



STATE OF NEW MEXICO
BEFORE THE SECRETARY OF ENVIRONMENT



NEW MEXICO ENVIRONMENT)
DEPARTMENT, HAZARDOUS WASTE)
BUREAU CLASS 3 CLARIFICATION)
OF TRU MIXED WASTE DISPOSAL)
VOLUME REPORTING PERMIT)
MODIFICATION TO THE WIPP HAZARDOUS)
WASTE FACILITY PERMIT)
_____)

HWB 18-19 (P)

STEVE ZAPPE PROPOSED FINDINGS OF FACT
AND CONCLUSIONS OF LAW
AND
CLOSING ARGUMENT

Pursuant to 20.1.4.500.B NMAC, Steve Zappe submits the following proposed findings of fact and conclusions of law:

FINDINGS OF FACT

- A. ASSUMPTIONS OF THE AMOUNT OF WASTE IN CONTAINERS
 - 1. The Permittees submitted Revision 6 of the original RCRA Part B Permit Application to the Department on April 12, 1996. (AR 180914.37I, "960412 Apr 12 Transmittal Letter")
 - 2. The Permittees assert that a fundamental assumption regarding volume of waste in the original permit application was that the waste containers would be totally full. (AR 180121, p. 8)
 - 3. To support this assertion, the Permittees cite the 1997 WIPP Disposal Phase Final Supplemental Environmental Impact Statement (SEIS-II) DOE/EIS-0026-S-2, and include this statement as support for their



assumption: *“For the purposes of analyses in SEIS-II, the volume of the drum or cask is used, as if the drum or cask were full without void space.”* (AR 180121, p. 8, citing AR 180121.03, p. S-12)

4. However, the same page of the SEIS-II Summary read in context clearly places this statement in the category of a conservative assumption, one that would *“ensure that the results would actually be less than those presented”* and that TRU waste inventory estimates in SEIS-II would *“ensure bounding analyses of maximum, reasonably foreseeable impacts.”* (Zappe Exhibit Z-1, pp. 29-30; AR 180402.48, p. 2, footnote 1; AR 180121.03, p. S-12)
5. Furthermore, in discussing the uncertainty of total waste volumes, the full SEIS-II documents states, *“In addition, the waste volumes used for SEIS-II analyses are estimates of ‘emplaced waste volumes’ (the volumes of the containers that TRU wastes would be emplaced in), not actual waste volumes inside the containers, except as noted. DOE recognizes that virtually all containers would contain some void space and that some containers may be only partially filled (for instance, to meet limits on weight or thermal power for transportation).”* (AR 180402.48H, pp. 2-8 - 2-9, pdf pp. 84-85)
6. On cross-examination, Permittees’ witness Kehrman stated that Appendix D16 in the original permit application included parameters used for performance assessment modeling and *“there is reference to the fact that containers were considered to be full...”* (Tr. Oct 23, pp. 73-75)
7. Appendix D16, “Parameter Values Used to Simulate Repository Processes,” Section D16-7, “Repository and Panel Closures and Disturbed Rock Zone Parameter Values,” discusses, among other things, effective porosity of

waste regions for modeling analyses. It states, *"The current analyses consider a disposal room containing 6804 drums of uniformly distributed unprocessed waste and no backfill."* There is no clear statement that the drums were considered to be full. (AR 180914.37I, "960412 Rev 6 VOLUME X", pdf page 750)

8. Appendix D16 is the only citation to the original permit application provided by Permittees' witness Kehrman to support the assertion that "waste containers would be full of TRU waste." (Applicants' Exhibit 1, p. 3; Tr. Oct 23, pp. 73-75)
9. Zappe's written testimony asserts that this "fundamental assumption" is not only not in the original permit application, it does not appear in any comments by the Permittees on the two draft permits issued in 1998 by the Department prior to the public hearing on the original permit (Zappe Exhibit Z-1, p. 18; AR 180914.37L; AR 180914.37M; AR 180914.37R)
10. Zappe's written comment on the PMR stated, *"Everybody involved in the original permit application process understood that few waste containers would ever be 100% full. Many solidified solid waste drums would be partially full due to weight limitations, and many debris waste drums would be loosely compacted, resulting in inefficiently packaged containers."* (AR 180402.48, p. 2, footnote 1)
11. Zappe's written testimony states, *"Having been personally involved in the original WIPP Permit issuance, I can think of no person associated with the Permittees who ever publically stated that all containers managed, stored, and disposed of at WIPP would be full."* (Zappe Exhibit Z-1, p. 22)

12. The Permittees cited one instance in congressional records “*where container volumes and total volume were mentioned simultaneously*” and that the containers were “*filled containers.*” (AR 180706, p. 6, 1st ¶)
13. The cited document, “H.R.2637. Waste Isolation Pilot Plant Land Withdrawal Act (Reported in House - RH)” as provided in the record by the Permittees is incomplete and contains no language to support the statement that the containers were “*filled containers.*” (AR 180706.11)
14. However, the specific language from H.R.2637 was quoted by SRIC in their comments as “*CAPACITY OF THE WIPP.—The total capacity of the WIPP by volume is 6.2 million cubic feet of transuranic waste. Not more than 850,000 drums (or drum equivalents) of transuranic waste may be emplaced at the WIPP.*” Section 9(a)(3). House Report 102-241, Part 2. (AR 180402.34BB, p. 10; AR 180914.32, p. 4)
15. The full text of H.R.2637 contains no language to support the Permittees’ statement that the containers were “*filled containers.*” (AR 180402.34BB)
16. The term “actual waste volume” or “actual volume of [TRU] waste” appears several times in Permittees’ submittals in the record. (AR 180121, p. 8; AR 180706, p. 6; Applicants’ Exhibit 1, p. 3)
17. The term “actual waste volume” or “actual volume of [TRU] waste” is not defined in the Permittees’ submittals.
18. On direct testimony, Mr. Kehrman stated, “the statutory capacity represents the volume of the actual waste material disposed of.” (Tr. Oct 23, p. 22 ll. 16-17)

