8, 1990	2.2.2.15
40 CFR 268.30	Waste-specific prohibitions--solvent wastes	2.2.2.16
40 CFR 268.31	Waste-specific prohibitions--dioxin-containing wastes	2.2.2.17
40 CFR 268.32	Waste-specific prohibitions--California listed wastes	2.2.2.18
40 CFR 268.33	Waste prohibitions--first-third wastes	2.2.2.19
40 CFR 268.34	Waste prohibitions--second-third wastes	2.2.2.20
40 CFR 268.35	Waste prohibitions--third-third wastes	2.2.2.21
40 CFR 268.41	Treatment standards expressed as concentrations in waste extract	2.2.2.22
40 CFR 268.42	Treatment standards expressed as specified technologies	2.2.2.23
40 CFR 268.43	Treatment standards expressed as waste concentrations	2.2.2.24
40 CFR 268.44	Variance from a treatment standard	2.2.2.25
40 CFR 268.50	Prohibitions on storage of restricted wastes	2.2.2.26

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40 CFR Part 270 (HWMR-7, § 901)	**EPA Administered Permit Programs: the Hazardous Waste Permit Program**	25.2.5
40 CFR 270.1	Purpose and scope of the RCRA permit program regulations	25.2.5.1
40 CFR 270.10	General application requirements	25.2.5.2
40 CFR 270.11	Signatories to permit applications and reports	25.2.5.3
40 CFR 270.13	Contents of Part A of the permit application	25.2.5.4
40 CFR 270.14 (HWMR-7, §§ 901 and 902)	Contents of Part B: general requirements	25.2.5.5
40 CFR 270.15	Specific Part B information requirements for containers	25.2.5.6
40 CFR 270.23	Specific Part B requirements for miscellaneous units	25.2.5.7
40 CFR 270.30	Conditions applicable to all permits	25.2.5.8
40 CFR 270.31	Requirements for recording and reporting of monitoring results	25.2.5.9
40 CFR 270.42 (HWMR-7, §§ 901 and 902)	Permit modification at the request of the permittee	25.2.5.10
40 CFR 270.71	Operation during interim status	25.2.5.11
40 CFR 270.72	Changes during interim status	25.2.5.12
55 FR 47700	**Conditional No-Migration Determination (NMD)**	**2.3**
Condition 1, IV.B.1 and VI(1)	Testing of long-term acceptability of WIPP only	2.3.1
Condition 2, IV.B.2 and VI(2)	Wastes not to exceed 8,500 drums or 1 percent of repository's total capacity	2.3.2
Condition 3, IV.B.3 and VI(3)	Retrieval of waste if noncompliance with 40 CFR 268.6	2.3.3
Condition 4, IV.B.4 and VI(4)	Readily retrievable placement of waste	2.3.4

