

STATE OF NEW MEXICO  
BEFORE THE SECRETARY OF THE ENVIRONMENT



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)  
IN THE MATTER OF THE FINAL PERMIT )  
ISSUED TO THE UNITED STATES )  
DEPARTMENT OF ENERGY AND )  
WESTINGHOUSE ELECTRIC COMPANY )  
WASTE ISOLATION DIVISION FOR )  
A HAZARDOUS WASTE ACT PERMIT )  
FOR THE WASTE ISOLATION PILOT )  
PLANT; USEPA No. NM4890139088 )  
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HRM 98-04(P)

REPORT OF THE HEARING OFFICER

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STATEMENT OF THE CASE

The United States Department of Energy ("DOE") is the owner and operator, and the Westinghouse Waste Isolation Division ("WID"), a private corporation, is the co-operator (collectively "Applicants") of the Waste Isolation Pilot Plant ("WIPP"). The WIPP facility is located in southeastern New Mexico, approximately 26 miles east of the City of Carlsbad. WIPP was designed and constructed to store and dispose transuranic ("TRU") nuclear waste and TRU waste that is mixed with hazardous waste ("TRU mixed waste") in an underground geologic repository, mined within a bedded salt formation. Owners and operators of facilities located in New Mexico that store or dispose TRU mixed waste must apply for a permit from the New Mexico Environment Department. Accordingly, Applicants seek a permit under the New

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Mexico Hazardous Waste Act, NMSA §74-4-1 *et seq.* (“HWA”) and the Resource Conservation and Recovery Act, 42 U.S.C. §6901 *et seq.* (“RCRA”) for the storage of TRU mixed waste in surface areas and disposal of such waste in the underground repository at WIPP.<sup>1</sup>

A public hearing was held before the undersigned Hearing Officer from February 22, 1999 through March 26, 1999, in Santa Fe, New Mexico to consider technical and non-technical public comment.<sup>2</sup> Nineteen technical witnesses testified and over 100 individuals offered non-technical oral comment in addition to substantial written comment. The official transcript and hearing exhibits<sup>3</sup> exceed 10,000 pages and the full administrative record may run hundreds of thousands of pages.

Most parties filed post-hearing memoranda and/or Proposed Findings of Fact and Conclusions of Law. After considering the full record including post-hearing submissions, the Hearing Officer issues this Report in accordance with Environment Department Permit Procedures, 20 NMAC 1.4.503, and Order of the Secretary, dated June 4, 1999.

## ISSUE

The issue before the Hearing Officer is whether Applicants should be granted a permit to store and dispose TRU mixed waste at WIPP and, if granted, what conditions should be imposed.

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<sup>1</sup> WIPP was previously subject to a separate administrative process conducted by the United States Environmental Protection Agency (“USEPA”) respecting the disposal of radioactive waste. USEPA determined that TRU waste could be safely isolated at WIPP for at least 10,000 years. Record Proper No. 119 (USEPA Final Rule of May 18, 1998, pgs. 27363, 27355).

<sup>2</sup> One day of non-technical oral public comment was also held on March 9, 1999, in Carlsbad, New Mexico.

<sup>3</sup> Hearing exhibits were not separately marked. All exhibits were incorporated into the “Record Proper” and identified by “pleading log number.”

## FINDINGS OF FACT

By a preponderance of the evidence,<sup>4</sup> the Hearing Officer finds as follows:

### Administrative and Procedural History

1. On January 25, 1985, the United States Environmental Protection Agency (“USEPA”) authorized the State of New Mexico to issue and enforce permits for the treatment, storage and disposal of hazardous wastes within the State pursuant to criteria established under RCRA and Hazardous and Solid Waste Amendments of 1984 (“HSWA”). 50 Fed. Reg. 1515 (January 11, 1985); 61 Fed. Reg. 2450 (January 26, 1996). Effective July 25, 1990, the USEPA authorized New Mexico, through the New Mexico Environment Department (“NMED”), to implement and enforce its hazardous waste program, in lieu of the federal program, with respect to TRU mixed waste. 55 Fed. Reg. 28,397 (July 11, 1990).

2. The Environmental Improvement Board (“EIB”) is authorized under the HWA to adopt regulations setting forth the requirements for issuance of a permit for the treatment, storage, or disposal of hazardous wastes. NMSA 1978 §§74-4-4(A)(6); 74-1-8(A)(13) (Repl. Pamp. 1993).

3. NMED, by and through its Secretary, is responsible for administering, implementing and enforcing regulations promulgated by the EIB regarding the management, treatment, storage or disposal of hazardous wastes in New Mexico. NMSA 1978, §74-1-7(13), (Repl. Pamp. 1993).

4. The WIPP facility is a geologic repository located in southeastern New Mexico, approximately 26 miles east of the City of Carlsbad, New Mexico. Record Proper, Number 1

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<sup>4</sup> “Preponderance of the evidence” is the appropriate standard of proof for this proceeding. 20 NMAC 1.4.401.C; *see also Foster v. Board of Dentistry*, 103 N.M. 776, 777 (1986) (Preponderance of evidence standard is applicable to administrative proceedings in New Mexico).

(Fact Sheet, November 13, 1998, pg. 1); Administrative Record, No. X (Permit Application, Chapter G, page G-1).<sup>5</sup>

5. DOE is the owner and operator of WIPP; WID is the co-operator of WIPP. AR No. X (Permit Application, Part A, pg. A9).

6. On August 27, 1990, NMED required the DOE to submit a Part B permit application for the management of TRU mixed waste at WIPP in accordance with the HWA and RCRA at 20 NMAC 4.1.900 (incorporating 40 C.F.R. §270.1(b)). RP No. 14; RP No. 130 (Statutory and Regulatory Background).

7. Applicants submitted a Part A permit application on January 22, 1991, and a Part B permit application on February 26, 1991 for a “test phase”. *Id.*

8. On August 30, 1993, NMED issued a Draft Permit to accept public comment for WIPP’s Test Phase application. *Id.*

9. On October 21, 1993, Applicants announced that the “tests involving radioactive wastes will *not* be conducted at WIPP.” *Id.*; AR No. 940904.

10. On September 2, 1994, NMED issued an order to the Applicants requiring them to submit a revised permit application for future activities at WIPP and remanding the Test Phase Draft Permit to the Hazardous and Radioactive Materials Bureau (HRMB). *Id.*

11. On May 26, 1995, Applicants submitted a revised permit application (Revision 5.0) to manage, store and dispose TRU mixed waste at the WIPP facility. *Id.*

12. On June 20, 1995, NMED issued an order finding that Applicants complied with

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<sup>5</sup> Hereinafter, references to the Record Proper shall be cited as “RP” followed by the pleading log number and, if required for clarification, a description of the cited document. References to the Administrative Record shall be cited as “AR” followed by the identification number or index number as listed in RP 25 (Administrative Record Index) and, if required for clarification, a description of the cited document. References to the official transcript shall be cited as “Tr.” followed by the page number and the name of the witness.

all requirements of the September 2, 1994 order. RP No. 130 (Statutory and Regulatory Background, pg. 5); AR No. 950611.

13. In accordance with 40 C.F.R. §124.32(a)(b), on June 15, 1995, NMED issued a public notice acknowledging receipt of Applicants' revised permit application. RP No. 130 (Statutory and Regulatory Background, pg. 5); AR No. 950608.

14. In November of 1995, NMED determined that the revised permit application (Revision 5.0) contained technical deficiencies and issued three requests for information to remedy those defects. RP No. 130 (Statutory and Regulatory Background, pg. 5); AR Nos. 951101, 951110 and 951121.

15. In response, Applicants submitted a revised permit application (Revision 5.2). AR Nos. 951202, 951207, 951214, 951224, 951225 and 960106.

16. On March 14, 1996, NMED issued a Notice of Deficiency alleging technical deficiencies in Revision 5.2. RP No. 130 (Statutory and Regulatory Background, pgs. 6-7); AR No. 960308.

17. In response, on or about April 12, 1996, Applicants submitted a revised permit application (Revision 6.0). AR Nos. 960413-14.

18. On June 27, 1996, NMED found the revised permit application to be "technically complete." RP No. 130 (Statutory and Regulatory Background, pg. 8); Tr. 2377 (S. Zappe).

19. Though Revision 6.0 was found technically complete, NMED intended to address remaining deficiencies by imposing permit conditions. Tr. 2377 (S. Zappe).

20. Between April 12, 1996 and November 20, 1997, Applicants submitted revised permit applications (Revisions 6.1 through 6.5) and other technical documents that contained

substantial revisions and new information. RP No. 130 (Statutory and Regulatory Background); AR Nos. 970310, 970514, 970607, 970713, 970714, 970715, 970939, 971114. Revision 6.3 contained material not requested by NMED. *See* AR No. 970939.

21. WID did not submit a “disclosure statement” with its permit application. AR Nos. 970421, 970939; Tr. 2380 (S. Zappe).

22. On September 26, 1997, NMED rescinded its completeness determination based upon the following: (a) A substantial volume of new material, that had not been requested by NMED, had been submitted by Applicants; (b) WID had failed to submit a disclosure statement at the time the permit application was submitted as required under the HWA; and (c) WID had failed to provide financial assurance information as required under the HWA and regulations. NMED informed Applicants that some of the information was new and apparently was *not* submitted for the purpose of clarifying, modifying or supplementing previously submitted information. AR No. 970939. *See also* RP No. 130 (Statutory and Regulatory Background, pg. 7); Tr. 2380–81 (S. Zappe).

23. On January 5, 1998, NMED issued a new completeness determination. AR No. 980102. RP No. 130 (Statutory and Regulatory Background, pg. 8); Tr. 2381 (S. Zappe).

24. Pursuant to its legal obligation under 40 C.F.R. Part 270 and 20 NMAC 4.1.901.A, NMED prepared a Draft Permit and, on May 15, 1998, in accordance with 20 NMAC 4.1.901.A, .C and .D, published a public notice announcing the availability of a Draft Permit and Fact Sheet for WIPP and a public comment period of 90 days, including requests for hearing. AR No. 980542; RP No. 130 (Statutory and Regulatory Background, pg. 8).

25. On or before August 14, 1998, NMED received public comment on the WIPP

Draft Permit from 30 persons. RP No. 130 (Statutory and Regulatory Background, pg. 8); AR Nos. 980545, 48, 53-55; 980703-08, 980810-12, 14-30.

26. On or before August 14, 1998, NMED received 6 requests for a public hearing (AR Nos. 980553, 980814, 19, 24, 27, 30) and 9 requests for an extension of time to provide public comment. AR Nos. 980807, 14, 16, 19, 21-22, 26, 29-30.

27. On August 20, 1998, NMED informed those persons seeking an extension of time that NMED would review all public comment, revise the Draft Permit to incorporate public comment, and provide a new Revised Draft Permit for public notice at a later date. NMED did not grant an extension of time to submit comments on the ground that the Draft Permit would be revised and the public would have another opportunity to comment upon the Revised Draft Permit. *Id.*; AR Nos. 980842, 47, 49, 52, 54 -55, 60-62; RP No. 130 (Statutory and Regulatory Background, pg. 8).

28. On August 29, 1998, NMED informed those persons who requested a public hearing that a public hearing would be held *after* the WIPP Draft Permit was revised. *Id.*; AR Nos. 980869-74.

29. In accordance with 20 NMAC 4.1.901, on November 13, 1998, NMED issued a Revised Draft Permit that incorporated public comment received on or before August 14, 1998, and published a public notice announcing the availability of the Revised Draft Permit and Fact Sheet and a written public comment period for 67 days until January 18, 1999. The public notice also announced a public hearing to accept oral public comment (technical and non-technical) on February 22, 1999. RP No. 130 (Statutory and Regulatory Background, pgs. 8-9); AR No. 981134.

30. The public notice advised each person who wished to present technical oral public comment to file, on or before February 1, 1999, a “Notice of Intent to Present Technical Oral Comment” that provided certain required information. RP No.1; AR No. 981134; RP No. 130 (Statutory and Regulatory Background, pg. 9).

31. On December 9, 1999, NMED issued a public notice announcing the availability of a Supplemental Fact Sheet. The Supplemental Fact Sheet identified two errors in the printed version of the Revised Draft Permit. RP No. 10 (Supplemental Fact Sheet, December 4, 1998); RP No. 130 (Statutory and Regulatory Background, pg. 9).

32. Between November 13, 1998 and January 19, 1999, NMED received 16 written public comments. RP Nos. 15, 18, 19, 23, 24, 27-28, 30-35, 37-39.

33. On January 13, 1999, the NMED Secretary appointed the undersigned to serve as Hearing Officer. RP No. 20.

34. On or before February 1, 1999, 11 persons or entities filed “Notices of Intent To Present Technical Testimony” as follow: Bonnie Bonneau; Tod Rockefeller; Savanna River Site Citizens Advisory Board; Environmental Evaluation Group (“EEG”); NFT, Inc.; Citizens for Alternatives to Radioactive Dumping (“CARD”); Southwest Research and Information Center (“SRIC”); Applicants; Concerned Citizens for Nuclear Safety (“CCNS”); Office of the New Mexico Attorney General; and NMED. RP Nos. 18, 29, 31, 45, 49, 50, 53, 54, 56-58.

35. On or before February 1, 1999, 7 persons or entities filed an “Entry of Appearance” as follow: Applicants; Bonnie Bonneau; Office of the New Mexico Attorney General; EEG; SRIC; CCNS; and Christopher Wentz. RP Nos. 8, 18, 38, 44, 53, 55, 56.

36. On February 8, 1999, the Hearing Officer issued a Pre-Hearing Order that



formally identified the parties-of-record to the public hearing, *see* 20 NMAC 1.4.301.A (“A timely Statement of Intent to Present Technical Testimony shall be considered an Entry of Appearance”), and prescribed procedural rules. RP No. 68.

37. On February 19, 1999, the Hearing Officer issued a Supplemental Pre-Hearing Order to supplement the February 8, 1999 order. RP No. 88.

38. A public hearing was held from February 22, 1999 through March 26, 1999, in Santa Fe, New Mexico to consider technical and non-technical public comment. Non-technical oral public comment was also heard in Carlsbad, New Mexico on March 9, 1999. Tr. Master Index; List of Commenters.

39. At the public hearing, the following parties presented technical oral public comment: Applicants; EEG; Norbert Rempe; Tod Rockefeller; NFT, Inc.; SRIC and CCNS jointly; Bonnie Bonneau; CARD; and NMED. Tr. 30, 875, 1412, 1429, 1511, 1523, 1688, 1985, 2365.

40. In accordance with 20 NMED 4.1.901.E.4, the public hearing was recorded by a certified court reporter and transcripts were filed with the Hearing Clerk for public review. RP Nos. 171-74.

41. At the public hearing, approximately 140 persons provided non-technical oral comment and 14 persons provided written public comment. On June 25, 1999, NMED responded to public comment respecting the Draft Permit issued on May 13, 1998, and the Revised Draft Permit issued on November 13, 1999. *See* New Mexico Environment Department’s Response to Public Comment issued on June 25, 1999; Tr. List of Commenters.

42. Pursuant to 20 NMAC 4.1.901.A.6, the public comment period ended on March

26, 1999, at the close of the public hearing.

43. Based upon public comment, NMED has recommended certain revisions to the WIPP Revised Draft Permit including revisions to certain imposed conditions. These revisions are reflected in the Proposed Final Permit issued on June 25, 1999. The bases for these revisions are set forth in NMED's Response to Public Comment issued on June 25, 1999, and in the Technical Support Document for Module VII issued on June 25, 1999.

#### Description of the WIPP Facility

44. The WIPP facility is located approximately 26 miles east of Carlsbad, New Mexico in Eddy County, New Mexico. The closest town to the WIPP facility is Loving, New Mexico, which is located about 18 miles to the west. Based on 1990 census numbers, there are less than 30 people living within a ten-mile radius of the WIPP site. Tr. 39 (R. Kehrman).

45. The WIPP site is situated 3310 feet above sea level; 500 feet above the Pecos river (located 12 miles to the west); and 400 feet above the 100-year floodplain. RP No. 36 (comment 273, pgs. 27, 29).

46. The WIPP facility consists of a four-square-mile area or sixteen sections of land. Tr. 42 (R. Kehrman).

47. The WIPP Land Withdrawal Act removed the sixteen sections of land from the public domain in perpetuity and transferred the administration of that land from the Bureau of Land Management to DOE. *Id.* at 45.

48. The WIPP facility consists of the surface facilities, the shafts, and the underground facility. *Id.* at 46.

49. The Property Protection Area, a 35-acre area within a chain link fence, contains

all the surface buildings used to manage TRU waste. *Id.* at 44.

50. There are four shafts which connect the surface to the underground: the Air Intake Shaft; the Salt Handling Shaft; the Exhaust Shaft and the Waste Shaft. *Id.* at 53; RP No. 36 (comment 265, pg. 3).

51. The Air Intake Shaft is the principal source of fresh air for the underground and is equipped to transport personnel if necessary. Tr. 53 (R. Kehrman).

52. The Salt Handling Shaft is the principal route for removing mined salt from the underground, provides a source of fresh air into the underground, and is also used to transport personnel. *Id.* at 53-54.

53. The Waste Handling Shaft is used to transport TRU waste into the underground. It provides a small amount of fresh air into the underground and is also used to transport people into the underground. *Id.*

54. The Exhaust Shaft pulls air out of the underground and is not used to transport personnel. *Id.*

55. The Salt Handling Shaft is lined with steel and the other three shafts are lined with concrete to the top of the “Salado Formation” for the purpose of preventing waters in the overlying horizons from entering into the facility during operations. *Id.* at 55-56; Tr. 777 (N. Williams).

56. There are three basic underground areas: the experimental area, deactivated beginning in 1996, which includes the Site and Preliminary Design Validation area; the shaft pillar area, which contains the shafts, shop areas and facilities used to service equipment; and the waste disposal area, where disposal rooms have been constructed, and additional rooms will be

constructed, and used for the disposal of TRU waste. Tr. 57-58 (R. Kehrman).

57. Containers<sup>6</sup> of TRU waste will be emplaced in underground “panels” located 2150 feet below the ground surface within a 2000-foot thick bedded salt formation known as the Salado Formation. *Id.*; RP No. 36 (comment 273, pgs. 1-2); RP No. 54 (exhibit 26).

58. Each panel consists of seven rooms and two access drifts. Each room is approximately 13 feet high by 33 feet wide by 300 feet long, supported by 100-foot wide pillars. *Id.*; Tr. 59, 82 (R. Kehrman).

59. The underground facility was designed for eight, or possibly ten, panels. If the access drifts of Panels 2, 3, and 4 are ultimately used for waste disposal, they will be designated as Panels 9 and 10. Tr. 81 (R. Kehrman); RP No. 36 (comment 273, pg. 2); RP No. 54 (exhibit 13).

60. The “room and pillar” concept is based on general potash mining practice under similar lithologic conditions. RP No. 36 (comment 273, pg. 2).

61. Containers will be stacked in each room up to three containers high. *Id.* at 9.

#### Geology and Hydrology of the WIPP Site

62. In the WIPP site vicinity, the surface gently slopes southwesterly, marked by caliche and sand dunes. *Id.* at 27.

63. At the WIPP site, the Salado Formation begins at about 850 feet below the ground surface and extends for about 2000 feet deeper into the subsurface. Tr. 60 (R. Kehrman); RP No. 54 (Exhibit 26 -- Generalized Stratigraphic Cross Section).

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<sup>6</sup> All TRU wastes will be retained in containers during receipt, handling, and emplacement. RP No. 36 (comment 273, pg. 25).

64. The Salado formation was formed from an ancient sea that covered the WIPP site during the Permian Age, 220 to 250 million years ago. As the seawater evaporated, the dissolved salts precipitated out and formed massive layers consisting primarily of the minerals halite and anhydrite. Tr. 60-61 (R. Kehrman).

65. In the 1950s, the National Academy of Sciences conducted a study to consider the best methods for disposing of radioactive waste generated from the nation's nuclear weapons program. The Academy studied mined geological repositories and recommended salt formations as the likely candidate for long-term isolation of these wastes. Subsequent studies concluded that the Salado Formation would be a suitable site. *Id.*

66. The Salado is a suitable location for the disposal of TRU mixed waste for the following reasons: (a) it is regionally extensive; (b) it is essentially dry, containing very little natural water; (c) it is virtually impermeable to water; (4) it has a tendency to "creep" shut and close openings mined within it; and (d) it is isolated from other formations by impermeable beds above and below. *Id.* at 61-62.

67. The Salado Formation underlies about 36,000 square miles in New Mexico, Texas, Kansas and Oklahoma. *Id.* at 62.

68. The fact that the Salado is regionally extensive indicates that it is stable and there is little circulating groundwater in the vicinity. *Id.*

69. Extensive karstic<sup>7</sup> conditions exist in areas proximate to the WIPP site such as in Nash Draw and other areas of the Pecos Valley. Tr. 3112 (D. Powers).

70. However, karst is *not* present *at* the WIPP site. *Id.* at 3104-06, 3111, 3112-13; Tr.

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<sup>7</sup> Karstic terrain often occurs in areas containing limestone, gypsum, or other soluble rock beds that slowly dissolve as water passes. The dissolution of rock can cause the formation of caves, tunnels, underground voids, or surface collapses. *See* RP No. 36 (comment 273, pg. 5).

3276 (N. Williams).

71. WIPP-33 is located in a karst area, outside the Land Withdrawal Area in Nash Draw. Tr. 3112-14 (D. Powers).

72. Nash Draw is an area with geologic and hydrologic features distinct from the Land Withdrawal Area. Tr. 3264 (N. Williams).