19. On cross-examination, Mr. Kehrman stated that actual waste volume was “the LWA TRU waste volume, the amount of waste, discounting the air or packaging materials, that might be placed in an overpack.” (Tr. Oct 23, p. 76, ll. 5-8)
20. The term “actual waste volume” or “actual volume of [TRU] waste” appears nine times in the written technical testimony of the Department’s witness Ricardo Maestas. (Bureau Exhibit 2, pp. 8-9)
21. On cross-examination, Mr. Maestas did not provide a clear definition or understanding of these terms. (Tr. Oct 24, p. 92 l. 18 through p. 93 l. 8)
22. A reasonable definition of “actual volume of waste” can be inferred from a plain reading of the Permittees’ quote from SEIS-II, which states, “*Many of the containers would include a great deal of void space... the actual volume of waste in a drum or cask, therefore, may be much less than the volume of the drum or cask.*” (AR 180121, p. 8; AR 180121.03, p. S-12)
23. By substituting “container” for “drum or cask” in the above quote, a reasonable definition could be “the actual volume of waste in a container is the volume of the container minus the void volume in the container.” (AR 180121.03, p. S-12)
24. The definition for “LWA TRU Waste Volume” proposed for inclusion in the draft permit is that it “*means the volume of TRU waste inside a disposal container.*” (AR 180804, Draft Part 1, Permit Section 1.5.22, p. 6)
25. The Permittees provided a draft DOE policy for implementing a tracking and reporting method for the TRU waste limits on “total capacity of WIPP”

- stipulated in Section 7(a)(3) of the WIPP LWA. (Applicants' Exhibit 1-A, p. 1, pdf p. 2)
26. This draft policy states, "*The method for tracking and reporting LWA TRU Waste Volume will distinguish between two categories of waste containers being disposed of in the WIPP facility: Those that are overpacked and those that are not overpacked (i.e., direct loaded).*" (Applicants' Exhibit 1-A, p. 5, pdf p. 6)
 27. The LWA TRU Waste Volume in direct-loaded containers will be tracked as the gross internal volume of the disposal container. (Applicants' Exhibit 1-A, p. 5, pdf p. 6)
 28. The LWA TRU Waste Volume for overpacked containers will be tracked as "*the gross internal volume of the innermost disposal container or the Pipe Overpack Component (POC).*" (Applicants' Exhibit 1-A, p. 5, pdf p. 6)
 29. The LWA TRU Waste Volume for overpacked containers will exclude the gross internal volume of the overpack, or outermost, disposal container. (Tr. Oct 23, pp. 49 l. 7 – p. 50 l. 11)
 30. The remaining volume in an overpack, not counting the overpacked containers, is "made up of just air." (Tr. Oct 23, p. 48 ll. 7-14)
 31. Waste containers may be overpacked due to integrity issues. (AR 180121, p. 9, pdf p. 13)
 32. Waste containers may also be overpacked for reasons associated transportation and radiological limits. (Applicants' Exhibit 1, p. 5)
 33. Waste containers may also be overpacked for payload management. (Zappe Exhibit Z-1, pp. 37-39)

34. There generally is no explicit denotation or reason given in the WDS why an overpack is created at a generator site when entered. (Tr. Oct 24, p. 23 ll. 8-16; p. 26 l. 10 – p. 27 l. 9)
35. The Permittees track and record a “fill factor” for every waste container disposed of at WIPP in the WDS, but it is not used. (Tr. Oct 24, p. 31 ll. 10-20)
36. Fill factor is an estimated percentage of waste inside the innermost container. (Bureau Exhibit 2, p. 9)
37. Zappe’s comments submitted on the original PMR questioned whether the definition of LWA TRU Waste Volume could be interpreted to mean the Permittees would multiply the internal gross volume of each waste container by the fill factor percentage recorded for each container in the WDS. (AR 180402.48, p. 9)
38. The Permittees have stated that the draft DOE policy will not instruct the use of fill factors in performing the data collection. (AR 180706, p. 1 of 10, pdf p. 4)
39. The draft DOE policy as submitted does not mention the term “fill factor.” (Applicants’ Exhibit 1-A)
40. The Department has no assurances that the Permittees will not revise their policy in the future, after it is separate from the permit, to consider fill factor to calculate the LWA TRU Waste Volume. (Tr. Oct 24, p. 103, ll. 3-19)