CITATION	REQUIREMENT	BECR SECTION
Condition 5, IV.B.5 and VI(5)	Installation of carbon adsorption device	2.3.5
Condition 6, IV.B.6 and VI(6)	Implementation of air monitoring plan for VOCs	2.3.6
Condition 7(a), IV.B.7(a) and VI(7)(a)	Waste analysis: flammable mixtures of gases	2.3.7
Condition 7(b), IV.B.7(b) and VI(7)(b)	Waste analysis: comparison of analytical results with estimated compositions	2.3.8
Condition 7(c), IV.B.7(c) and VI(7)(c)	Waste analysis: maintenance of records	2.3.9
Condition 8, IV.B.8 and VI(8)	Annual report	2.3.10
55 FR 47700	**General Conditions for Compliance with the NMD**	**2.3**
General condition (GC) 1, IV.B.1	Correlation between wastes received and those described in the No-Migration Variance Petition	2.3.11
GC 2, VI	Notification of EPA of changes in conditions	2.3.12
GC 3, VI	Suspension of receipt of restricted wastes and notification of EPA in the event of migration of hazardous constituents from the repository	2.3.13
GC 4, VI	Term of petition approved	2.3.14
55 FR 13068	**Additional Requirements for Air Monitoring under the Proposed Variance**	**2.3**
Proposed Variance (PV) 1, IV.K	Monitoring in the exhaust shaft	2.3.15
PV 2, IV.K	Monitoring of bin-scale experiment rooms	2.3.16
PV 3, IV.K	Monitoring of alcoves	2.3.17
PV 4, IV.K.1	Measurement of the leakage rate of sealed alcoves	2.3.18
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PV 7, IV.K.1	Monitoring frequency for the bin discharge system	2.3.21
PV 8, IV.K.1	Increased monitoring frequency due to increased variability	2.3.22
PV 9, IV.K.2	Routine quantification of any VOC	2.3.23
PV 10, IV.K.2	Standard operating procedures to identify certain other VOCs	2.3.24
PV 11, IV.K.3	Use of the average response factor for each target analyte	2.3.25
PV 12, IV.K.4	Use of standard operating procedures to ensure the validity of the monitoring data	2.3.26
PV 13, IV.K.4	Recalibration of instruments	2.3.27
PV 14, IV.K.4	Establishment and annual evaluation of the method limit of quantification for each target analyte	2.3.28
PV 15, IV.K.4	Separate determination of the method limit of quantification for the bin, alcove, and exhaust shaft monitoring locations	2.3.29
PV 16, IV.K.4	Collection and analysis of recovery samples	2.3.30
PV 17, IV.K.4	Collection and analysis of duplicate samples	2.3.31
PV 18, IV.K.4	Validation of the completeness of the data	2.3.32
PV 19, IV.K.4	Tracking and evaluation of accuracy, precision, and completeness of the data	2.3.33
PV 20, IV.K.4	Performance of systems audits	2.3.34
PV 21, IV.K.4	Corrective action required for improper conditions or practices	2.3.35

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PV 23, IV.K.4	Corrective action required	2.3.37
PV 24, IV.K.5	Annual averaging of concentrations of targeted constituents	2.3.38
PV 25, IV.K.5	Submittal of annual data summaries and summaries of data accuracy, precision, and completeness for each monitoring location	2.3.39
PV 26, IV.K.5	Maintenance of documentation on all aspects of QA/QC	2.3.40
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SWMR-3, § 104	Applicability of regulations	26.2.1
SWMR-3, § 106	General requirements	26.2.2
SWMR-3, § 107	Prohibited acts	26.2.3
SWMR-3, § 109	Recordkeeping and annual reports	26.2.4
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SWMR-3, Part IV	Solid waste facility operation requirements	26.2.6
SWMR-3, Part V	Closure and postclosure requirements	26.2.7
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SWMR-3, § 706(C)	Storage and containment requirements for infectious waste	26.2.9
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USTR Sec. 200	Existing tanks	25.2.6.2
USTR Sec. 201	Transfer of ownership	25.2.6.3
USTR Sec. 202	New UST system	25.2.6.4
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USTR Sec. 301	Amount of fee	25.2.6.11
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USTR Sec. 401(c)	Upgrading requirements for metal piping	25.2.6.21
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USTR Sec. 1200(B)-1222	Additional corrective action requirements for petroleum UST systems	25.2.6.81
USTR Sec. Part XIII	Corrective action for hazardous substance UST systems	25.2.6.82
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CITATION	REQUIREMENT	BECR SECTION
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USTR Sec. 1508	Minimum site assessment	25.2.6.85
	Waste Transportation Legislation	
49 CFR Part 171	**General Information, Regulations, and Definitions**	**16.1**
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49 CFR 171.3	Transport of hazardous material requiring manifests, labeling, and shipper/generator and transporter identification	16.2.2
49 CFR 171.14	Materials poisonous by inhalation; segregation requirements	16.2.3
49 CFR 171.15/16	Notice and report of hazardous material incidents	16.2.4
49 CFR Part 172	**Hazardous Materials Table, Special Provisions, Hazardous Materials Communication Requirements and Emergency Response Information Requirements**	**16.2**
49 CFR 172.101	Hazardous materials table	16.2.5
Subpart C, 49 CFR 172.200-172.205	Shipping paper requirements	16.2.6
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Subpart G, 49 CFR 172.600	Emergency response	16.2.10
Subpart H, 49 CFR 172.700-172.704	Training requirements for the transportation of hazardous materials	16.2.11