73. Karstic conditions in Nash Draw are too distant to affect groundwater flow at the WIPP facility. *Id.* at 3276-77.

74. There is a minimal amount of salt dissolution in the Rustler since deposition. Tr. 3127 (D. Powers).

75. Shallow potash mines in the general vicinity caused surface subsidence. The extent to which subsidence over the potash mines has changed the overall water flow properties is not known but potash mining will not occur close enough to the WIPP repository to have an impact on waste disposed within the Salado. RP No. 36 (comment 273, pgs. 27-28).

76. The major groundwater resources in the region, the Capitan and Ogallala aquifers, and the surface waters, are not hydrologically connected within the WIPP repository or water-bearing units overlying the WIPP repository. *Id.* at 24, 28.

77. The climate in the WIPP region is semi-arid, with an average of 12 inches of rainfall per year. More than 90% of the precipitation is lost to evapotranspiration so that infiltration below the immediate surface is negligible. *Id.* at 28.

78. Most of the water that infiltrates the surface soil is retained above the Mescalero Caliche located directly below the ground surface and then lost through evapotranspiration. *Id.*; Tr. 292-93, 298 (R. Kehrman).

79. The mean annual runoff is 0.1 to 0.2 inches. RP No. 36 (comment 273, pg. 28).

80. The maximum recorded precipitation event in Carlsbad was 5.12 inches in August 1916. The predicted maximum 6-hour, 100-year precipitation event for the site is 3.6 inches and is most likely to occur during the summer. *Id.*

81. The site drainage system has been designed to handle a probable maximum storm event. *Id.*

82. Beyond 10 miles, several water bodies lie to the north and southwest of the site. The largest is the Laguna Grande de Sal, located southwest of the site. It is several square miles in area and is a catchment basin for limited surface drainage and artesian saline springs. *Id.* at 29.

83. The most prominent drainage feature near the WIPP site is Hill Tank Draw, which drains westward into Nash Draw. The drainage area is about 4 square miles with an average channel slope of 1 percent. *Id.* at 27, 29.

84. Nash Draw, an undrained physiographic depression resulting from differential dissolution of portions of the Rustler and the upper part of the Salado, is the nearest major geomorphic feature to the WIPP facility, located 5 miles west of the WIPP facility. *Id.* at 27.

85. The Laguna Gatuna, Laguna Tonto, Laguna Plata and Laguna Toston are playas located more than 10 miles north of the site, at elevations of 3450 feet or higher. Surface runoff from the site, at an elevation of 3310 feet above sea level, would not flow toward any of these playas. *Id.* at 27, 29.

86. To the north, west and southwest, Red Lake, Lindsey Lake and the Laguna Grande de la Sal, and a few unnamed stock tanks, are located more than 10 miles from the WIPP site at elevations between 3000 and 3300 feet. *Id.* at 29.

87. The Pecos River is located 12 miles west of the WIPP site. The flow in the Pecos River below Fort Sumner is regulated by storage in Sumner Lake, Brantley Reservoir, Lake Avalon and several other smaller irrigation dams. *Id.* at 27, 29.

88. A few small creeks and draws are the only westward flowing tributaries of the Pecos River within 20 miles north or south of the WIPP site. There are no perennial streams within the WIPP Land Withdrawal Area and there are no major surface water bodies, lakes, or streams within 5 miles of the site. *Id.*

89. The mining process at the WIPP facility creates a disturbed rock zone ("DRZ") that extends out about 2 meters or 6 feet out into the rock and allows the water (brine) that was trapped in the Salado at the time of formation, about ½ percent by volume, to drain into the facility. This water is immediately evaporated by the ventilation system and leaves efflorescence or small white crystals on the wall. *Id.* at 62-63.

90. The DRZ fractures may encounter anhydrites, allowing dewatering over a larger area or may intercept a clay seam, which tend to produce a little more water than the rest of the rock. *Id.* at 64.

91. There is insufficient water in the facility to form a leachate. *Id.* at 65.

92. The amount of brine that will accumulate in the WIPP facility will probably not ever fill the DRZ and likely will never come into contact with the waste materials. Tr. 3282 (N. Williams).

93. The hydrologic properties of the Salado were evaluated by drilling holes into the rock within the facility and out into areas of undisturbed rock, placing a seal in the hole, pressurizing the rock behind the seal with liquid or gas, and assessing changes to the liquid or



gas volume or pressure. In most cases, Applicants observed no changes, which indicates that the permeability was lower than what can be measured using conventional *in-situ* instrumentation.

Tr. 68 (R. Kehrman).

94. Hydraulic conductivity is a measurement of flow through connected pores that reflects the ability of fluid to move through a formation. Tr. 748 (N. Williams).

95. Pure halite has an average hydraulic conductivity of about  $1 \times 10^{-14}$  centimeters per second ("cm/s"), which is equal to  $3 \times 10^{-5}$  centimeters per century. Impure halites have conductivities in the range of  $1 \times 10^{-14}$  to  $4 \times 10^{-9}$  cm/s. Anhydrites have conductivities in the range of  $2 \times 10^{-11}$  to  $7 \times 10^{-9}$  cm/s. *Id.* at 742, 756.

96. The Castile Formation underlies the Salado at the WIPP site and consists of halites and anhydrites with very low permeabilities. Tr. 69 (R. Kehrman).

97. The Rustler Formation, which overlies the Salado Formation, contains mudstones and anhydrites in very low permeability beds. *Id.* at 69-70.

98. The Rustler Formation consists of five layers: the unnamed lower member; Culebra; the Tamarisk; the Magenta; and the Forty-Niner. *Id.* at 71.

99. All five members of the Rustler Formation are discrete hydrological units with no hydrological connections. *Id.* at 243.

100. The unnamed lower member has hydraulic conductivities in the range of  $6 \times 10^{-13}$  to  $1.5 \times 10^{-9}$  cm/s. Tr. 741-42 (N. Williams).

101. The Culebra member has hydraulic conductivities in the range of  $2 \times 10^{-8}$  to  $1 \times 10^{-2}$  cm/s. *Id.*

102. The Tamarisk member has hydraulic conductivities of approximately 1.2 to  $1.5 \times$

$10^{-10}$  cm/s. *Id.*

103. The Magenta dolomite has hydraulic conductivities in the range of  $2 \times 10^{-8}$  to  $7 \times 10^{-3}$  cm/s. *Id.*

104. The Forty-Niner member has hydraulic conductivities in the range of  $3 \times 10^{-8}$  to  $4 \times 10^{-5}$  cm/s. *Id.*

105. In comparison, sand has a hydraulic conductivity in the range of  $10^{-2}$  to  $10^{-4}$  cm/s. Clay typically has a hydraulic conductivity between  $10^{-6}$  and  $10^{-9}$  cm/s. Concrete typically has hydraulic conductivities in the range between  $10^{-8}$  and  $10^{-10}$  cm/s. High density polyethylene membranes used for containment of hazardous waste and municipal waste in most facilities throughout the country has an average hydraulic conductivity of  $10^{-12}$  cm/s. Steel typically has a hydraulic conductivity of approximately  $10^{-13}$  cm/s. *Id.* at 744-45.

106. The interface of the Salado and the Rustler formations is not a primary water-bearing zone within the Land Withdrawal Area. *Id.* at 3266.

107. The hydraulic conductivities at the Rustler/Salado interface are in the range of  $10^{-9}$  to  $10^{-10}$  cm/s. Because of this extremely low conductivity, the interface would not constitute a water-bearing zone that could conceivably be a primary pathway for constituent migration. *Id.*

108. During operation of WIPP, in order for groundwater to migrate from the repository to the Culebra, the shaft would have to fill with water; there is insufficient flow from the Salado Formation for that to occur. *Id.* at 3268.

109. The Rustler Formation contains two continuous water-bearing zones, the Culebra and the Magenta. *Id.* at 3261; 72 (R. Kehrman).

110. The Culebra is a highly fractured bed approximately 25 to 30 feet thick.

Groundwater flows through the fractures. Tr. 73 (R. Kehrman).

111. The brine in the Culebra is hydrologically confined; there are no natural connections between the Culebra water and the Salado at the WIPP site. *Id.* at 75.

112. The Culebra is the first primary water-bearing zone above the WIPP site. Tr. 742, 3266 (N. Williams).

113. The Culebra is the most transmissive continuous fluid-bearing unit above the WIPP repository. Tr. 3135 (D. Powers).

114. The Culebra is typically about 100 times more transmissive than the Magenta. Tr. 237 (R. Kehrman).

115. The Magenta has been monitored for many years and there has been very little change in the Magenta. *Id.* at 335-36.

116. The Dewey Lake Formation, located above the Rustler, consists of orange-red siltstone, mudstone and some sandstone. The Dewey Lake contains a number of permeable sand lenses that yield limited quantities of fresh water to a few private wells in the area around the WIPP site. (RP No. 36: comment 273, pg. 20).

117. No Dewey Lake water has been mapped in the vicinity of the WIPP shafts or repository. *Id.*; Tr. 79 (R. Kehrman).

118. When the WIPP facility was built, no water was encountered at the base of the Santa Rosa and the top of the Dewey Lake. *Id.*

119. In 1978, a series of boreholes were drilled for construction support and the Santa Rosa was found to be dry. As the Exhaust Shaft was mapped, the Santa Rosa was also dry at that time. Tr. 3130 (D. Powers).

120. Water has recently been found in the basal part of the Santa Rosa Formation. This water is of recent origin and due to activities on site including runoff from the facility area that seeps into the ground *Id.* at 3129-30; 3259 (N. Williams).

121. In the vicinity of the WIPP site, the water at the base of the Santa Rosa and top of the Dewey Lake is a perched water table -- hydrologically confined by an impermeable barrier below that prevents downward migration. Tr. 3259 (N. Williams).

122. Surface water in the vicinity of the WIPP site migrates within the weathered or fractured zone, through the surface soils and the Santa Rosa where it accumulates (or perches) at the low permeability barrier at the top of the Dewey Lake. *Id.*

123. If the perched water discovered at the Dewey Lake/Santa Rosa interface could migrate downward into the repository, it would do so at an extremely slow rate because of the low hydraulic conductivity of the material below it. It is more likely to spread laterally because the horizontal hydraulic conductivity at that interface is much higher than the vertical conductivity below it. Tr. 3260-61 (N. Williams).

#### Potential Migration of Waste

124. There are no credible pathways that will result in contamination of the groundwater or the subsurface environment in the vicinity of WIPP for the following reasons: (a) TRU waste will be handled in unopened containers and the waste will be in solid form with virtually no liquid; (b) the WIPP repository is hydrologically isolated because the permeability of the Salado is extremely low -- fluids within it are effectively immobilized and no driving force exists for the waste to migrate from the disposal rooms into groundwater or the subsurface; (c) the operation of WIPP is such that there will be no discharges from the waste management areas

that will affect groundwater; (d) the placement of the shaft seals will block possible pathways and prevent the migration of groundwater into the waste areas from upper water bearing zones and will prevent the movement of waste constituents from the repository into the groundwater; (e) active institutional controls will prevent intentional drilling into the repository which could create groundwater flow paths; (f) the culverts and drainage ditches on the surface will divert surface run-on during intense precipitation events and prevent flooding; and (g) the design and construction of the shafts minimizes drainage of groundwater into the repository and any water that does enter is collected, hauled to the surface, and properly disposed. RP No. 36 (comment 273, pgs. 23-24).

125. There are no credible mechanisms for a direct release of hazardous waste or hazardous constituents into the soil surface or into surface waters. *Id.* at 25-26.

126. Exposure of humans or environmental receptors to hazardous waste or constituents, from surface water or the soil surface, will be highly unlikely. *Id.* at 32.

#### Releases to the Air

127. The quantity of waste constituents released into the air will probably be negligible in comparison to other facilities in the area. Tr. 816 (N. Williams). *But cf.* Findings of Fact (Confirmatory VOC Monitoring Program) *infra*.

128. Exposure of animals, wildlife, crops, vegetation and physical structures to VOCs in the air will probably be negligible due to the short exposure periods and the low concentration of the releases. RP No. 36 (comment 273, pg. 39).

#### Room/Roof Stability

129. The design of the underground repository, including the width and spacing of the

disposal rooms, is based on experience gained from mining practices in mines with similar geology and depth, universally applied mining and engineering standards, and computer model simulations. *Id.* at 7-8, and attached Patchet Decl. ¶¶ 8, 9.

130. The design is appropriate for the intended and permitted uses of the WIPP facility. *Id.*; cf. Tr. 1619-20 (J. Parker – design is “adequate but can be improved upon considerably”), 1311 (L. Chaturvedi – design is generally adequate but recommends abandoning Panel 1 due to its age).

131. In 1983, Applicants initiated the Site and Preliminary Design Validation ("SPDV") Program to provide direct observation of the underground design in actual, site specific conditions. RP No. 36 (comment 273, pgs. 7-8), and attached Patchet Decl. ¶¶10-11.

132. The SPDV Program included excavating the following: (a) the exploratory and ventilation shafts; (b) an experimental panel of four rooms excavated to the same dimensions of the future waste disposal rooms; and (c) connecting drifts. *Id.*

133. The SPDV rooms are now deactivated and none of the SPDV Rooms will be used for waste disposal. RP No. 36 (comment 273, pgs. 7-8), attached Patchet Decl. ¶21.

134. The SPDV Program included a study of the roof fall process in which the roofs of SPDV rooms 1 and 2 were purposefully left unsupported and allowed to fall. In contrast, SPDV room 4 was rockbolted in 1990 and has not yet experienced a roof fall, over 15 years after excavation. RP No. 36 (comment No. 273), and attached Patchet Decl. ¶¶14-16, 18.

135. The SPDV Program confirmed the stability and safety of the WIPP underground design and demonstrated the Applicants’ ability to predict roof falls before they occur. RP No. 36 (comment No. 273), and attached Patchet Decl. ¶19.

136. All Panel 1 rooms were initially pattern bolted with mechanically anchored rockbolts in 1988. RP No. 36 (comment No. 273), and attached Patchet Decl. ¶29; RP No. 109 (Annual Ground Control Operating Plan, pgs. 36-37).

137. Since 1991, much of Panel 1 has been rebolted with resin-anchored threaded bar rockbolts that are more effective than mechanically anchored bolts due to their greater flexibility and ability to bear more load. *Id.*

138. In 1991, a supplemental roof support system, with a design approved by two formal review panels, was installed in Panel 1, Room 1. RP No. 36 (comment No. 273), and attached Patchet Decl. ¶¶32-33; RP No. 109 (Annual Ground Control Operating Plan, pgs. 36-37).

139. Current geomechanical data reveal no indication of expected roof fall at this time in any of the rooms of Panel 1. RP No. 36 (comment No. 273), and attached Patchet Decl. ¶51.

140. The precise amount of warning time prior to a roof fall is uncertain but there will be *some* warning time, probably in the range of six months, prior to a fall. RP No. 36 (comment No. 273), and attached Patchet Decl. ¶19; Tr. 1580, 1647 (J. Parker). *But cf.* Tr. 1044-45, 1192 (L. Chaturvedi – citing an incident in 1990, when the roof of an *experimental* room fell just 18 days after personnel had last entered the room).

141. There will be ample warning time before a roof fall to evacuate and ensure the safety of workers. *Id.*

142. Studies reveal that a roof fall in an actively ventilated, open room, during the time required to fill that room, is "beyond extremely unlikely." RP No. 109 (Analysis of Roof Falls and Methane Gas Explosions in Closed Rooms and Panels, §1.2.1).

143. Applicants' geomechanical monitoring program measures and assesses ground conditions in the underground to ensure continued safe operating conditions and to evaluate and project underground conditions and behavior. RP No. 36 (comment 273, pgs. 14-15), and attached Patchet Decl. ¶¶43-51; Tr. 97-98 (R. Kehrman).

144. The geomechanical monitoring program will provide warning of instability and impending roof fall. RP No. 36 (comment 273), and attached Patchet Decl. ¶51 n.7; *Cf.* Tr. 1145 (L. Chaturvedi).

#### Panel Closure

145. After each panel is filled with waste, that panel will be closed to create a permanent separation from the ventilation system, and to limit the emission of VOCs<sup>8</sup> from the WIPP facility. Tr. 107 (R. Kehrman).

146. The panel closure design consists of construction of an explosion-isolation wall made of concrete block keyed into the salt; removal of the disturbed rock zone around the panel opening to achieve consistent permeability at the interface with the drifts; a massive concrete barrier/plug consisting of Salado Mass concrete; and grouting to seal off construction joints and fill in any fractures. *Id.* at 108-11; RP No. 36 (comment 271, pgs. 3-4).

147. Salado Mass concrete is concrete made with brine and does not dissolve when it contacts the salt. *Id.*

#### Final Facility Closure

148. The purpose of final facility closure is to restore the WIPP site to as near to its original condition as is practicable. RP No. 36 (comment 271, pg. 5).

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<sup>8</sup> See Findings of Fact (Confirmatory VOC Monitoring Program) *infra*.



149. Final facility closure will render the facility in a final, closed posture so that no hazardous waste will escape. Tr. 112 (R. Kehrman).

150. Final facility closure will begin when all waste disposal areas are filled or WIPP reaches its legal capacity of TRU waste. Tr. 112 (R. Kehrman); RP No. 36 (comment 271, pg. 5).

151. WIPP will receive no more than 6.2 million cubic feet of TRU waste during its active life. RP No. 36 (comment 271, pg. 12).

152. The maximum volume of waste in each disposal panel will be 636,000 cubic feet of TRU waste. *Id.*

153. Final facility closure activities include decontamination or disposal of all contaminated equipment, structures and soils; the placement of shaft seals; the placement of plugs in boreholes that penetrate the salt; and the implementation of a groundwater monitoring program.<sup>9</sup> *Id.* at 5. Proposed Final Permit of June 25, 1999, Module II.L.5, Attachment I.

154. Shaft seals will control the release of hazardous wastes by preventing water from entering the WIPP underground disposal unit, where it could saturate the waste and form leachates. RP No. 36 (comment 271, pg. 10); Proposed Final Permit of June 25, 1999, Attachment I.

155. Shaft seals will also control the release of hazardous wastes from the facility by preventing contaminated brines or gases from leaving the disposal unit. *Id.*; Tr. 118 (R. Kehrman).

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<sup>9</sup> See Findings of Fact (Detection Monitoring Program) *infra*.

156. Each shaft will be filled with high-density/low-permeability materials, creating seals that closely approximate the hydraulic properties of the *in-situ* intact salt and render the shafts virtually impermeable. Tr. 112-15 (R. Kehrman); RP No. 36 (comment 271, pgs. 9-11); Proposed Final Permit of June 25, 1999, Attachments I, I2.

157. The design of the shaft seals provides for a long-term seal resistant to both gas and brine by providing more than 500 feet of highly compacted crushed salt barrier in series with more than 400 feet of clay barriers. *Id.*

158. At the Rustler Formation, the shaft seal design will prevent leakage of groundwater into the lower seal components. *Id.*

159. At the Salado Formation, the shaft seal design will prevent the transport of hazardous waste constituents from the WIPP repository beyond the disposal system. *Id.*

160. During both the disposal phase and final facility closure, boreholes located near the WIPP facility will be plugged with high quality cement grout mixes that are compatible with the host rock. *Id.*

#### Post-Closure Care

161. Post-closure care continues for 30 years after the completion of final facility closure. Tr. 120 (R. Kehrman); Proposed Final Permit of June 25, 1999, Module VI.A, Attachment J.

162. Post-closure care includes general monitoring, inspection, maintenance, including air and groundwater monitoring. RP No. 36 (comment 275, pg. 1); Proposed Final Permit of June 25, 1999, Module VI.C.2, Attachments J, J1. *See also Findings of Fact* (Confirmatory VOC Monitoring Program and Detection Monitoring Program) *infra*.

163. After final facility closure of the WIPP facility, Applicants will prepare a plan for managing the land withdrawal area which will include a description of the “active institutional controls.” RP No. 36 (comment 275, pg. 4-5); Proposed Final Permit of June 25, 1999, Module VI.C.2, Attachments J, J5.

164. The land management plan will be prepared in consultation with the Department of Interior and the State of New Mexico. *Id.*

165. Through the use of active institutional controls, Applicants will prohibit any use of the facility surface area which could disturb the integrity of the shaft sealing system or the function of the facility monitoring systems, during the post-closure care period. *Id.*

166. Security measures will continue throughout the post-closure period. *Id.*

#### Other Issues

167. “Incompatible wastes” (wastes not compatible with the backfill, panel closure materials, waste containers/casks, the transportation containers, or other wastes) are prohibited at WIPP. Compliance will be demonstrated through review of records showing chemical constituents and comparison to the chemical compatibility analysis databases described in Appendix C1 of the permit application. Proposed Final Permit of June 25, 1999, Module II.C.3.d; RP No. 36 (comment 266 pg. 24).

168. The USEPA has developed a method for determining the compatibility of hazardous wastes. RP No. 145 (exhibit 68).

169. Pursuant to USEPA's waste compatibility methodology, DOE conducted a waste compatibility study, set forth Appendix C1 of the permit application. The study revealed that the wastes destined for disposal at WIPP are compatible with each other, the waste containers, the

transportation containers, and backfill materials. AR Nos. ID, AX.

170. Actual examination of waste at the Idaho National Environmental Engineering Laboratory showed no adverse effects of chemical reactions between different types of wastes or between wastes and waste containers even after 15 years of storage, indicating that the wastes are chemically compatible with themselves and with payload containers. RP No. 142 (exhibit 65 pg. 1.3.9-7).

171. The standard for “corrosivity” is set forth at 20 NMAC 4.1.200 (incorporating 40 C.F.R. §261.22) and defines corrosivity through use of USEPA Method 9040. This method does not require testing of solid forms of waste for corrosivity, as advocated by some parties. *Id. See* CARD’s Proposed Findings of Fact and Conclusions of Law, pgs. 25-26 (June 25, 1999); Proposed Findings of Fact and Conclusions of Law of SRIC/CCNS, pgs. 10-12, 34 (June 25, 1999).