B. REPORTING OF WASTE VOLUME IN CONTAINERS

41. Since at least 1982, DOE has carefully studied and estimated the inventory of retrievably stored and newly generated waste potentially destined for WIPP. (AR 180402.48, p. 2)
42. Such inventory reports include, but are not limited to (AR 180402.48, p. 2):
 - “Integrated Data Base Report – Spent Fuel and Radioactive Waste Inventories, Projections, and Characteristics” (listed either as DOE/NE-0013 or DOE/RW-0006), issued between 1982 and 1997.
 - “WIPP Transuranic Waste Baseline Inventory Report” (TWBIR), issued between 1994 and 2006.
 - “Annual Transuranic Waste Inventory Report” (ATWIR), issued annually beginning in 2008.
43. On September 30, 1982, DOE issued DOE Order 5820.1, “Management of Transuranic Contaminated Material.” (AR 180402.48, p. 3; AR 180402.48A; Zappe Exhibit Z-1, p. 6)
44. Among other things, DOE Order 5820.1 established “*guidelines for the generation, treatment, packaging, storage, transportation, and disposal of transuranic (TRU) contaminated material.*” (Zappe Exhibit Z-1, p. 6; AR 180402.48A, p. 1)
45. DOE Order 5820.1 also provided a definition for waste container, which states in part, “... *any overpack shall be considered the waste container, and the original container shall be considered part of the waste.*” (AR 180402.48, p. 3; AR 180402.48A, p. 3)

46. On September 26, 1988, DOE issued DOE Order 5820.2A, "Radioactive Waste Management" (Zappe Exhibit Z-1, p. 7; Zappe Exhibit Z-6)
47. Among other things, DOE Order 5820.2A established "*policies, guidelines, and minimum requirements by which DOE manages its radioactive and mixed waste and contaminated facilities.*" (Zappe Exhibit Z-6, p. 1)
48. DOE Order 5820.2A also defined and addressed hazardous and mixed wastes for the first time. (Zappe Exhibit Z-1, p. 7; Zappe Exhibit Z-6, pdf pp. 16-17)
49. DOE Order 5820.2A reiterated, under the definition for waste package, "*... any overpack shall be considered the waste container, and the original container shall be considered part of the waste.*" (Zappe Exhibit Z-6, pdf p. 18)
50. DOE Order 5820.2A was in effect when the Pub. L. 102-579, WIPP Land Withdrawal Act was enacted on October 30, 1992 (Zappe Exhibit Z-1, p. 7; AR 180121.11)
51. DOE Order 5820.2A was also in effect when DOE submitted the WIPP RCRA Part B Permit Application for disposal to the Department on April 12, 1996 (Zappe Exhibit Z-1, p. 7; AR 180914.37I)
52. On October 6, 1992, Congress enacted Pub. L. 102-386, Federal Facility Compliance Act (Zappe Exhibit Z-1, p. 7; AR 180402.48C)
53. Among other things, the Federal Facility Compliance Act (FFCA) required DOE to submit an inventory of all its mixed waste to the EPA and authorized states. (AR 180914.37, p. 9, 11; Zappe Exhibit Z-1, p. 7; AR 180402.48C)

54. The first annual report fulfilling the inventory reporting requirement of the FFCA was the Integrated Data Base Report for 1993, DOE/RW-0006, Rev 9, March 1994. (Zappe Exhibit Z-1, pp. 19-20, 30-31; 180402.48D)
55. The Integrated Data Base Report for 1993, Overview, Section O.4 Waste Characteristics and Units Reported, stated in part, "*Waste volume is reported in cubic meters (m³) and generally reflects the amount of space occupied by the waste and its container.*" (AR 180402.48D, p. 5, pdf p. 2; Zappe Exhibit Z-1, pp. 30-31)
56. The Integrated Data Base Report for 1994, DOE/RW-0006, Rev 11, September 1995, repeated the same statement regarding waste volume. (AR 180402.48E, p. 5, pdf p. 38)
57. This understanding of reporting waste volume had been published at least twice when DOE submitted the WIPP RCRA Part B Permit Application for disposal to the Department on April 12, 1996 (Zappe Exhibit Z-1, p. 7; AR 180914.37I)
58. The most recent (2017) Annual TRU Waste Inventory Report (ATWIR) reports that "final form" waste stream volumes are derived by applying container type volumes to the respective container type counts, and that CH-TRU waste volume in overpacks reflects the outer container volume. (AR 18042.34X, p. 18; Zappe Exhibit Z-1, pp. 32-33)
59. Gross internal container volume is the historic practice for reporting the volume of waste disposed of at WIPP (Statement of Don Hancock, pp. 5-8; AR 180402.34, pp. 5-6)

60. The 1999 Implementation Guide for Use with DOE M 435.1-1 provides guidance for satisfying minimum waste characterization requirements for safe and effective management of TRU waste. (Zappe Exhibit Z-5, pp. III-64-65, pdf pp. 488-489)
61. The guidance states that volume information is necessary for proper control of storage and disposal facility capacities, and that a typical parameter includes “*container volume, measured as the external volume of the waste container which represents the volume that will be occupied in a storage or disposal facility...*” (Zappe Exhibit Z-5, p. III-66, pdf pp. 490)
62. A 2015 DOE document entitled “Waste Volume Definitions Used For TRU Waste” confirms the historic understanding of reporting waste volumes consistent with the 1999 Implementation Guide. (Zappe Exhibit Z-1, pp. 31-32; Tr. Oct 25, pp. 60-62, 64; Zappe Exhibit Z-3)