CITATION	REQUIREMENT	BECR SECTION
49 CFR Part 173	**Shippers - General Requirements for Shipments and Packagings**	**16.3**
Subpart A, 49 CFR 173.12	General requirements for shipments and packagings	16.2.12
Subpart B, 49 CFR 173.21-173.40	Preparation of hazardous materials for transport	16.2.13
Subpart C, 49 CFR 173.50-173.63	Definitions, classification, and packaging of Class 1 materials	16.2.14
Subpart D, 49 CFR 173.115-173.156	Classification, packing group assignments, and exceptions for hazardous materials other than Classes 1 and 7	16.2.15
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49 CFR Part 175	**Carriage by Aircraft**	**16.4**
49 CFR 175	Transportation of hazardous material by aircraft	16.2.18
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49 CFR 177.800, 177.816, and 177.825	Training responsibilities and requirements for Class 7 material	16.2.19
49 CFR Part 178	**Specifications for Packagings**	**16.6**
49 CFR 178	Packagings and containers used for transportation of hazardous materials	16.2.20
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40 CFR Part 112	**Oil Pollution Prevention**	**7.1**
40 CFR 112.3	Requirements for preparation and implementation of spill prevention, control, and countermeasures (SPCC) plans	7.2.1

CITATION	REQUIREMENT	BECR SECTION
40 CFR 112.5	Amendment of SPCC plans by owners and operators	7.2.2
40 CFR Part 122	**EPA-Administered Permit Programs: the National Pollutant Discharge Elimination System (NPDES)**	7.1
40 CFR 122.1(b)(1)	NPDES permits for the discharge of pollutants from any point source into waters of the United States	7.2.3
40 CFR 122.21(c)(2)	NMDES permit assessment for sewage sludge	7.2.4
40 CFR 122.26(a)	Requirement for a storm water discharge permit	7.2.5
40 CFR 122.26(c)	Application requirements for storm water discharges associated with industrial activity	7.2.6
57 FR 41236	**Final NPDES General Permits for Storm Water Discharges Associated with Industrial Activity**	7.3
IV(A); Appendix B, II(A)	Notice of Intent to file for general permit	7.3.1
IV(A)(4)	Notice of Termination	7.3.2
IV(B)(1); Appendix B, III(A)	Prohibition on non-storm water discharges	7.3.3
IV(B)(2); Appendix B, III(B)	Releases of reportable quantities of hazardous substances and oil	7.3.4
IV(C); Appendix B, Part IV	Storm water pollution prevention plan	7.3.5
IV(C)(1); Appendix B, IV(D)(1)	Pollution prevention team	7.3.6
IV(C)(2)Appendix B, IV(D)(2)	Identification of potential pollution sources	7.3.7
IV(C)(2); Appendix B, IV(D)	Site assessments	7.3.8
IV(C)(3); Appendix B, IV(D)(3)	Measures and controls	7.3.9
IV(C)(4); Appendix B, IV(D)(4)	Comprehensive site compliance evaluations	7.3.10