172. WIPP has a program to address "Y2K Compliance" so that the operation, performance and functionality of its computer systems will not be affected by dates prior to, during, or after the year 2000 rollover. The only mission-critical system, the WIPP Waste Information System, *see Findings of Fact* (Access to the WISS) *infra*, has been tested and determined to be Y2K compliant. All other systems were scheduled to be compliant or retired prior to the issuance of this Report. In addition, Applicants have conducted business continuity planning exercises with external systems and utility providers, including electric utilities to ensure continuity of operations. RP No. 148 (exhibit 71 -- WIPP Y2K Project Overview).

173. Tod M. Rockefeller's claims that he engaged in protected whistle-blowing concerning alleged safety problems at WIPP were specifically considered and rejected by the

U.S. Merit Systems Protection Board, RP No. 149 (exhibit 72, pgs. 2-3), and the U.S. Department of Labor. RP No. 150 (exhibit 73).

174. “Tritium” is not contained in the waste destined for WIPP. Tr. 181, 183 (R. Kehrman); 883, 928 (R. Neill).

175. Charles Loftus’ concerns about opening waste containers at the WIPP site were satisfied by a change in procedure. Tr. 3489 (C. Loftus). His concerns about the use of a carpet and water, *see Id.* at 3493, to treat spills in the Waste Handling Building are unfounded because neither carpet nor water are spill control procedures or equipment in the RCRA Contingency Plan. *See* Proposed Final Permit of June 25, 1999, Attachment F, pgs. F26-F27, F56-F65.

#### Technical Terms

176. “TRU waste” generally includes waste containing more than 100 nanocuries of alpha-emitting transuranic isotopes per gram of waste, with half-lives greater than 20 years. Proposed Final Permit of June 25, 1999, Module I.D.5.

177. “TRU mixed waste” includes waste that is also a hazardous waste as defined by the HWA and 20 NMAC 4.1.200 (incorporating 40 C.F.R. §261.3).

178. “Hazardous waste,” as defined in 40 C.F.R. §261.3 is waste that, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may cause or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible illness, or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed. Hazardous wastes are listed in 20 NMAC 4.1.200 (40 C.F.R. §261) and/or exhibit one of four enumerated hazardous characteristics in 20 NMAC 4.1.200 (incorporating 40 C.F.R.

§261). AR No. X (Vol. 1, Glossary, pg. 12). There are four types of characteristic hazardous waste under RCRA: ignitable, corrosive, reactive, and toxic.<sup>10</sup> Tr. 429 (E. Hunter), 1761 (J. Hirschhorn).

179. “Waste characterization” is the process of sampling, monitoring, and analyzing waste to determine the general nature of the waste.<sup>11</sup> AR No. X (Vol. 1, Glossary, pg. 28).

180. “Waste analysis” is the process of obtaining a detailed chemical and physical analysis of a representative sample of waste. The analysis may include data developed using sampling and laboratory analysis, as well as existing published or documented data on the waste or on a waste generated from similar processes. *Id.* at 27.

181. A “waste stream” is a quantity of waste that is produced by the same or similar process and has similar physical, chemical or nuclear characteristics.<sup>12</sup> Tr. 435 (E. Hunter).

182. The Waste Analysis Plan (“WAP”) is the document describing the procedures for performing chemical and physical analyses of each waste managed at a waste-generating facility in order to obtain sufficient information to treat, sort, or dispose of the waste in accordance with 40 C.F.R. 264.13. AR No. X (Vol. 1, Glossary, pg. 28).

183. Waste Acceptance Criteria (“WAC”) are a set of permit application conditions established to specify the types of wastes that may be managed and disposed at WIPP. *Id.* at 27.

184. Treatment, Storage, and Disposal Facility Waste Acceptance Criteria (“TSDF WAC”) are proposed permit conditions that prescribe certain prohibitions including the disposal of liquid waste; pyrophoric materials; wastes containing explosive or compressed gasses; wastes

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<sup>10</sup> Only “toxic” hazardous waste (*e.g.* waste containing lead) is proposed to be permitted. Ignitable, corrosive, and reactive wastes are proscribed. Tr. 429-31 (E. Hunter).

<sup>11</sup> The purpose of waste characterization is to ensure that only permitted wastes are disposed at WIPP. Tr. 426 (E. Hunter).

<sup>12</sup> Approximately 20 waste sites in 10 states will be disposing of waste at WIPP. This waste was generated through a variety of waste-generating processes. Tr. 460-461 (E. Hunter).

chemically incompatible with backfill, seal and panel closure materials, container and packaging materials, or shipping container materials; any waste container that has not undergone headspace gas sampling and either radiographic or visual examination; non-mixed hazardous waste (with no TRU component), and remote handled TRU mixed waste. Proposed Final Permit of June 25, 1999 (Module II.C.3).

185. “Acceptable knowledge” is the knowledge of all the processes involved in creating a waste stream.<sup>13</sup> Tr. 437 (E. Hunter).

186. “Headspace gas analysis” is the process of withdrawing a sample of gas from the headspace of a waste container and chemically analyzing the sample. *Id.* at 439.

187. “Radiography” is the technique of viewing the contents of a waste container by x-ray. Its primary purpose is to confirm the absence of prohibited items and waste. *Id.* at 442, 450.

188. “Visual inspection” is the process of actually opening a drum of waste and visually inspecting the contents. AR No. X (Vol. 1, Glossary, pg. 29).

189. “Miscertification rate” is the error rate in identifying the contents of waste drums through radiography--the percent of radiographed waste containers that are determined, through subsequent visually inspection, to be incorrectly identified with respect to waste acceptance criteria. Applicants and NMED propose that the percentage of drums that must be visually inspected should generally depend upon the past accuracy (miscertification rate) of radiography. Tr. 447, 500-01 (E. Hunter); Tr. 2703 (C. Walker). *See Findings of Fact, (Miscertification) infra.*

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<sup>13</sup> Applicants intend to assign hazardous waste codes at the generator sites primarily based upon acceptable knowledge. Tr. 436 (E. Hunter).

190. Quality Assurance Program Plan (“QAPP”) is a document describing the overall program plans and activities designed to meet the project’s quality assurance goals with respect to waste characterization. AR X (Vol. 1, Glossary, pg. 20); RP 36 (comment 266, pgs. 25-26).

191. Quality Assurance Project Plans (“QAPjP”)<sup>14</sup> are documents developed by each waste generator site to establish detailed site-specific waste characterization processes and methods to meet the data quality objectives. *Id.*

192. The “Proposed Final Permit of June 25, 1999,” is divided into seven “modules.”<sup>15</sup> Module I addresses general issues such as permit expiration date and NMED’s authority to inspect and obtain samples. Module II establishes permit conditions respecting such issues as waste sources, waste analysis, security, inspections, training, emergency procedures, general closure requirements, and financial assurance for closure. Module III addresses the design and operations of the above ground TRU mixed waste container storage areas. Module IV specifies requirements for underground waste disposal. Module V addresses the groundwater monitoring program requirements. Module VI prescribes requirements during the “post-closure care” period. Module VII describes permit conditions pertaining to corrective action to investigate possible waste releases. Proposed Final Permit of June 25, 1999.

#### Audit Requirements

193. Permit Condition II.C.2 of the Revised Draft Permit provides:

The Permittees [Applicants] shall not manage, store, or dispose TRU mixed waste at WIPP from a generator/storage site until the following conditions have been met as necessary for the Secretary to determine that the characterization requirements of Permit Condition II.C.1 have been implemented:

Requirement to audit - the Permittees shall demonstrate to the Secretary that the generator/storage sites have implemented and comply with applicable

<sup>14</sup> Both QAPP and QAPjP documents are subject to the permit audit requirements. Tr. 693 (E. Hunter).

<sup>15</sup> Prior drafts followed the same format. *See, e.g.*, RP No. 1.



requirements of the WAP by conducting an audit of the generator/storage sites as specified in Permit Attachment B, Section B-4b(1)(iii), and Permit Attachment B6 (Waste Isolation Pilot Plant Permittees' Audit and Surveillance Program), and as required by 20 NMAC 4.1.500 (incorporating 40 C.F.R. §264.13).

Observation of audit - the Secretary may observe such audits as necessary to validate the implementation of and compliance with applicable WAP requirements at each generator/storage site. The Permittees shall provide the Secretary with a current audit schedule and notify the Secretary no later than forty-five (45) calendar days prior to each audit.

Final audit report - the Permittees shall provide the Secretary a final audit report as specified in Permit Attachment B6. The final audit report shall include all information specified in Permit Attachment B6, Section B6-4, and:

A detailed description of all corrective actions and the resolution of any corrective action applicable to WAP requirements, including re-audits if required;

All documentation necessary for the Secretary to determine if the corrective action was resolved.

Secretary notification of approval - the Secretary shall approve the Permittees' final audit report by written notification to the Permittees that the characterization requirements of the WAP at a generator/storage site have been implemented.

AR, No. 981134.

194. The Applicants proposed the audit requirement as a process to obtain all required waste characterization information in accordance with 20 NMAC 4.1.500 (incorporating 40 C.F.R. §264.13(a)(1)) and to ensure that WAC procedures are properly implemented. Tr. 690-92 (E. Hunter).

195. The audit process is the only available method to ensure that waste generator sites have properly implemented and complied with applicable portions of the WAP. RP No. 5; AR No. 981134.

196. The Applicants have expressed several concerns<sup>16</sup> with the proposed audit process including the following:

- (a) Applicants prefer a time limit for approval by NMED of the final audit report—preferably 30 days;
- (b) Applicants prefer mandatory NMED participation in all audits and resolution of all conflicts during the audit;
- (c) Applicants prefer that audits not include the review of actual waste characterization data; and
- (d) Applicants contend that providing NMED with a 45-day notice prior to an audit is not feasible.

Tr. 709-11 (E. Hunter).

197. A thirty-day time limit for approval of the final audit report is not feasible because the scope of audits can not be determined in advance and could entail multiple reports that address multiple procedures, waste categories, or waste streams. Moreover, the time required for approval of final audit reports depends upon the reports' quality, completeness, accuracy and organization. Tr. 2461-63 (S. Zappe).

198. NMED cannot commit to mandatory participation in all audits because future resources and budgetary constraints are unknown. Additionally, it is not practicable for NMED to restrict its obligation and authority to address deficiencies concerning implementation or compliance with the WAP. NMED must be allowed to review the report after close of the audit. Furthermore, resolution of all conflicts during an audit is not feasible because NMED may be unable to participate in all audits. Tr. 2464 (S. Zappe), 2728 (C. Walker).

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<sup>16</sup> These concerns were articulated by Applicants technical witness, E. Hunter, but were not specifically addressed in Applicants' post-hearing submission.

199. NMED must be allowed to review actual waste characterization data to determine whether required methods have functioned as designed, whether the WAP was properly implemented, and whether any characterization problems are identified and corrected. Tr. 2728 (C. Walker).

200. With respect to the Applicants' assertion that they are unable to provide 45 days notice to NMED prior to each audit, NMED considered this comment and reduced the notice requirement to 30 days in the Proposed Final Permit of June 25, 1999. Thirty days prior notice is reasonable and practicable. Proposed Final Permit of June 25, 1999 (Module II, II.C.2).

#### Remote-Handled TRU Waste

201. Permit Condition II.C.3.h, of the Revised Draft Permit (AR No. 981134) and Proposed Final Permit of June 25, 1999, provides:

Remote-handled TRU mixed waste (waste with a surface dose of 200 millirem per hour or greater) is not acceptable at WIPP.

202. The WAP, the QAPP and the TRU waste Characterization Sampling and Analysis Methods Manual, as currently written, apply only to contact-handled ("CH") TRU waste<sup>17</sup> and do not apply to remote-handled ("RH") TRU waste. Tr. 880-81 (R. Neill); RP Nos. 15, 36 (comment 167). Applicants have not provided sufficient information regarding procedures to characterize RH TRU waste in response to prior requests and notices of NMED. Tr. 2377-78 (S. Zappe).

203. Applicants concede that a permit modification must be obtained to add RH TRU mixed waste characterization methods in order to manage, store, and dispose RH TRU mixed waste at WIPP. RP Nos. 15, 36 (comment 177); Applicants' Closing Argument and

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<sup>17</sup> CH TRU waste is TRU waste with a surface dose rate not greater than 200 millirem per hour. RP 1 (Fact Sheet, pg. 1); Proposed Final Permit of June 25, 1999 (Module I.D.1).

Memorandum, pg. M6 (June 25, 1999).

204. Applicants seek to make structural modifications to the RH Bay area of the Waste Handling Building in preparation for the possible future receipt of RH TRU waste in the event a permit modification is granted. Applicants' Closing Argument and Memorandum, pg. M7 (June 25, 1999).

#### Miscertification

205. The Miscertification rate is used as a quality control check on the accuracy of radiography. As contemplated by the Revised Draft Permit (and Final Proposed Permit), the miscertification rate determines the percent of radiographed waste containers that must be visually inspected—the higher the miscertification rate, the higher the percentage of waste containers that must be opened and the contents visually inspected. Tr. 2730 (C. Walker).

206. Under the Revised Draft Permit, the initial, presumed miscertification rate for all waste generator sites was based upon the two percent rate at Idaho National Engineering and Environmental Laboratory ("INEEL"). Tr. 546 (E. Hunter).

207. Although the most recently calculated miscertification rate at INEEL is two percent, the rate at Rocky Flats is 3.6 percent, and the rate at Los Alamos National Laboratory ("LANL") is eleven percent. *Id.* at 534, 546.

208. Based upon testimony and comments received at the public hearing, NMED proposes to amend the language of Attachment B2 concerning miscertification rates for the final permit. The proposed amendments from the Revised Draft Permit are noted in underscore/strikeout as follows:

As a Quality Control check on the radiographic examination of waste containers, a statistically selected portion of the certified waste containers must be opened

and visually examined. The data from visual examination shall be used to verify the matrix parameter category, waste material parameter weights, and absence of prohibited items as identified in Attachment B, Section B-1C, as determined by radiography.

The data obtained from the visual examination shall also be used to determine, with acceptable confidence, the percentage of miscertified waste containers from the radiographic examination. Miscertified containers are those that radiography indicates meet the Waste Isolation Pilot Plant Treatment, Storage, and Disposal Facility Waste Acceptance Criteria and Transuranic Package Transporter-II Authorized Methods for Payload Control but visual examination indicates do not meet these criteria.

~~Previous evaluation of the miscertification rate of radiography at the Idaho National Engineering Laboratory indicates that two percent of the radiography-certified waste containers have been miscertified when compared to the results of visual examination (EG&G 1994). Participating sites shall initially use this historical an eleven-percent (11%) miscertification rate to calculate the number of waste containers that shall be visually examined if until a site-specific historical miscertification rate has not been established. Sites may establish a site-specific miscertification rate by characterizing a waste stream or waste stream lot of no less than fifty containers at the initial 11% miscertification rate. The results of this initial characterization shall then serve as the site-specific miscertification rate until reassessed annually as described below.~~

~~The site-specific miscertification rate shall be determined each year based on results of certification activities at the generator/storage site over a minimum of 12 months applied initially to each waste stream to determine the number of containers requiring visual examination, as specified in Table B2-1. However, a waste stream-specific miscertification rate shall be determined when either six months have passed since radiographic characterization commenced on a given waste stream, or at least 50% of a given waste stream has undergone radiographic characterization, whichever occurs first. The waste stream shall then be subject to the visual examination requirements of this reevaluated waste stream-specific miscertification rate to ensure that the entire waste stream is appropriately characterized. Table B2-1 provides the number of waste containers per waste stream that shall be visually examined for several various miscertification rates and waste container population sizes using a hypergeometric sampling approach. Sites shall use a miscertification rate of 1% for any waste stream-specific miscertification rate calculated to be less than 1%.~~

The site-specific miscertification rate shall be reassessed annually by calculating a drum-weighted average of all historic waste stream-specific miscertification rates. Each waste stream-specific miscertification rate shall be rounded off to the

nearest integer value before being used to calculate the new site-specific miscertification rate. Sites shall use a miscertification rate of 1% for any site-specific miscertification rate calculated to be less than 1%.

Proposed Final Permit of June 25, 1999 (Attachment B2).

209. NMED concomitantly proposes to amend Table B2-1, of Attachment B2, in accordance with the proposed amendments to Attachment B2. *Id.* (Table B2-1).

210. Applying a miscertification rate that is lower than the actual miscertification rate may result in the storage and disposal of waste at WIPP that is inadequately characterized and/or contains prohibited materials under the TSDF WAC. Tr. 3585 (D. Hancock).

211. The determination of visual examination rates based upon a percent-basis of waste shipped from a particular site for an entire year, rather than on a waste-stream basis, could result in storage and disposal of waste at WIPP without confirmatory visual examination of radiographic results for a specific waste stream. Tr. 646 (E. Hunter).

212. Notwithstanding the potentially greater risk of radiation exposure to workers if required to visually inspect a somewhat greater number of waste containers, NMED's proposed revisions in the Proposed Final Permit respecting miscertification are required to protect human health and the environment. *See generally* AR No. F (Introduction-2); Tr. 2002 (D. Reade), 3585-86 (D. Hancock);

#### Access to the WWIS

213. The WIPP Waste Information System ("WWIS") is an electronic database that contains information and data related to the characterization, certification and shipment of waste destined for storage and disposal at WIPP. RP No. 36 (comment 266, pg. 20).

214. The WWIS is the primary vehicle for transmitting waste characterization

information and for conducting container-by-container review of waste characterization data. *Id.*

215. The WWIS contains records and results of waste analyses that are necessary to determine whether the Applicants are complying with the requirements of the Permit. Tr. 2387 (S. Zappe); RP. No. 130 (WIPP Waste Information System, pgs. 2-3).

216. The permit application provides that most waste characterization activities will be performed at out-of-state locations, where the original data is maintained and will be electronically input into the WWIS. RP. No. 130 (WIPP Waste Information System, pg. 3).

217. Applicants have not proposed to perform confirmatory "fingerprint" analysis of incoming waste shipments at WIPP. *Id.* at pg. 2; Tr. 692 (K. Hunter).

218. If NMED does not have access to the WWIS in accordance with Permit Condition II.C.1.g, NMED would be required to travel out-of-state to review original data of waste analysis results to ensure compliance with the WAP. Tr. 2391 (S. Zappe); RP. No. 130 (WIPP Waste Information System, pg. 3).

219. After considering Applicants' comment, RP No. 15 (comment 192, pgs. 115-16), expressing a preference to segregate information concerning the location of disposed waste containers, NMED proposed to revise the Revised Draft Permit with the following modifications indicated in underscore/strikeout:

This report will be added to the operating record as an indication of the quantities of waste, date of emplacement, and location of authorized containers or container assemblies in the repository. The Permittees will document the specific panel room or drift that an individual waste container is placed in as well as the row/column/height coordinates location of the container or containers assembly. This report will be generated on a weekly basis. Locations of containers or container assemblies will also be placed on a map separate from the WWIS. Reports and maps that are included as part of the operating record will be retained at the ~~generator/storage~~ WIPP site, for the life of the facility.

Proposed Final Permit of June 25, 1999 (Attachment B, pg. B26).

220. After considering Applicants' comment, RP No. 15 (comment 194, pgs. 118-20), expressing a preference to delete certain data fields, NMED also proposed to revise Table B-8 of the Revised Draft Permit. Proposed Final Permit of June 25, 1999 (Attachment B, Table B-8).

221. Applicants have requested that the permit restrict NMED access to WWIS to "Remote Site Query" but have not articulated a reasonable justification for the requested restriction. RP No. 15 (comment 223, pg. 175); RP No. 36 (comment 266, pg.21).

#### Composite Sampling

222. Applicable hazardous waste regulations require analysis of a representative waste sample in accordance with 20 NMAC 4.1.200 (incorporating 40 C.F.R. Part 261, Appendix I). 20 NMAC 4.1.500 (incorporating 40 C.F.R. §264.13(a)(1))

223. Permit Condition II.C.1.b (incorporating Attachment B1) requires the collection of cores from soil/gravel and solid TRU-mixed waste for sample preparation and analysis. AR No. 981134 (Revised Draft Permit); Proposed Final Permit of June 25, 1999 (Module II.C.1.b, Attachment B1-2a).

224. For analyses of Volatile Organic Compounds ("VOCs"), the Applicants are required to either (a) collect three sub-samples from the vertical axis of the sample core, place the sub-samples in a single sample container, and prepare and analyze that sample, or (b) may collect a representative core subsection provided the appropriate SW-846 sample preparation methods and containers are used. Module II.C.1.b (citing USEPA Publication SW-846), Attachment B1-2a(2); RP 130 (Composite Sampling).

225. Applicants may "composite" the sub-samples in a single VOC container for



analysis. *Id.*

226. NMED authorized the Applicants to collect samples for semi-volatile, polychlorinated biphenyl, and analyses of metals, using the same methodology, or by compositing a representative subsection of the core. *Id.*

227. The objective of the permit condition requiring the collection of three sub-samples for VOC analysis is to increase the representativeness of the sampling process, eliminate inconsistencies in the Applicants' proposed sampling approach for non-VOC analyses, and create equivalency in the sampling design between VOC and other core sample analyses. *Id.*

228. Composite sampling is a commonly used sampling technique by which multiple, random sub-samples of a targeted media are combined to form a single sample of manageable size for analysis. Compositing is desirable because the resulting composite sample is more representative of the chemical characteristics of the entire core than a single, small sample collected randomly along the core. NMED's proposed VOC sample collection process is similar to "classic" composite sampling because a number of samples are collected to form a single sample. *Id.*

229. NMED's proposed permit condition regarding the analysis of VOCs provides a reasonable VOC sampling approach that is consistent with USEPA guidance regarding soil/gravel and solid matrix sampling for VOCs, and maximizes the representativeness of the sampling process while minimizing worker exposure and the loss of VOCs from the sample. *Id.*

230. After considering public comment, NMED proposes to revise the Revised Draft Permit to allow Applicants to use any sample container that conforms to the specifications for SW-846 Test Methods for VOC soil samples. Several applicable SW-846 Test Methods do not

preclude the collection of a representative core subsection, provided the appropriate SW-846 sample preparation methods and containers are used. Accordingly, NMED proposes to allow the use of containers other than 40 milliliter vials, provided that these containers do not prevent the application of the SW-846 Test Methods. *Id.*; Proposed Final Permit of June 25, 1999, Module II.2.C.1.b., Attachment B1-2a(2).