C. BASIS FOR WIPP LAND WITHDRAWAL ACT TOTAL VOLUME CAPACITY LIMIT

63. The WIPP LWA established several transuranic waste limitations in Section 7, “Disposal Operations,” Subsection (a), “Transuranic Waste Limitations.” (AR 180706.03, p. 106 STAT. 4785; AR 180402.48F, Page 3)
64. Of these limitations, the one relevant to this proceeding is in Section 7(a)(3), which states, “*CAPACITY OF WIPP.— The total capacity of WIPP by volume is 6.2 million cubic feet of transuranic waste.*” (AR 180706.03, p. 106 STAT. 4785; AR 180402.48F, Page 3)

65. Congress likely considered numerous sources to arrive at that limit, including
- The 1980 WIPP Final Environmental Impact Statement, DOE/EIS-0026 identified the design capacity of WIPP as a total of 6.2 million cubic feet (AR 180706.05, p. 2-17, pdf p. 52)
 - The 1981 WIPP Record of Decision stated the WIPP facility was designed to emplace approximately 6.2 million cubic feet of contact-handled TRU waste and as much as 250,000 cubic feet of remote-handled TRU waste in a mined repository. (AR 180121.02, p. 9163, pdf p. 2)
 - The Second Modification to the Consultation and Cooperation Agreement between DOE and the State of New Mexico, signed August 4, 1987, incorporated the 6.2 million cubic feet limit into the agreement. (Tr. Oct 25, p. 182 l. 1 – p. 185 l. 7; AR 180706.02, pdf p. 56)
66. Additional written testimony presents evidence demonstrating *“Congress understood that the capacity limits for the Test Phase... and the facility were based on 55-gallon drums (or drum equivalents)”* (Statement of Don Hancock, pp. 3-4; Tr. Oct 25, p. 181 ll. 3-25)
67. During cross-examination of Applicants’ witness Kehrman, SRIC counsel further demonstrated how Congress expressed WIPP capacity limits in terms of volume in cubic feet as well as the number and volume of disposal containers (Tr. Oct 23, p. 166 l. 4 – p. 173 l. 1)
68. The initial May 15, 1998 WIPP Hazardous Waste Facility Draft Permit and the November 13, 1998 Revised Draft Permit expressed storage and

disposal maximum capacities as both volumes in cubic feet/meters and container equivalents:

- May 15, 1998 Fact Sheet, “Units to be Permitted” (AR 180914.37), pp. 3-4, pdf pp. 8-9)
 - May 15, 1998 Draft Permit, “Table III.A.1 - WHB Unit,” “Table III.A.2 - Parking Area Unit,” “Table IV.A.1 - Underground HWDUs” (AR 180914.37K, pdf pp. 46, 47, 52)
 - November 13, 1998 Fact Sheet, “Units to be Permitted” (180914.37O, pp. 3-4, pdf pp. 8-9)
 - November 13, 1998 Revised Draft Permit, “Table III.A.1 - WHB Unit,” “Table III.A.2 - Parking Area Unit,” “Table IV.A.1 - Underground HWDUs” (AR 180914.37P, pdf pp. 48, 49, 54)
69. During cross-examination of SRIC witness Hancock, Applicant’s counsel questioned whether the LWA definition of transuranic waste mentioned or included any reference to waste being in a container. (Tr. Oct 25, p. 206 l. 11 – p. 207 l. 24)
70. SRIC witness Hancock stated that it was unnecessary to say that. (Tr. Oct 25, p. 206 l. 19)
71. In Section 2(20), the LWA defines *“The term ‘transuranic waste’ means waste containing more than 100 nanocuries of alpha-emitting transuranic isotopes per gram of waste, with half- lives greater than 20 years...”* (AR 180706.03, p. 106 STAT. 4779; AR 180402.48F, Page 1)
72. DOE Order 5820.2A, in effect at the time the LWA was enacted, defined transuranic waste as, *“Without regard to source or form, waste that is*

contaminated with alpha-emitting transuranium radionuclides with half-lives greater than 20 years and concentrations greater than 100 nCi/g at the time of assay.” (Zappe Exhibit Z-6, pdf p. 18, Definition 39)

73. DOE Order 5820.2A defined waste package as, *“The waste, waste container, and any absorbent that are intended for disposal as a unit.”* (Zappe Exhibit Z-6, pdf p. 19, Definition 44)
74. DOE Order 5820.2A, Chapter II.3.a.(2), further stated, *“The lower concentration limit for transuranic waste (>100 nCi/g of waste) shall apply to the contents of any single waste package at the time of assay.”* (Zappe Exhibit Z-6, pdf p. 31)
75. The TRU Waste Acceptance Criteria for the Waste Isolation Pilot Plant Revision 3 (January 1989), also in effect at the time at the time the LWA was enacted, cites in Section 4.6 this requirement from DOE Order 5820.2A as criterion for determining the specific activity of the waste and thus for acceptance of waste at WIPP. (AR 180402.48B, p. 30)
76. The first criterion listed in TRU WAC Revision 3 addresses waste container requirements, including specific requirements for waste containers, waste package size, and waste package handling for acceptance of waste at WIPP. (AR 180402.48B, pp. 8, 14-18)
77. TRU WAC Revision 3 contains no provision for acceptance of non-containerized TRU waste at WIPP. (AR 180402.48B)
78. Likewise, the current TRU Waste Acceptance Criteria for the Waste Isolation Pilot Plant Revision 8 (July 5, 2016), Sections 3.1 and 4.1, “Summary of WIPP Authorization Basis” presents *“the requirements and associated criteria that must be met for [CH/RH] TRU waste to be transported to, managed at, and*

disposed of at the WIPP." This document also contains no provision for acceptance of non-containerized TRU waste at WIPP. (AR 180914.37H, pp. 22, 41)

