



Operated for the U.S. Department of Energy's  
National Nuclear Security Administration  
by **Sandia Corporation**

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**Michael W. Hazen**  
Vice President  
Infrastructure Operations  
Chief Security Officer

Mr. Geoffrey Beausoleil  
Manager  
U. S. Department of Energy  
National Nuclear Security Administration  
Sandia Field Office, MS-0184  
P. O. Box 5400  
Albuquerque, NM 87185-0184

Dear Mr. Beausoleil:

Subject: ***Updates to Comprehensive Part B Permit Request for Sandia National Laboratories/New Mexico (SNL/NM), Environmental Protection Agency Identification Number (EPA ID) NM5890110518***

Enclosed please find updates to the Comprehensive Part B Permit Request for hazardous and radioactive/hazardous mixed waste storage and treatment operations at SNL/NM.

Your office submitted the Part B Permit Request to the New Mexico Environment Department (NMED) on behalf of the Department of Energy (DOE) and Sandia Corporation (Sandia) in February 2002. The Part B Permit Request has been revised numerous times to address Notices of Deficiency issued by NMED, and to incorporate changes in waste management operations at SNL/NM. Your office submitted the most recent revisions and updates to NMED on May 4, 2012 on behalf of DOE/National Nuclear Security Administration (DOE/NNSA) and Sandia.

Enclosed are technical corrections and updates that must be submitted to incorporate the most current information regarding geology at and near SNL/NM.

The corrections and updates affect some of the pages in Parts 1 and 2 of the Part B Permit Request. This submittal includes three enclosures. Each is discussed below.

Enclosure A: Summary of Corrections and Updates

The corrections and updates are summarized for your convenience in reviewing them.



Enclosure B: Redline/Strikeout Copies of Revised Pages

Text revisions are limited to Part 2 of the Part B Permit Request. The revised text pages are included in redline/strikeout format. Revisions to figures are summarized in Enclosure A, but are not shown in redline/strikeout format in Enclosure B.

Enclosure C: Revised Pages

Revised figures and text pages are included.

Sandia requests that DOE/NNSA submit the enclosed information to the NMED as soon as possible and no later than noon April 14, 2014.

I have signed the certification to be sent to the NMED as the Operator at SNL/NM. If you agree, please sign the certification as the Owner.

If you have any questions about the document, please contact Sidney Gutierrez, Director, at (505) 284-0431/[smgutie@sandia.gov](mailto:smgutie@sandia.gov), Fran Nimick, Senior Manager, at (505) 284-2577/[fbnimic@sandia.gov](mailto:fbnimic@sandia.gov) or Jeffrey Jarry, Manager, at (505) 284-3080/[jfjarry@sandia.gov](mailto:jfjarry@sandia.gov).

Sincerely,

Michael W. Hazen  
Vice President

Enclosures:

1. Updates to Comprehensive Part B Permit Request for Sandia National Laboratories, Certification Statement
2. Enclosure A: Summary of Corrections and Updates to Comprehensive Part B Permit Request
3. Enclosure B: Revised Pages, Redline/Strikeout Format, Comprehensive Part B Permit Request
4. Enclosure C: Revised Pages, Text and Figures, Comprehensive Part B Permit Request

Copy to (w/enclosures):

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**U. S. Department of Energy and Sandia Corporation**

**Updates to Comprehensive Part B Permit Request  
for Sandia National Laboratories**

**Albuquerque, New Mexico  
EPA ID No. NM5890110518**

**CERTIFICATION STATEMENT**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment for knowing violations.

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Michael W. Hazen, Vice-President  
Sandia Corporation  
Albuquerque, New Mexico  
Operator

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Date signed

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Geoffrey L. Beausoleil, Manager  
U.S. Department of Energy  
National Nuclear Security Administration  
Sandia Field Office  
Owner

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Date signed

**Enclosure A**

**Summary of Corrections and Updates  
Comprehensive Part B Permit Request**

**Sandia National Laboratories  
NM5890110518**

**ATTACHMENT A**  
**SUMMARY OF CHANGES FOR COMPREHENSIVE PART B PERMIT REQUEST**  
**SANDIA NATIONAL LABORATORIES, NM5890110518**

March 2014

Item No.	Location	Current Language	Revised Language	Explanation for Change
1	Part 1: General Part A, Appendix B, <i>Figures</i>	Figure B-1 presents geologic information that was available when the Part B Permit Request was submitted in February 2002. It also presents groundwater well data from April 2012.	Figure B-1 has been revised to incorporate the most current information regarding faults on Kirtland Air Force Base. Groundwater wells have been revised to reflect recent activities and to correct errors.	Incorporate current information.
2	Part 2, General Part B, Appendix A, <i>Acronyms and Abbreviations</i>	<i>none</i>	<u>CAMU</u> <u>Corrective Action Management Unit</u>	Incorporate CAMU into revised Appendix A.
3	Part 2, General Part B, Appendix A, page SW-A-2 Table A-1, row 5	In Manzano Area on KAFB. 0.4 acres occupied by bunkers (approximately 1600 to <u>2100</u> square feet in each bunker)	In Manzano Area on KAFB. 0.4 acres occupied by bunkers (approximately 1600 to <u>2400</u> square feet in each bunker)	Correct error.
4	Part 2, General Part B, Appendix A, page SW-A-2 Table A-1, row 6	<i>none</i>	Add row 6 to Table A-1:  <u>Corrective Action Management Unit</u> <u>CAMU</u> <u>Southeast corner of TA-III. Includes containment cell located due north of RMWMF.</u> <u>Post-closure monitoring of containment cell</u> <u>Existing, post-closure care</u>	Incorporate CAMU into revised Appendix A.
5	Part 2, General Part B, Appendix A, page SW-A-5 Section A.4.1, <i>Geologic Setting</i>	SNL/NM is located along the east-central edge of the Albuquerque Basin, one of a north-south-trending series of basins that make up the Rio Grande Rift. <u>The Sandia, Manzanita, and Manzano Mountains, which are uplifted fault blocks, form the eastern boundary of the basin. The Lucero uplift bounds the west side of the basin, the Ladron Mountains bound the south side, and there is limited topographic relief on the northwest side of the basin.</u> The basin is approximately 100 miles long and 20 to 40 miles wide (Figure A-9).  The eastern section of the Albuquerque Basin shows major faulting (Figures A-2 and A-9).	SNL/NM is located along the east-central edge of the Albuquerque Basin, one of a north-south-trending series of basins that make up the Rio Grande Rift. The basin is approximately 100 miles long and 20 to 40 miles wide (Figure A-9). <u>As shown on Figure A-9, the structural boundaries of the Albuquerque Basin are as follows:</u>  <ul style="list-style-type: none"> <li>• <u>Colorado Plateau on the west</u></li> <li>• <u>Nacimiento Uplift and the Jemez Mountains to the north</u></li> <li>• <u>La Bajada Escarpment to the northeast</u></li> <li>• <u>Sandia, Manzanita, Manzano, and Los Pinos mountains to the east</u></li> <li>• <u>Joyita and Socorro uplifts to the south</u></li> <li>• <u>Ladron and Lucero uplifts to the southwest.</u></li> </ul>	Incorporate current information regarding regional geology and faults on KAFB.

**ATTACHMENT A**  
**SUMMARY OF CHANGES FOR COMPREHENSIVE PART B PERMIT REQUEST**  
**SANDIA NATIONAL LABORATORIES, NM5890110518**

March 2014

Item No.	Location	Current Language	Revised Language	Explanation for Change
		<p><u>The Hubbell Springs, Sandia, and Tijeras faults form a series of down-dropped blocks to the west (SAIC, 1985; Machette, 1982; Grant, 1981; Kelley, 1977).</u></p> <p><u>The Tijeras Fault zone trends northeast from SNL/NM through Tijeras Canyon. The fault zone consists of several subparallel faults with near-vertical dips and show normal and left lateral displacement (Maynard et al., 1991; Lisenbee et al., 1979).</u></p>	<p>The eastern section of the Albuquerque Basin shows major faulting (Figures A-2 and A-9). <u>The four primary faults on the east side of KAFB are (1) the Sandia fault, (2) the West Sandia fault, (3) the Hubbell Spring fault (West, Central, and East fault segments), and (4) the Tijeras fault. The Sandia fault is thought to be the primary boundary between the Sandia Mountains and the Albuquerque Basin. The Hubbell Spring fault extends northward from Socorro County and terminates on KAFB in the vicinity of the Tijeras fault. The Sandia and the Hubbell Spring faults are north-south-trending, down-to-the-west, en-echelon normal faults bounding the east side of the Albuquerque Basin.</u></p> <p><u>The Tijeras Fault zone trends northeast from SNL/NM through Tijeras Canyon. The Tijeras fault is an ancient strike-slip fault that developed in the Precambrian or early Paleozoic and was reactivated in association with the Laramide Orogeny during the Cretaceous period (Kelley 1977). The fault also demonstrates Quaternary movement (Kelson et al. 1999, GRAM 1995). Preferential erosion along the fault formed Tijeras Canyon, which divides the Sandia and Manzanita Mountains. The fault trends southwest from Tijeras Canyon, intersects the northeast boundary of KAFB, and crosses KAFB east and south of Manzano Base. Manzano Base occupies an uplift of four peaks defined by the Tijeras fault on the east side and the Sandia fault on the west side. The Sandia, Hubbell Spring, and Tijeras faults converge near the southeast end of TA-III. This complicated system of faults, defining the east edge of the basin, is referred to collectively as the Tijeras fault complex.</u></p>	
6	Part 2, General Part B, Appendix A, page SW-A-7 Section A.5, <i>Topographic Maps</i>	<ul style="list-style-type: none"> <li>Locations of the HWHF, TTF, RMWMF, AHCF, and MSB</li> </ul>	<ul style="list-style-type: none"> <li>Locations of the HWHF, TTF, RMWMF, AHCF, MSB, and CAMU</li> </ul>	Incorporate CAMU into revised Appendix A.

**ATTACHMENT A**  
**SUMMARY OF CHANGES FOR COMPREHENSIVE PART B PERMIT REQUEST**  
**SANDIA NATIONAL LABORATORIES, NM5890110518**

March 2014

Item No.	Location	Current Language	Revised Language	Explanation for Change
7	Part 2, General Part B, Appendix A, page SW-A-8 Section A.5.2, <i>Wind Rose</i>	It also appears that Tijeras Arroyo diverts surface air flow between TAs III and V on the south and TAs I, II, and IV, and Albuquerque on the north (SNL/NM 2002, 2004).	It also appears that Tijeras Arroyo diverts surface air flow between TAs III and V on the south and TAs I, II, and IV, and Albuquerque on the north (SNL/NM 2002, 2004, <u>2012</u> ).	Add a citation to a reference in Appendix A.
8	Part 2, General Part B, Appendix A, pages SW-A-10 and -11, <i>References</i>	<p>Grant, P. R., 1981, "Geothermal Potential on Kirtland Air Force Base Lands, Bernalillo County, New Mexico," SAND81-7141, Sandia National Laboratories, Albuquerque, New Mexico.</p> <p>Jackson, M., 1991, Kirtland Air Force Base, Public Affairs, Albuquerque, New Mexico, Personal Communication to B. A. Sladek, IT Corporation, Albuquerque, New Mexico.</p> <p>Kelley, V. C., 1977, "Geology of the Albuquerque Basin, New Mexico," Memoir 33, New Mexico Bureau of Mines and Mineral Resources, Socorro, New Mexico.</p> <p>Lisenbee, A. L., L. A. Woodward, and J. R. Connolly, 1979, "Tijeras-Canoncito Fault System—A Major Zone of Recurrent Movement in North-Central New Mexico," New Mexico Geological Society Guidebook 30, pp. 89–99.</p> <p>Meyers, L., 1991, Kirtland Air Force Base, Construction and Engineering Department, Albuquerque, New Mexico, Personal Communication to B. A. Sladek, IT Corporation, Albuquerque, New Mexico.</p> <p>SAIC, see Science Applications International Corporation.</p> <p>Science Applications International Corporation (SAIC), 1985, "Installation Restoration Program Phase II, Confirmation/Quantification Stage I,"</p>	<p><u>GRAM, Inc., 1995, "Conceptual Geological Model of the Sandia National Laboratories and Kirtland Air Force Base, Environmental Restoration Program, Sandia National Laboratories, New Mexico", GRAM, Inc. and William Lettis &amp; Associates, Inc., Albuquerque New Mexico.</u></p> <p>Grant, P. R., 1981, "Geothermal Potential on Kirtland Air Force Base Lands, Bernalillo County, New Mexico," SAND81-7141, Sandia National Laboratories, Albuquerque, New Mexico.</p> <p><u>Hansen, S., and C. Gorbach, 1997, "Middle Rio Grande Water Assessment, Final Report". U.S. Bureau of Reclamation, Albuquerque Area Office, Albuquerque, New Mexico.</u></p> <p>Jackson, M., 1991, Kirtland Air Force Base, Public Affairs, Albuquerque, New Mexico, Personal Communication to B. A. Sladek, IT Corporation, Albuquerque, New Mexico.</p> <p><u>Kelley, V. C., and S. A. Northrup, 1975, "Geology of Sandia Mountains and Vicinity, New Mexico", Memoir 29, New Mexico Bureau of Mines and Mineral Resources, Socorro, New Mexico.</u></p> <p>Kelley, V. C., 1977, "Geology of the Albuquerque Basin, New Mexico," Memoir 33, New Mexico Bureau of Mines and Mineral Resources, Socorro, New Mexico.</p> <p><u>Kelson, K.I., C.S. Hitchcock, and J.B.J. Harrison, 1999, "Paleoseismology of the Tijeras Fault Near Golden, New Mexico. Albuquerque Geology", F.J. Pazzaglia and S. Lucas (eds.), <i>New Mexico Geological Society</i>, "Fiftieth Annual Field Conference", New Mexico Geological Society.</u></p>	Add references for current information regarding regional geology and faults on KAFB.