231. Careful collection and preparation of composited samples will not bias the VOC analyses. VOC loss should be minimal and any volatile loss during sample collection would be offset by the use of heated purge-and-traps methods that minimize VOC loss during the analytical process. *Id.*

232. The composite sampling requirement would not impose significant additional costs or sampling delays. The time required to collect three sub-samples, rather than a single sample, is minimal compared to the other tasks associated with core sampling. *Id.*

#### Financial Assurance

233. On April 28, 1997, and September 24, 1997, NMED notified Applicants that WID was required to comply with the financial assurance requirements under 20 NMAC 4.1.500 (incorporating 40 C.F.R. Part 264, Subpart H, §§264.140 *et seq.*) and requested cost estimates for financial assurance in accordance with 20 NMAC 4.1.900 (incorporating 40 C.F.R. §270.14(b)(15),(16),(17). AR No. 970930.

234. On November 19, 1997, Applicants submitted the requested cost estimates. AR No. 971114.

235. On January 5, 1998, NMED issued the completeness determination for Applicants' RCRA Part B permit application (Revision 6.5). AR No. 980102.

236. The approved financial assurance cost estimates are \$2,018,966.00 for partial closure; \$9,840,679.00 for contingency closure; \$80,263,644.00 for final closure; and \$18,800,615.00 for post closure. Revised Draft Permit (Attachment K, Table K1, K2).

237. Applicants proposed that financial assurance be provided in the form of DOE indemnifying WID, or any successor, for closure and post-closure costs and by WID providing a declaration of self-insurance. RP No. 36 (Comment 179); *See also* Tr. 2423 (S. Zappe).

238. The alternative mechanisms proposed by Applicants are inadequate to provide financial assurance for closure and post-closure costs in order to protect human health and the environment.<sup>18</sup> Tr. 2419-22 (S. Zappe).

239. Because WID is a private corporation, AR No. 981134, and not a state or federal government entity, NMED imposed financial assurance requirements upon WID under Module II.N, II.O, II.P, II.Q. Tr. 2392-93 (S. Zappe).

240. DOE has previously invoked the Anti-Deficiency Act with respect to clean-up obligations under state environmental laws. Tr. 2407-11 (S. Zappe).

#### Tentatively Identified Compounds

241. Permit Condition II.C.4 of the Revised Draft Permit prohibits the management, storage or disposal at WIPP of any TRU mixed waste with corresponding hazardous waste codes not listed in the Applicants' Part A permit application and in Module II, Table II.C.4. AR No. 981134.

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<sup>18</sup> These proposed mechanisms may also be void as a matter of state law. *See generally* NMED's Memorandum of Law, pgs. 12-14.

242. Permit Condition II.C.3.k of the Revised Draft Permit prohibits the management, storage or disposal at WIPP of any waste unless the waste container is preceded by a corresponding Waste Stream Profile Form containing the appropriate USEPA hazardous waste codes applicable to the waste stream. *Id.* (Attachment B-1d).

243. A tentatively identified compound (“TIC”) is a compound identified through Volatile Organic Compound (“VOC”) or Semi-Volatile Compound (“SVOC”) analytical processes, such as Gas Chromatography/Mass Spectrometry (“GC/MS”), that is not included on the list of hazardous waste codes or the list of target analytes submitted in the Applicants’ Part A permit application. RP No. 130 (Tentatively Identified Compounds, pg. 1).

244. The target analyte list consists of expected hazardous constituents from the hazardous waste codes provided in the Part A permit application and compounds found in the calibration standards used to calibrate VOC/SVOC analytical instruments. The target analyte list is identified in Permit Attachment B3, Tables B3-2, B3-4, and B3-6. *Id.*

245. TICs are indicators of hazardous waste not previously identified in the Applicants’ list of hazardous waste codes for a specific waste stream. *Id.* at pg. 3.

246. TICs are indicators of hazardous waste not previously identified through acceptable knowledge. *Id.* at pgs. 3-4.

247. The TIC requirements proposed by Applicants in the Part B permit application (AR. No. X) were deficient because they were inconsistent with USEPA SW-846 TIC reporting criteria; posed a risk that significant TICs would not be reported or added to target analyte lists; failed to require reporting for significant TICs not included in the Appendix IX list; and failed to provide a mechanism for ensuring that TICs found in twenty-five percent of a waste stream

would be added to the target analyte lists. *Id.* at pg. 6.

248. In response to said deficiencies, and after considering public comment, NMED proposed certain permit conditions respecting TICs in the Revised Draft Permit including the following:

In accordance with EPA convention, identification of hazardous constituents detected by gas chromatography/mass spectrometry methods that are not on the list of target analytes shall be reported. These compounds are reported as tentatively identified compounds (TICs) in the analytical batch data report and shall be added to the target analyte list if detected in a given waste stream, if they appear in the 20 NMAC 4.1.200 (incorporating 40 C.F.R. §261) Appendix VIII, and are detected in 25% of the samples from a given waste stream.

AR No. 981134 (Attachment B-3a(1)).

In accordance with SW-846 convention, identification of compounds detected by gas chromatography/mass spectrometry methods that are not on the list of target analytes shall be reported. Headspace gas, volatile analysis (TCLP/Totals), and semi-volatile (TCLP/Totals) shall be subject to tentatively identified compound (TIC) reporting. These TICs are identified in accordance with the following SW-846 criteria:

Relative intensities of major ions in the reference spectrum (ions greater than 10% of the most abundant ion) must be present in the sample spectrum.

The relative intensities of the major ions must agree within  $\pm 20$  percent.

Molecular ions present in the reference spectrum must be present in the sample spectrum.

Ions present in the sample spectrum but not in the reference spectrum should be reviewed for possible background contamination or presence of coeluting compounds.

Ions present in the reference spectrum but not in the sample spectrum should be reviewed for possible subtraction from the sample spectrum because of background contamination or coeluting peaks.

TICs that meet the SW-846 identification criteria, are detected in 25 percent of all samples from a given waste stream, and that appear in the 20 NMAC 4.1.200

(incorporating 40 C.F.R. §261) Appendix VIII list, will be compared to acceptable knowledge data to determine if the TIC is a listed waste in the waste stream. TICs may be excluded from the target analyte list for a waste stream if the TIC is a constituent in an F-listed waste whose presence is attributable to waste packaging materials or radiolytic degradation from acceptable knowledge documentation. If a listed waste constituent TIC cannot be attributed to waste packaging materials, radiolysis, or other origins, the constituent will be added to the target analyte list and new hazardous waste codes will be assigned, if appropriate. TICs subject to inclusion on the target analyte list that are toxicity characteristic parameters shall be added to the target analyte list regardless of origin because the hazardous waste designation for these codes is not based on source. However, for toxicity characteristic and non-toxic F003 constituents, the site may take concentration into account when assessing whether to add a hazardous waste code. If a target analyte list for a waste stream is expanded due to the presence of TICs, all samples collected from that waste stream will be analyzed for constituents on the expanded list.

*Id.* (Attachment B3-1).

249. In response to comments from LANL and INEE respecting the Revised Draft Permit, NMED proposes revisions in the Proposed Final Permit as indicated in underscore/strikeout as follows:

Every TRU mixed waste container will be sampled and analyzed to determine the concentrations of VOCs (presented in Table B-3) in headspace gases. Sampling protocols, equipment, and QA/QC methods for headspace-gas sampling are provided in Permit Attachment B1. In accordance with EPA convention, identification of hazardous constituents detected by gas chromatography/mass spectrometry methods that are not on the list of target analytes shall be reported. These compounds are reported as tentatively identified compounds (TICs) in the analytical batch data report and shall be added to the target analyte list if detected in a given waste stream, if they appear in the 20 NMAC 4.1.200 (incorporating 40 C.F.R. §261) Appendix VIII, and if they are detected in 25% of the samples from a given waste stream. The headspace gas analysis method Quality Assurance Objectives (QAOs) are specified in Permit Attachment B3.

Proposed Final Permit (Attachment B-3a(1)).

In accordance with SW-846 convention, identification of compounds detected by gas chromatography/mass spectrometry methods that are not on the list of target analytes shall be reported. Headspace gas, volatile analysis (TCLP/Totals), and semi-volatile (TCLP/Totals) shall be subject to tentatively identified compound

(TIC) reporting. These TICs for GC/MS Methods are identified in accordance with the following SW-846 criteria:

Relative intensities of major ions in the reference spectrum (ions greater than 10% of the most abundant ion) must be present in the sample spectrum.

The relative intensities of the major ions must agree within  $\pm 20$  percent.

Molecular ions present in the reference spectrum must be present in the sample spectrum

Ions present in the sample spectrum but not in the reference spectrum should be reviewed for possible background contamination or presence of coeluting compounds

Ions present in the reference spectrum but not in the sample spectrum should be reviewed for possible subtraction from the sample spectrum because of background contamination or coeluting peaks.

TICs for headspace gas analyses that are performed through FTIR analyses shall be identified in accordance with the specifications of SW-846 Method 8410.

TICs that meet the SW-846 identification criteria, are detected in 25 percent of all samples from a given waste stream, and that appear in the 20 NMAC 4.1.200 (incorporating 40 C.F.R. §261) Appendix VIII list, will be compared to acceptable knowledge data to determine if the TIC is a listed waste in the waste stream. TICs identified through headspace gas analyses that meet the Appendix VIII list criteria and the 25 percent identification criteria for a waste stream will be added to the headspace gas waste stream target list regardless of the hazardous waste listing associated with the waste stream. TICs reported from the Totals VOC or SVOC analyses may be excluded from the target analyte list for a waste stream if the TIC is a constituent in an F-listed waste whose presence is attributable to waste packaging materials or radiolytic degradation from acceptable knowledge documentation. If a listed waste constituent TIC cannot be attributed to waste packaging materials, radiolysis, or other origins, the constituent will be added to the target analyte list and new hazardous waste codes will be assigned, if appropriate. TICs subject to inclusion on the target analyte list that are toxicity characteristic parameters shall be added to the target analyte list regardless of origin because the hazardous waste designation for these codes is not based on source. However, for toxicity characteristic and non-toxic F003 constituents, the site may take concentration into account when assessing whether to add a hazardous waste code. If a target analyte list for a waste stream is

expanded due to the presence of TICs, all samples collected from that waste stream will be analyzed for constituents on the expanded list.

Proposed Final Permit (Attachment B3).

250. The Applicants submitted the following comments regarding TICs:
- a. TICs should be reported only if they satisfy the minimum identification requirements specified in the SW-846 Methods and, consistent with the Comprehensive Environmental Response, Cleanup and Liability Act Contractor Laboratory Program (CERCLA CLP) criteria, to a maximum of 20 GC/MS semi-volatile compounds, 10 volatile GC/MS compounds, and 5 Fourier Transform Infrared Spectroscopy compounds (applicable to headspace gas VOC analyses only).
  - b. The permit should not require the addition of a TIC to the target analyte list for a method if the TIC were detected in the original and confirmatory samples.
  - c. A TIC should only be added if found in more than 25% of the samples.
  - d. TICs should not be added to the target analyte list if found on the Appendix VIII list provided in 20 NMAC 4.1.200 (incorporating 40 C.F.R. §261).

RP Nos. 15,36 (comment 188 – resubmitting comment 27).

251. The comment respecting Fourier Transform Infrared Spectroscopy (FTIR) analysis was adopted and proposed in the Final Permit on the basis that the methodology for GC/MS does not apply to FTIR. The applicable method for FTIR is SW-846 Method 8410. *See* NMED's Proposed Finding of Facts (Tentatively Identified Compounds, #37).

252. The CERCLA CLP Statement of Work (EPA, OLMO 3.2 revision) limits are inappropriate for use in identifying TICs under the Hazardous Waste Act because the CLP statement of work arbitrarily limits the number of compounds identified to 10 volatile organic compounds and 20 semi-volatile organic compounds of greatest concentration which are not system monitoring compounds and are not listed on the Target Compound List. The arbitrary nature of the CLP limitations might exclude significant TICs from target analyte lists and CLP



criteria were prepared for a completely different regulatory scheme (CERCLA). The only chemical analyses specified for use under RCRA are SW-846 methods. RP No. 130 (Tentatively Identified Compounds, pg. 7); 20 NMAC 4.1.200 (incorporating C.F.R. §261, Appendix III).

253. Comments regarding the use of the Appendix IX list specified in 20 NMAC 4.1.500 (incorporating C.F.R. §264) were not incorporated into the Proposed Final Permit because the Appendix IX list is applicable to groundwater monitoring and is not applicable to TIC identification, and because the Appendix IX list is a sublist of Appendix VIII and does not include all possible constituents. RP NO. 130 (Tentatively Identified Compounds, pg. 7).

#### TRU Non-Mixed Waste

254. As described in the permit application, TRU mixed waste will be disposed in discrete “underground hazardous waste management units” consisting of eight panels, each containing seven rooms and two access drifts, mined in a salt bed. Each panel, including panel 1, is a proposed HWA regulated unit under the permit application. AR No. X (Permit Application, Chapter B, pg. B9); RP No. 130 (Non-Mixed Waste, pg. 2). In the HWA permit, each panel is considered an underground hazardous waste disposal unit (“HWDU”). *See, e.g.*, Proposed Final Permit of June 25, 1999, Module IV.A.1.

255. The permit application contains a waste characterization plan representing that Applicants would manage and characterize all TRU waste as if it were “mixed waste.” AR No. X (Permit Application, Chapter A, page A5); Tr. 2446-47 (S. Zappe); RP No. 130 (Non-Mixed Waste, pgs. 1-2).

256. Applicants’ representation in the permit application is consistent with subsequent correspondence. Tr. 2449-50 (S. Zappe, quoting a letter of February 14, 1994, from a

DOE official: “I want to clarify for you that the DOE has no plans or intentions of disposing of any waste (neither hazardous, radioactive nor mixed) in the WIPP prior to the receipt of a RCRA Part B Disposal Phase Permit.”); Tr. 3554 (D. Hancock, quoting from a DOE letter to Don Hancock).

257. The permit application and WAP, submitted by Applicants, did not propose to segregate TRU waste based upon its characterization as “non-mixed” or “mixed” waste in any proposed HWA-regulated unit or units that are not part of the permit application. The application did not propose that non-mixed wastes would be disposed in proposed HWA-regulated units *prior* to permit issuance. Tr. 2448-49 (S. Zappe).

258. NMED approved Applicants’ permit application and WAP in the Draft Permit and Revised Draft Permit based upon Applicants’ commitment to manage and characterize all TRU waste as “mixed waste” in the WIPP “underground hazardous waste management units.” RP No. 130 (Non-Mixed Waste, pg. 3). This was a “critical commitment that was key to all of the assumptions used by NMED in developing a draft permit.” Tr. 2455 (S. Zappe).

259. After issuance of the Draft Permit of May 15, 1998, and during the public comment period, the Applicants informed NMED that it determined to manage and dispose TRU “non-mixed” waste from LANL (TA-55-43), and possibly waste from other generator sites, prior to receipt of a RCRA Part B Disposal Phase permit. RP No. 130 (Non-Mixed Waste, Attachment 4, Letter dated May 18, 1998, from DOE Deputy Counsel to NMED Secretary); Tr. 2451, 53 (S. Zappe).

260. After consideration of public comment, NMED determined to impose Permit Condition IV.B.2.b in the Revised Draft Permit to prohibit the disposal of TRU non-mixed waste

in any unit unless such waste is characterized in a manner identical to the requirements of the WAP. RP No. 130 (Non-Mixed Waste, pg. 1); Tr. 2453-54 (S. Zappe).

261. NMED proposed certain revisions to Permit Condition IV.B.2.b in the Proposed Final Permit of June 25, 1999. The term “any unit” was changed to “any Underground HWDU”, and language was added prohibiting disposal of “TRU mixed waste in any Underground HWDU if the Underground HWDU contains non-mixed TRU waste not characterized in accordance with the requirements of the WAP.” Proposed Final Permit of June 25, 1999; RP No. 130 (Non-Mixed Waste, pg.1); Tr. 2424-27 (S. Zappe).

262. The disposal of significant quantities of waste that has not been characterized in accordance with the WAP poses a direct threat to human health and the environment. Indeed, waste characterization is “the linchpin” of the HWA and RCRA. RP No. 130 (Non-Mixed Waste, pgs. 4-5); Tr. 2426-28 (S. Zappe).

263. If TRU non-mixed waste is not characterized according to the processes set forth in the permit, including radiography, visual examination, solids sampling, and analyses for Summary Waste Categories Groups S3000 and S4000, NMED can not confirm that the waste is not “hazardous” or otherwise prohibited in violation of the permit. Tr. 2433 (S. Zappe), 2707 (C. Walker).

264. If Applicants are not required to meet data management and quality assurance requirements for TRU non-mixed waste, NMED can not confirm that Applicants will properly evaluate characterization data or properly characterize waste. Tr. 2433 (S. Zappe); RP No. 139 (Non-Mixed Waste, pg. 6).

265. After waste is disposed at WIPP, it is not possible for NMED to distinguish

between TRU non-mixed and mixed waste containers. Tr. 2441 (S. Zappe).

266. The permit application recites that VOCs may be generated that threaten and adversely affect human health and the environment from TRU non-mixed and mixed waste containers. RP No. 130 (Non-Mixed Waste, pgs. 4-5 and VOC Concentration Limits, pgs. 6-14); Tr. 2430-31 (S. Zappe), 2705-06 (C. Walker).

267. The permit application recites that 6 of the 13 VOCs expected to be present in TRU waste would contain carcinogenic compounds which are harmful to human health and the environment; the application does not distinguish between mixed and TRU non-mixed waste containers. Tr. 2429-30 (S. Zappe). *See also* RP No. 130 (VOC Concentration Limits, pgs. 6-14).

268. The average concentration of VOCs in headspace gas of TRU waste containers (mixed and non-mixed) in a HWDU room must be limited to protect human health and the environment. RP No. 130 (Non-Mixed Waste, pg. 4).

269. Radiolysis of plastics in non-mixed waste may generate VOCs. Tr. 2704 (C. Walker); RP No. 130 (Non-Mixed Waste, pgs. 4-5).

270. If both TRU mixed and non-mixed waste are not characterized and data reported for the presence of VOCs in the headspace gas of non-mixed waste containers, no mechanism would exist to allocate respective VOC contributions (nor relative contributions from HWA regulated units) and NMED would lack sufficient information to ensure that the requirements of the HWA or RCRA were met. Tr. 2431 (S. Zappe).

271. Without data from properly characterized TRU non-mixed waste containers, there is no mechanism for requiring the Applicants to take remedial action under the permit because NMED could not ascertain the source of the VOC limit violation. RP No. 130 (Non-Mixed

Waste, pg. 7).

272. If Applicants had informed NMED that they intended to dispose TRU non-mixed waste prior to permit issuance, NMED may have requested additional information regarding the following: (a) whether the non-mixed waste would be disposed in underground HWDUs or HWA-regulated units, or be segregated; (b) the characterization methodology; (c) the quantity of non-mixed waste; (d) the possible emissions of VOCs from WIPP by non-mixed waste; and (e) the regulatory authority by which disposal would occur. RP No. 130 (Non-Mixed Waste, pg. 8); Tr. 2449, 51 (S. Zappe)

#### Confirmatory VOC Monitoring Program

273. Permit Condition IV.F.2.a provides that a “Confirmatory VOC Monitoring Plan” shall be implemented as specified in Permit Attachment N and as required by 20 NMAC 4.1.500 (incorporating 40 C.F.R. §264.601(c) and §264.602.<sup>19</sup> Proposed Final Permit, Module IV.F.2.a.

274. The VOC Monitoring Program is required to confirm compliance with the environmental performance standard for the Underground HWDUs and to provide a mechanism for implementing remedial action in the event of noncompliance. RP No. 130 (VOC Monitoring Program); Tr. 2917, 21 (D. Walker).

275. The waste containers that will be disposed in the Underground HWDUs may

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<sup>19</sup> 40 C.F.R. § 264.601 provides in pertinent part:

A miscellaneous unit must be located, designed, constructed, operated, maintained, and closed in a manner that will ensure protection of human health and the environment. Permits for miscellaneous units are to contain such terms and provisions as necessary to protect human health and the environment, including, but not limited to ... detection and monitoring requirements, and requirements for responses to releases of hazardous waste or hazardous constituents from the unit . . . Protection of human health and the environment includes, but is not limited to . . .

(c) Prevention of any release that may have adverse effects on human health and the environment due to migration of waste constituents in the air.

40 C.F.R. § 264.602 provides:

Monitoring, testing, analytical data, inspections, response, and reporting procedures and frequencies must ensure compliance with §§264.601 . . . as well as meet any additional requirements needed to protect human health and the environment as specified in the permit.

contain VOCs in the vapor state within the headspace of the containers, which will diffuse across filter vents, enter the air in an Underground HWDU, become entrained in the exhaust air, and migrate through the mine ventilation system to the atmosphere at the outlet of the mine ventilation exhaust shaft. RP No. 130 (VOC Monitoring Program); Tr. 2923-24 (D. Walker).