79. During cross-examination of SRIC witness Hancock, the Department's counsel asked if it was correct that Congress did not mention mixed waste in the LWA capacity limit. (Tr. Oct 25, pp. 227 l. 12 – p. 229 l. 8)
80. SRIC witness Hancock stated that it did not mention it because it did not need to. (Tr. Oct 25, p. 228 ll. 7-10)
81. The Permit states, *"TRU Mixed Waste' means TRU waste that is also a hazardous waste as defined by the HWA and 20.4.1.200 NMAC (incorporating 40 CFR §261.3).*" (Tr. Oct 25, p. 82 ll. 1-8; Permit Part 1, Section 1.15, "Definitions," p. 1-4)
82. DOE's 1997 SEIS-II states, *"TRU mixed waste is defined as any TRU waste that is commingled with a hazardous waste regulated by RCRA... TRU waste containing hazardous chemical constituents has physical and radiological characteristics similar to TRU waste that does not contain these constituents."* (AR 180402.48H, p. 2-4, pdf p. 80)
83. SEIS-II also states, *"TRU mixed waste is approximately 60 percent of the Department's TRU waste."* (AR 180402.48H, p. 2-5, pdf p. 81)
84. The WIPP Land Withdrawal Act (Public Law 102-579) as enacted in 1992 did not mention transuranic mixed waste. (AR 180706.03)
85. The National Defense Authorization Act for Fiscal Year 1997 (Public Law 104-201), which included the WIPP Land Withdrawal Act Amendments, inserted language pertaining to transuranic mixed waste in two locations in the LWA. (AR 180121.08, p. 110 STAT 2853, pdf p. 433)

86. In both instances (LWA Sections 9(a)(1) and 14(b)(2)), the inserted language exempted transuranic mixed waste, designated by the Secretary for disposal at WIPP, from RCRA land disposal restrictions. (Tr. Oct 25, pp. 233-236; AR 180121.08, p. 110 STAT 2853, pdf p. 433)
87. The LWA total volume capacity limit was unchanged by the WIPP LWA Amendments. (AR 180121.08, pp. 110 STAT 2851-2854, pdf pp. 431-434)

D. REGULATORY OVERSIGHT OF LWA TOTAL VOLUME CAPACITY LIMIT

88. The WIPP LWA established several transuranic waste limitations in Section 7, "Disposal Operations," Subsection (a), "Transuranic Waste Limitations." (AR 180706.03, p. 106 STAT. 4785; AR 180402.48F, Page 3)
89. Of these limitations, the one most relevant to this proceeding is in Section 7(a)(3), which states, "*CAPACITY OF WIPP.— The total capacity of WIPP by volume is 6.2 million cubic feet of transuranic waste.*" (AR 180706.03, p. 106 STAT. 4785; AR 180402.48F, Page 3)
90. Subsection (a) contains two other limitations dealing with (1) REM limits for remote-handled transuranic waste and (2) Curie limits for remote-handled transuranic waste (AR 180706.03, p. 106 STAT. 4785; AR 180402.48F, Page 3)
91. The transuranic waste limitations in Section 7(a) are not explicitly associated with any particular regulatory program. (Tr. Oct 25, p. 212 l. 16 – p. 213 l. 20)

92. The Permittees state, "The WIPP LWA limit was formulated by Congress as a limit on the amount of TRU waste the DOE can dispose in the WIPP facility and not as a RCRA disposal unit volume limit." (AR 180121, p. 7, pdf p.11)
93. The Permittees suggested that because the LWA capacity limit was not in Section 9, "Compliance With Environmental Laws And Regulations," it is not considered a RCRA limit. (Tr. Oct 25, p. 63 ll. 10-16)
94. The Permittees state, "*Removing the references to the LWA TRU waste total capacity limit is one of the Permittees' objectives in the PMR since the number is not relevant to RCRA.*" (Applicants' Exhibit 1, pp. 20-21)
95. In the RCRA Part B Permit Application submitted by the Applicants in April 1996, Chapter A, p. A-5 of the Hazardous Waste Permit Application Part A states, "*During the Disposal Phase of the facility, which is expected to last 25 years, the total amount of waste received from off-site generators and any derived waste will be limited to 175,600 m³ of TRU waste of which up to 7,080 m³ may be remote handled (RH) TRU mixed waste. For purposes of this application, all TRU waste is managed as though it were mixed.*" (AR 180914.37I, "960412 Rev 6 VOLUME I," p. A-5, pdf p. 83)
96. 175,600 m³ and 7,080 m³ are roughly equal to 6,200,000 ft³ and 250,000 ft³.
97. This identical language was included in Attachment O of the draft permit subject to public hearing in 1999. (AR 180914.37P, "981137 Nov 13 Revised Draft Permit," pdf p. 1774)