**ATTACHMENT A  
SUMMARY OF CHANGES FOR COMPREHENSIVE PART B PERMIT REQUEST  
SANDIA NATIONAL LABORATORIES, NM5890110518**

March 2014

Item No.	Location	Current Language	Revised Language	Explanation for Change
		<p>Report 2-827-06-351-33, prepared for Sandia National Laboratories, Albuquerque, New Mexico.</p> <p>SNL/NM, see Sandia National Laboratories/New Mexico</p> <p>Sandia National Laboratories/New Mexico (SNL/NM), 2002, "Calendar Year 2001 Annual Site Environmental Report", SAND 2002-2415, Sandia National Laboratories/New Mexico, Albuquerque, New Mexico.</p> <p>Sandia National Laboratories/New Mexico (SNL/NM), 2004, "Calendar Year 2003 Annual Site Environmental Report", SAND 2004-2813, Sandia National Laboratories/New Mexico, Albuquerque, New Mexico.</p>	<p><u>Socorro, New Mexico.</u></p> <p>Lisenbee, A. L., L. A. Woodward, and J. R. Connolly, 1979, "Tijeras-Canoncito Fault System—A Major Zone of Recurrent Movement in North-Central New Mexico," New Mexico Geological Society Guidebook 30, pp. 89–99.</p> <p>Meyers, L., 1991, Kirtland Air Force Base, Construction and Engineering Department, Albuquerque, New Mexico, Personal Communication to B. A. Sladek, IT Corporation, Albuquerque, New Mexico.</p> <p>SAIC, see Science Applications International Corporation.</p> <p>Science Applications International Corporation (SAIC), 1985, "Installation Restoration Program Phase II, Confirmation/Quantification Stage I," Report 2-827-06-351-33, prepared for Sandia National Laboratories, Albuquerque, New Mexico.</p> <p>SNL/NM, see Sandia National Laboratories/New Mexico</p> <p>Sandia National Laboratories/New Mexico (SNL/NM), 2002, "Calendar Year 2001 Annual Site Environmental Report", SAND 2002-2415, Sandia National Laboratories/New Mexico, Albuquerque, New Mexico.</p> <p><u>Sandia National Laboratories/New Mexico (SNL/NM), 2003, "Geologic Investigation: An Update of Subsurface Geology on Kirtland Air Force Base, New Mexico", SAND 2003-1869, Sandia National Laboratories/New Mexico, Albuquerque, New Mexico.</u></p> <p>Sandia National Laboratories/New Mexico (SNL/NM), 2004, "Calendar Year 2003 Annual Site Environmental Report", SAND 2004-2813, Sandia National Laboratories/New Mexico, Albuquerque, New Mexico.</p> <p><u>Sandia National Laboratories/New Mexico (SNL/NM), 2012,</u></p>	

**ATTACHMENT A**  
**SUMMARY OF CHANGES FOR COMPREHENSIVE PART B PERMIT REQUEST**  
**SANDIA NATIONAL LABORATORIES, NM5890110518**

March 2014

Item No.	Location	Current Language	Revised Language	Explanation for Change
			<p><u>“Calendar Year 2011 Annual Site Environmental Report”, SAND 2012-7340P, Sandia National Laboratories/New Mexico, Albuquerque, New Mexico.</u></p> <p><u>Sandia National Laboratories/New Mexico (SNL/NM), 2013, “Annual Groundwater Monitoring Report, Calendar Year 2012”, SAND 2013-4700P, Sandia National Laboratories/New Mexico, Albuquerque, New Mexico.</u></p>	
9	Part 2, General Part B, Appendix A	Figure A-2 presents geologic information that was available when the Part B Permit Request was submitted in February 2002. It also presents groundwater well data from April 2012.	Figure A-2 has been revised to incorporate the most current information regarding faults on Kirtland Air Force Base. Groundwater wells have been revised to reflect recent activities and to correct errors.	Incorporate current information.
10	Part 2, General Part B, Appendix A	Figure A-9 presents geologic information that was available when the Part B Permit Request was submitted in February 2002.	Figure A-9 has been revised to incorporate the most current information regarding geology in the area surrounding KAFB.	Incorporate current information.
11	Part 2: General Part B, Module II, <i>Thermal Treatment Facility</i>	Figure 6 presents geologic information that was available when the Part B Permit Request was submitted in February 2002. It also presents groundwater well data from April 2012.	Figure 6 has been revised to incorporate the most current information regarding faults on Kirtland Air Force Base. Groundwater wells have been revised to reflect recent activities and to correct errors.	Incorporate current information.
12	Part 2: General Part B, Module VI, <i>Manzano Storage Bunkers</i>	Figure 7 presents geologic information that was available when the Part B Permit Request was submitted in February 2002.	Figure 7 has been revised to incorporate the most current information regarding faults on Kirtland Air Force Base.	Incorporate current information.

**Enclosure B**

**Revised Pages  
Redline/Strikeout Format  
Comprehensive Part B Permit Request**

**Sandia National Laboratories  
NM5890110518**

**APPENDIX A**

**SITE-WIDE DESCRIPTION FOR  
SANDIA NATIONAL LABORATORIES/NEW MEXICO  
RESOURCE CONSERVATION AND RECOVERY ACT-REGULATED  
WASTE MANAGEMENT UNITS**

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A-9	Geologic Features in Relation to Sandia National Laboratories/New Mexico

## ACRONYMS AND ABBREVIATIONS

20 NMAC 4.1.X00	New Mexico Administrative Code, Title 20, Chapter 4, Part 1, Subpart X
40 CFR 2XX.XX	Code of Federal Regulations, Title 40, Part 2XX, Section 2XX.XX
AHCF	Auxiliary Hot Cell Facility
<u>CAMU</u>	<u>Corrective Action Management Unit</u>
DOE	U.S. Department of Energy/National Nuclear Security Administration
ft	foot/feet
HWHF	Hazardous Waste Handling Facility
KAFB	Kirtland Air Force Base
MSB	Manzano Storage Bunkers
RCRA	Resource Conservation and Recovery Act
RMWMF	Radioactive and Mixed Waste Management Facility
Sandia	Sandia Corporation
SNL/NM	Sandia National Laboratories/New Mexico
TA	Technical Area
TTF	Thermal Treatment Facility
Unit	RCRA-regulated waste management unit
USFS	U.S. Forest Service

## **SITE-WIDE DESCRIPTION FOR SANDIA NATIONAL LABORATORIES/NEW MEXICO**

The information provided in this appendix is submitted in accordance with the applicable requirements of New Administrative Code, Title 20, Chapter 4, Part 1, Subparts V and IX (20 NMAC 4.1.1500– and .900), revised October 1, 2003 [7-1-08]. 20 NMAC 4.1.500 and .900 adopt, with limited exceptions, all of the Code of Federal Regulations, Title 40, Parts 264 and 270 (40 CFR 264 and 270). The following subject areas are addressed in this appendix or in Section 2.0 of each Unit-specific module.

- A general description of the Sandia National Laboratories/New Mexico (SNL/NM) site (20 NMAC 4.1.900/40 CFR 270.14[b][1] [7-1-08]);
- Site-wide security procedures and equipment (20 NMAC 4.1.900/40 CFR 270.14[b][4] and 270.14[b][19][viii] [7-1-08]; 20 NMAC 4.1.500/40 CFR 264.14 [7-1-08]);
- Site-wide traffic patterns, volume, and controls (20 NMAC 4.1.900/40 CFR 270.14[b][10] [7-1-08]);
- Site location information for compliance with the seismic standard and floodplain requirements (20 NMAC 4.1.900/40 CFR 270.14[b][11] [7-1-08], and 20 NMAC 4.1.500/40 CFR 264.18[a] and [b] [7-1-08]);
- Site-wide topographic map requirements (20 NMAC 4.1.900/40 CFR 270.14[b][19] [7-1-08]);
- Site-wide groundwater monitoring and protection information (20 NMAC 4.1.900/40 CFR 270.14[c] [7-1-08], and 20 NMAC 4.1.500/40 CFR 264.90[a] [7-1-08]); and
- Other permit activities.

Together, the information in this appendix, in the General Part B, and in each Unit-specific Part B module meets the applicable regulatory requirements. Individual Units are listed in Table A-1.

For the purposes of this permit renewal request/application, SNL/NM (the facility) is owned by the U.S. Department of Energy/National Nuclear Security Administration (DOE) and operated by Sandia.

### **A.1 GENERAL SITE DESCRIPTION (20 NMAC 4.1.900/40 CFR 270.14[b][1])**

SNL/NM is located on Kirtland Air Force Base (KAFB) immediately southeast of the Albuquerque city limits in Bernalillo County, New Mexico. SNL/NM occupies an area of approximately 2,842 acres within the 80-square-mile KAFB (Figure A-1).

**Table A-1  
RCRA-Regulated Waste Management Units**

<b>Unit Name</b>	<b>Acronym</b>	<b>Location, Size</b>	<b>Types of Operations</b>	<b>Operating Status</b>
Hazardous Waste Handling Facility	HWHF	South of TA-I, north of entrance to TA-II. 1.35 acres	Storage, Repackaging	Existing, operational
Thermal Treatment Facility	TTF	Northern part of TA-III. 196 square feet	Treatment	Existing, operational
Radioactive and Mixed Waste Management Facility	RMWMF	Southeast corner of TA-III. 3.11 acres	Storage, Treatment, Repackaging	Existing, operational
Auxiliary Hot Cell Facility	AHCF	TA-V. 5578 square feet	Storage, Treatment, Repackaging	Existing, operational
Manzano Storage Bunkers (Set of five Units)	MSB	In Manzano Area on KAFB. 0.4 acres occupied by bunkers (approximately 1600 to <del>2100</del> <u>2400</u> square feet in each bunker)	Storage	Existing, operational
<u>Corrective Action Management Unit</u>	<u>CAMU</u>	<u>Southeast corner of TA-III. Includes containment cell located due north of RMWMF.</u>	<u>Post-closure monitoring of containment cell.</u>	<u>Existing, post-closure care</u>

SNL/NM (U.S. Environmental Protection Agency Identification Number NM5890110518) is a multidisciplinary laboratory engaged in research and development of weapons and alternative energy sources. SNL/NM is managed by Sandia, a wholly-owned subsidiary of Lockheed Martin, for the DOE, with work also performed for others. Activities at SNL/NM fall under North American Industry Classification System Numbers 92811 (National Security) and 54171 (Research and Development in the Physical, Engineering, and Life Sciences).

The major Sandia/DOE research and administration functions are located at five Technical Areas (TAs), designated I through V. TAs I, II, and IV are located north of Tijeras Arroyo and Arroyo del Coyote (Figures A-2 and A-3). TAs III and V occupy contiguous tracts of land south of Tijeras Arroyo and west of Arroyo del Coyote.

**A.2 SECURITY PROCEDURES AND EQUIPMENT (20 NMAC 4.1.900/40 CFR 270.14[b][4]; 20 NMAC 4.1.500/40 CFR 264.14)**

In accordance with 20 NMAC 4.1.500/40 CFR 264.14(a) [7-1-08], an owner or operator must prevent the unknowing entry, and minimize the possibility for the unauthorized entry, of persons or livestock onto the active portion of a facility. The following sections describe the security provisions provided at SNL/NM to prevent unknowing or unauthorized entry onto the active portions of Units.

### **A.2.1 Barriers and Means to Control Entry (20 NMAC 4.1.500/40 CFR 264.14[b][2][i] and [ii])**

20 NMAC 4.1.500/40 CFR 264.14 [7-1-08] and 270.14[b][19][viii] [7-1-08], require that security be provided by 24-hour surveillance which is continuously monitored and controls access to the facility (20 NMAC 4.1.500/40 CFR 264.14[b][1] [7-1-08]), or if that requirement cannot be met, a natural or artificial barrier and means to control entry must be provided (20 NMAC 4.1.500/40 CFR 264.14[b][2] [7-1-08]). The design and operation of the SNL/NM facility fully meet the security requirements of 20 NMAC 4.1.500/40 CFR 264.14(b)(2) [7-1-08].

The five TAs, Manzano Base, and Units outside TAs are surrounded by fences that prohibit access except through gated entrances. Only personnel with appropriate Sandia-issued access badges and identification, or escorted visitors, are allowed access to the TAs and all Units. The gates and/or doors to all Units are closed and locked during non-operating hours.