276. NMED specified the environmental performance standards for the prevention of a VOC release to the ambient air. Assuming a minimum running annual average mine ventilation rate of 260,000 standard cubic feet per minute (“scfm”), the total individual risk associated with exposures to VOCs in the exhaust air from the WIPP repository may not exceed the acceptable risk levels specified as follows: (a) for a resident living at the WIPP site boundary, a total individual risk from exposure to carcinogens and potential carcinogens of one in one million ( $10^{-6}$ ); (b) for a WIPP non-waste surface worker, a total individual cancer risk from exposure to carcinogens and potential carcinogens of one in one hundred thousand ( $10^{-5}$ ); and (c) for a resident living at the WIPP site boundary and a WIPP non-waste surface worker, a hazard index from exposure to non-carcinogens of less than one. RP No. 130 (VOC Concentration Limits); Tr. 2918-20 (D. Walker).

277. In prescribing the environmental performance standard for WIPP workers, NMED reasonably balanced several factors as follow: (a) WIPP workers, particularly non-waste surface workers, are the human receptors potentially receiving the largest chronic exposure to VOCs emitted by the WIPP; (b) WIPP workers may be stationed in the exhaust shaft area; (c) WIPP workers may include persons at greater risk due to age, disability, or medical condition; (d) WIPP workers might be exposed to elevated VOC concentrations resulting from a roof fall in an Underground HWDU; (e) Applicants did not propose to use personal protection equipment, such

as self-contained breathing apparatus, in the Underground HWDUs; (f) Applicants could exert control over worker occupational exposures; (g) WIPP workers are covered by the OSHA occupational exposure standards and health and safety regulations of the Mine Safety and Health Administration (MSHA); (h) WIPP workers would not be exposed as long as residents living at the WIPP site boundary (approximately 10 years versus 35 years); and (i) occupational exposures typically are not evaluated in facility risk assessments. RP, NMED's Exhibit A (VOC Concentration Limits); Tr. 2929-33, 2983-84. (D. Walker).

278. NMED reasonably established VOC Room-Based Concentration Limits (VOC limits) for 9 VOCs because they represent approximately 99% of the risk due to air emissions from the Underground HWDUs. RP No. 130 (VOC Concentration Limits); Proposed Final Permit, Tables IV.D.1 and IV.F.2.c; Tr. 2918 (D. Walker).

279. Using most of Applicants' proffered assumptions, NMED determined reasonable VOC limits, equations, methodology, and models, but, NMED reasonably (a) decreased the minimum mine ventilation rate (425,000 scfm to 260,000 scfm); and (b) changed the Reference Concentration (RfC) for 1,1,1-trichloroethane to a compound-specific value. RP No. 130 (VOC Concentration Limits). Tr. 2931-32 (D. Walker).

280. NMED calculated the VOC limits by reasonably (a) apportioning the total carcinogenic risk for the WIPP non-waste worker equally between the carcinogenic VOCs; (b) apportioning the total non-carcinogenic hazard quotient for the WIPP non-waste worker equally between the non- carcinogenic VOCs; (c) back-calculating an initial set of values; (d) revising the values to reflect their Lower Explosive Limits (LELs) and Immediately Dangerous to Life and Health (IDLH) Levels, and lower values requested by the Applicants; (e) revising the values

to reflect a correction in the equation used to calculate VOC concentrations in the closed room accident scenario; and (f) readjusting the values to reflect equal apportionment of carcinogenic risk and hazard quotient. RP No. 130 (VOC Concentration Limits); Tr. 2933-42 (D. Walker).

281. Because a closed disposal room is isolated from the mine ventilation system, VOCs present in the headspace will diffuse through container filters, but not be removed by mine ventilation air. Consequently VOC concentration may attain equilibrium at the approximate average concentration in the containers. Friction produced by a roof fall in a closed disposal room could cause gas ignition and explosion. RP No. 130 (VOC Concentration Limits); Tr. 2934-35 (D. Walker).

282. The probability of a roof fall in Panel 1 ranges from one in one hundred ( $10^{-2}$ ) to one in ten thousand ( $10^{-4}$ ). Accordingly, it is reasonable to impose VOC limits on each disposal room. The VOC limits based on IDLH levels are appropriate given the unique character and potential hazards of underground geological repositories, such as enclosed disposal operations and roof falls. RP No. 130 (VOC Concentration Limits); Tr. 2936-40, 2978-80 (D. Walker).

283. The VOC Monitoring Program requires the Applicants to collect air samples from two monitoring stations, VOC-A and VOC-B, located in the E-300 drift. At Monitoring Station VOC-A, located downstream of Panel 1, the Applicants measure the VOC concentrations in the mine ventilation exhaust air (*e.g.*, VOC concentrations attributable to open and closed panels containing CH TRU mixed waste). Station VOC-A will remain at the same location during the term of the permit because the exhaust air from the three Underground HWDUs currently authorized for waste disposal will flow past this station. At Monitoring Station VOC-B, located upstream of the open panel, the Applicants measure background VOC concentrations (*e.g.*,



attributable to upstream sources). RP No. 130 (VOC Concentration Limits); Tr. 2944-46 (D. Walker).

284. The VOC Monitoring Program requires the Applicants to begin VOC sampling at Monitoring Stations VOC-A and VOC-B within 30 calendar days of permit issuance, and to continue sampling until the certified closure of all Underground HWDUs. These requirements are reasonable and necessary based upon the following: (a) the Applicants must confirm compliance with the environmental performance standard until the end of WIPP's operational period; (b) the Applicants must confirm the assumptions underlying the VOC limits including assumptions regarding expected emissions from closed panels; and (c) the Applicants must monitor VOC emissions due to waste radiolysis during the disposal phase. RP No. 130 (VOC Monitoring Program); Tr. 2946-47 (D. Walker).

285. The VOC Monitoring Program requires the Applicants to sample at least two times per week at Monitoring Stations VOC-A and VOC-B. This frequency of sampling is reasonable and adequate because the physical conditions in the disposal rooms are not expected to change rapidly and the sample results would be representative of the incremental increase in waste disposed in the room. Moreover, because the environmental performance standards are based upon long-term average exposures, minor variations in the VOC concentrations emitted from an Underground HWDU are not significant. RP No. 130 (VOC Monitoring Program); Tr. 2948 (D. Walker).

286. The VOC Monitoring Program requires the Applicants to use a VOC sampling method based on the concept of pressurized sample collection, as specified in USEPA Compendium Method TO-14. The TO-14 sampling concept uses 6-liter SUMMA® passivated

stainless-steel canisters to collect integrated air samples at each sample location. The samples will be analyzed using GC/MS under an established quality assurance and control program. Laboratory analytical procedures have been developed based on the concepts contained in both USEPA Compendium TO-14 and the draft USEPA Contract Laboratory Program - Statement of Work (CLP-SOW) for Volatile Organics Analysis of Ambient Air in Canisters. These procedures are reasonable because the USEPA Compendium TO-14 method is an USEPA-recognized sampling concept for VOC sampling and speciation. It can be used to provide integrated samples, or grab samples, and compound quantitation for a broad range of concentrations. The canister sampling system and GC/MS analytical methods are particularly appropriate because a relatively large sample volume is collected, and multiple dilutions and re-analyses can be performed to ensure identification and quantification of target VOCs within the working range of the method. Low VOC concentrations can be measured, because the contract-required quantitation limits proposed by the USEPA in the CLP-SOW are 5 parts per billion by volume (“ppbv”), or less, for the nine target compounds. RP No. 130 (VOC Monitoring Program); Tr. 2948-50 (D. Walker).

287. The VOC Monitoring Program requires the Applicants to collect a VOC sample from each monitoring station on designated sample days, validate the laboratory analytical data, and evaluate whether the VOC emissions exceed the specified Concentrations of Concern (“COC”). RP No. 130 (VOC Monitoring Program); Tr. 2967, 2971-72. (D. Walker).

288. COCs are used to determine compliance with the VOC limits because VOC concentrations measured at Monitoring Station VOC-A cannot be directly compared with the VOC limits. NMED derived the COCs by multiplying the target exhaust shaft concentration for

each VOC by the ratio of the overall mine ventilation rate (260,000 scfm) and the mine ventilation rate through the E-300 drift (130,000 scfm). The ratio is appropriate because there is a direct relationship between (a) the actual average VOC concentrations in the headspace of containers in an Underground HWDU and the expected target VOC concentrations at the exhaust shaft outlet, and (b) the expected VOC concentrations at the exhaust shaft outlet and the COCs at Monitoring Station VOC-A. If the VOC concentrations measured at Monitoring Station VOC-A (e.g., the difference between the VOC concentrations measured at Monitoring Stations VOC-A and VOC-B) are below the COCs, NMED can determine whether the Applicants are complying with the VOC limits and the assumptions underlying the VOC limits are accurate. RP No. 130 (VOC Monitoring Program); Tr. 2972-74 (D. Walker).

289. Although NMED calculated the COCs using the permitted mine ventilation rate of 260,000 scfm and the expected flow rate at Monitoring Station VOC-A of 130,000 scfm, these rates may vary at the time of sampling. Therefore, the Applicants must measure and record these rates during each sampling event. Additionally, the Applicants must measure and record the temperature and pressure during each sampling event for conversion to standard flow rates. RP No. 130 (VOC Monitoring Program); Tr. 2967-71 (D. Walker).

290. Applicants shall use analytical data collected under typical mine ventilation flow rate conditions without further manipulation. Applicants shall subtract the concentration of each target VOC detected at Monitoring Station VOC-B from the concentration detected at Monitoring Station VOC-A. The resulting VOC concentration represents the concentration of VOCs being emitted from the open and closed Underground HWDUs upstream of Station VOC-A. RP No. 130 (VOC Monitoring Program); Tr. 2967-71 (D. Walker).

291. Applicants are required to “normalize” analytical data if collected under atypical mine ventilation flow rate conditions. Analytical data collected under such conditions must be normalized because variation in these conditions significantly affects the measurable VOC concentrations. Applicants shall subtract the normalized concentration of each target VOC detected at Monitoring Station VOC-B from the normalized concentration detected at Monitoring Station VOC-A. The resulting VOC concentration represents the concentration of VOCs being emitted from the open and closed Underground HWDUs upstream of Station VOC-A. *Id.*

292. Applicants must compare the calculated VOC emission concentration (*e.g.*, the difference between Monitoring Stations VOC-A and VOC-B) directly to the relevant COC. If the value exceeds the COC, Applicants must notify the Secretary in writing, within 5 working days of obtaining validated analytical results. RP No. 130 (VOC Monitoring Program); Tr. 2974-75 (D. Walker).

293. Applicants must calculate the running annual average concentration for each target VOC by averaging the calculated VOC emission concentration (*e.g.*, the difference between Monitoring Stations VOC-A and VOC-B) for each air-sampling event with the data collected during the previous twelve months. If this value exceeds the COC, Applicants must notify the Secretary in writing, within 5 working days. Additionally, Applicants must undertake remedial action, including the cessation of disposal in the active disposal room and the installation of ventilation barriers. If this value exceeds the COC for 6 consecutive months, the Applicants must close the affected Underground HWDU. Should VOC concentrations exceed the COCs, these requirements provide the sole mechanisms to prevent harm to human health and

the environment. RP No. 130 (VOC Monitoring Program); Tr. 2975-76 (D. Walker).

294. A minimum mine ventilation exhaust rate is required because of the direct relationship between the rate and VOC concentrations at the exhaust shaft outlet. A significant decrease in this rate would cause an increase in VOC concentrations at the exhaust shaft outlet, potentially causing a violation of the environmental performance standard. RP No. 130 (Mine Ventilation Rates); Tr. 2988 (D. Walker).

295. The minimum active room ventilation rate, prescribed in Condition IV.E.3.c of the Revised Draft Permit, is reasonable and appropriate. However, the minimum mine exhaust ventilation rates do not provide sufficient flexibility for the safe and efficient operation of the WIPP underground. RP No. 130 (Mine Ventilation Rates). Accordingly, NMED proposed certain revisions in the Proposed Final Permit. *See* Proposed Final Permit of June 25, 1999, Module IV.E.3.b; NMED's Response to Public Comment, Module IV, pg. 23 (June 25, 1999).

296. The minimum mine ventilation exhaust rate should be a running annual average of 260,000 scfm. This rate allows the Applicants to operate the ventilation system at lower flow rates when required for safe operation, such as during maintenance, or during events beyond Applicants' control, such as power outages. Although the minimum mine ventilation exhaust rate must be maintained, on average, to comply with the VOC limits, infrequent short term variations do not pose a threat to human health or the environment. The risk assessment used to calculate the VOC limits is based on long-term exposure. RP No. 130 (Mine Ventilation Rates); Tr. 2987-89 (D. Walker).

297. Pursuant to the schedule of compliance prescribed in the Proposed Final Permit of June 25, 1999, in order to implement the running annual average requirement, Applicants must

develop a ventilation rate monitoring plan describing the following: (a) the objective; (b) the program design; (c) the procedures; (d) equipment calibration and maintenance; (e) data evaluation, reporting and record keeping; and (f) quality assurance. Applicants must measure and record the mine ventilation exhaust rate on an hourly basis, calculate the running annual average mine ventilation exhaust rate on a monthly basis, and report the results in the Confirmatory VOC Monitoring Annual Report. The schedule of compliance is reasonable and necessary. *Id.*; Proposed Final Permit of June 25, 1999, Module IV.H.3; IV.F.2.b.

298. When workers are present in a room, a minimum active room ventilation rate of 35,000 scfm is required because the rate is based upon the direct relationship with the underground worker exposure concentration of VOCs in an open room. A decrease in the active room mine ventilation rate would cause an increase in the concentration of VOCs in an open room, possibly causing a violation of the environmental performance standard. RP. No. 130 (VOC Monitoring Program, Mine Ventilation Rates).

299. The minimum active room ventilation rate should not be a running annual average or other variable rate. The rate must ensure that during normal operations, WIPP workers will not be exposed to VOC concentrations greater than the LEL and IDLH levels. *Id.*

300. The Applicants must measure and record the active room ventilation rate on an hourly basis, record the date and time when workers are present in an active disposal room, evaluate whether the active room ventilation rate has been met on a monthly basis, and report the results in the Confirmatory VOC Monitoring Annual Report. *Id.*

#### Detection Monitoring Program

301. The "Detection Monitoring Program," prescribed under Module V.A, is necessary

to establish background ground-water quality and to monitor waste constituents and certain parameters that indicate the presence of hazardous constituents in the groundwater. RP No. 130 (Detection Monitoring Program); Proposed Final Permit of June 25, 1999.

302. The Detection Monitoring Program is necessary to detect a release that may have adverse effects on human health or the environment due to migration of waste constituents in the groundwater or subsurface environment. RP No. 130 (Detection Monitoring Program, pg. 4).

303. Applicants initially requested a waiver<sup>20</sup> from the groundwater monitoring requirement. AR Nos. J, R, and X; RP No. 130 (Detection Monitoring Program, pg. 1).

304. In a March 14, 1996 Notice of Deficiency, NMED determined the WIPP permit application was deficient because it lacked a groundwater monitoring program and failed to adequately demonstrate that hazardous constituents will not migrate beyond the point of compliance during the post-closure period. NMED could not determine whether the Applicants had based their predictions for liquid migration potential on assumptions that maximized the predicted rate of liquid migration. AR No. 960308; RP No. 130 (Detection Monitoring Program, pgs. 1-3).

305. Applicants did not challenge NMED's determinations and proceeded to develop a groundwater monitoring plan. *Id.*; RP No. 36 comment 274). *See also* Applicants' Closing Argument and Memorandum, pg. M59 (June 25, 1999).<sup>21</sup>

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<sup>20</sup> The owner or operator of a hazardous waste facility may seek a waiver from the Detection Monitoring Program requirements by demonstrating that there is no potential for migration from a regulated unit during the active life of the regulated unit and the post-closure care period. The waiver demonstration must base any predictions related to the potential for migration on assumptions that maximize the rate of liquid migration. 20 NMAC 4.1.500 (incorporating 40 C.F.R. §264.90(b)(4)).

<sup>21</sup> However, Applicants do challenge the need to monitor for gross alpha and beta radionuclides as required under Module V.D, Table V.D. *See* Applicants' Closing Argument and Memorandum, pg. M62 (June 25, 1999). The Hearing Officer finds that monitoring for these constituents *does* aid in assessing whether a release of waste constituents has occurred.

### Point of Compliance

306. The “Point of Compliance”<sup>22</sup> is the point at which the groundwater protection standard applies and at which groundwater monitoring must be conducted. 20 NMAC 4.1.500 (incorporating 40 C.F.R. §264.95(a)); RP No. 130 (Point of Compliance, pg. 1).

307. The WIPP shafts are the only reasonably foreseeable pathway for release of hazardous constituents from the repository during the operational period of the facility. RP No. 130 (Point of Compliance, pg. 3).

308. The aquifer (a water-bearing geological unit that yields suitable well water) most likely to be contaminated by an unlikely release of hazardous constituents from the repository is the Culebra Member of the Rustler Formation. By far, the Culebra is the most transmissive water-bearing unit near the site. A release of hazardous constituents to the uppermost aquifer underlying the HWDUs, the Bell Canyon Formation, is even less likely than a release to the Culebra Member. *Id.*; Tr. 104, 236-37, 334-35, 342 (R. Kehrman); 3266, 3271, 3275-76 (N. Williams). *See also Findings of Fact* (Geology and Hydrology of the WIPP Site) *supra*.

309. In response to public comments, NMED revised the Point of Compliance, as previously specified in Module V.B of the Revised Draft Permit. Revisions are reflected in underscore/strikeout as follow:

The point of compliance is the vertical surface located ~~at the hydraulically downgradient limit of the Underground HWDUs~~ perpendicular to the ground-water flow direction at the DMWs that extends to the Culebra Member of the Rustler Formation [20 NMAC 4.1.500 (incorporating 40 C.F.R. §§264.95, 264.601, and 264.602)]. The Permittees shall conduct the DMP at the DMWs specified in Table V.C.1, and as required by 20 NMAC 4.1.500 (incorporating 40 C.F.R. §§264.98 and 264.601).

Proposed Final Permit of June 25, 1999, Module V.B.

<sup>22</sup> As part of the requirement to establish a Detection Monitoring Program, a Point of Compliance must be identified. 20 NMAC 4.1.500 (incorporating 40 C.F.R. §264.95).



310. USEPA concurs with NMED's proposed Point of Compliance, which extends to the Culebra Member of the Rustler Formation, the first potential migration pathway of hazardous constituents from the repository. RP No. 130 (Point of Compliance, pgs. 1-3).

311. NMED's revised Point of Compliance ensures that Applicants will monitor groundwater quality more than one mile upgradient of the facility boundary. Consequently, NMED could detect a release of waste constituents long before groundwater contamination reaches the WIPP Site boundary. *Id.* at 4. Applicants concur with the proposed revision. *See Applicants' Closing Argument and Memorandum*, pg. M59, n. 17 (June 25, 1999).

#### Corrective Action

312. RCRA and the HWA require all permits to contain corrective action requirements for "releases of hazardous wastes or constituents." NMSA 1978, §§ 74-4-4.A.5h and 74-4-4.2.B (Repl. Pamp. 1993); 20 NMAC 4.1.500 (incorporating 40 C.F.R. §264.101).

313. USEPA defines "release" as "any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment ... including abandonment or discarding of barrels, containers and other closed receptacles containing hazardous waste or hazardous constituents." 50 FR 28713 (1985); 55 FR 30874 (1990).

314. In the Permit, "hazardous constituents" are defined as any constituent identified in 20 NMAC 4.1.200 (incorporating 40 C.F.R. §261 Appendix VIII), any constituent identified in 20 NMAC 4.1.500 (incorporating 40 C.F.R. §264 Appendix IX), any constituent identified in a hazardous waste listed in 20 NMAC 4.1.200 (incorporating 40 C.F.R. §261 Subpart D), or any constituent identified in a toxicity characteristic waste in 20 NMAC 4.1.200 (incorporating 40

C.F.R. §261.24, Table 1). RP No. 130 (Corrective Action, pg. 3-4).

315. NMED determined to impose conditions for the implementation of “Corrective Action” for Solid Waste Management Units (“SWMUs”) at WIPP. Module VII of Revised Draft Permit and Proposed Final Permit of June 25, 1999.

316. A SWMU is “any discernable unit at which solid wastes have been placed at any time ... includ[ing] any area at a facility at which solid wastes have been routinely and systematically released.” 55 FR 30874 (1990). *See also* RP No. 130 (Corrective Action, pg. 3).

317. Module VII is patterned after the USEPA Region 6 Model Hazardous and Solid Waste Amendments Permit. RP No. 130 (Corrective Action, pg. 1).

318. NMED considers a release of hazardous waste or constituents to have occurred if any of the following occur: (a) a hazardous waste or a waste containing hazardous constituents was managed directly on or within the ground surface at a SWMU (*e.g.*, an unlined landfill or surface impoundment); (b) it is known that a release of hazardous constituents from a SWMU or Area of Concern (“AOC”)<sup>23</sup> came into contact with any environmental medium (*e.g.*, a leak or spill from a SWMU or AOC contacted soil, surface water, or groundwater outside the unit); or (c) chemical analyses of samples of any environmental medium (*e.g.*, soil, surface water, groundwater, or air), collected within, adjacent to, or down gradient from a SWMU or AOC, detect organic hazardous constituents above the method detection limit, or detect inorganic hazardous constituents above background concentrations. *Id.* at 4.