98. This identical language is included in Attachment B of the current permit subject to revision in this administrative proceeding. (Permit Attachment B, p. B-13, pdf p. 17, ll. 18-21)
99. At the time the Permittees prepared the Part B Permit Application, they considered the WIPP LWA capacity limit and the repository limit to be the same. (AR 180121, p. 7, pdf p.11)
100. At the time of the original permit hearing in 1999, the Department understood that the WIPP LWA capacity limit was also a capacity limit under RCRA, and that the capacity limit was based on container volume. (Tr. Oct 25, p. 100 l. 18 – p. 102 l. 2)
101. In the 1996 permit application, the closure plan stated, *“For the purposes of this Closure Plan, final facility closure is defined as closure that will occur when all waste disposal areas are filled or when the WIPP achieves its capacity of 6.2 million cubic feet (ft³) (175,600 cubic meters (m³) of TRU waste.”* (AR 180914.371, “960412 Rev 6 VOLUME I,” p. I-2, pdf p. 687 ll. 42-44)
102. This exact language was incorporated into the original permit issued in 1999, and has remained unchanged for 19 years (Permit Attachment G, “Closure Plan,” p. G-2, pdf p. 6)
103. The Permittees proposed to significantly modify this requirement in their PMR by removing the LWA limit and replacing it with a reference to permitted HWDU capacities in Permit Part 4, Table 4.1.1 (AR 180121, p. B-14, pdf p. 37)

104. The draft permit supported by the Department retains the LWA limit but conditions the volume as the LWA TRU Waste Volume, not the RCRA volume used in the permit (proposed to be called “TRU Mixed Waste RCRA Volume”). (Draft Permit Attachment G, p. G-2, pdf p. 6)
105. At the time of the original permit hearing in 1999, the Department understood that the LWA capacity limit was one provision that could trigger final closure under the RCRA permit, and that the Department had the authority and responsibility to enforce the LWA capacity limit. (Tr. Oct 25, p. 102 l. 12 – p. 103 l. 6)
106. The Permittees’ position that the LWA capacity limit is not a RCRA limit appears nowhere in the record prior to submittal of their PMR on January 31, 2018. (AR 180121)

CONCLUSIONS OF LAW

A. ASSUMPTIONS OF THE AMOUNT OF WASTE IN CONTAINERS

1. Based upon findings of fact 1 through 2, the Permittees claim that at the time the RCRA Part B Permit Application was submitted to the Department, the Permittees assumed that all waste containers disposed of at WIPP would be totally full.
2. Based upon findings of fact 3 through 5, the Permittees assumption of totally full containers, justified by citation to the SEIS-II document, is unsupported. The Permittees selectively quoted a limited portion of the text without placing it into its correct context. "Full containers" are only assumed for conservatism in bounding modeled outcome, and waste volume estimates are generally based upon the volume of the emplaced waste container, not the actual waste volume inside a container.
3. Based upon findings of fact 6 through 11, Permittees' witness Kehrman's assertion that the original permit application referenced full containers is unsupported. This conclusion is reached not only by a review of the citation provided during cross-examination, but by a thorough review of the entire original permit application and significant portions of the administrative record for the original permit.
4. Based upon findings of fact 5 and 10 through 11, witness Zappe confirms the SEIS-II conclusion that few containers would be 100% full. His assertion that he could think of "*no person associated with the Permittees*

who ever publically stated that all containers managed, stored, and disposed of at WIPP would be full” was never challenged or refuted.

5. Based upon findings of fact 12 through 15, the Permittees assertion that congressional records identified filled containers when mentioning container volumes and total volumes is unsupported.
6. Based upon findings of fact 1 through 15, there is no evidence whatsoever in the record to support the assertion that containers were ever assumed to be full in the original permit application. Instead, waste volume estimates are generally based upon the volume of the emplaced waste container, not the actual waste volume inside a container.
7. Based upon findings of fact 16 through 19, the Permittees believe the statutory limit of 6.2 million ft³ in the LWA is an actual volume, not associated with the volume of the emplaced container, and that it is specifically associated with actual amount of waste placed in an overpack.
8. Based upon findings of fact 20 through 21, the Department failed to articulate what they meant by “actual volume of waste” in their testimony.
9. Based upon findings of fact 22 through 23, a concise summary statement would be “the actual volume of waste in a container is the volume of the container minus the void volume in the container.”
10. Based upon findings of fact 24 through 27 and conclusions 6 and 7, the Permittees have submitted a draft policy that does not meet the definition proposed in the permit for LWA TRU Waste Volume, that is, to determine “the volume of TRU waste inside a disposal container.” For direct-loaded containers, the policy states that the LWA TRU Waste Volume is the gross

internal volume of the disposal container. This is equal to the volume of the emplaced container, and is not the actual volume of waste inside the disposal container because, as concluded above, most direct-loaded disposal containers would have some void volume that must be subtracted. In order to satisfy the definition proposed for LWA TRU Waste Volume, the policy would have to specify actual volume of waste in direct-loaded containers.

11. Based upon findings of fact 24 through 30, the same problem persists for overpacked containers, which are generally presumed to be either direct-loaded containers or POCs in 55-gallon drums. However, the policy states that the LWA TRU Waste Volume is the gross internal volume of the innermost disposal (i.e., overpacked) container or the gross internal volume of the POC. In neither case does this volume represent the actual waste volume inside the innermost disposal container or POC because the innermost disposal containers and POCs would also have some void volume.
12. Based upon findings of fact 31 through 34, although there are many reasons why a waste container may be overpacked, the reason is not given in the WDS.
13. Based upon findings of fact 35 through 40, the Permittees track and record fill factor for every waste container in the WDS. Fill factor could be used to estimate the actual volume of waste in every container, but the draft policy does not use it, and the Permittees have stated they will not use it.