Sandia/DOE security personnel periodically monitor the gates of all SNL/NM technical areas and RCRA-regulated waste management Units during non-operational hours. Any additional Unit-specific information on security procedures and access control is provided in each Unit-specific module.

The SNL/NM Units are located within the fenced boundaries of KAFB. Access to KAFB is controlled 24 hours per day, 7 days per week. Entrance is possible only through five gates, staffed by armed military police, upon recognition of identification stickers or passes issued to each vehicle. Visitors must have a base sponsor and sign an entry log prior to entering the base. The gates are shown in Figure A-4.

### **A.2.2 Warning Signs (20 NMAC 4.1.500/40 CFR 264.14[c])**

20 NMAC 4.1.500/40 CFR 264.14(c) [7-1-08], requires that signs meeting the requirements of that section be posted. Each SNL/NM Unit is posted with “Danger: Unauthorized Personnel Keep Out” (or functionally equivalent) signs in English and Spanish. The signs are legible from a distance of 25 feet and can be seen from any approach to any Unit. The signs and their placement meet the requirements of 20 NMAC 4.1.500/40 CFR 264.14(c) [7-1-08]. Any additional Unit-specific information on warning signs is provided in each Unit-specific module.

### **A.3 TRAFFIC PATTERNS, VOLUMES, AND CONTROLS (20 NMAC 4.1.900/40 CFR 270.14[b][10])**

The traffic pattern information presented below is general in nature. More detailed information is provided in Section 2.2 of each Unit-specific module.

RCRA-regulated waste is generated during operations at sites throughout SNL/NM. Because RCRA-regulated waste may be generated throughout SNL/NM, waste transport may occur on nearly all roads within KAFB. Off-site wastes may be received at SNL/NM (see Appendix B of this General Part B). The Units included in this permit application can be reached from the KAFB

entrance gates at Wyoming Boulevard, Truman Avenue, Gibson Boulevard, or Eubank Boulevard (Figure A-4). KAFB may restrict hazardous material traffic to one or more gates.

A system of interior roads, as shown in Figures A-4, A-5, A-6, and A-7, is maintained at SNL/NM. About 78 total miles of roadway exist; 33 of those miles are paved. The paved roads present at SNL/NM are generally built in conformance to the New Mexico State Highway Standards or the “City of Albuquerque Development Process Manual, Standards for Residential Streets” (City of Albuquerque, 1983 and amendments). These standards conform to specifications prepared by the American Association of State Highway Transportation Officials. Paved roads at SNL/NM are generally designed and constructed to accommodate light to moderate volumes of truck traffic, including 30- to 40-ton vehicles. The roads typically consist of a 1.5 - to 4-inch layer of asphaltic pavement over a 4- to-6 inch base course (not always present) and 8- to 12-inch compacted subgrade.

### **A.3.1 Traffic Patterns**

Information addressing current Unit-specific travel routes is presented in Section 2.2 of each Unit-specific module. Traffic patterns are subject to change in response to KAFB security requirements.

### **A.3.2 Traffic Volumes**

During the last official traffic study conducted at KAFB in 1984, the average number of vehicles passing through the continuously guarded KAFB gates during normal workday hours from Monday through Friday was estimated to be (Meyers, 1991):

- Carlisle-Gibson gate—5,200 vehicles
- Truman-Gibson gate—10,200 vehicles
- Louisiana-Gibson gate—18,000 vehicles
- Wyoming gate—21,600 vehicles
- Eubank gate—12,200 vehicles.

The majority of the 67,200 total vehicles consisted of commuting employees in personal automobiles and light-duty trucks. At the time of the traffic study, about 8,400 people were employed at SNL/NM (including Sandia personnel and contractors) and an estimated additional 21,000 people were employed at adjoining KAFB and DOE facilities (Jackson, 1991). Sandia personnel and contractors currently number about 6,450 people and an additional 17,000 are employed at KAFB and DOE facilities (Francis, 2001). The KAFB Security Forces squadron estimates that 40,000 to 50,000 vehicles currently pass through KAFB gates daily (Francis, 2001).

Therefore, Sandia/DOE believes the 1984 traffic data slightly overestimate the traffic volume for 2001.

### A.3.3 Traffic Control Signals

Site wide traffic flow on KAFB is controlled by traffic lights, stop signs, yield signs, and one-way streets. Traffic lights are in place at major intersections on KAFB. Traffic signs are used at “T” intersections throughout KAFB, including SNL/NM. Any additional Unit-specific information addressing traffic control is presented in Section 2.2 of each Unit-specific module.

## A.4 SITE LOCATION INFORMATION (20 NMAC 4.1.900/40 CFR 270.14[b][11])

### A.4.1 Geologic Setting (20 NMAC 4.1.500/40 CFR 264.18[a] and 20 NMAC 4.1.900/40 CFR 270.14[b][11])

SNL/NM is located along the east-central edge of the Albuquerque Basin, one of a north-south-trending series of basins that make up the Rio Grande Rift. ~~The Sandia, Manzanita, and Manzano Mountains, which are uplifted fault blocks, form the eastern boundary of the basin. The Lucero uplift bounds the west side of the basin, the Ladron Mountains bound the south side, and there is limited topographic relief on the northwest side of the basin.~~ The basin is approximately 100 miles long and 20 to 40 miles wide (Figure A-9). As shown on Figure A-9, the structural boundaries of the Albuquerque Basin are as follows:

- Colorado Plateau on the west
- Nacimientto Uplift and the Jemez Mountains to the north
- La Bajada Escarpment to the northeast
- Sandia, Manzanita, Manzano, and Los Pinos mountains to the east
- Joyita and Socorro uplifts to the south
- Ladron and Lucero uplifts to the southwest.

The eastern section of the Albuquerque Basin shows major faulting (Figures A-2 and A-9). The four primary faults on the east side of KAFB are (1) the Sandia fault, (2) the West Sandia fault, (3) the Hubbell Spring fault (West, Central, and East fault segments), and (4) the Tijeras fault. The Sandia fault is thought to be the primary boundary between the Sandia Mountains and the Albuquerque Basin. The Hubbell Spring fault extends northward from Socorro County and terminates on KAFB in the vicinity of the Tijeras fault. The Sandia and the Hubbell Spring faults are north-south-trending, down-to-the-west, en-echelon normal faults bounding the east side of the Albuquerque Basin. The Hubbell Springs, Sandia, and Tijeras faults form a series of down-dropped blocks to the west (SAIC, 1985; Machette, 1982; Grant, 1981; Kelley, 1977).

~~The Tijeras Fault zone trends northeast from SNL/NM through Tijeras Canyon. The Tijeras fault is an ancient strike-slip fault that developed in the Precambrian or early Paleozoic and was reactivated in association with the Laramide Orogeny during the Cretaceous period (Kelley 1977). The fault also demonstrates Quaternary movement (Kelson et al. 1999, GRAM 1995). Preferential erosion along the fault formed Tijeras Canyon, which divides the Sandia and Manzanita Mountains. The fault trends southwest from Tijeras Canyon, intersects the northeast boundary of KAFB, and crosses KAFB east and south of Manzano Base. Manzano Base occupies an uplift of four peaks defined by the Tijeras fault on the east side and the Sandia fault on the west side. The Sandia, Hubbell Spring, and Tijeras faults converge near the southeast end of TA-III. This complicated~~

~~system of faults, defining the east edge of the basin, is referred to collectively as the Tijeras fault complex. The fault zone consists of several subparallel faults with near-vertical dips and show normal and left lateral displacement (Maynard et al., 1991; Lisenbee et al., 1979).~~

Within the boundaries of KAFB, the Albuquerque Basin rocks are Precambrian to Holocene in age. The upper part of the basin fill within KAFB is comprised of the Ceja Member of the Tertiary Santa Fe Group, which is a complex sequence of gravel, sand, silt, clay, and caliche deposits. Quaternary and Holocene deposits, which include alluvium, landslide deposits, eolian deposits, caliche, and gravel pediments, also comprise Albuquerque Basin sediments within KAFB (Kelley, 1977).

#### **A.4.2 Seismic Standard (20 NMAC 4.1.900/40 CFR 270.14[b][11][i and ii]; 20 NMAC 4.1.500/40 CFR 264.18[a])**

SNL/NM is located in Bernalillo County, New Mexico, which is listed in Appendix VI of 20 NMAC 4.1.500/40 CFR 264 [7-1-08]. None of the SNL/NM Units are located within 3,000 feet (ft) of any fault with Holocene displacements (Machette, 1982). Therefore, all SNL/NM Units are compliant with the seismic standards in 20 NMAC 4.1.500/40 CFR 264.18(a) [7-1-08] and 20 NMAC 4.1.900/40 CFR 270.14(b)(11)(ii) [7-1-08].

#### **A.4.3 Floodplain Standard (20 NMAC 4.1.900/40 CFR 270.14[b][11][iii through v]; 20 NMAC 4.1.500/40 CFR 264.18[b])**

SNL/NM is located near the middle of the upper Rio Grande basin that originates in southern Colorado. SNL/NM occupies generally flat, gently west-sloping mesa land located between the Rio Grande Valley to the west and the Manzano and Manzanita Mountains to the east. The nearest surface water body is the Rio Grande, located about 7 miles west of SNL/NM.

The locations of the 100-year floodplains of Tijeras Arroyo and Arroyo del Coyote are shown in Figure A-2. The floodplain portion of Figure A-2 was derived from a U.S. Army Corps of Engineers map (COE, 1979), prepared using Federal Emergency Management Administration guidelines that are equivalent to the mapping techniques used to prepare Federal Insurance Administration floodplain maps. None of the SNL/NM Units are located within a 100-year floodplain, as defined in 20 NMAC 4.1.500/40 CFR 264.18(b)(2)(i) [7-1-08], and as regulated under 20 NMAC 4.1.500/40 CFR 264.18(b)(1) [7-1-08] and 20 NMAC 4.1.900/40 CFR 270.14(b)(11)(iv) [7-1-08]. Therefore, all SNL/NM Units are compliant with the floodplain standards.

### **A.5 TOPOGRAPHIC MAPS (20 NMAC 4.1.900/40 CFR 270.14[b][19])**

Figure A-2 is provided to meet the requirements of the 20 NMAC 4.1.900/40 CFR 270.14(b)(19) [7-1-08]. Figure A-2 is a topographic map of KAFB that shows the SNL/NM TAs and includes the following:

- Map scale and date
- The 100-year floodplain area
- Surface water bodies, including intermittent streams
- Wind roses
- Map orientation (north arrow)
- Legal boundaries of the SNL/NM facility
- Access control features (i.e., fences and gates)
- Groundwater monitoring, withdrawal, and water supply wells both on site and off site at KAFB and SNL/NM in the vicinity of the Units
- Buildings and other structures (e.g., access and internal roads)
- Locations of the HWHF, TTF, RMWMF, AHCF, ~~and MSB~~, and CAMU
- Areas of residential land use within KAFB.

These items are also shown on topographic maps in the Unit-specific modules. The Unit-specific maps show Unit features and the area surrounding each Unit in greater detail.

#### **A.5.1 Wells (20 NMAC 4.1.900/40 CFR 270.14[b][19][ix])**

There are no injection wells at SNL/NM. Groundwater monitoring wells and withdrawal wells located at SNL/NM are shown in Figure A-2. None of the wells shown in Figure A-2 are expected to be influenced by activities at any SNL/NM RCRA-regulated waste management Unit because waste management activities occur in contained areas. KAFB water-supply wells, City of Albuquerque wells, and other wells located within 1,000 ft of the KAFB boundaries are shown on Figure A-2.

#### **A.5.2 Wind Rose (20 NMAC 4.1.900/40 CFR 270.14[b][19][v])**

A network of meteorological towers is used to monitor weather conditions at SNL/NM. Data indicate that the overall prevailing winds at SNL/NM are from the east, except that winter winds at the 100-ft elevation are from the north. Rapid night time ground cooling after sunset on cloudless or near-cloudless nights produces strong temperature inversions in which temperature increases with elevation (an atmospheric condition resulting from a reversal of the normal temperature lapse rate). This rapid cooling effect generates nighttime drainage winds out of the mountains, which are strongest at the mouths of the larger canyons. Nighttime winds in these areas are typically from the east and southeast, while daytime winds are typically from the southwest, west, and northwest. It also appears that Tijeras Arroyo diverts surface air flow between TAs III and V on the south and

TAs I, II, and IV, and Albuquerque on the north (SNL/NM 2002, 2004, [2012](#)). The channeling of wind through Tijeras Canyon can be seen by comparing the wind roses from these two areas (SNL/NM, 2002). Figure A-2 shows wind roses that summarize wind speeds and directions for TA-II (near the HWHF), the southeast corner of TA-III (near the RMWFM), and the northeast corner of TA-III (near the AHCF and TTF). Wind roses are also shown on the Unit-specific topographic maps.