319. In the permit application, Applicants identified 28 units as SWMUs. AR No. X.

320. Based upon information contained in the Administrative Record, NMED prepared

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<sup>23</sup> An AOC is any discernable unit or area that, in the opinion of the USEPA Administrator or NMED Secretary, may have received solid or hazardous waste or waste containing hazardous constituents. RP No. 130 (Corrective Action, pgs. 3-4).

a technical support document to “provide the rationale for the exclusion of SWMUs from and the inclusion of SWMUs and AOCs in Module VII of the WIPP draft and revised Draft permit.” AR No. BD. The SWMUs were identified in Module VII, Table 2, and the AOCs were identified in Table 3, of the Draft Permit and Revised Draft Permit. Draft Permit and Revised Draft Permit, Module VII, Tables 2, 3.

321. SWMUs or AOCs that required “no further action” were not identified in the permits. *Id.*

322. In the Revised Draft Permit, NMED proposed “further action” on 15 SWMUs and 8 AOCs. The 15 SWMUs consisted of 13 drilling mud pits, 1 storage yard, and 1 evaporation pond. The 8 AOCs consisted of 6 drilling mud pits and 2 mine shafts sumps. In addition, 5 TRU mixed waste management units were identified as SWMUs not requiring further action. AR No. BC (Tables 2, 2A and 3).

323. After considering public comment, NMED proposed certain revisions to Module VII of the Revised Draft Permit. Proposed Final Permit of June 25, 1999, Module VII; Technical Support Document for Module VII (June 25, 1999).

324. The proposed revisions to Module VII are reasonable and necessary. *See* NMED’s Response to Public Comment, Module VII (June 25, 1999).

#### Other Permit Conditions

325. All other conditions and provisions of Modules I through VII, including the Technical Support Document for Module VII, and attachments A through Q, of the Proposed Final Permit of June 25, 1999, are reasonable and necessary. *See generally* RP No. 130; NMED’s Proposed Findings of Fact and Conclusions of Law (June 25, 1999); Applicants’

Proposed Findings of Fact and Conclusions of Law (June 25, 1999).

## DISCUSSION

This section of the Report is not intended as an exhaustive discussion of all factual and legal issues or all proposed permit conditions. Only controverted issues deemed particularly significant shall be addressed here.

### RH TRU Waste

It is essentially uncontroverted that the RH TRU waste prohibition, manifested in Permit Condition II.C.3.h, is reasonable and supported by substantial evidence. *See, e.g.*, Applicants' Closing Argument Memorandum, pg. M6 (June 25, 1999). However, Applicants seek to begin preparing the facility for possible future receipt of RH TRU waste *in the event* a permit modification is granted by the Secretary. *Id.* To that end, Applicants desire to make certain structural changes to the RH Bay area. *Id.* NMED has adopted the position that the Proposed Final Permit implicitly prohibits Applicants from making structural changes to the RH Bay and NMED declines to revise the proposed permit to allow any structural changes. Rather, NMED would require Applicants to seek modification of the permit through public process pursuant to 20 NMAC 4.1.900 (incorporating 40 C.F.R. §§270.14(a) and 270.42, *prior* to commencing any structural modifications. *See* NMED's Proposed Findings of Fact and Conclusions of Law (June 25, 1999), Remote-Handled TRU Waste Prohibition, pgs. 8-10; RP No. 14 (Supplemental Fact Sheet, pg. 7). The Hearing Officer does not accept NMED's position<sup>24</sup> in this limited regard. It

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<sup>24</sup> Apparently, NMED believes Module III.A.1 supports this position. *See* NMED's Proposed Findings of Fact and Conclusions of Law, Remote-Handled TRU Waste Prohibition, pgs. 8-10. *But cf.*, Tr. 2531-32 (NMED witness, S. Zappe, rendered no opinion on the issue). However, this provision does not *preclude* structural modifications as obviously contemplated under Module I.E.11.a.

certainly would have been preferable for the Applicants to have modified their permit application and included specific details of their proposed modifications. These specific details would have then been subject to full public notice and comment. However, Module I.E.11 of the Proposed Final Permit of June 25, 1999 (Module I.D.11 of the Revised Draft Permit) clearly envisages “physical alterations or additions to the permitted facility.” And NMED has not articulated a compelling justification for a permit condition that *would* prohibit physical alterations or additions. Accordingly, Applicants may commence such physical alterations so long as Applicants comply with the provisions of Module I.E.11. Of course, before accepting any RH TRU waste at WIPP, Applicants must clear the regulatory hurdle<sup>25</sup> of obtaining a permit modification<sup>26</sup>.

#### Financial Assurance

The HWA authorizes the EIB to establish standards for financial responsibility. NMSA 1978, §74-4-4.A.5.f (Repl. Pamp. 1993). The adopted regulations provide that financial assurance requirements apply to “owners and operators” of all hazardous waste facilities, except as provided in 40 C.F.R. §264.140(c). 20 NMAC 4.1.500 (incorporating, verbatim, 40 C.F.R. Part 264, Subpart H, §§264.140 et. seq.). Section 264.140(c) explicitly exempts “States and the Federal Government” from the financial assurance requirements. Accordingly, the Proposed Final Permit of June 25, 1999 (as did the Revised Draft Permit), requires WID, a private “operator” of WIPP, to provide financial assurance for closure and post-closure costs. Module II.N, II.O, II.P, II.Q. Applicants strenuously object to the financial assurance conditions, which

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<sup>25</sup> The Hearing Officer need not, and does not, render any recommendation as to the *manner* by which such permit modification must be pursued.

<sup>26</sup> The Secretary can not certify compliance with the permit under Module I.E.11.b.2 unless and until a modified permit is issued.

they deem “a colossal waste of money.” Applicants’ Closing Argument and Memorandum, pg. M-33 (June 25, 1999). Applicants advance several legal theories in support of their position,<sup>27</sup> *id.* at M-22 through M-28, as follow: (1) because the EIB adopted the federal regulations, verbatim, NMED is bound by the USEPA interpretation of those regulations; (2) NMED may not impose upon WID an interpretation of the regulation that is materially different from its prior interpretations; (3) the most reasonable interpretation of section 264.140(c) is that contractors of the federal government are exempt from the financial assurance requirements and; (4) financial assurances are not necessary to protect human health and the environment. Each argument is addressed below.

In support of Applicants’ first argument, Applicants cite a 1983 letter and memoranda from USEPA officials opining that the section 264.140(c) exemption for “States and the Federal Government” also exempts private operators, *if* the owner is a state or federal government unit. AR No. 971013. However, Applicants fail to cite any authority for their *legal* position – a position that simply lacks legal merit. A USEPA policy opinion can not, and does not, bind the State of New Mexico. The interpretation of state regulations originally promulgated as federal regulations, even if adopted verbatim, is a matter of state law.<sup>28</sup> *See, e.g., Rabar v. E.I. duPont*

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<sup>27</sup> In prior comments, Applicants articulated other arguments. *See, e.g.,* RP No. 15 (Executive Summary, pg. 5; comment 14, pg. 36; comment 179, pg. 77) (Because NMED’s interpretation of the section 140(c) exemption is more “stringent” than the USEPA interpretation, it violates NMSA 1978 §74-4-4(D); there is no precedent for requiring a federal contractor to provide financial assurances; and because DOE has contractually agreed to reimburse WID, imposition of financial assurances on WID is legally impermissible). These arguments lack merit. *See generally* NMED’s Memorandum of Law, pgs. 8-12 (June 25, 1999). Applicants also appear to have abandoned its previously proposed alternative mechanisms for financial assurance. RP No. 36 (comment 179, pgs. 4-8).

<sup>28</sup> USEPA officials apparently agree. *See* AR Nos. 971013 (“[T]he State may impose financial assurance requirements under State regulations”) and 980804 (recommending the permit be revised to impose financial assurance requirements on “WID”, rather than on “permittees”).

deNemours, Inc., 415 A.2d 499, 502 (Del. 1980); Carroll v. Getty Oil Co., 498 F. Supp. 409, 413 (D. Del. 1980)

As to the second argument, Applicants have drawn sweeping conclusions from a single answer to a single question posed to an NMED witness. *See* Applicants' Closing Argument Memorandum, pg. M26, n. 10 (June 25, 1999). The record evidence does not establish that NMED has "changed" its interpretation of the section 264.140(c) exemption. Moreover, Applicants have apparently confused two distinct legal concepts. Applicants correctly assert that NMED would not be entitled to deference respecting interpretation of its own regulation *if* such interpretation were not consistently adhered to over time. *See, e.g., Hobbs Gas Co. v. New Mexico Public service Comm'n*, 115 N.M. 678, 681 (1993). However, even assuming, *arguendo*, that NMED were accorded no deference, it does not follow that an improper past interpretation requires a consistently improper prospective interpretation. Rather, the task would then fall to the Hearing Officer, the Secretary, and ultimately the courts, to *independently* determine the proper meaning of the regulation. Accordingly, attention is now directed toward Applicants' third legal argument.

Even had the Hearing Officer concluded that NMED was entitled to no deference (and he has not) the Hearing Officer would be inclined to accord the regulatory language its plain and ordinary meaning. The exemption applies to "States and the Federal Government." 40 C.F.R. §264.140(c). WID is not such an entity; it merely *operates* a federally owned facility.

Having concluded that financial assurances are required of WID, Applicants' final argument becomes moot. The regulations require financial assurances whether or not the Hearing Officer deems them necessary. 20 NMAC 4.1.500 (incorporating 40 C.F.R. §§264.140

*et. seq.*). Moreover, in light of prior attempts by DOE to assert the Anti-Deficiency Act with respect to clean-up obligations, whether successfully or unsuccessfully invoked, NMED's financial assurance conditions are reasonable and necessary to protect human health and the environment. *See* Tr. 2407-08, 2508 (S. Zappe).

#### TRU Non-Mixed Waste

Perhaps the most controversial and provocative issue raised in this proceeding is whether TRU waste, with no hazardous waste component (TRU *non-mixed* waste), is or should be, subject to prohibition or regulation at WIPP by NMED. *See, e.g.*, Proposed Findings of Fact and Conclusions of Law of CARD, pgs. 2-4 (June 25, 1999); Proposed Findings of Fact and Conclusions of Law of SRIC/CCNS, pgs. 18-22 (June 25, 1999); Closing Statement of Bonnie Bonneau, pg. 2 (filed June 28, 1999); Tr. 2452 (S. Zappe), 3555 (D. Hancock). From the early stages of the permit application process until recently, Applicants consistently represented that *all* waste disposed at WIPP would be managed as TRU mixed waste. *See, e.g.*, AR No. X, Permit Application, Chapter A, pg. A-5 (“For purposes of this permit application, all TRU waste is managed as though it were mixed.”); Tr. 2449-50 (S. Zappe, quoting a letter of February 14, 1994, from a DOE official: “I want to clarify for you that the DOE has no plans or intentions of disposing of any waste (neither hazardous, radioactive nor mixed) in the WIPP prior to the receipt of a RCRA Part B Disposal Phase Permit.”); Tr. 3554 (D. Hancock, quoting from a DOE letter to Don Hancock). Three days *after* issuance of the Draft Permit of May 15, 1998, Applicants first apprised NMED of its intention to dispose TRU non-mixed waste at WIPP prior to issuance of the final permit. *Id.* at 2450. On March 22, 1999, Applicants announced “[t]his week the Waste Isolation Pilot Plant will begin disposal of radioactive transuranic waste from the



Los Alamos Laboratory.” Tr. 3556 (D. Hancock, quoting a letter of March 22, 1999, from DOE Secretary Richardson).

NMED approved the Applicants’ permit application and WAP in the Draft Permit and Revised Draft Permit based upon Applicants’ express commitment to manage and characterize all TRU waste as mixed waste. Indeed, this commitment was a key to all of the assumptions used by NMED in developing a draft permit.” Tr. 2455 (S. Zappe). Accordingly, after notification of Applicants’ apparently contrary intention, and after considering public comment on the issue, NMED proposed to impose Permit Condition IV.B.2.b in the Revised Draft Permit, which provided as follows:

Specific prohibition – the Permittees [Applicants] shall not dispose non-mixed TRU waste in any unit specified in this Module unless such waste is characterized in a manner identical to the requirements of the WAP specified in Permit Condition II.C.1.

RP No. 130 (Non-Mixed Waste, pg. 1).

After considering additional public comment respecting the Revised Draft Permit, NMED sought to “clarify the Department’s intent”, NMED’s Proposed Findings of Fact and Conclusions of Law, Non-Mixed TRU Waste, pg. 21 (June 25, 1999), by revising Permit Condition IV.B.2.b in the Proposed Final Permit as follows:

Specific prohibition – the Permittees shall not dispose non-mixed TRU waste in any Underground HWDU unless such waste is characterized in accordance with the requirements of the WAP specified in Permit Condition II.C.1. The Permittees shall not dispose TRU mixed waste in any Underground HWDU if the Underground HWDU contains non-mixed TRU waste not characterized in accordance with the requirements of the WAP.

Proposed Final Permit of June 25, 1999, Module IV.B.2.b.

Applicants initially offered compromised versions of Permit Condition IV.B.2.b

containing “softer” language, *see* RP No. 15 (comment 155, submitted on December 22 and 24, 1998, and on January 19, 1999), but have since abandoned those offers<sup>29</sup> and adopted the stance that this Permit Condition exceeds the NMED’s regulatory authority because it attempts to regulate TRU non-mixed waste. Applicants’ Closing Argument and Memorandum, pgs. M34 through M39 (June 25, 1999). NMED responds that imposition of the Permit Condition does not exceed its authority, conferred under RCRA and the HWA, because the proposed language “does not *substantively* regulate” TRU non-mixed waste. Rather, the condition “prohibits the disposal of TRU non-mixed wastes in a regulated unit under the HWA unless those wastes have been properly characterized to demonstrate the absence of prohibited and incompatible wastes.” NMED’s Memorandum of Law, pg. 24 (June 25, 1999) (First emphasis added; second emphasis in original).

NMED’s pertinent regulatory authority is derived from the USEPA, which delegated RCRA regulation of hazardous waste to the State of New Mexico. 50 Fed. Reg. 1515 (January 11, 1985). Effective July 25, 1990, the USEPA authorized New Mexico, to implement and enforce its hazardous waste program, in lieu of the federal program, with respect to TRU mixed waste. 55 Fed. Reg. 28397 (July 11, 1990). However, RCRA and the HWA exclude from the definition of solid waste any “source, special nuclear, or *byproduct* material defined by the Atomic Energy Act.” 42 U.S.C. §6903(27); NMSA 1978 §74-4-3.M (Repl. Pamp. 1993) (Emphasis added). The radioactive component of TRU non-mixed waste is excluded from

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<sup>29</sup> NMED’s position respecting TRU non-mixed waste has similarly lacked constancy. *See, e.g.*, RP No. 79, Exh. 4 (letter of October 14, 1997 from then NMED Secretary to a legislator, “WIPP facility can open for disposal of non-mixed TRU waste without a RCRA Part B Permit”); RP No. 34, Attachment 5 (letter of September 9, 1998 from current NMED Secretary to Don Hancock, “if NMED determines that DOE has adequately characterized this waste stream [LANL TA-55-43, Lot 1] to contain no hazardous waste, then it falls outside the jurisdictional scope of the HWA”).

regulation under RCRA as “byproduct material.” New Mexico v. Watkins, 969 F.2d 1122, 1128 (D.C. Cir. 1992). Accordingly, non-mixed waste may not be “regulated” under RCRA nor the HWA.

That Permit Condition IV.B.2.b, or similar language, is necessary to protect human health and the environment, is beyond serious dispute. *See generally* NMED’s Memorandum of Law, pgs. 17-22 (June 25, 1999). *But see* Applicants’ Closing Argument and Memorandum, pgs. M39 through M43 (attempting to attack NMED’s “technical justifications”). Absent Permit Condition IV.B.2.b, or similar language, it is unclear how the TRU non-mixed waste will be characterized to ensure that prohibited, incompatible, and non-permitted wastes are not disposed at WIPP. Tr. 2441 (S. Zappe). *See also* New Mexico Attorney General’s Office Proposed Findings of Fact and Conclusions of Law, pgs. 51-53 (June 30, 1999); Proposed Findings of Fact and Conclusions of Law of SRIC/CCNS, pg. 21 (June 25, 1999). Moreover, VOCs in TRU non-mixed containers may cause unregulated emissions in contravention of the environmental performance standards. *Id.*

Notwithstanding, the *legal* issue before the Hearing Officer is whether the language of Proposed Final Permit Condition IV.B.2.b impermissibly “regulates” TRU non-mixed waste. Clearly, the second proposed sentence does *not* regulate TRU non-mixed waste; this clause prohibits disposal of TRU *mixed waste* under a specified circumstance. The first proposed sentence is more problematic in that it essentially prohibits disposal of TRU non-mixed waste unless Applicants characterize such waste as if it were TRU *mixed waste*. Relying heavily upon United States v. State of New Mexico, 32 F.3d 494 (10th Cir. 1994), NMED presses the argument that this prohibition is permissible because it does not constitute “substantive

regulation.” *Id.* at 498. In United States v. New Mexico *supra*, the United States challenged three conditions imposed in a HWA permit issued to LANL by the New Mexico Health and Environment Department (predecessor to NMED). *Id.* at 496. The permit was issued for operation of an on-site incinerator that was used to burn both hazardous and radioactive waste. This dual role presented the possibility of radioactive waste being inadvertently incinerated during a hazardous waste burn or of radioactive emissions from leftover radioactive material being emitted during a hazardous waste burn – in violation of the HWA permit. *Id.* Addressing these possibilities, the Department imposed permit conditions requiring that each batch of waste be surveyed to determine its radionuclide content and that the waste stack be continuously monitored for radioactivity during each hazardous waste burn. *Id.* Moreover, the third challenged condition even went so far as to establish exhaust gas radioactivity limits during hazardous waste feed operations. *Id.* The Court of Appeals for the Tenth Circuit stated:

[D]ue to the dual capacity of the LANL incinerator as a hazardous waste and radioactive waste incinerator, permit condition V.C.3 alone is insufficient to ensure that only permitted waste is being burned. Radioactive material may remain in the incinerator apparatus following a radioactive burn and be caught in a hazardous waste burn. Permit conditions V.E.10 and V.F.9, therefore, *merely recognize the particular circumstances at LANL and operate to ensure that only permitted hazardous waste is being burned.*

*Id.* at 498. (Emphasis added). With respect to the third condition, which actually established exhaust gas radioactivity limits, the Court noted:

[I]t does not appear that the [S]tate is attempting to *substantively regulate radioactive waste* through this condition. The ... standard can be seen as a cut-off point beyond which it may be reasonably assumed that there is more than a *de minimis* level of radioactive material in the hazardous waste burn. In this way, condition V.F.9 is merely another tool for New Mexico to implement its statutory and regulatory hazardous waste provisions.

*Id.* (Emphasis added).

It appears the United States did not challenge the original determination of the *District* Court below that these permit conditions do not “regulate” radioactive waste; they instead asserting other arguments. *See id.* note 4. This raises an argument that the Court of Appeals’ statement, quoted above, constitutes mere *dicta*. In any event, the Hearing Officer finds the reasoning persuasive and applicable to the instant matter – but *by the thinnest of threads*. Though imposed here for analogous and quite legitimate concerns, NMED seeks to impose a complex waste characterization plan upon TRU non-mixed waste – a waste not subject to “regulation.” This goes far beyond merely monitoring and limiting radioactivity during an incinerator burn.

Accordingly, with serious reservations, the Hearing Officer accepts NMED’s position and finds that imposition of Permit Condition IV.B.2.b of the Proposed Final Permit of June 25, 1999, does not “regulate” TRU non-mixed waste; rather it merely “recognizes the particular circumstances” at WIPP and operates to ensure that only permitted hazardous wastes are disposed.

In light of the Hearing Officer’s finding “with serious reservations,” exploration of alternative language that might be acceptable to Applicants, while adequately protecting human health and the environment, is recommended. Applicants have professed an *intention* to characterize TRU non-mixed waste as if it were TRU mixed waste. Tr. 433 (E. Hunter); *See also* AR No. X *supra*. As recently as January 19, 1999, prior to NMED’s final proposed revision to

Permit Condition IV.B.2.b, Applicants expressed a willingness to accept the following language:

The Permittees shall not dispose of non-mixed TRU waste in any unit specified in this Module *once this permit becomes effective* unless such waste is characterized in a manner that substantially complies with the requirements of the WAP as specified in Permit Module II.C.1.

RP No. 36 (comment 155, January 19, 1999) (Emphasis added). As discussed *supra*, after NMED's final version was proposed, Applicants seemingly abandoned this comment and reverted to its legal argument. It appears that Applicants are now more concerned, for legitimate reasons, that the final proposed version would *ex post facto* subject Applicants to civil and criminal liability for having already emplaced the TA-55-43, Lot No. 1, TRU non-mixed waste at WIPP. *See* Applicants' Closing Argument and Memorandum, pgs. M39 through M43. In light of Applicants' prior proposed language and apparent intention to characterize TRU non-mixed waste as if it were TRU mixed waste, this concern about liability appears to outweigh their objection to the spirit of Permit Condition IV.B.2.b. – notwithstanding their legal posture.

Accordingly, the Hearing Officer recommends the following substitute language for Permit Condition IV.B.2.b in the Final Permit (added language is underscored):

Specific prohibition – after this Permit becomes effective, the Permittees shall not dispose non-mixed TRU waste in any Underground HWDU unless such waste is characterized in accordance with the requirements of the WAP specified in Permit Condition II.C.1. The Permittees shall not dispose TRU mixed waste in any Underground HWDU if the Underground HWDU contains non-mixed TRU waste not characterized in accordance with the requirements of the WAP.