14. Based upon findings of fact 1 through 40, the Permittees have created a confusing situation where they state that all containers are assumed full, but it has been demonstrated that they are not. The Permittees state that the statutory limit is an actual volume, but their draft policy is inadequate to determine the actual volume of waste in direct-loaded containers and in overpacked containers. Therefore, the Permittees are unable to track and report volumes of emplaced waste to the accuracy necessary to be consistent with their belief that the statutory limit is an actual volume.

B. REPORTING OF WASTE VOLUME IN CONTAINERS

15. Based upon findings of fact 41 through 42, DOE has a long history of studying, estimating, and reporting the inventory of waste potentially destined for WIPP.
16. Based upon findings of fact 43 through 49, DOE issued several orders during the 1980s related to the management of radioactive waste. These orders defined waste containers and waste packages, and both stated that the overpack container is considered the waste container for disposal, and the original container is part of the waste.
17. Based upon findings of fact 50 through 51, the DOE requirement regarding overpacks was in effect and understood when the WIPP LWA was enacted in 1992 and when the WIPP permit application for disposal was submitted to the Department in 1996.

18. Based upon findings of fact 52 through 53, enactment of the FFCA in 1992 required DOE to submit an inventory of all mixed waste to EPA and authorized states.
19. Based upon findings of fact 54 through 56, DOE's Integrated Data Base Reports issued in 1994 and 1995 clearly stated that reported waste volume generally reflected the amount of space occupied by the waste and its container.
20. Based upon finding of fact 57, DOE understood this assumption when the WIPP permit application for disposal was submitted to the Department in 1996.
21. Based upon findings of fact 58 through 59, DOE has an extensive record of reporting the estimated inventory and the volume of waste disposed of at WIPP based upon the gross internal volume of the container and not of the actual waste.
22. Based upon findings of fact 60 through 61, current DOE guidance issued in 1999 makes it clear that container volume, measured as the external volume of the waste container, is the appropriate volume information necessary for proper control of storage and disposal facility capacities because it represents the volume that will be occupied in the facility.
23. Based upon finding of fact 62, a DOE document part of a 2015 Request for Proposals solicitation clearly confirms the historic practice of reporting waste volumes consistent with the current DOE guidance.
24. Based upon findings of fact 41 through 62, the record is unequivocal regarding how waste volumes are to be reported:

- Overpacks are considered the waste container for disposal, and any overpacked containers are considered part of the waste.
 - Waste volume is reported as the amount of space occupied by the waste and its container (i.e., gross internal volume of outermost container).
25. Based upon findings of fact 1 through 62, although the presumed “assumption” by the Permittees regarding “full containers” ultimately yields the same volume as using the amount of space occupied by the waste and its container, this false assumption leads to the unfounded conclusions presented by the Permittees in their testimony regarding the need for a new definition of “LWA TRU Waste Volume.” If the initial assumption regarding volume of waste is instead as it is listed in conclusion 24, there is no basis for proposing an alternate definition, and the entire premise undergirding the PMR and draft permit disappears.

C. BASIS FOR WIPP LAND WITHDRAWAL ACT TOTAL VOLUME CAPACITY LIMIT

26. Based upon findings of fact 63 through 64, the plain language of the LWA capacity limit is *“The total capacity of WIPP by volume is 6.2 million cubic feet of transuranic waste.”*
27. Based upon findings of fact 65 through 67, Congress was familiar with the assumptions DOE used to arrive at the design capacity as well as the limits expressed in the agreement between DOE and the State. Congress also recorded its deliberations in various congressional reports, expressing

WIPP capacity limits in terms of volume in cubic feet as well as the number and volume of disposal containers.

28. Based upon finding of fact 68, the WIPP draft permit subject to hearing in 1999 similarly expressed storage and disposal maximum capacities as both volumes in cubic feet/meters and container equivalents.
29. Based upon findings of fact 69 through 70, Applicant's counsel attempted to support their position that the LWA capacity limit was an actual volume and not based upon container volumes by asking SRIC witness Hancock whether the LWA definition of transuranic waste mentioned or included any reference to waste being in a container.
30. Based upon findings of fact 71 through 75, the LWA definition of transuranic waste implies that measurements must be taken to confirm the classification of waste as transuranic. DOE orders and WIPP Waste Acceptance Criteria from the same time period clearly require that waste must be in a container in order to determine the specific activity of the waste by assay for classification and acceptance as transuranic waste.
31. Based upon findings of fact 76 through 78, there is no provision in historic and current WIPP Waste Acceptance Criteria for acceptance of non-containerized TRU waste at WIPP.
32. Based upon findings of fact 79 through 80, the Department's counsel attempted to support an unclear position regarding the LWA capacity limit by asking SRIC witness Hancock if it was correct that Congress did not mention mixed waste in the LWA capacity limit.

33. Based upon findings of fact 81 through 87, transuranic mixed waste is a subset of all transuranic waste, represents a majority of the transuranic waste inventory, and thus is clearly included in the overall LWA capacity limit.
34. Based upon findings of fact 41 through 87, the LWA capacity limit must be understood as radioactive waste that has been containerized, assayed to verify that it meets the definition of transuranic waste, and otherwise acceptable for storage and disposal at WIPP. The volume is the amount of space occupied by the waste and its container, otherwise referred to in testimony as the gross internal volume of the outermost container.
35. Based upon findings of fact 1 through 87, there is no basis for creating a new definition for LWA TRU Waste Volume, because the LWA capacity limit is not an actual waste volume limit, but is instead clearly based upon the waste volumes reported as the gross internal volume of outermost containers.