### **A.5.3 Surrounding Land Use (20 NMAC 4.1.900/40 CFR 270.14[b][19][iv])**

Albuquerque is the largest population center in Bernalillo County and also the closest population center to KAFB and SNL/NM. According to Census 2010 data, the total population of the Albuquerque metropolitan area is 633,233 (U.S. Census Bureau, 2010). This population includes permanent residents of KAFB living in the KAFB housing areas. An additional 29,341 people live outside the Albuquerque metropolitan area but within Bernalillo County (U.S. Census Bureau, 2010).

SNL/NM is essentially surrounded by KAFB, with co-use agreements on some portions of KAFB. An additional 22,500-acre area to the east of KAFB has been withdrawn from the U.S. Forest Service (USFS) for the exclusive use of KAFB. High explosive tests, explosives storage, and other operations are buffered and barricaded by the mountainous terrain toward the eastern edge of this withdrawal area. Areas to the west and south, by agreements with the State of New Mexico and Isleta Pueblo, serve as buffer zones for other test operations.

Land use in the vicinity of SNL/NM and KAFB is urban to the northwest, north, and northeast. Undeveloped grazing land of Isleta Pueblo is located to the south. Undeveloped public grazing land lies to the west and southwest of KAFB and the buffer zones.

The urbanized area immediately northeast, north, and northwest of SNL/NM is predominantly residential, with commercial development along more heavily-traveled streets. Military (i.e., KAFB) housing is located north of F Street (adjacent to the northern edge of SNL/NM TA-I), as shown on Figure A-2. Albuquerque International Sunport is located west of the northern part of KAFB. Figure A-8 shows land uses for the areas adjacent to and within KAFB boundaries.

Some areas of KAFB and SNL/NM are within flight paths for aircraft that are taking off and landing at the Albuquerque International Sunport. Sandia/DOE studied the likelihood and potential impact of airplane crashes into SNL/NM facilities (DOE, 1999). The analysis covered several operations and facilities throughout SNL/NM, including the RMWFM and facilities near the HWHF and the AHCF. Such accidents were determined to be very unlikely; the annual probability varies from 2.8 in 1,000,000 at the RMWFM to 90 in 1,000,000 near the HWHF.

The SNL/NM facility is comprised of five TAs and several additional test areas spread over 17,845 acres, which are under diverse land ownership. SNL/NM occupies 2,842 acres owned by the DOE and an additional 15,003 acres that have been made available through a series of land-use agreements or permits among DOE-Albuquerque Operations, DOE Transportation Safeguards Division, KAFB, USFS, Bureau of Land Management, State of New Mexico, Phillips Laboratory (a private contractor), DOE Central Training Academy, and Isleta Pueblo.

The HWHF is approximately 2 miles south of Interstate 40 and 6 miles east of Interstate 25 and downtown Albuquerque. At their nearest points, the AHCF and the TTF are approximately 3 miles south of Interstate 40 and 6.5 miles east of Interstate 25 and downtown Albuquerque. The MSB are approximately 5 miles south of Interstate 40 and 7.5 miles east of Interstate 25 and downtown Albuquerque. The RMWMF is approximately 5.5 miles south of Interstate 40 and 6.5 miles east of Interstate 25 and downtown Albuquerque. Land use in the vicinity of each RCRA-regulated Unit is predominantly or completely industrial. There are no residential areas within 1 mile of any of the SNL/NM Units. The closest residences are in a KAFB residential area located north of TA-I.

#### **A.5.4 Drainage Control Features (20 NMAC 4.1.900/40 CFR 270.14(b)(8)(ii))**

Drainage control features (e.g., run-on/runoff, drainage barriers, storm water discharge) are shown on figures provided in each Unit-specific module.

#### **A.5.5 Waste Management Areas**

Locations of the waste management areas at each SNL/NM Unit are shown on figures provided in each Unit-specific module.

#### **A.6 GROUNDWATER MONITORING (20 NMAC 4.1.900/40 CFR 270.14[c] and 20 NMAC 4.1.500/40 CFR 264.90[a])**

The nine SNL/NM Units included in Part 2 of this Sandia/DOE comprehensive Part B permit request are storage and/or treatment Units that are subject to 20 NMAC 4.1.500/40 CFR 264.101 [7-1-08] which requires that operators of treatment, storage, or disposal facilities develop and implement corrective actions as necessary to protect human health and the environment from past, present, or future releases of RCRA-regulated wastes. None of the nine storage and/or treatment Units addressed in Part 2 have released RCRA-regulated wastes in the past.

The nine Units are not subject to the groundwater protection and monitoring requirements of 20 NMAC 4.1.500/40 CFR 264, Subpart F [7-1-08] because they are not regulated units or solid waste management units.

SNL/NM currently has one regulated unit (the Chemical Waste Landfill) that is subject to the groundwater protection and monitoring requirements of 20 NMAC 4.1.500/40 CFR 264, Subpart F [7-1-08]. Chemical Waste Landfill groundwater monitoring is addressed in Part 3 of this Sandia/DOE comprehensive Part B permit request.

#### **A.7 OTHER PERMIT ACTIVITIES**

Sandia/DOE hold numerous environmental permits issued by various agencies. Current permits, including RCRA permits, are listed in Appendix A of the General Part A included in Part 1 of this comprehensive Part B renewal request.

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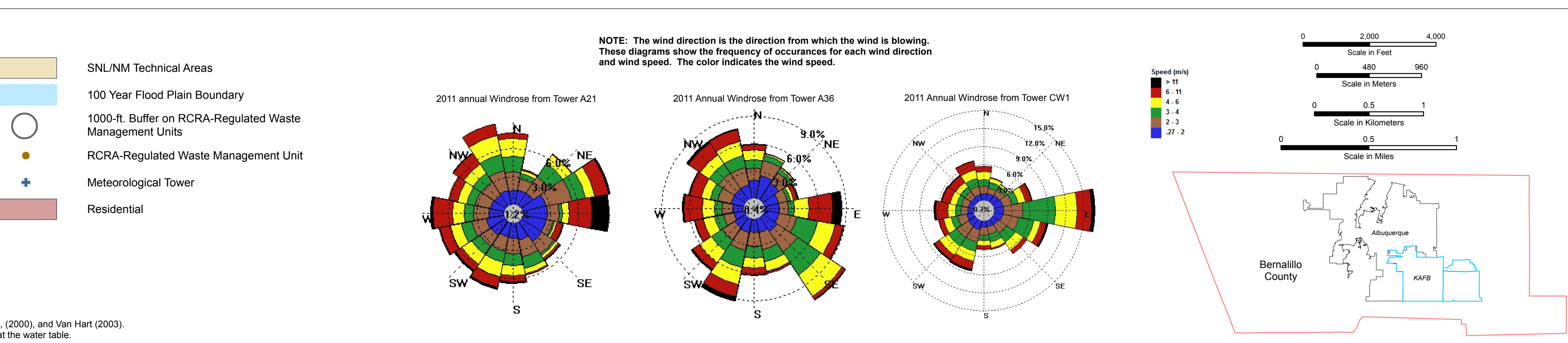
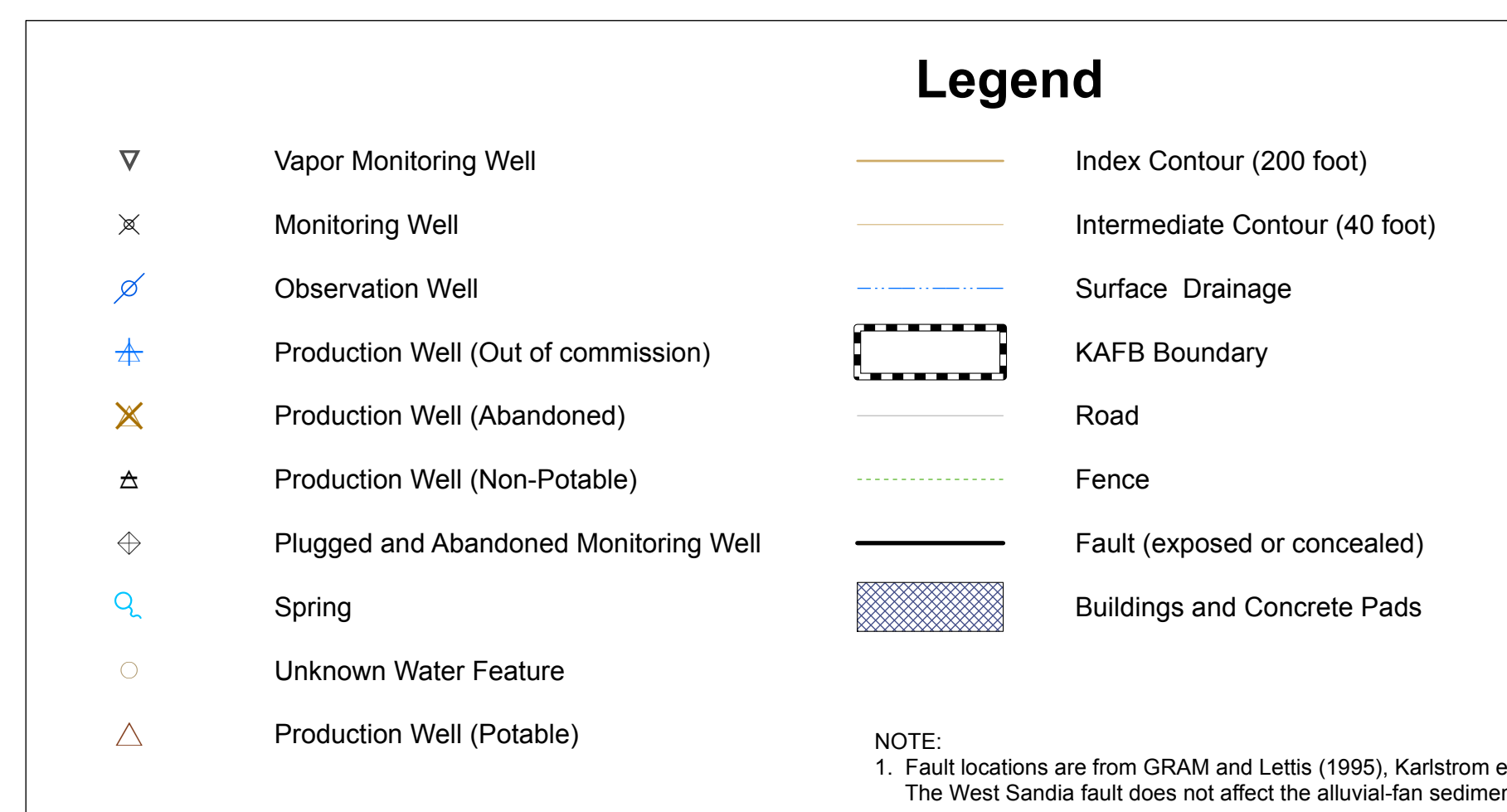
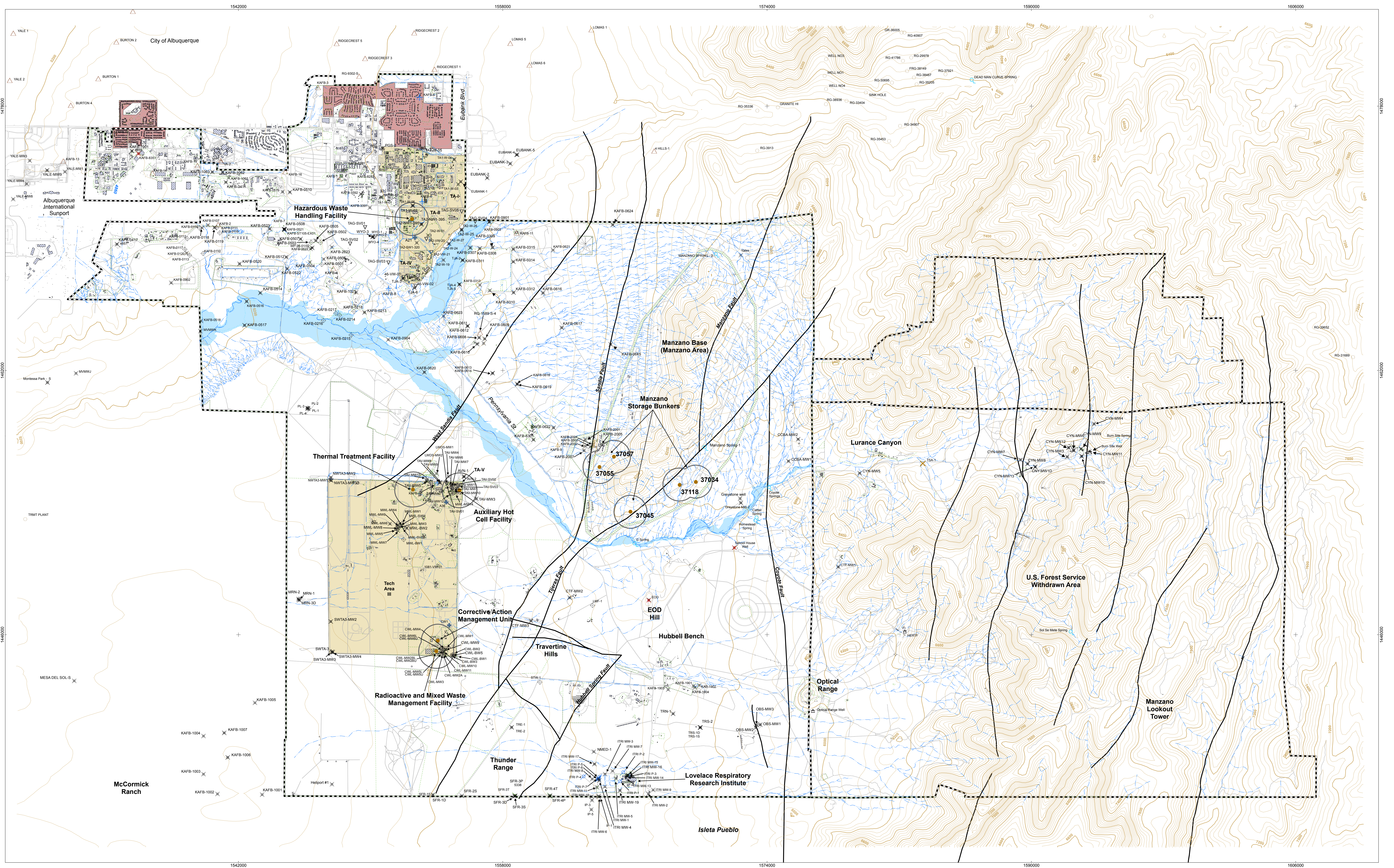
**Enclosure C**