CITATION	REQUIREMENT	BECR SECTION
IV(D)(1); Appendix B, IV(D)(7)	Requirements for storage, processing, and handling areas for EPCRA § 313 "water priority chemicals"	7.3.11
IV(D)(2); Appendix B, IV (D)(8)	Enclosure or covering of outdoor salt piles	7.3.12
IV(D)(3); Appendix B, IV(D)(5)	Notification to municipal large and medium separate storm water systems	7.3.13
IV(E); Appendix B, Part IV and XI(C)(vi)	Monitoring and reporting requirements	7.3.14
IV(G); Appendix B, IV(A)(1)	Deadline for plan preparation and compliance	7.3.15
NMED 92-1	**New Mexico Environment Department 92-1, *Ground Water Protection Act Corrective Action Fund Regulations***	**28.1**
NMED 92-1	Reimbursement of costs from corrective actions for spills/releases from USTs	28.2.1
DP-831	**New Mexico Discharge Plan for the WIPP, DP-831**	**30.3**
DP-831 Specific Requirement (SR) #1	Monitoring and quarterly reports	30.3.1
DP-831 SR #2	Submittal of water quality analysis	30.3.2
DP-831 SR #3	Quarterly sampling of each evaporation lagoon	30.3.3
DP-831 SR #4	Maintenance of berms	30.3.4
DP-831 SR #5	Completion of proposed evaporation ponds	30.3.5
DP-831 General Requirement (GR)--Recordkeeping	Records to be kept and made available to the NMED upon request	30.3.6
DP-831 GR--Inspection and Entry	Allowing inspections, entry, sampling, and monitoring by NMED personnel	30.3.7

CITATION	REQUIREMENT	BECR SECTION
DP-831 GR--Duty to Provide Information	Providing information relevant to discharge plan/records	30.3.8
DP-831 GR--Spills, Leaks, and Other Unauthorized Discharges	Reporting and remediation of any spills, leaks, and any other unauthorized discharges	30.3.9
DP-831 GR--Retention of Records	Retention of all monitoring information, discharge plan reports, and data used to complete the discharge plan application	30.3.10
DP-831 GR--Modification and/or Amendments	Notification of NMED of any modifications or additions to the wastewater disposal system; approval by NMED required prior to increasing the quantity or concentration of constituents in waste waster above those approved in the plan	30.3.11
WQCC 82-1	**New Mexico Water Quality Control Commission Regulations**	**30.1**
WQCC 82-1, 1-201	Notice of Intent to discharge	30.2.1
WQCC 82-1, 1-202	Filing of plans and specifications--sewerage systems	30.2.2
WQCC 82-1, 1-203	Notification of discharge	30.2.3
WQCC 82-1, 2-101	General discharge limitations and sampling/analytical requirements	30.2.4
WQCC 82-1, 3-104	Authorization only of effluent(s)/ leachate(s) as specified in discharge plan	30.2.5
WQCC 82-1, 3-106	Application for discharge plan approval	30.2.6
WQCC 82-1, 3-107	Monitoring, reporting, and other requirements	30.2.7
WQCC 82-1, 3-108	Public notice and participation	30.2.8
WQCC 82-1, 3-109	Director approval, disapproval, modification, or termination of proposed discharge plans	30.2.9

CITATION	REQUIREMENT	BECR SECTION
WQCC 91-1	Water quality standards for interstate and intrastate streams in New Mexico	30.2.10
WSR 3	**New Mexico Water Supply Regulations (WSR)**	**31.1**
WSR 3, § 107(A)(1)	Use of chlorinated materials as disinfectants or oxidants	31.2.1
WSR 3, § 202(A)	Maximum contaminant levels (MCLs) for inorganic chemicals	31.2.2
WSR 3, § 205(A)	MCL for total coliform bacteria	31.2.3
WSR 3, § 208(I)	Cross connections	31.2.4
WSR 3, § 301(E)	Certification of sampling personnel	31.2.5
WSR 3, § 302(A)	Compliance sampling of coliforms	31.2.6
WSR 3, § 305(A)(2)	Requirements for organic chemicals other than total trihalomethanes	31.2.7
WSR 3, § 309	Laboratories	31.2.8
WSR 3, § 310	Sampling of consecutive public water-supply systems	31.2.9
WSR 3, § 401(A)	Reporting requirements	31.2.10
WSR 3, § 403(A)	Record maintenance	31.2.11
WSR 3, § 404(B)	Public notice requirements pertaining to lead	31.2.12