The “in accordance with” language favored by NMED is retained, but Applicants are relieved of their fear that NMED intends to pursue a permit violation action immediately upon issuance of the permit. With respect to the introductory clause, the Hearing Officer is unimpressed with NMED's conclusory assertion that this type of language “is inappropriate for a

final permit and is, on its face, applicable to the pre-permit period.” NMED’s Proposed Findings of Fact and Conclusions of Law, Non-Mixed TRU Waste, pg. 24 (June 25, 1999). Indeed, the language proposed by the Hearing Officer “merely recognizes the particular circumstances at WIPP.” Furthermore, RCRA contemplates possible disposal of waste prior to the issuance of a final permit – circumstances that may be incorporated into the permit. *See* 42 U.S.C. §6924. Finally, the relatively small volume of TRU non-mixed waste disposed prior to issuance of the final permit, apparently characterized in substantially the same manner as if TRU mixed waste, should pose no risk to public health or the environment. And, of course, Applicants could not dispose TRU mixed waste in any Underground HWDU if the Underground HWDU already contains TRU non-mixed waste *not* characterized in accordance with the WAP. Accordingly, the Hearing Officer’s substitute language *supra* is recommended.

#### Adequacy of WIPP Site Studies

Certain parties assert that further geologic and hydrologic study of the WIPP site is required to assure that waste can be safely contained. *See, e.g.*, CARD’s Proposed Findings of Fact and Conclusions of Law, pgs. 6-16 (June 25, 1999). CARD contends that the WIPP site is located in an area of karst, Tr. 2199 (R. Phillips); CARD’s Proposed Findings of Fact and Conclusions of Law, pg. 6, and that dissolution of salt beds is occurring in the Rustler Formation creating a pathway for release of waste contaminants. RP No. 35, pgs. 1-2; CARD’s Proposed Findings of Fact and Conclusions of Law, pg. 6.

Initially, it should be noted that since 1972, the WIPP site has been the subject of well over 1000 geotechnical reports. Tr. 3101 (D. Powers). Indeed, “the WIPP site is probably the most heavily characterized piece of real estate in terms of hydrology and geology anywhere in

the world.” Tr. 312 (R. Kehrman). Notwithstanding, the expert opinions of respected scientists presented by CARD, SRIC/CCNS and other parties are worthy of serious consideration.

Accordingly, the Hearing Officer has carefully reviewed and considered the testimony of all expert witnesses.

The Hearing Officer was particularly impressed with the testimony of Dr. Richard Hays Phillips who has devoted considerable scholarly effort to a geologic study of the site. *See generally* RP No. 35; Tr. 2196-2270. Dr. Phillips raised several interesting issues respecting the possibility of karstic conditions and salt dissolution.<sup>30</sup> *Id.* And the Hearing Officer agrees that, despite the massive geologic scrutiny accorded the WIPP site, some additional inquiry may have been prudent. However, the Hearing Officer must render a final recommendation based upon the totality of circumstances and evidence adduced. After a careful review of all the evidence, the Hearing Officer concludes that the Applicants have met their burden of proving that a permit should be granted.

Dr. Dennis Powers appears to be the most experienced expert witness respecting the WIPP site geology and has conducted the most comprehensive study of the Rustler Formation. Tr. 3099-3101, 3128 (D. Powers). He was also responsible for the mapping of three facility shafts, allowing him to “describe in considerable detail the rocks from fundamentally the surface all the way down to the facility horizon.” *Id.* at 3120-21. In mapping the shafts, Dr. Powers discovered “well-displayed, undisturbed sedimentary features indicative of being deposited in original mud-flat environment and lacking removal of significant amounts of halite.” *Id.* at 3126.

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<sup>30</sup> Applicants attempted to make much of an arithmetic error committed by Dr. Phillips and take issue with the data he used for average annual precipitation rate. Tr. 3278-80 (N. Williams); Applicants’ Proposed Findings of Fact and Conclusions of Law, pg. M54. However, according to the Hearing Officer’s calculations, correction of these errors actually strengthens Dr. Philips’ thesis.



Based upon the shaft mapping and examination of cores along with geophysical logs, Dr. Powers concluded that the clay materials present in the Rustler Formation were indicative of original deposition; not dissolution of salt beds. Indeed, there was a "very minimal amount of salt dissolution anywhere in the Rustler." *Id.* at 3126-27. Accordingly, Dr. Powers concluded that there is no karst below the surface of the WIPP site within the Land Withdrawal boundary. *Id.* at 3111-12. Dr. Powers testimony was corroborated by Mr. Robert Kehrman as well as by the USEPA's own independent conclusion that there is no karst at the WIPP site. Tr. 281, 285-86, 306; RP No. 119, pg. 27373.

#### Breach Scenarios

As previously discussed, the WIPP facility has several natural features that will contain the hazardous waste and constituents. *See generally Findings of Fact* (Geology and Hydrology of the WIPP Site) *supra*. Indeed, even under reasonably foreseeable, worst case assumptions, a 10% concentration of waste would only migrate 2.4 meters after 80 years and about 4 meters after 300 years. Tr. 791-94 (N. Williams). Waste containment at WIPP is far superior to four state-of-the-art facilities throughout North America and compares favorably with underground repositories for radioactive and hazardous waste in Germany. Tr. 759-72 (N. Williams); 1414-20 (N. Rempe).

Notwithstanding, several parties asserted that the underground repository could be breached. On behalf of SRIC and CCNS, Dr. John Bredehoeft opined that fluid injection from nearby oil and gas drilling could cause flooding of the WIPP repository with consequent release of contaminants through marker beds, drill holes, and shafts. Tr. 2103-13. CARD witness, Dr. Phillips, predicted that contaminants, driven by fluid injection or brine underlying WIPP, could

"jump" to higher lithostatic layers. TR. 2239-40 (R. Phillips). Dr. David Snow, also on behalf of CARD, suggested that the subsidence experience at the K-2 mine in Saskatchewan, Canada could occur at WIPP. Tr. 3429-57. No realistic probability of any of these breach scenarios actually occurring is supported by a preponderance of the evidence.

The WIPP site is surrounded by numerous oil and gas wells, some may be within two lateral miles of the repository. Tr. 2157. High-pressure injection of fluid (usually brine) into oil-bearing formations to force out remaining oil reserves is a common industry practice worldwide, including southeastern New Mexico. Tr. 2093-94 (J. Bredehoeft). Fluid injection can cause "hydrofracs" -- rock fractures that foster water flow. *Id.* at 2096. In the early 1990s, an oil well located within the Yates oil field, drilled by a Mr. Doyle Hartman, in southeastern New Mexico, experienced a water "blow-out." *Id.* at 2090-91. Dr. Bredehoeft and others, apparently including Applicants' witness, Dr. Powers, concluded that the blow-out was caused by hydrofracturing of the anhydrite section of the lower Salado formation and migration of water from the injection point for two miles to the Hartman well. *Id.* at 2090-91, 2119. Dr. Bredehoeft believes that this "Hartman Scenario" could occur at the WIPP site causing a flooding of the repository and ultimate release of waste contaminants. *Id.* at 2099-2103, 2119, 2124-25.

USEPA evaluated Dr. Bredehoeft's theory concerning potential effects of fluid injection near the WIPP facility. USEPA concluded the theory was unrealistic, and noted the following:

- Dr. Bredehoeft's fluid injection modeling was based on "highly unrealistic" assumptions;
- USEPA found that "using more realistic but still conservative assumptions in the modeling fluid movement sufficient to mobilize radioactive waste in the disposed system does not occur";

- USEPA could not replicate Dr. Bredehoeft's results because of insufficient documentation of vital aspects of his modeling;
- "[D]ue to lack of proper documentation it was not clear to [USEPA] that Bredehoeft's modeling represented the Hartman Scenario";
- "[C]urrent well construction practices make it unlikely that there could be a well failure of the nature of the 'Hartman Scenario' ... this is because requirements for drilling are much more vigorous near WIPP than was the case at the ... time of the Hartman case"; and
- Dr. Bredehoeft's use of Linear Elastic Fracture Mechanics ("LEFM") was inappropriate for the anhydrite beds in the Salado at WIPP because field tests proved that the fractures were numerous and shortened instead of the single, long fracture Dr. Bredehoeft hypothesizes.

RP No. 119 pgs. 27368-69.

USEPA's own analysis of the probability of a catastrophic failure of an injection well concluded that the probability of a chain of events occurring for a given well in the vicinity of WIPP was within the range of 1 in 56,889 to 1 in 667 million. *Id.* at 27369. In order for the Hartman Scenario to occur at WIPP, water would have to migrate vertically from the injection level or a significant breach, or leak, in the well casing must occur. Tr. 2130 (J. Bredehoeft). USEPA noted that wells around WIPP contained dual annular seals through the salt section that are less likely to corrode or degrade; improved well stimulation techniques that are less likely to damage the annular cement seals; improved controls on injection pressures to avoid seal damage; and improved monitoring of tubing leaks. *Id.* at 2126-27. Moreover, the four shafts at WIPP do not constitute a pathway for groundwater migration *out* of the facility to the Culebra formation, either before or after the shafts are closed. When the facility is open, the only way for groundwater to migrate from the repository to the Culebra is if the shaft is filled with water; however, there is insufficient water in the Culebra formation for this to occur. The shaft seal is

designed so that once the facility is closed, low-permeability materials will be in place, including compacted halite, concrete, asphalt and clay, to provide both short-term and long-term containment. Tr. 3267-68 (N. Williams); *See generally* Findings of Fact (Final Facility Closure) *supra*.

Dr. Phillips' theory of vertical contaminant transport<sup>31</sup> was cogently addressed by Dr. Williams. Tr. 3282-83. Dr. Williams testified that brine likely will never fill the disturbed rock zone and never come in contact with waste. But, even using Dr. Bredehoeft's calculations, significant gas pressures could not accumulate for at least 2000 years. Tr. 3269, 3282 (N. Williams). Hence, no vertical transport force exists. *Id.* at 3282. Moreover, Dr. Williams correctly explains that "[t]he stress field that results from overpressurization of an injection well results in fractures along a plane which is perpendicular to the primary stress. In this case, the primary stress is vertical, so the fractures would be horizontal; and there simply isn't a mechanism for fractures to propagate at an angle and jump between marker beds."

With respect to Dr. Snow's testimony, the Hearing Officer found his presentation extremely interesting and informative, but not compelling. Significant differences exist between the K2 mine in Saskatchewan, upon which Dr. Snow heavily relied, and the WIPP facility with respect to stratigraphy, room sizes and designs, and total excavation. Tr. 3472-73 (D. Snow). Dr. Snow also conceded that he did not use the Subsidence Engineer's Handbook, computer modeling, or an area of influence assessment to assess any subsidence at WIPP. *Id.* at 3473-74.

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<sup>31</sup> Dr. Phillips stated that "[a]t any interruption of a clay bed, or at an unsealed borehole, a hydrofracture will jump to higher stratum where lithostatic pressure is lower ... a single, elongated hydrofracture ... will ultimately breach to the Rustler aquifer." Tr. 2239-40.

### Location of the Groundwater Monitoring Wells

The Hearing Officer finds that the groundwater monitoring wells have been appropriately located to intercept potential, though unlikely, releases from the facility. Tr. 104-05 (R. Kehrman); *See generally* Findings of Fact, (Geology and Hydrology of the WIPP Site) *supra*. Some parties have suggested that substitute or additional wells should be required. *See, e.g.*, CARD's Proposed Findings of Fact and Conclusions of Law, pgs. 19-21 (June 25, 1999); EEG's Proposed Findings of Fact and Conclusions of Law, pgs. 2-3 (June 25, 1999). CARD asserts that because karstic conditions exist at the WIPP site, *see* Discussion (Adequacy of WIPP Site Studies) *supra*, the existing wells are not properly placed in the likely migration pathways, and recommend placement in other horizons. CARD's Proposed Findings of Fact and Conclusions of Law, pgs. 6-7, 19-21. Dr. Chaturvedi, of EEG, urged that an additional monitoring well be placed into the lower Santa Rosa/upper Dewey Lake Redbeds near the WIPP exhaust shaft. Tr. 1063 (L. Chaturvedi); EEG's Proposed Findings of Fact and Conclusions of Law, pgs. 2-3. The Hearing Officer finds insufficient record support for these positions. As previously discussed, karstic conditions do not exist at the WIPP site. *See* Discussion (Adequacy of WIPP Site Studies) *supra*. Placement of monitoring wells in other horizons is of no value because any release, though unlikely, would first impact the Culebra. Tr. 3266, 3271, 3285 (N. Williams); RP No. 130 (Point of Compliance, pgs. 3-6). And water monitoring near the exhaust shafts in the lower Santa Rosa/upper Dewey Lake Redbeds is unnecessary because the accumulation of water at that location was caused by human activities at WIPP. Tr. 3129-30 (D. Powers), 3259 (N. Williams). Moreover, construction of wells near the shaft could unnecessarily disrupt the rock units around the shafts. RP No. 130 (Point of Compliance, pg. 3).

### Adequacy of Waste Characterization

Pursuant to 20 NMAC 4.1.500 (incorporating 40 C.F.R. §264.13(a)), Applicants are required to obtain “all the information which must be known to treat, store, or dispose” the TRU mixed waste destined for disposal at WIPP. 40 C.F.R. §264.13(a). All analyses, or characterization, of the waste will be performed at the generator sites, prior to transport to WIPP. Tr. 433-34 (E. Hunter). Apparently, because generator sites possess unique knowledge and experience with their own waste, and to obviate radiation control problems if characterization were performed at WIPP, characterization of TRU mixed waste at the generator sites is endorsed by the Nuclear Regulatory Commission and the USEPA. *Id.* at 434-35; RP No. 54 (TM-8, Joint NRC/EPA Guidance on Testing Requirements for Mixed Radioactive and Hazardous Waste, 62 Fed. Reg. 62,079 (1997). Module II.C contains the primary permit requirements regulating characterization of TRU mixed waste. Proposed Final Permit of June 25, 1999. The waste characterization procedures will provide adequate information “which must be known to treat, store, or dispose” TRU mixed waste destined for WIPP, including determination of waste codes and confirmation of the absence of materials prohibited by the WAC and the TSDF WAC. Tr. 426-27 (E. Hunter). Hazardous waste codes will be determined through the use of acceptable knowledge. Headspace gas analysis will be performed on all waste streams, and solids sampling and analysis for certain homogeneous solids, soils, and gravels will be performed to confirm acceptable knowledge. *Id.* at 438. Waste containers will be radiographed, and a statistically selected portion visually examined, to confirm the absence of prohibited materials. *Id.* at 441-42.

Some parties fervently criticize the use of acceptable knowledge to characterize the waste destined for WIPP and argue that visual examination should be required of each and every waste

container that contains waste from a debris waste stream.<sup>32</sup> *See, e.g.*, Proposed Findings of Fact and Conclusions of Law of SRIC/CCNS, pgs. 4-7 (June 25, 1999). SRIC/CCNS assert that “[t]he [A]pplicants’ ‘acceptable knowledge’ is not comprehensive enough, accurate enough, or reliable enough to make critical decisions regarding waste characterization.” *Id.* at 6 (citing Tr. 1856, 1878, 1880 (J. Hirschhorn)). The Hearing Officer agrees that visual inspection and analysis of each and every waste container would likely improve waste characterization accuracy. But, consideration of this issue can not end here. The benefits of somewhat more accurate waste characterization must be balanced against the associated increased risks to workers and the public. If every waste container is opened for inspection and/or analysis, the risk of radiation exposure dramatically increases. Tr. 436 (E. Hunter). The Hearing Officer finds that the waste characterization procedures contemplated by the Proposed Final Permit [that require more frequent visual inspections than required under prior draft permits, *see Findings of Fact*, (Miscertification) *supra*], are adequate and recommends against more invasive inspection and analysis of waste.

#### Non-Technical Oral Public Comment

The public was invited to offer non-technical oral comment on ten occasions in Santa Fe and for a full day in Carlsbad, New Mexico. *See* Tr. List of Commenters. Of the commenters who appeared in Santa Fe, most seemed to oppose the granting of an HWA permit, under any conditions, while most of the commenters in Carlsbad supported expeditious approval of the

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<sup>32</sup> SRIC and CCNS contend that debris waste destined for disposal at WIPP is heterogeneous (not homogeneous) consisting of widely diverse materials of diverse origin. Accordingly, they maintain, representative sampling is impossible. Hence, unless a debris waste stream is first segregated into homogeneous waste streams, all such waste containers should be visually inspected and all rigid inner containers tested for toxic gasses. Proposed Findings of Fact and Conclusions of Law of SRIC/CCNS, pgs. 4, 34-35 (June 25, 1999) (citing Tr. 1768 (J. Hirschhorn)). *But cf.*, *Findings of Fact* (Composite Sampling) *supra*.

permit. *See generally* Tr. WIPP Public Comment. Many commenters offered eloquent and extremely articulate testimony regarding nuclear technology in general and/or WIPP in particular. *See, e.g., id.* at 48-50 (L. Bower), 50-52 (E. Dunham), 147-49 (J. Greenwald). Some offered moving accounts of personal tragedy that they associated with the nuclear defense industry. *See, e.g., id.* at 372-76 (S. Alvarez). Others viewed the protracted administrative history of WIPP, and repeated delays in granting permit approval, as merely government run-amuck. *See, e.g., id.* at 531-33 (M. Salinas), 599-602 (R. Kirkes), 606-08 (S. Gentry). Some commenters railed against the DOE, along with the political and judicial processes that they viewed as thwarting popular sentiment. *See, e.g., id.* at 367-71 (J. Nichols).

The Hearing Officer carefully reviewed and considered all public comment, but only insofar as the comments were germane to the issues before him. Some commenters implored the Hearing Officer to deliberate from “the heart.” *See, e.g., id.* at 52 (E. Dunham). The Hearing Officer appreciates the depth of emotion that WIPP evokes, on all sides of the issue, among the residents of New Mexico and beyond its borders. Notwithstanding, the Hearing Officer’s solemn duty is to render a recommendation based upon a preponderance of the evidence; not by a preponderance of public sentiment. *See note 4 supra.* And the Hearing Officer has attempted to discharge that duty faithfully, to the best of his ability.

It should be noted that the public commenters and *all* the parties, including those opposed to granting a HWA permit, such as CARD, SRIC, and CCNS, have performed a valuable public service by actively participating throughout the permit process. All of their concerns have been considered by the Hearing Officer and by NMED. Indeed, some of these concerns have been reflected and incorporated into the Proposed Final Permit. *See, e.g., Findings of Fact,*



(Miscertification) *supra*; NMED's Response to Public Comment (June 25, 1999); Proposed Final Permit of June 25, 1999.

### CONCLUSIONS OF LAW

Based upon the foregoing Findings of Fact and Discussion, the Hearing Officer renders the following legal conclusions:

1. The Secretary of NMED ("the Secretary") has jurisdiction to require all persons that manage, store or dispose TRU mixed waste to submit an application and obtain a final permit that includes corrective action requirements under the HWA and 20 NMAC 4.1. *et seq.*
2. The WIPP repository is a "miscellaneous unit" under 20 NMAC 4.1.101 (incorporating 40 C.F.R. §260.10); 20 NMAC 4.1.300 (incorporating 40 C.F.R. § 262.10) and subject to the standards under 20 NMAC 4.1.500 (incorporating 40 C.F.R. § 264.600 (Subpart X)).
3. DOE is a "person" under Section 74-4-3.K of the HWA and the owner and operator of WIPP under 20 NMAC 4.1.900 (incorporating 40 C.F.R. §270.2). WID is also a "person" under Section 74-4-3.K of the HWA and a co-operator of WIPP under 20 NMAC 4.1.900 (incorporating 40 C.F.R. §270.2).
4. The Secretary has authority to require and issue a final permit to Applicants for the management, storage or disposal of TRU mixed waste at WIPP under the HWA and 20 NMAC 4.1. *et seq.* Under NMED regulations, the burden of proof for issuance of a HWA permit, shall be on the Applicants. 20 NMAC 4.1.901.E.6.
5. NMED has complied with all administrative and procedural laws and regulations

respecting the application and permitting process including the pertinent provisions of 40 C.F.R. §124.32(b)(1), 270.10(c) and 20 NMAC 4.1.900, 901.

6. Pursuant to 20 NMAC 1.4.401.A. and 20 NMAC 4.1.901.E.6, Applicants are charged with the burden of proving that the permit application should be granted and a HWA permit issued. NMED has the burden of proving that the conditions it proposes in the Proposed Final Permit are justified. After establishment of a *prima facie* case, any person opposed to the Permit, or to any imposed condition therein, has the burden of going forward with any adverse evidence proving that the Permit should not be granted.

7. Pursuant to 20 NMAC 4.1.901.A.7, the Secretary must give due consideration and weight to all comments received during the public comment period and to all relevant facts presented at the public hearing.

8. Based upon the full record, Applicants have met their burden of proving that a HWA permit should be granted. Notwithstanding certain findings and recommendations of the Hearing Officer set forth herein [*see Discussion* (TRU Non-Mixed Waste and RH TRU Waste) *supra*], NMED has met its burden of proving that the conditions it proposes to impose in the Proposed Final Permit of June 25, 1999, along with all attachments thereto, are justified. Those opposed to issuance of the Proposed Final Permit, or to any conditions set forth therein, have failed to meet their burdens of proof.

9. Each permit for an interim status or new hazardous waste management facility shall contain terms and conditions as necessary to protect human health and the environment. 20 NMAC 4.1.900 (incorporating 40 C.F.R. §270.32(b)(2)).

10. Each permit must include permit conditions necessary to achieve compliance with

the HWA and regulations, including each of the applicable requirements specified in 20 NMAC 4.1.500 (incorporating 40 C.F.R. Part 264). 20 NMAC 4.1.900 (incorporating 40 C.F.R. §270.32(b)(1))

11. The audit requirement as proposed by NMED in Permit Condition<sup>33</sup> II.C.2 of the Proposed Final Permit of June 25, 1999, is a condition necessary for approval of the WAP in order to protect human health and the environment. 20 NMAC 4.1.901.A.8 and NMSA 1978 §74-4-4.2(C) ( Repl. Pamp. 1993).