**Revised Pages  
Text and Figures  
Comprehensive Part B Permit Request**

**Sandia National Laboratories  
NM5890110518**

**Revised Figure B-1**

**Part 1: General Part A  
Appendix B**



Sandia National Laboratories, New Mexico  
Environmental Geographic Information System

## Figure B-1 Unit Location Map April 2012 Sandia National Laboratories New Mexico

Transverse Mercator Projection, New Mexico State Plane Coordinate System,  
Central Zone, 1983 North American Horizontal Datum  
1983 North American Vertical Datum

Mapid = mb14093-dh120097.aml 03/18/14 SNL EGIS ORG. 4142 MB Barthel

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**Revised Appendix A**

**Part 2: General Part B  
Appendix A**

**Appendix A is reproduced in its entirety.  
See Enclosure A for a discussion of revisions.**

**APPENDIX A**

**SITE-WIDE DESCRIPTION FOR  
SANDIA NATIONAL LABORATORIES/NEW MEXICO  
RESOURCE CONSERVATION AND RECOVERY ACT-REGULATED  
WASTE MANAGEMENT UNITS**

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## ACRONYMS AND ABBREVIATIONS

20 NMAC 4.1.X00	New Mexico Administrative Code, Title 20, Chapter 4, Part 1, Subpart X
40 CFR 2XX.XX	Code of Federal Regulations, Title 40, Part 2XX, Section 2XX.XX
AHCF	Auxiliary Hot Cell Facility
CAMU	Corrective Action Management Unit
DOE	U.S. Department of Energy/National Nuclear Security Administration
ft	foot/feet
HWHF	Hazardous Waste Handling Facility
KAFB	Kirtland Air Force Base
MSB	Manzano Storage Bunkers
RCRA	Resource Conservation and Recovery Act
RMWMF	Radioactive and Mixed Waste Management Facility
Sandia	Sandia Corporation
SNL/NM	Sandia National Laboratories/New Mexico
TA	Technical Area
TTF	Thermal Treatment Facility
Unit	RCRA-regulated waste management unit
USFS	U.S. Forest Service

## **SITE-WIDE DESCRIPTION FOR SANDIA NATIONAL LABORATORIES/NEW MEXICO**

The information provided in this appendix is submitted in accordance with the applicable requirements of New Administrative Code, Title 20, Chapter 4, Part 1, Subparts V and IX (20 NMAC 4.1.1500– and .900), revised October 1, 2003 [7-1-08]. 20 NMAC 4.1.500 and .900 adopt, with limited exceptions, all of the Code of Federal Regulations, Title 40, Parts 264 and 270 (40 CFR 264 and 270). The following subject areas are addressed in this appendix or in Section 2.0 of each Unit-specific module.

- A general description of the Sandia National Laboratories/New Mexico (SNL/NM) site (20 NMAC 4.1.900/40 CFR 270.14[b][1] [7-1-08]);
- Site-wide security procedures and equipment (20 NMAC 4.1.900/40 CFR 270.14[b][4] and 270.14[b][19][viii] [7-1-08]; 20 NMAC 4.1.500/40 CFR 264.14 [7-1-08]);
- Site-wide traffic patterns, volume, and controls (20 NMAC 4.1.900/40 CFR 270.14[b][10] [7-1-08]);
- Site location information for compliance with the seismic standard and floodplain requirements (20 NMAC 4.1.900/40 CFR 270.14[b][11] [7-1-08], and 20 NMAC 4.1.500/40 CFR 264.18[a] and [b] [7-1-08]);
- Site-wide topographic map requirements (20 NMAC 4.1.900/40 CFR 270.14[b][19] [7-1-08]);
- Site-wide groundwater monitoring and protection information (20 NMAC 4.1.900/40 CFR 270.14[c] [7-1-08], and 20 NMAC 4.1.500/40 CFR 264.90[a] [7-1-08]); and
- Other permit activities.

Together, the information in this appendix, in the General Part B, and in each Unit-specific Part B module meets the applicable regulatory requirements. Individual Units are listed in Table A-1.

For the purposes of this permit renewal request/application, SNL/NM (the facility) is owned by the U.S. Department of Energy/National Nuclear Security Administration (DOE) and operated by Sandia.

### **A.1 GENERAL SITE DESCRIPTION (20 NMAC 4.1.900/40 CFR 270.14[b][1])**

SNL/NM is located on Kirtland Air Force Base (KAFB) immediately southeast of the Albuquerque city limits in Bernalillo County, New Mexico. SNL/NM occupies an area of approximately 2,842 acres within the 80-square-mile KAFB (Figure A-1).

**Table A-1  
RCRA-Regulated Waste Management Units**

<b>Unit Name</b>	<b>Acronym</b>	<b>Location, Size</b>	<b>Types of Operations</b>	<b>Operating Status</b>
Hazardous Waste Handling Facility	HWHF	South of TA-I, north of entrance to TA-II. 1.35 acres	Storage, Repackaging	Existing, operational
Thermal Treatment Facility	TTF	Northern part of TA-III. 196 square feet	Treatment	Existing, operational
Radioactive and Mixed Waste Management Facility	RMWMF	Southeast corner of TA-III. 3.11 acres	Storage, Treatment, Repackaging	Existing, operational
Auxiliary Hot Cell Facility	AHCF	TA-V. 5578 square feet	Storage, Treatment, Repackaging	Existing, operational
Manzano Storage Bunkers (Set of five Units)	MSB	In Manzano Area on KAFB. 0.4 acres occupied by bunkers (approximately 1600 to 2400 square feet in each bunker)	Storage	Existing, operational
Corrective Action Management Unit	CAMU	Southeast corner of TA-III. Includes containment cell located due north of RMWMF.	Post-closure monitoring of containment cell.	Existing, post-closure care

SNL/NM (U.S. Environmental Protection Agency Identification Number NM5890110518) is a multidisciplinary laboratory engaged in research and development of weapons and alternative energy sources. SNL/NM is managed by Sandia, a wholly-owned subsidiary of Lockheed Martin, for the DOE, with work also performed for others. Activities at SNL/NM fall under North American Industry Classification System Numbers 92811 (National Security) and 54171 (Research and Development in the Physical, Engineering, and Life Sciences).

The major Sandia/DOE research and administration functions are located at five Technical Areas (TAs), designated I through V. TAs I, II, and IV are located north of Tijeras Arroyo and Arroyo del Coyote (Figures A-2 and A-3). TAs III and V occupy contiguous tracts of land south of Tijeras Arroyo and west of Arroyo del Coyote.

**A.2 SECURITY PROCEDURES AND EQUIPMENT (20 NMAC 4.1.900/40 CFR 270.14[b][4]; 20 NMAC 4.1.500/40 CFR 264.14)**

In accordance with 20 NMAC 4.1.500/40 CFR 264.14(a) [7-1-08], an owner or operator must prevent the unknowing entry, and minimize the possibility for the unauthorized entry, of persons or livestock onto the active portion of a facility. The following sections describe the security provisions provided at SNL/NM to prevent unknowing or unauthorized entry onto the active portions of Units.

### **A.2.1 Barriers and Means to Control Entry (20 NMAC 4.1.500/40 CFR 264.14[b][2][i] and [ii])**

20 NMAC 4.1.500/40 CFR 264.14 [7-1-08] and 270.14[b][19][viii] [7-1-08], require that security be provided by 24-hour surveillance which is continuously monitored and controls access to the facility (20 NMAC 4.1.500/40 CFR 264.14[b][1] [7-1-08]), or if that requirement cannot be met, a natural or artificial barrier and means to control entry must be provided (20 NMAC 4.1.500/40 CFR 264.14[b][2] [7-1-08]). The design and operation of the SNL/NM facility fully meet the security requirements of 20 NMAC 4.1.500/40 CFR 264.14(b)(2) [7-1-08].

The five TAs, Manzano Base, and Units outside TAs are surrounded by fences that prohibit access except through gated entrances. Only personnel with appropriate Sandia-issued access badges and identification, or escorted visitors, are allowed access to the TAs and all Units. The gates and/or doors to all Units are closed and locked during non-operating hours.

Sandia/DOE security personnel periodically monitor the gates of all SNL/NM technical areas and RCRA-regulated waste management Units during non-operational hours. Any additional Unit-specific information on security procedures and access control is provided in each Unit-specific module.

The SNL/NM Units are located within the fenced boundaries of KAFB. Access to KAFB is controlled 24 hours per day, 7 days per week. Entrance is possible only through five gates, staffed by armed military police, upon recognition of identification stickers or passes issued to each vehicle. Visitors must have a base sponsor and sign an entry log prior to entering the base. The gates are shown in Figure A-4.

### **A.2.2 Warning Signs (20 NMAC 4.1.500/40 CFR 264.14[c])**

20 NMAC 4.1.500/40 CFR 264.14(c) [7-1-08], requires that signs meeting the requirements of that section be posted. Each SNL/NM Unit is posted with "Danger: Unauthorized Personnel Keep Out" (or functionally equivalent) signs in English and Spanish. The signs are legible from a distance of 25 feet and can be seen from any approach to any Unit. The signs and their placement meet the requirements of 20 NMAC 4.1.500/40 CFR 264.14(c) [7-1-08]. Any additional Unit-specific information on warning signs is provided in each Unit-specific module.

### **A.3 TRAFFIC PATTERNS, VOLUMES, AND CONTROLS (20 NMAC 4.1.900/40 CFR 270.14[b][10])**

The traffic pattern information presented below is general in nature. More detailed information is provided in Section 2.2 of each Unit-specific module.

RCRA-regulated waste is generated during operations at sites throughout SNL/NM. Because RCRA-regulated waste may be generated throughout SNL/NM, waste transport may occur on nearly all roads within KAFB. Off-site wastes may be received at SNL/NM (see Appendix B of this General Part B). The Units included in this permit application can be reached from the KAFB

entrance gates at Wyoming Boulevard, Truman Avenue, Gibson Boulevard, or Eubank Boulevard (Figure A-4). KAFB may restrict hazardous material traffic to one or more gates.

A system of interior roads, as shown in Figures A-4, A-5, A-6, and A-7, is maintained at SNL/NM. About 78 total miles of roadway exist; 33 of those miles are paved. The paved roads present at SNL/NM are generally built in conformance to the New Mexico State Highway Standards or the “City of Albuquerque Development Process Manual, Standards for Residential Streets” (City of Albuquerque, 1983 and amendments). These standards conform to specifications prepared by the American Association of State Highway Transportation Officials. Paved roads at SNL/NM are generally designed and constructed to accommodate light to moderate volumes of truck traffic, including 30- to 40-ton vehicles. The roads typically consist of a 1.5 - to 4-inch layer of asphaltic pavement over a 4- to-6 inch base course (not always present) and 8- to 12-inch compacted subgrade.

### **A.3.1 Traffic Patterns**

Information addressing current Unit-specific travel routes is presented in Section 2.2 of each Unit-specific module. Traffic patterns are subject to change in response to KAFB security requirements.

### **A.3.2 Traffic Volumes**

During the last official traffic study conducted at KAFB in 1984, the average number of vehicles passing through the continuously guarded KAFB gates during normal workday hours from Monday through Friday was estimated to be (Meyers, 1991):

- Carlisle-Gibson gate—5,200 vehicles
- Truman-Gibson gate—10,200 vehicles
- Louisiana-Gibson gate—18,000 vehicles
- Wyoming gate—21,600 vehicles
- Eubank gate—12,200 vehicles.

The majority of the 67,200 total vehicles consisted of commuting employees in personal automobiles and light-duty trucks. At the time of the traffic study, about 8,400 people were employed at SNL/NM (including Sandia personnel and contractors) and an estimated additional 21,000 people were employed at adjoining KAFB and DOE facilities (Jackson, 1991). Sandia personnel and contractors currently number about 6,450 people and an additional 17,000 are employed at KAFB and DOE facilities (Francis, 2001). The KAFB Security Forces squadron estimates that 40,000 to 50,000 vehicles currently pass through KAFB gates daily (Francis, 2001).