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APPENDIX K2

SUMMARY OF AGREEMENTS BETWEEN THE U.S. DEPARTMENT OF ENERGY AND OTHER AGENCIES THAT AFFECT THE WASTE ISOLATION PILOT PLANT ENVIRONMENTAL PROGRAM

APPENDIX K2

SUMMARY OF AGREEMENTS BETWEEN THE U.S. DEPARTMENT OF ENERGY AND OTHER AGENCIES THAT AFFECT THE WASTE ISOLATION PILOT PLANT ENVIRONMENTAL PROGRAM

K2-1 AGENCY: STATE OF NEW MEXICO—GOVERNOR'S OFFICE

Stipulated Agreement on Civil Action No. 81-0363 JB—This agreement, approved by the U.S. District Court when it stayed (held in abeyance) proceedings in the lawsuit against the U.S. Department of Energy (DOE) by the State of New Mexico, was executed on July 1, 1981. The eight-page agreement assures that a binding, enforceable "consultation and cooperation" agreement will be entered into by the DOE and the State and that the DOE will make a "good faith effort" to resolve certain State off-site concerns (which are covered in the Supplemental Stipulated Agreement). The Stipulated Agreement also addresses a number of additional studies and experiments to be conducted by the DOE for the Site Preliminary and Design Validation Phase of the Waste Isolation Pilot Plant (WIPP) facility. It was signed by Jeff Bingaman, Attorney General, State of New Mexico, and Myles Flint, Attorney, U.S. Department of Justice, and issued July 1, 1981, by Juan G. Burciaga, U.S. District Judge, District of New Mexico.

Agreement for Consultation and Cooperation—Usually referred to as the "C&C Agreement," this agreement is contained in Appendix A to the Stipulated Agreement. It affirms the intent of the Secretary of Energy to consult and cooperate with New Mexico with respect to State public health and safety concerns. It was signed in July 1981 by Bruce King, Governor, State of New Mexico, and James B. Edwards, Secretary, U.S. Department of Energy.

Working Agreement for Consultation and Cooperation, Appendix B, Article IV, Revision I—This agreement, Appendix B to the Stipulated Agreement, identifies in Article IV over 60 "key events" and "milestones" in the construction and operation of the WIPP facility that must be reviewed by the State before they are commenced. Many environmental items are included. It was signed in March 1983 by Robert McNeill, Chairman, Radioactive Waste Task Force, and R. G. Romotowski, Manager, Albuquerque Operations Office, U.S. Department of Energy. (Article IV of the Working Agreement was revised on April 8, 1983.)

Supplemental Stipulated Agreement Resolving Certain State Off-Site Concerns Over WIPP—This agreement, dated December 27, 1982, addresses five State concerns, including the need for State "verification" of the WIPP Environmental Monitoring Program. The concerns addressed are: 1) stating liability (for a nuclear incident), emergency response preparedness, transportation monitoring of the WIPP facility waste, the WIPP facility environmental monitoring by the state, and 2) upgrading of state highways. It was signed in December 1982 by Bruce King, Governor, State of New Mexico, et al., and R. G. Romotowski, Manager, Albuquerque Operations Office, U.S. Department of Energy.

First Modification to the July 1, 1981, Agreement for Consultation and Cooperation on WIPP by the State of New Mexico and the U.S. Department of Energy—This modification was signed November 30, 1984, wherein the DOE and the State agreed to address certain concerns of the

state regarding: 1) the specific mission of the WIPP Project, 2) a demonstration of retrievability prior to waste emplacement, 3) post-closure control and responsibility, 4) completion of certain additional scientific testing and reports, 5) compliance with applicable federal regulatory standards for waste repositories, and 6) a program for encouraging and reporting on the hiring of New Mexico residents at the WIPP Project. It was signed in November 1984 by Joseph Goldberg, Secretary, Health and Environment Department, State of New Mexico, and R. G. Romotowski, Manager, Albuquerque Operations Office, U.S. Department of Energy.