D. REGULATORY OVERSIGHT OF LWA TOTAL VOLUME CAPACITY LIMIT

36. Based upon findings of fact 88 through 91, the LWA established several TRU waste limitations in Section 7, "Disposal Operations." One of the limitations is the total capacity limit of 6.2 million cubic feet. None of these limitations are explicitly associated with any particular regulatory program.

37. Based upon findings of fact 92 through 94, the Permittees make several arguments supporting their position that the LWA capacity limit is not a RCRA limit.
38. Based upon findings of fact 95 through 98, the Permittees submitted information in the narrative portion of their RCRA Part A permit application stating that the total amount of waste received would be limited to the LWA capacity limit. This language was incorporated into the original permit in 1999 and remains in the permit today.
39. Based upon findings of fact 99 through 100, the Permittees and the Department considered the LWA capacity limit and the repository limit to be the same, and the Department explicitly understood that the repository limit was a RCRA limit based upon container volumes, not actual waste volumes.
40. Based upon findings of fact 101 through 105, the LWA capacity limit has been understood by both the Permittees and the Department to serve as one of the provisions that would trigger final closure under the RCRA permit, and the Department has understood its authority and responsibility to enforce the LWA capacity limit under the RCRA permit.
41. Based upon findings of fact 88 through 106, the Permittees are now attempting to reverse and revise these common understandings of the significance of RCRA to the LWA capacity limit more than 25 years after enactment of the WIPP LWA. The record is clear that the Permittees have never before challenged the Department's authority to enforce the LWA capacity limit, nor have they challenged the understanding that the

LWA/RCRA capacity limit was based upon the gross internal volume of the outermost containers.

CLOSING ARGUMENT AND MEMORANDUM IN OPPOSITION

The relevant summary conclusions for the four categories presented in my proposed findings of fact and conclusion of law are repeated here:

A. Assumptions Of The Amount Of Waste In Containers

The Permittees have created a confusing situation where they state that all containers are assumed full, but it has been demonstrated that they are not. The Permittees state that the statutory limit is an actual volume, but their draft policy is inadequate to determine the actual volume of waste in direct-loaded containers and in overpacked containers. Therefore, the Permittees are unable to track and report volumes of emplaced waste to the accuracy necessary to be consistent with their belief that the statutory limit is an actual volume.

B. Reporting Of Waste Volume In Containers

Although the presumed “assumption” by the Permittees regarding “full containers” ultimately yields the same volume as using the amount of space occupied by the waste and its container, this false assumption leads to the unfounded conclusions presented by the Permittees in their testimony regarding the need for a new definition of “LWA TRU Waste Volume.” If the initial assumption regarding volume of waste is instead that

- Overpacks are considered the waste container for disposal, and any overpacked containers are considered part of the waste, and
- Waste volume is reported as the amount of space occupied by the waste and its container (i.e., gross internal volume of outermost container),

there is no basis for proposing an alternate definition, and the entire premise undergirding the PMR and draft permit disappears.

C. Basis For WIPP Land Withdrawal Act Total Volume Capacity Limit

There is no basis for creating a new definition for LWA TRU Waste Volume, because the LWA capacity limit is not an actual waste volume limit, but is instead clearly based upon the waste volumes reported as the gross internal volume of outermost containers.

D. Regulatory Oversight Of LWA Total Volume Capacity Limit

The Permittees are now attempting to reverse and revise these common understandings of the significance of RCRA to the LWA capacity limit more than 25 years after enactment of the WIPP LWA. The record is clear that the Permittees have never before challenged the Department’s authority to enforce the LWA capacity limit, nor have they challenged the understanding that the LWA/RCRA capacity limit was based upon the gross internal volume of the outermost containers.

I will finish by summarizing the conclusions previously expressed in my two public comments and my written testimony:

- Congress clearly expressed its intent in two laws, both enacted in October 1992 – the Federal Facility Compliance Act and the Land Withdrawal Act.

- In responding to the FFCA requirement to provide an inventory of mixed waste to the states, DOE chose to report waste volumes for both storage and disposal on two principles listed above in B.
- The consistency of this choice for reporting waste volume based on these principles for purposes of comparison to the LWA total capacity limit is overwhelming in the record presented.
- Any dissatisfaction that the Permittees have with how that choice turned out is not a result of the RCRA Permit, but is either due to the inherent limitations on how radioactive waste must be safely packaged for transportation and disposal (e.g., weight and radiological limitations) or to their deliberate choices to overpack waste in creative ways (e.g., payload management).
- The impact of those choices did not become apparent just recently, but have been understood for many years.
- The State's RCRA Permit is the wrong place to attempt to effect this change because the justifications put forth by the Permittees in their PMR and testimony are brazenly inconsistent with the administrative record.
- Congress did not intend for DOE to have multiple opportunities to define how waste volumes are calculated for purposes of the LWA total capacity limit.
- The Permittees should seek legislative remedy from Congress for their perceived concerns.

In conclusion, I oppose issuance of the draft permit for these reasons, and recommend that Secretary deny it.

A handwritten signature in black ink, appearing to read "Steve Zappe". The signature is written in a cursive, flowing style.

Steve Zappe

CERTIFICATE OF SERVICE

I hereby certify that a copy of these Proposed Findings of Fact and Conclusions of Law was sent via the stated methods below on November 28, 2018:

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