Therefore, Sandia/DOE believes the 1984 traffic data slightly overestimate the traffic volume for 2001.

### **A.3.3 Traffic Control Signals**

Site wide traffic flow on KAFB is controlled by traffic lights, stop signs, yield signs, and one-way streets. Traffic lights are in place at major intersections on KAFB. Traffic signs are used at “T” intersections throughout KAFB, including SNL/NM. Any additional Unit-specific information addressing traffic control is presented in Section 2.2 of each Unit-specific module.

## **A.4 SITE LOCATION INFORMATION (20 NMAC 4.1.900/40 CFR 270.14[b][11])**

### **A.4.1 Geologic Setting (20 NMAC 4.1.500/40 CFR 264.18[a] and 20 NMAC 4.1.900/40 CFR 270.14[b][11])**

SNL/NM is located along the east-central edge of the Albuquerque Basin, one of a north-south-trending series of basins that make up the Rio Grande Rift. The basin is approximately 100 miles long and 20 to 40 miles wide (Figure A-9). As shown on Figure A-9, the structural boundaries of the Albuquerque Basin are as follows:

- Colorado Plateau on the west
- Nacimiento Uplift and the Jemez Mountains to the north
- La Bajada Escarpment to the northeast
- Sandia, Manzanita, Manzano, and Los Pinos mountains to the east
- Joyita and Socorro uplifts to the south
- Ladron and Lucero uplifts to the southwest.

The eastern section of the Albuquerque Basin shows major faulting (Figures A-2 and A-9). The four primary faults on the east side of KAFB are (1) the Sandia fault, (2) the West Sandia fault, (3) the Hubbell Spring fault (West, Central, and East fault segments), and (4) the Tijeras fault. The Sandia fault is thought to be the primary boundary between the Sandia Mountains and the Albuquerque Basin. The Hubbell Spring fault extends northward from Socorro County and terminates on KAFB in the vicinity of the Tijeras fault. The Sandia and the Hubbell Spring faults are north-south-trending, down-to-the-west, en-echelon normal faults bounding the east side of the Albuquerque Basin.

The Tijeras fault is an ancient strike-slip fault that developed in the Precambrian or early Paleozoic and was reactivated in association with the Laramide Orogeny during the Cretaceous period (Kelley 1977). The fault also demonstrates Quaternary movement (Kelson et al. 1999, GRAM 1995). Preferential erosion along the fault formed Tijeras Canyon, which divides the Sandia and Manzanita Mountains. The fault trends southwest from Tijeras Canyon, intersects the northeast boundary of KAFB, and crosses KAFB east and south of Manzano Base. Manzano Base occupies an uplift of four peaks defined by the Tijeras fault on the east side and the Sandia fault on the west side. The Sandia, Hubbell Spring, and Tijeras faults converge near the southeast end of TA-III. This complicated system of faults, defining the east edge of the basin, is referred to collectively as the Tijeras fault complex.

Within the boundaries of KAFB, the Albuquerque Basin rocks are Precambrian to Holocene in age. The upper part of the basin fill within KAFB is comprised of the Ceja Member of the Tertiary Santa Fe Group, which is a complex sequence of gravel, sand, silt, clay, and caliche deposits. Quaternary and Holocene deposits, which include alluvium, landslide deposits, eolian deposits, caliche, and gravel pediments, also comprise Albuquerque Basin sediments within KAFB (Kelley, 1977).

#### **A.4.2 Seismic Standard (20 NMAC 4.1.900/40 CFR 270.14[b][11][i and ii]; 20 NMAC 4.1.500/40 CFR 264.18[a])**

SNL/NM is located in Bernalillo County, New Mexico, which is listed in Appendix VI of 20 NMAC 4.1.500/40 CFR 264 [7-1-08]. None of the SNL/NM Units are located within 3,000 feet (ft) of any fault with Holocene displacements (Machette, 1982). Therefore, all SNL/NM Units are compliant with the seismic standards in 20 NMAC 4.1.500/40 CFR 264.18(a) [7-1-08] and 20 NMAC 4.1.900/40 CFR 270.14(b)(11)(ii) [7-1-08].

#### **A.4.3 Floodplain Standard (20 NMAC 4.1.900/40 CFR 270.14[b][11][iii through v]; 20 NMAC 4.1.500/40 CFR 264.18[b])**

SNL/NM is located near the middle of the upper Rio Grande basin that originates in southern Colorado. SNL/NM occupies generally flat, gently west-sloping mesa land located between the Rio Grande Valley to the west and the Manzano and Manzanita Mountains to the east. The nearest surface water body is the Rio Grande, located about 7 miles west of SNL/NM.

The locations of the 100-year floodplains of Tijeras Arroyo and Arroyo del Coyote are shown in Figure A-2. The floodplain portion of Figure A-2 was derived from a U.S. Army Corps of Engineers map (COE, 1979), prepared using Federal Emergency Management Administration guidelines that are equivalent to the mapping techniques used to prepare Federal Insurance Administration floodplain maps. None of the SNL/NM Units are located within a 100-year floodplain, as defined in 20 NMAC 4.1.500/40 CFR 264.18(b)(2)(i) [7-1-08], and as regulated under 20 NMAC 4.1.500/40 CFR 264.18(b)(1) [7-1-08] and 20 NMAC 4.1.900/40 CFR 270.14(b)(11)(iv) [7-1-08]. Therefore, all SNL/NM Units are compliant with the floodplain standards.

### **A.5 TOPOGRAPHIC MAPS (20 NMAC 4.1.900/40 CFR 270.14[b][19])**

Figure A-2 is provided to meet the requirements of the 20 NMAC 4.1.900/40 CFR 270.14(b)(19) [7-1-08]. Figure A-2 is a topographic map of KAFB that shows the SNL/NM TAs and includes the following:

- Map scale and date
- The 100-year floodplain area
- Surface water bodies, including intermittent streams

- Wind roses
- Map orientation (north arrow)
- Legal boundaries of the SNL/NM facility
- Access control features (i.e., fences and gates)
- Groundwater monitoring, withdrawal, and water supply wells both on site and off site at KAFB and SNL/NM in the vicinity of the Units
- Buildings and other structures (e.g., access and internal roads)
- Locations of the HWHF, TTF, RMWMF, AHCF, MSB, and CAMU
- Areas of residential land use within KAFB.

These items are also shown on topographic maps in the Unit-specific modules. The Unit-specific maps show Unit features and the area surrounding each Unit in greater detail.

#### **A.5.1 Wells (20 NMAC 4.1.900/40 CFR 270.14[b][19][ix])**

There are no injection wells at SNL/NM. Groundwater monitoring wells and withdrawal wells located at SNL/NM are shown in Figure A-2. None of the wells shown in Figure A-2 are expected to be influenced by activities at any SNL/NM RCRA-regulated waste management Unit because waste management activities occur in contained areas. KAFB water-supply wells, City of Albuquerque wells, and other wells located within 1,000 ft of the KAFB boundaries are shown on Figure A-2.

#### **A.5.2 Wind Rose (20 NMAC 4.1.900/40 CFR 270.14[b][19][v])**

A network of meteorological towers is used to monitor weather conditions at SNL/NM. Data indicate that the overall prevailing winds at SNL/NM are from the east, except that winter winds at the 100-ft elevation are from the north. Rapid night time ground cooling after sunset on cloudless or near-cloudless nights produces strong temperature inversions in which temperature increases with elevation (an atmospheric condition resulting from a reversal of the normal temperature lapse rate). This rapid cooling effect generates nighttime drainage winds out of the mountains, which are strongest at the mouths of the larger canyons. Nighttime winds in these areas are typically from the east and southeast, while daytime winds are typically from the southwest, west, and northwest. It also appears that Tijeras Arroyo diverts surface air flow between TAs III and V on the south and TAs I, II, and IV, and Albuquerque on the north (SNL/NM 2002, 2004, 2012). The channeling of wind through Tijeras Canyon can be seen by comparing the wind roses from these two areas (SNL/NM, 2002). Figure A-2 shows wind roses that summarize wind speeds and directions for TA-II (near the HWHF), the southeast corner of TA-III (near the RMWMF), and the northeast corner of TA-III (near the AHCF and TTF). Wind roses are also shown on the Unit-specific topographic maps.

### **A.5.3 Surrounding Land Use (20 NMAC 4.1.900/40 CFR 270.14[b][19][iv])**

Albuquerque is the largest population center in Bernalillo County and also the closest population center to KAFB and SNL/NM. According to Census 2010 data, the total population of the Albuquerque metropolitan area is 633,233 (U.S. Census Bureau, 2010). This population includes permanent residents of KAFB living in the KAFB housing areas. An additional 29,341 people live outside the Albuquerque metropolitan area but within Bernalillo County (U.S. Census Bureau, 2010).

SNL/NM is essentially surrounded by KAFB, with co-use agreements on some portions of KAFB. An additional 22,500-acre area to the east of KAFB has been withdrawn from the U.S. Forest Service (USFS) for the exclusive use of KAFB. High explosive tests, explosives storage, and other operations are buffered and barricaded by the mountainous terrain toward the eastern edge of this withdrawal area. Areas to the west and south, by agreements with the State of New Mexico and Isleta Pueblo, serve as buffer zones for other test operations.

Land use in the vicinity of SNL/NM and KAFB is urban to the northwest, north, and northeast. Undeveloped grazing land of Isleta Pueblo is located to the south. Undeveloped public grazing land lies to the west and southwest of KAFB and the buffer zones.

The urbanized area immediately northeast, north, and northwest of SNL/NM is predominantly residential, with commercial development along more heavily-traveled streets. Military (i.e., KAFB) housing is located north of F Street (adjacent to the northern edge of SNL/NM TA-I), as shown on Figure A-2. Albuquerque International Sunport is located west of the northern part of KAFB. Figure A-8 shows land uses for the areas adjacent to and within KAFB boundaries.

Some areas of KAFB and SNL/NM are within flight paths for aircraft that are taking off and landing at the Albuquerque International Sunport. Sandia/DOE studied the likelihood and potential impact of airplane crashes into SNL/NM facilities (DOE, 1999). The analysis covered several operations and facilities throughout SNL/NM, including the RMWMF and facilities near the HWHF and the AHCF. Such accidents were determined to be very unlikely; the annual probability varies from 2.8 in 1,000,000 at the RMWMF to 90 in 1,000,000 near the HWHF.

The SNL/NM facility is comprised of five TAs and several additional test areas spread over 17,845 acres, which are under diverse land ownership. SNL/NM occupies 2,842 acres owned by the DOE and an additional 15,003 acres that have been made available through a series of land-use agreements or permits among DOE-Albuquerque Operations, DOE Transportation Safeguards Division, KAFB, USFS, Bureau of Land Management, State of New Mexico, Phillips Laboratory (a private contractor), DOE Central Training Academy, and Isleta Pueblo.

The HWHF is approximately 2 miles south of Interstate 40 and 6 miles east of Interstate 25 and downtown Albuquerque. At their nearest points, the AHCF and the TTF are approximately 3 miles south of Interstate 40 and 6.5 miles east of Interstate 25 and downtown Albuquerque. The MSB are approximately 5 miles south of Interstate 40 and 7.5 miles east of Interstate 25 and downtown Albuquerque. The RMWMF is approximately 5.5 miles south of Interstate 40 and 6.5 miles east of Interstate 25 and downtown Albuquerque. Land use in the vicinity of each RCRA-regulated Unit is predominantly or completely industrial. There are no residential areas within

1 mile of any of the SNL/NM Units. The closest residences are in a KAFB residential area located north of TA-I.

#### **A.5.4 Drainage Control Features (20 NMAC 4.1.900/40 CFR 270.14(b)(8)(ii))**

Drainage control features (e.g., run-on/runoff, drainage barriers, storm water discharge) are shown on figures provided in each Unit-specific module.

#### **A.5.5 Waste Management Areas**

Locations of the waste management areas at each SNL/NM Unit are shown on figures provided in each Unit-specific module.

### **A.6 GROUNDWATER MONITORING (20 NMAC 4.1.900/40 CFR 270.14[c] and 20 NMAC 4.1.500/40 CFR 264.90[a])**

The nine SNL/NM Units included in Part 2 of this Sandia/DOE comprehensive Part B permit request are storage and/or treatment Units that are subject to 20 NMAC 4.1.500/40 CFR 264.101 [7-1-08] which requires that operators of treatment, storage, or disposal facilities develop and implement corrective actions as necessary to protect human health and the environment from past, present, or future releases of RCRA-regulated wastes. None of the nine storage and/or treatment Units addressed in Part 2 have released RCRA-regulated wastes in the past.

The nine Units are not subject to the groundwater protection and monitoring requirements of 20 NMAC 4.1.500/40 CFR 264, Subpart F [7-1-08] because they are not regulated units or solid waste management units.

SNL/NM currently has one regulated unit (the Chemical Waste Landfill) that is subject to the groundwater protection and monitoring requirements of 20 NMAC 4.1.500/40 CFR 264, Subpart F [7-1-08]. Chemical Waste Landfill groundwater monitoring is addressed in Part 3 of this Sandia/DOE comprehensive Part B permit request.