Second Modification to the July 1, 1981, Agreement for Consultation and Cooperation on WIPP by the State of New Mexico and the U.S. Department of Energy—Signed August 4, 1987, wherein the DOE and the State agreed to address certain concerns of the state regarding: 1) surface and subsurface mining and drilling after closure of the WIPP site; 2) the disposal of salt tailings at the WIPP site and 3) compliance with U.S. Environmental Protection Agency, U.S. Department of Transportation, and U.S. Nuclear Regulatory Commission regulations. It was signed in August 1987 by Garrey Carruthers, Governor, State of New Mexico, et al., and R. G. Romotowski, Manager, Albuquerque Operations Office, U.S. Department of Energy.

1988 Modification to the Working Agreement of the Consultation and Cooperation Agreement Between the U.S. Department of Energy and the State of New Mexico on the Waste Isolation Pilot Plant—This modification deleted the sorbing tracer test from the list of required reports and substituted additional tests. In addition, the State is allowed to operate a fixed-air sampler in the mine-ventilation effluent-air stream. It was signed in March 1988 by Kirkland Jones, Deputy Director, New Mexico Environmental Improvement Division, State of New Mexico, et al., and R.G. Romotowski, Manager, Albuquerque Operations Office, U.S. Department of Energy.

K2-2 AGENCY: STATE OF NEW MEXICO ENVIRONMENT DEPARTMENT

Environmental Oversight and Monitoring Agreement—This agreement states that the DOE will provide additional technical and financial support for State activities in environmental oversight, monitoring, access, and emergency response to ensure compliance with applicable federal, state, and local laws at several DOE facilities, including the WIPP facility. It was signed in October 1990 by Garrey Carruthers, Governor, State of New Mexico; Dennis Boyd, Secretary, Health and Environment Department; and Bruce G. Twining, Manager, Albuquerque Operations Office, U.S. Department of Energy.

K2-3 AGENCY: BUREAU OF LAND MANAGEMENT

Memorandum of Understanding (MOU)

Section 4 of the WIPP Land Withdrawal Act of 1992 (LWA) makes the Secretary of Energy responsible for the management of the withdrawal, consistent with the Federal Land Policy and Management Act of 1976. The LWA directs the Secretary, in consultation with the Secretary of the Interior and the State of New Mexico, to develop a land management plan for the use of the withdrawal until the end of the decommissioning phase. It further directs the Secretary and the Secretary of the Interior to enter into an MOU to assist in the implementation of the management plan.

This MOU will be entered into pursuant to the authority of, and is consistent with, the LWA (Public Law 102-579). Moreover, it is consistent with and subject to appropriate statutory authorities (e.g., DOE Organization Act, Public Law 95-91; the Energy Reorganization Act of 1974, Public Law 93-438; and the Economy Act of 1932, as amended).

The Bureau of Land Management (BLM)/DOE MOU provides for direct communication between officials of the DOE and the BLM regarding issues that pertain to resource management within the LWA. Additionally, it sets forth cooperative arrangements and procedures for the administration of decisions by participating agencies. These decisions are consistent with multiple-use management.

Interagency funding for MOU implementation will be conducted in accordance with specific interagency agreements pursuant to applicable activities. The DOE and the Department of Interior will provide each other mutual support in budget justification to the Office of Management and Budget and in hearings before the Congress with respect to the programs described in the Land Management Plan and implemented through this MOU.

APPENDIX L1
NO-MIGRATION DETERMINATION FOR THE PROPOSED TEST PHASE

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APPENDIX L1
NO-MIGRATION DETERMINATION FOR THE PROPOSED TEST PHASE

TRU mixed waste is exempted from Land Disposal Restrictions by the Land Withdrawal Act Amendment (Public Law 104-201). This amendment states that WIPP "waste is exempt from treatment standards promulgated pursuant to section 3004(m) of the Solid Waste Disposal Act (42 U.S. C. 6924(m)) and shall not be subjected to the Land Disposal prohibitions in section 3004 (d), (e), (f), and (g) of the Solid Waste Disposal Act."