12. Permit Condition II.C.2 is a condition necessary to achieve compliance with 20 NMAC 4.1.900 (incorporating 40 C.F.R. §270.14 (b)(2) and §270.32(b)(1)) in order to address permit application deficiencies; to demonstrate compliance with the WAP; and to obtain all the information which must be known to manage, store and dispose TRU mixed waste at WIPP in accordance with 40 C.F.R. Part 264. 20 NMAC 4.1.901.A.8 and NMSA 1978 §74-4-4.2(C) (Repl. Pamp. 1993).

13. No Party or commentor has met their burden in challenging NMED's determination to impose Permit Condition II.C.2 by presenting substantial evidence that this condition is unreasonable or inconsistent with the HWA. *See* 20 NMAC 4.1.901.E.6 and 20 NMAC 1.4.401.A.

14. Permit Condition II.C.3.h is necessary to protect human health and the environment consistent with NMAC 4.1.500, .900 (incorporating 40 C.F.R. §§264.13, 270.14(b)(2)).

15. No Party or commentor has met their burden in challenging NMED's

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<sup>33</sup> Hereinafter, unless otherwise specified, "Permit Conditions" refers to those conditions proposed by NMED in the proposed Final Permit of June 25, 1999.

determination to impose Permit Condition II.C.3.h by presenting substantial evidence that this condition is unreasonable or inconsistent with the HWA. *See* 20 NMAC 4.1.901.E.6 and 20 NMAC 1.4.401.A.

16. Applicants may begin making structural changes to the RH Bay so long as Applicants comply with Module I.E.11.a (Module I.D.11 of the revised permit), which envisages “physical alterations or additions to the permitted facility.”<sup>34</sup>

17. Applicants may not use any modified areas to manage, store or dispose waste unless and until the Secretary certifies compliance with the permit under Module I.E.11.b.ii.

18. Modification of the permit would be required before the Secretary could certify compliance with respect to any modified areas.

19. Permit Condition II.C.1.g, Attachment B2, and Table B2-1 are necessary to protect human health and the environment by ensuring that waste which is managed, stored or disposed at WIPP is properly characterized and does not contain any prohibited or incompatible items, as required by 20 NMAC 4.1.500 and 900 (incorporating 40 C.F.R. §§264.13, 264.601, 264.602, 270.32(b)(1), 270.32(b)(2)). 20 NMAC 4.1.901.A.8; NMSA 1978 §74-4-4.2(c) (Repl. Pamp. 1993).

20. Attachment B2, including Table B2-1, of the Proposed Final Permit are necessary to ensure Applicants obtain a detailed physical analysis of a representative sample of the waste, as required by 20 NMAC 4.1.500 (incorporating 40 C.F.R. §264.13(a)(1)).

21. Attachment B2, including Table B2-1, of the Proposed Final Permit are necessary to confirm that the waste analyses are repeated as necessary to ensure the analyses are current

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<sup>34</sup> *See generally* Discussion (RH TRU Waste) *supra*.

and accurate, as required by 20 NMAC 4.1.500 (incorporating 40 C.F.R. §264.13(a)(3)).

22. No Party or commentor has met their burden in challenging NMED's Proposed Final Permit regarding the miscertification rate by presenting substantial evidence that this condition is unreasonable or inconsistent with the HWA. *See* 20 NMAC 4.1.901.E.6 and 20 NMAC 1.4.401.A.

23. Permit Condition II.C.1.g, and associated language in Attachment B, regarding NMED's access to the WWIS, is a condition necessary to ensure proper waste characterization through maintenance and inspection of records and results of waste analyses and waste determinations, as required by 20 NMAC 4.1.500 (incorporating 40 C.F.R. §§264.13, 264.73(a), 264.73(b)(3), 264.601); 20 NMAC 4.1.901.A.8; NMSA 1978 §74-4-4.2(c) (Repl. Pamp. 1993).

24. As contemplated in the Proposed Final Permit, because the WWIS database contains information and data related to the characterization, certification and shipment of waste destined for storage and disposal at WIPP, the WWIS will contain records and results of waste analyses and waste determinations as defined by 20 NMAC 4.1.500 (incorporating 40 C.F.R. §264.73(b)(3)).

25. As contemplated in the Proposed Final Permit, Module II.C.1.g, waste characterization information and hazardous waste determinations contained in the WWIS are required records which must be furnished upon request and made available at all reasonable times for inspection by authorized NMED personnel pursuant to 20 NMAC 4.1.500 (incorporating 40 C.F.R. §264.74(a)) and NMSA 1978 §§74-4-4(A)(5)(a) and 74-4-4.3(A)(1) (Repl. Pamp. 1993).

26. NMED's access to the WWIS, as proposed in the permit application, would be

inadequate because NMED would not have access to records and results of waste analyses and waste determinations in order to ensure that waste is characterized in compliance with the WAP, as required by 20 NMAC 4.1.500 (incorporating 40 C.F.R. §§264.13, 264.73(a), 264.73(b)(3), 264.601).

27. No Party or commentor has met their burden in challenging NMED's determination to impose Permit Condition II.C.1.g, and associated language in Attachment B, by presenting substantial evidence that this condition is unreasonable or inconsistent with the HWA. *See* 20 NMAC 4.1.901.E.6; 20 NMAC 1.4.401.A.

28. Permit Condition II.C.1.b, and incorporated language, requiring the collection of cores from soil/gravel and solid TRU mixed waste to ensure a representative sample, is reasonable and in accordance with 20 NMAC 4.1.200 (incorporating 40 C.F.R. Part 261, Appendix I). 20 NMAC 4.1.500 (incorporating 40 C.F.R. §264.13(a)(1)).

29. No Party or commentor has met their burden in challenging NMED's determination to impose a permit condition requiring the collection of cores from soil/gravel and solid TRU mixed waste by presenting substantial evidence that this condition is unreasonable or inconsistent with the HWA. *See* 20 NMAC 901.A.E.6; 20 NMAC 1.4.400.A.

30. The financial assurance requirements imposed under Module II.N, II.O, II.P, II.Q are required by and in accordance with 20 NMAC 4.1.500 (incorporating 40 C.F.R. Part 264, Subpart H, §§264.140 *et seq.*).<sup>35</sup>

31. No Party or commentor has met their burden in challenging NMED's determination to impose financial assurance. *See* 20 NMAC 4.1.901.E.6; 20 NMAC 1.4.401.A.

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<sup>35</sup> *See generally* Discussion (Financial Assurance) *supra*.

32. Permit Conditions II.C.3.k and II.C.4, and associated language regarding TICs, are conditions necessary to protect human health and the environment by requiring identification and characterization<sup>36</sup> of hazardous waste, such as headspace gas components, volatile organic compounds, and semi-volatile organic compounds, that could be emitted to the air during management, storage or disposal of waste at WIPP. 20 NMAC 4.1.901.A.8 and NMSA 1978 §74-4-4.2(c) (Repl. Pamp. 1993).

33. The TIC process proposed by Applicants' in the Part B permit application was deficient because it failed to ensure that all applicable waste codes would be applied to a hazardous waste, as required by 20 NMAC 4.1.200 (incorporating 40 C.F.R. §§261.20(b) and 261.30(c)).

34. The TIC process proposed by Applicants' in the Part B permit application was deficient because it might allow Applicants to manage, store or dispose improperly characterized hazardous waste, as prohibited by 20 NMAC 4.1.500 (incorporating 40 C.F.R. §264.13(a)).

35. The TIC process proposed by Applicants' in the Part B permit application was deficient because it did not provide data necessary to monitor and prevent releases to the air, as required by 20 NMAC 4.1.500 (incorporating 40 C.F.R. §264.601(c)).

36. Permit Conditions II.C.3.k and II.C.4, and associated language regarding TICs, are conditions necessary to ensure the Applicants do not dispose hazardous waste without identifying all applicable hazardous waste codes, as required by 20 NMAC 4.1.200 (incorporating 40 C.F.R. §§261.20(b), 261.30(c)).

37. Permit Conditions II.C.3.k and II.C.4, and associated language regarding TICs,

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<sup>36</sup> As required by 20 NMAC 4.1.500 & 900 (incorporating 40 C.F.R. §§264.601, 264.601(c), 264.602, 270.32(b)(2)).

are conditions necessary to ensure the Applicants obtain a detailed chemical analysis of the waste, as required by 20 NMAC 4.1.500 (incorporating 40 C.F.R. §264.13(a)(1)).

38. Permit Conditions II.C.3.k and II.C.4, and associated language regarding TICs, are conditions necessary to ensure the Applicants develop and follow a written waste analysis plan which describes the waste analysis procedures, including the parameters for analysis of each hazardous waste; the test methods that will be used to test for these parameters; and the sampling method that will be used to obtain a representative sample of the waste to be analyzed, as required by 20 NMAC 4.1.500 (incorporating 40 C.F.R. §264.13(b)(1), (2), (3)).

39. Permit Conditions II.C.3.k and II.C.4, and associated language regarding TICs, are conditions necessary to achieve compliance with the hazardous waste act and regulations specified at 20 NMAC 4.1.200 & 500 (incorporating 40 C.F.R. §§261.20(b), 261.30(c), 264.13(a)(1), (b)(1), (2) & (3), 264.601, 264.601(c) & 264.602), as required by 20 NMAC 4.1.900 (incorporating 40 C.F.R. §270.32(b)(1)).

40. No Party or commentor has met their burden in challenging NMED's determination to impose permit conditions regarding TICs by presenting substantial evidence that this condition is unreasonable or inconsistent with the HWA. *See* 20 NMAC 4.1.901.E.6; 20 NMAC 1.4.401.A.

41. As described in the permit application, all of the underground panels in which TRU waste will be disposed are "hazardous waste management units" under 20 NMAC 4.1.100 (incorporating 40 C.F.R. § 260.10) and subject to regulation under the HWA.

42. USEPA regulations at 40 C.F.R. Parts 191, 194 apply to the "time period beginning at disposal and ending 10,000 years after disposal." 40 C.F.R. §194.2 (defining the



“regulatory time frame”); RP No. 14 (Supplemental Fact Sheet pgs. 1-2). “Disposal” is defined as “the permanent isolation of spent nuclear fuel or radioactive waste from accessible environment with no intent of recovery... [f]or example, disposal of waste in a geologic repository occurs when all the shafts to the repository are backfilled and sealed.” *Id.*; 40 C.F.R. § 191.02(m).

43. USEPA’s regulatory requirements during the operational phase of the WIPP facility are set forth under 40 C.F.R. 191 (Subpart A), and limits radiation doses to members of the public from the management and storage of TRU waste at WIPP. Subpart A contains no other specific requirements. 40 C.F.R. 191 (Subpart A)

44. USEPA does not regulate potential VOC emissions from TRU mixed and non-mixed waste containers. 40 C.F.R. Parts 190, 194.

45. USEPA does not impose any regulatory requirements for waste characterization; EPA does not evaluate acceptable knowledge, headspace gas sampling, solid sampling, visual examinations, or radiography. Tr. 2709 (C. Walker).

46. The version of Permit Condition IV.B.2.b proposed by NMED in the Proposed Final Permit of June 25, 1999, or the substitute version recommended by the Hearing Officer,<sup>37</sup> is necessary to protect human health and the environment. Characterization of all TRU waste in accordance with the WAP is necessary to ensure compliance with the environmental performance standards of 40 C.F.R. Part 264, by preventing the release of carcinogenic VOCs that may have adverse effects upon human health and the environment due to the migration of hazardous constituents in the air. 20 NMAC 4.1.500 (incorporating 40 C.F.R. 264.601(c));

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<sup>37</sup> See generally Discussion, (TRU Non-Mixed Waste) *supra*.

NMSA 1978 § 74-4-4.2(c) ( Repl. Pamp. 1993); 20 NMAC 4.1.900 (incorporating 40 C.F.R. 270.32(b)(2)).

47. The version of Permit Condition IV.B.2.b proposed by NMED in the Proposed Final Permit of June 25, 1999, or the substitute version recommended by the Hearing Officer, is necessary to ensure that Applicants properly characterize all TRU waste destined for disposal in a HWA-regulated unit in accordance with the WAP and to ensure that no prohibited, incompatible and non-permitted wastes are disposed of at WIPP. *Id.*

48. The version of Permit Condition IV.B.2.b proposed by NMED in the Proposed Final Permit of June 25, 1999, or the substitute version recommended by the Hearing Officer, is necessary to ensure that TRU waste destined for disposal in HWA-regulated units has undergone headspace gas sampling, acceptable knowledge, radiography and solids sampling. *Id.*

49. The version of Permit Condition IV.B.2.b proposed by NMED in the Proposed Final Permit of June 25, 1999, or the substitute version recommended by the Hearing Officer, is necessary to enforce Permit Condition IV.D.1 (room-based VOC concentration limits) by requiring waste characterization of TRU non-mixed waste. *Id.*

50. The version of Permit Condition IV.B.2.b proposed by NMED in the Proposed Final Permit of June 25, 1999, or the substitute version recommended by the Hearing Officer, is necessary to enforce Permit Condition IV.D.2.b, by requiring VOC concentration data to ensure compliance with VOC concentration limits. *Id.*

51. The version of Permit Condition IV.B.2.b proposed by NMED in the Proposed Final Permit of June 25, 1999, or the substitute version recommended by the Hearing Officer, is necessary to enforce Permit Condition IV.D.2.b, which requires the WWIS to be capable of

generating a report identifying the average VOC concentrations on a room and panel basis generated from all TRU waste containers. *Id.*

52. The version of Permit Condition IV.B.2.b proposed by NMED in the Proposed Final Permit of June 25, 1999, or the substitute version recommended by the Hearing Officer, is necessary to enforce Permit Condition IV.F.2 by requiring compliance monitoring for VOCs from all TRU waste containers. *Id.*

53. The version of Permit Condition IV.B.2.b proposed by NMED in the Proposed Final Permit of June 25, 1999, or the substitute version recommended by the Hearing Officer, is necessary to enforce permit conditions relating to inspection, access to records and waste characterization information required to be maintained under the permit. *Id.*

54. The version of Permit Condition IV.B.2.b proposed by NMED in the Proposed Final Permit of June 25, 1999, or the substitute version recommended by the Hearing Officer, does not impermissibly regulate TRU non-mixed waste in contravention of 42 U.S.C. §6903(27), NMSA 1978 §74-4-3.M (Repl. Pamp. 1993), or New Mexico v. Watkins, 969 F.2d 1122, 1128 (D.C. Cir. 1992).

55. No Party or commentor has met their burden in challenging NMED's determination to impose Permit Condition IV.B.2.b, by presenting substantial evidence that this condition is unreasonable or inconsistent with the HWA. *See* 20 NMAC 4.1.901.E.6; 20 NMAC 1.4.401.A.

56. In light of all the circumstances, the *most* reasonable version of Permit Condition IV.B.2.b, is that version recommended by the Hearing Officer. *See generally* Discussion (TRU Non-Mixed Waste) *supra*.

57. NMED's determination to require the Applicants to implement a Confirmatory VOC Monitoring Program is reasonable and necessary pursuant to 20 NMAC 4.1.500 (incorporating 40 C.F.R. §§ 264.31, 264.601, and 264.602) and 20 NMAC 4.1.900 (incorporating 40 C.F.R. § 270.32(b)(2)).

58. No party or commentor has met their burden in challenging NMED's determination to require a Confirmatory VOC Monitoring Program by presenting substantial evidence that this requirement is unreasonable or inconsistent with the HWA. *See* 20 NMAC 901.A.E.6 and 20 NMAC 1.4.400.A.

59. NMED's proposed revisions contained in Permit Condition IV.E.3.b of the Proposed Final Permit of June 25, 1999, are reasonable, necessary, and consistent with the HWA and regulations.

60. Detection Monitoring Program requirements apply to miscellaneous units when necessary to comply with 40 C.F.R. §§264.601 through 603. 20 NMAC 4.1.500 (incorporating 40 C.F.R. §264.90(d)).

61. Pursuant to 20 NMAC 4.1.500 (incorporating 40 C.F.R. §§264 Subpart F, 264.601); 20 NMAC 4.1.901.A.8; NMSA 1978 §74-4-4.2(c) (Repl. Pamp. 1993), Module V of the Proposed Final Permit of June 25, 1999, including all constituents specified in Table V.D, is necessary to detect a release of hazardous constituents that may have adverse effects on human health or the environment due to migration of waste constituents in the groundwater or subsurface environment.

62. Applicants' request for waiver was deficient because it failed to base predictions related to the potential for migration on assumptions that maximized the rate of liquid migration,

as required by 20 NMAC 4.1.500 (incorporating 40 C.F.R. §264.90(b)(4)).

63. No party or commentor has met their burden in challenging NMED's proposed Detection Monitoring Program by presenting substantial evidence that this requirement is unreasonable or inconsistent with the HWA. *See* 20 NMAC 901.A.E.6 and 20 NMAC 1.4.400.A.

64. Permit Condition V.B, regarding the Point of Compliance, is a condition necessary to detect a release of hazardous constituents which may have adverse effects on human health or the environment due to migration of waste constituents in the groundwater or subsurface environment, as required by 20 NMAC 4.1.500 (incorporating 40 C.F.R. §§264 Subpart F, and 264.601); 20 NMAC 4.1.901.A.8 and NMSA 1978 §74-4-4.2(c) (Repl. Pamp. 1993).

65. Permit Condition V, which requires a Detection Monitoring Program and establishes the Point of Compliance, constitutes a detection and monitoring requirement. 20 NMAC 4.1.500 (incorporating 40 C.F.R. §264.601).

66. NMED's proposed Point of Compliance is necessary to demonstrate compliance with the environmental performance standards of 20 NMAC 4.1.500 (incorporating 40 C.F.R. §264.601).

67. NMED's proposed Point of Compliance is necessary to comply with the requirements of 20 NMAC 4.1.500 (incorporating 40 C.F.R. §264, Subparts F and X).

68. NMED's proposed Point of Compliance is necessary to comply with 20 NMAC 4.1.500 (incorporating 40 C.F.R. §264.95), which requires that ground-water monitoring be conducted at the Point of Compliance.

69. NMED's proposed Point of Compliance is necessary to comply with 20 NMAC 4.1.500 (incorporating 40 C.F.R. §264.98(b)), which requires the co-location of the Point of Compliance and the ground-water monitoring system.

70. No party or commentor has met their burden in challenging NMED's proposed condition regarding the Point of Compliance by presenting substantial evidence that this requirement is unreasonable or inconsistent with the HWA. *See* 20 NMAC 901.A.E.6 and 20 NMAC 1.4.400.A.

71. Module VII of the Proposed Final Permit of June 25, 1999, is reasonable and necessary as required by NMSA 1978, §§ 74-4-4.A.5h and 74-4-4.2.B (Repl. Pamp. 1993).

72. NMED's determinations to require "further action" or "no further action" for certain SWMUs and AOCs identified in the Proposed Final Permit of June 25, 1999, are reasonable and necessary.

73. No party or commentor has met their burden in challenging NMED's proposed Module VII by presenting substantial evidence that this requirement is unreasonable or inconsistent with the HWA. *See* 20 NMAC 901.A.E.6 and 20 NMAC 1.4.400.A.

74. The Hearing Officer has duly considered all relevant public comments received and all relevant facts presented at the public hearing.

#### RECOMMENDED DECISION AND PROPOSED FINAL ORDER

Based upon the foregoing Findings of Fact, Discussion, and Conclusions of Law, the Hearing Officer respectfully recommends that the Secretary issue a Final Order, pursuant to 20 NMAC 4.1.901.F and 20 NMAC 1.4.504, granting a permit to Applicants subject to the

conditions specified in NMED's Proposed Final Permit of June 25, 1999, *except* as noted below.

The following language should be<sup>38</sup> substituted for Permit Condition IV.B.2.b in the Final Permit (added language is underscored):

Specific prohibition – after this Permit becomes effective, the Permittees shall not dispose non-mixed TRU waste in any Underground HWDU unless such waste is characterized in accordance with the requirements of the WAP specified in Permit Condition II.C.1. The Permittees shall not dispose TRU mixed waste in any Underground HWDU if the Underground HWDU contains non-mixed TRU waste not characterized in accordance with the requirements of the WAP.

No other permit revisions are recommended. However, NMED has expressed the position that the Proposed Final Permit implicitly prohibits Applicants from making structural changes to the RH Bay. *See Discussion* (RH TRU Waste) *supra*. Accordingly, a statement reflecting the Hearing Officer's position is appropriate here. So long as Applicants comply with Module I.E.11.a, Applicants should be allowed to make structural changes to the RH Bay and no modifications to the Proposed Final Permit are required. The *existing language* allows structural changes to the RH Bay. Moreover, NMED has not articulated a compelling justification for a permit condition that *would* prohibit physical alterations or additions. Of course, Applicants may not use any modified areas to manage, store or dispose waste unless and until the Secretary certifies compliance with the permit under Module I.E.11.b.ii, and modification of the permit

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<sup>38</sup> As previously noted, the Hearing Officer has found that NMED met its burden of proof with respect to this and all other permit conditions. The substituted language is recommended merely as the *most* reasonable version. *See Discussion* (TRU Non-Mixed Waste) and *Conclusions of Law* ¶56 *supra*.

would be required before the Secretary could properly certify compliance with respect to any modified areas.

Submitted this 9th day of September, 1999

A handwritten signature in cursive script, appearing to read "Jeffrey S. Gulin", is written over a horizontal line.

JEFFREY S. GULIN  
Hearing Officer