### **A.7 OTHER PERMIT ACTIVITIES**

Sandia/DOE hold numerous environmental permits issued by various agencies. Current permits, including RCRA permits, are listed in Appendix A of the General Part A included in Part 1 of this comprehensive Part B renewal request.

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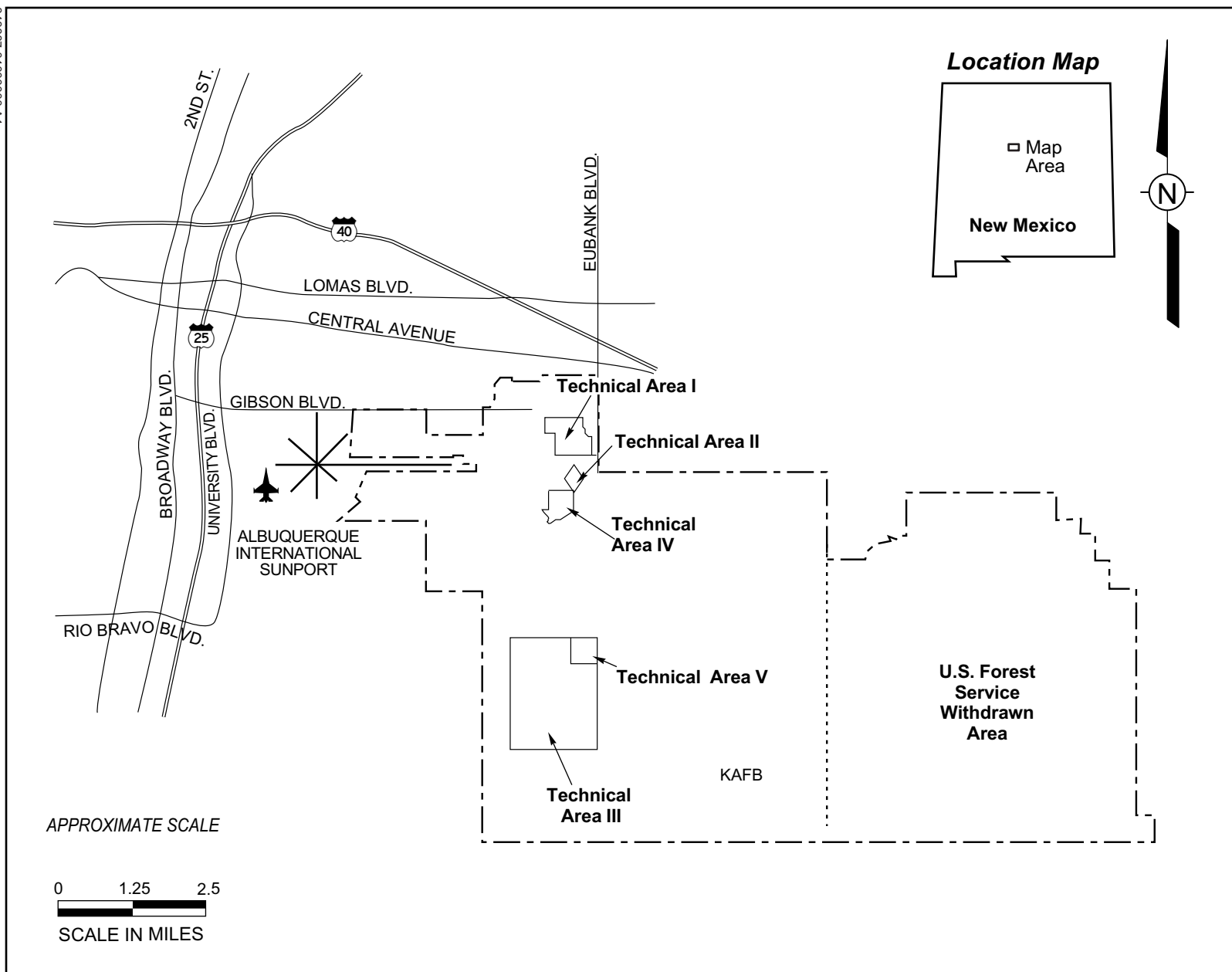
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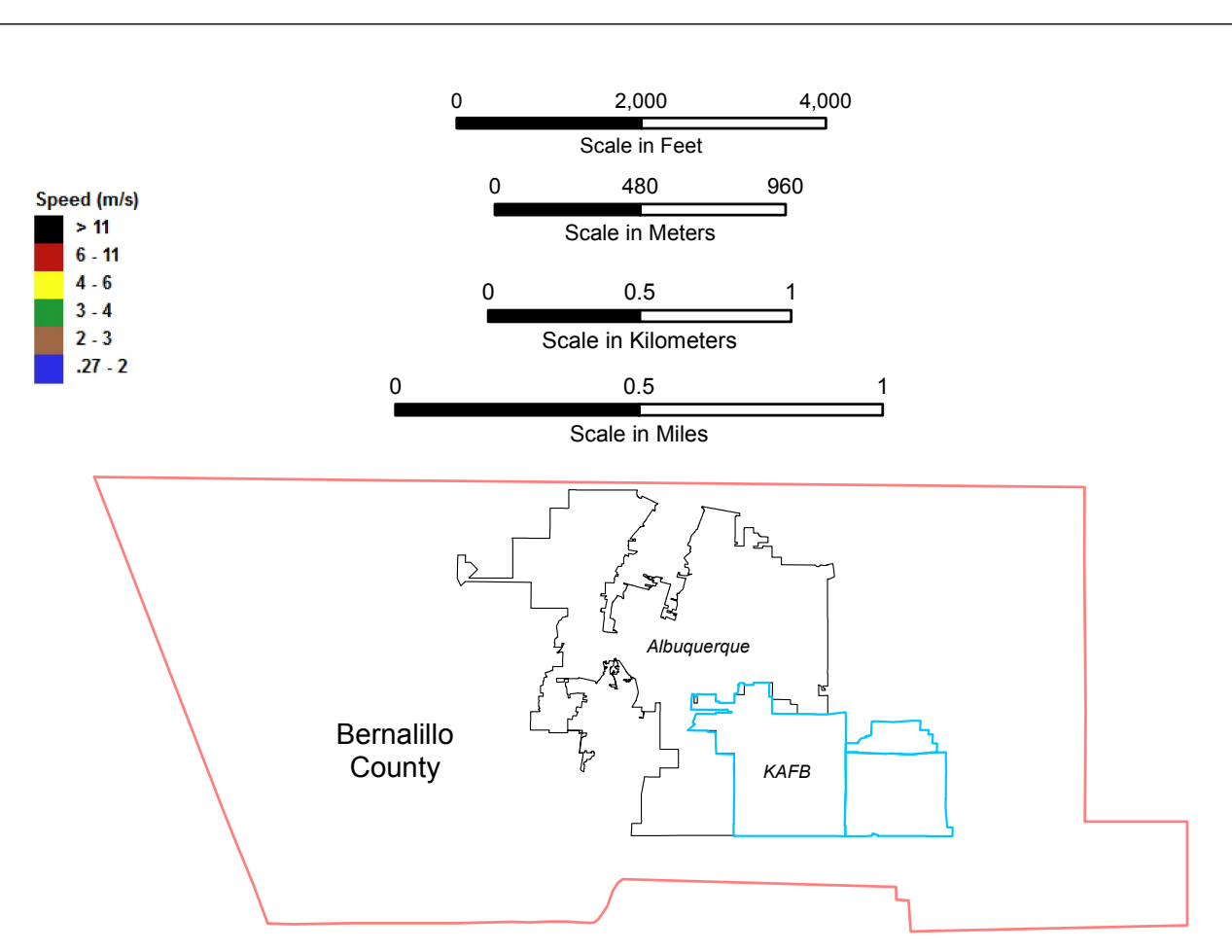
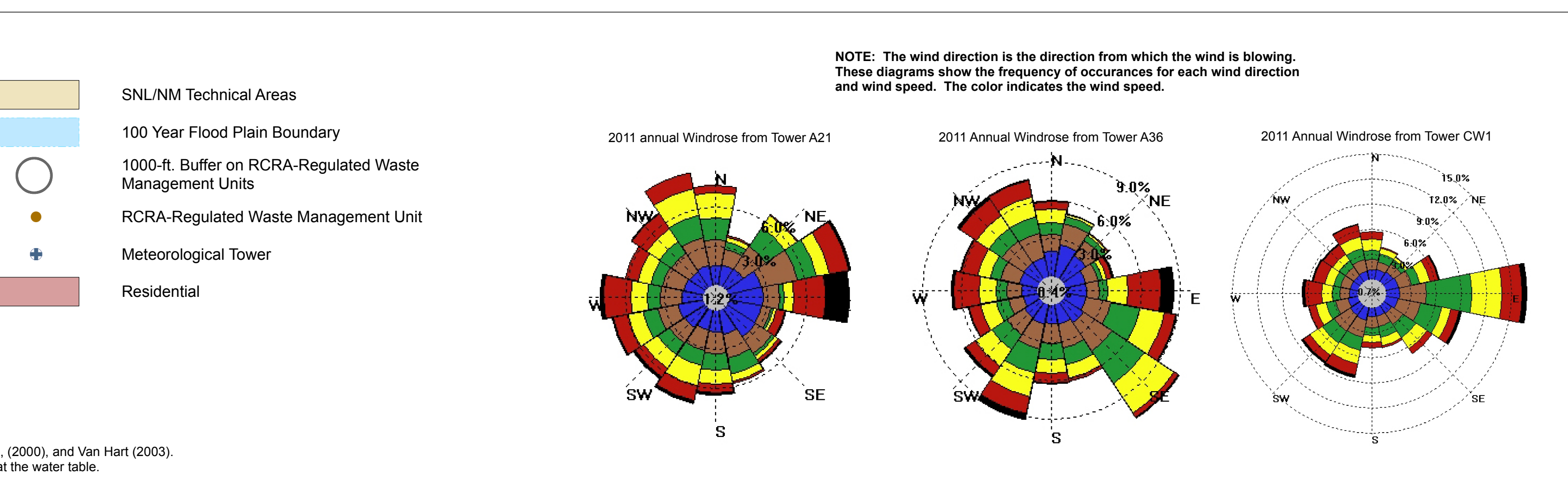
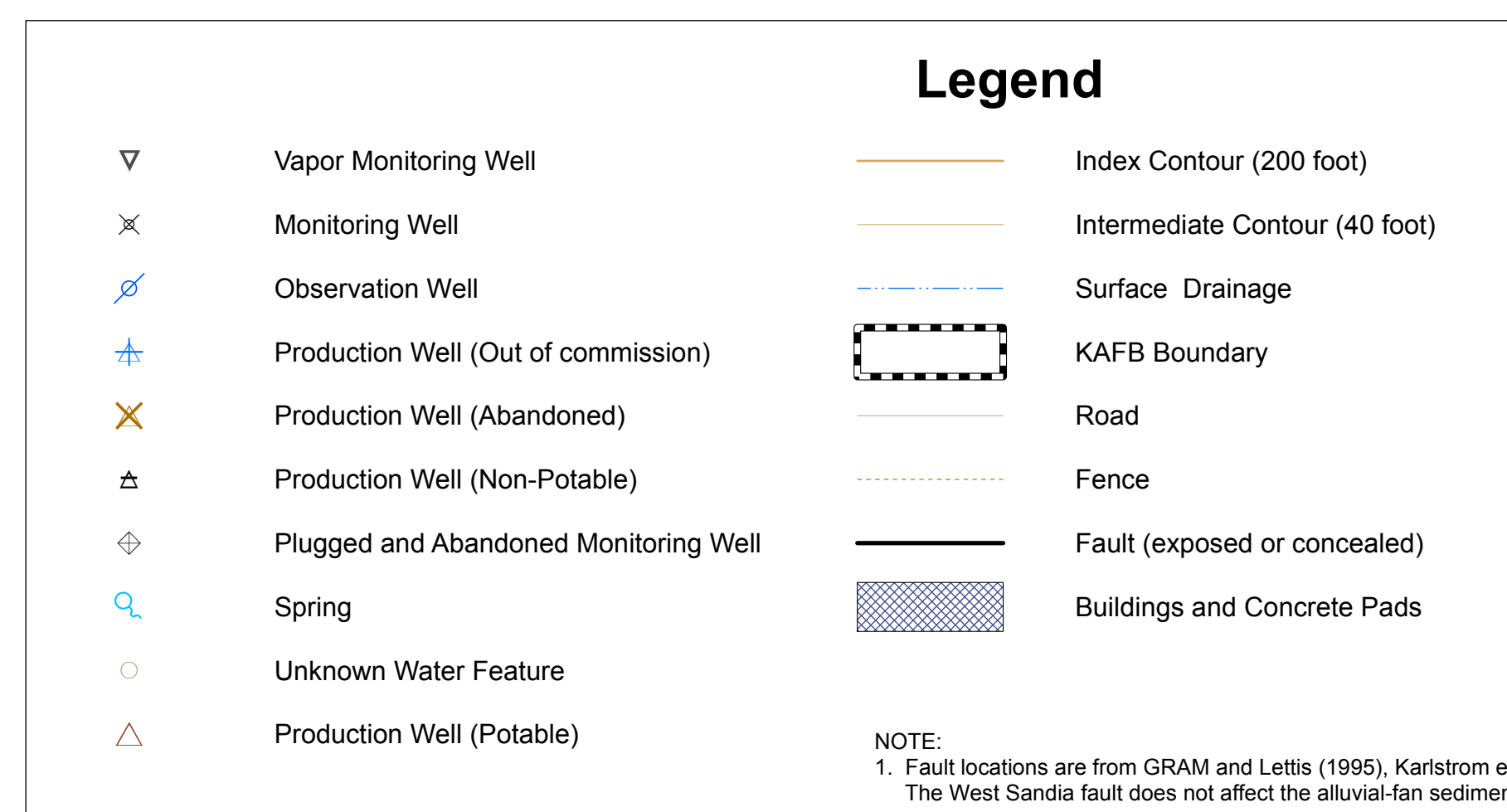
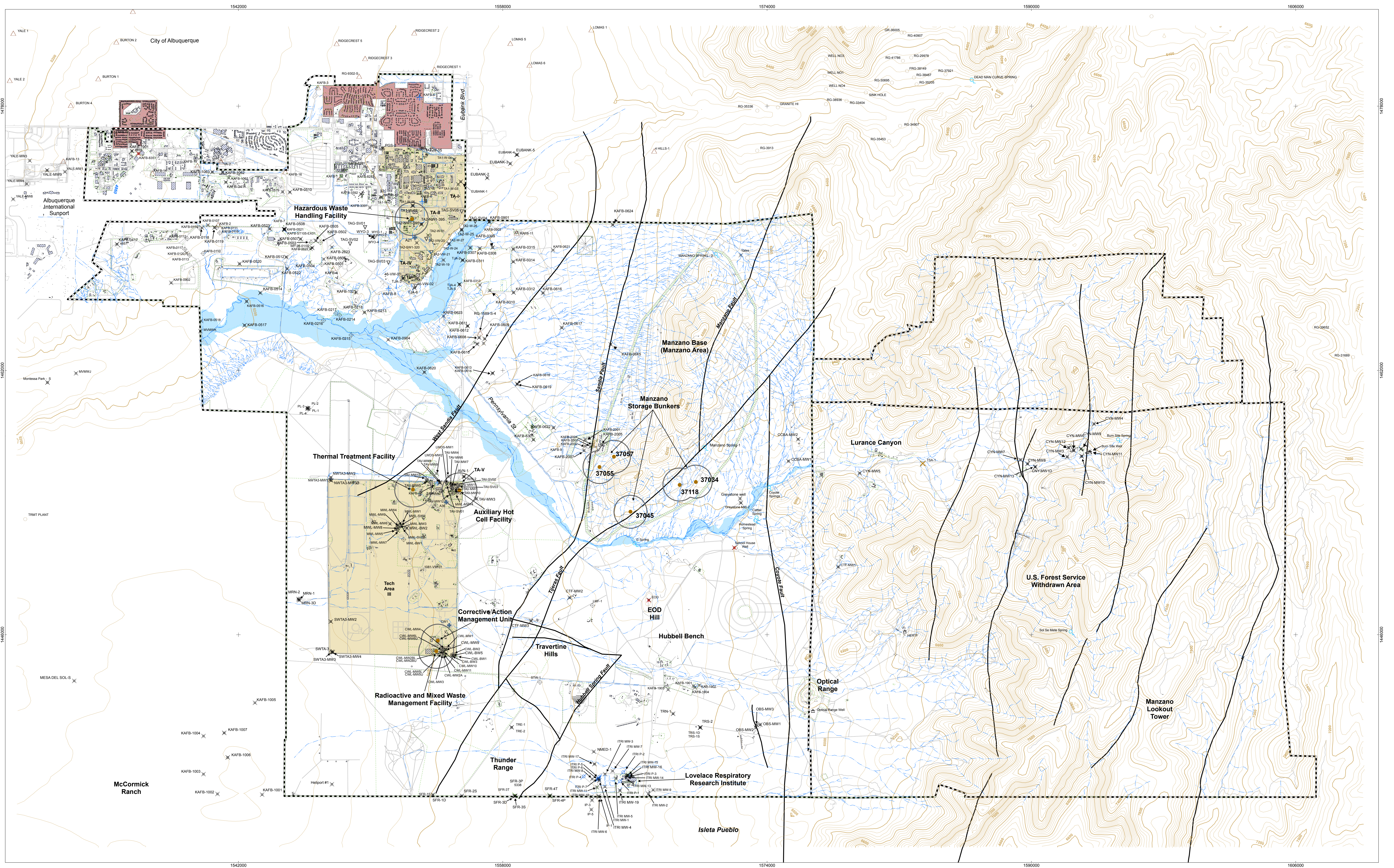
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**Figure A-1**  
**Site Location Map, Albuquerque and Kirtland Air Force Base (KAFB)**

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 Revision No.: 3.0  
 Date: November 2003



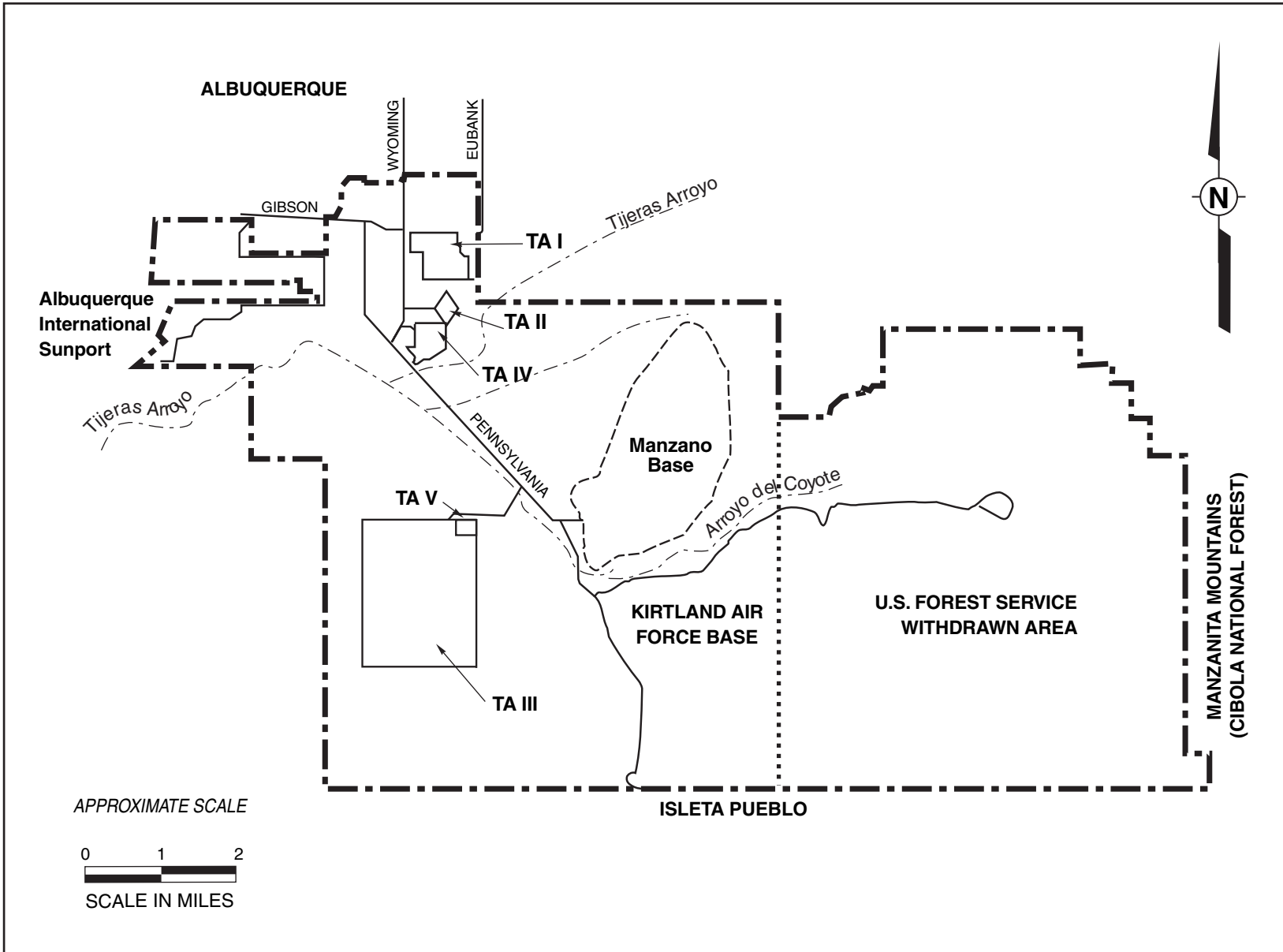
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## Figure A-2 Unit Location Map April 2012 Sandia National Laboratories New Mexico

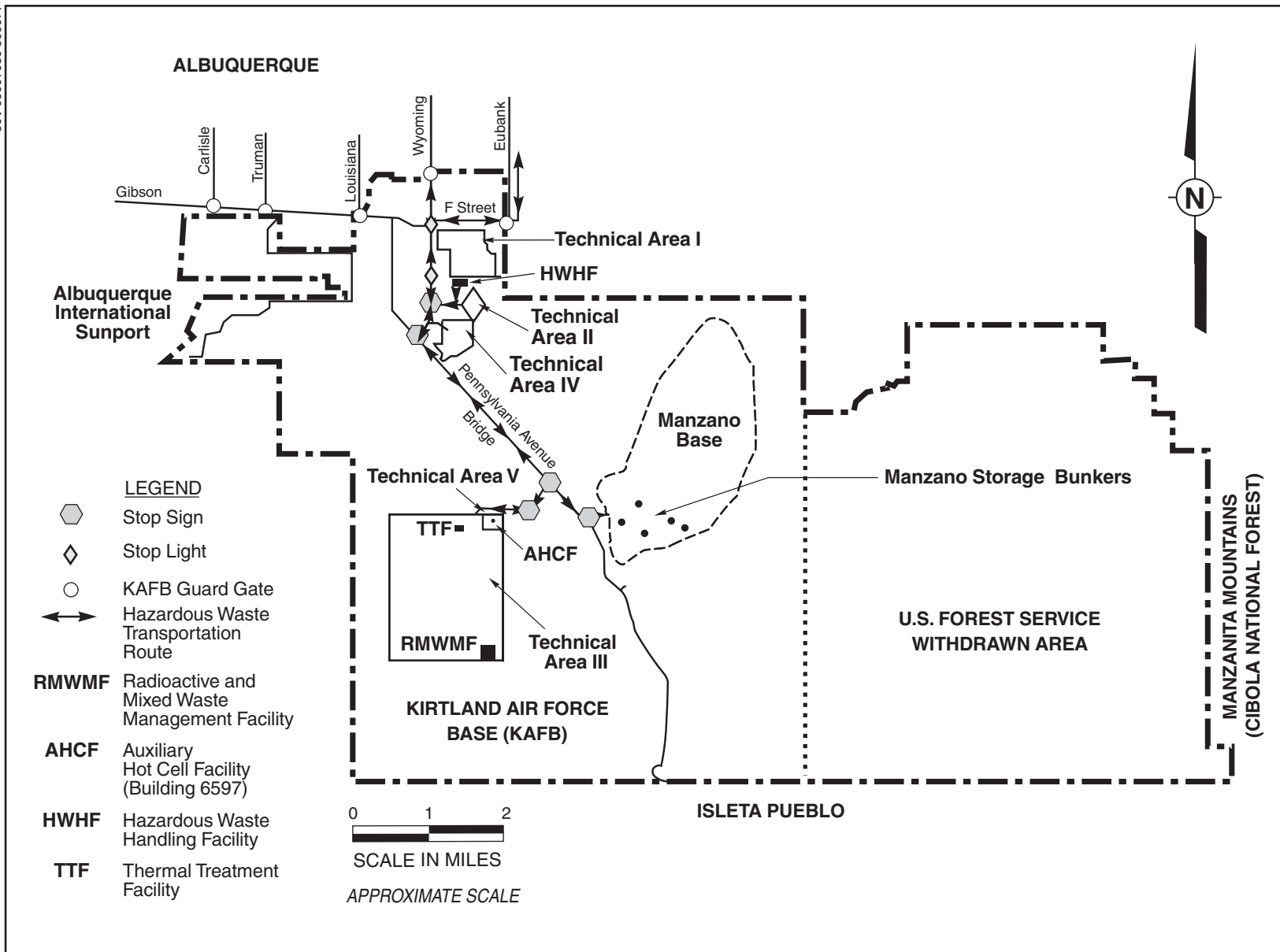
Transverse Mercator Projection, New Mexico State Plane Coordinate System,  
Central Zone, 1983 North American Horizontal Datum  
1983 North American Vertical Datum

Mapid = mb14092-dh120097.aml 03/18/14 SNL EGIS ORG. 4142 MB Barthel

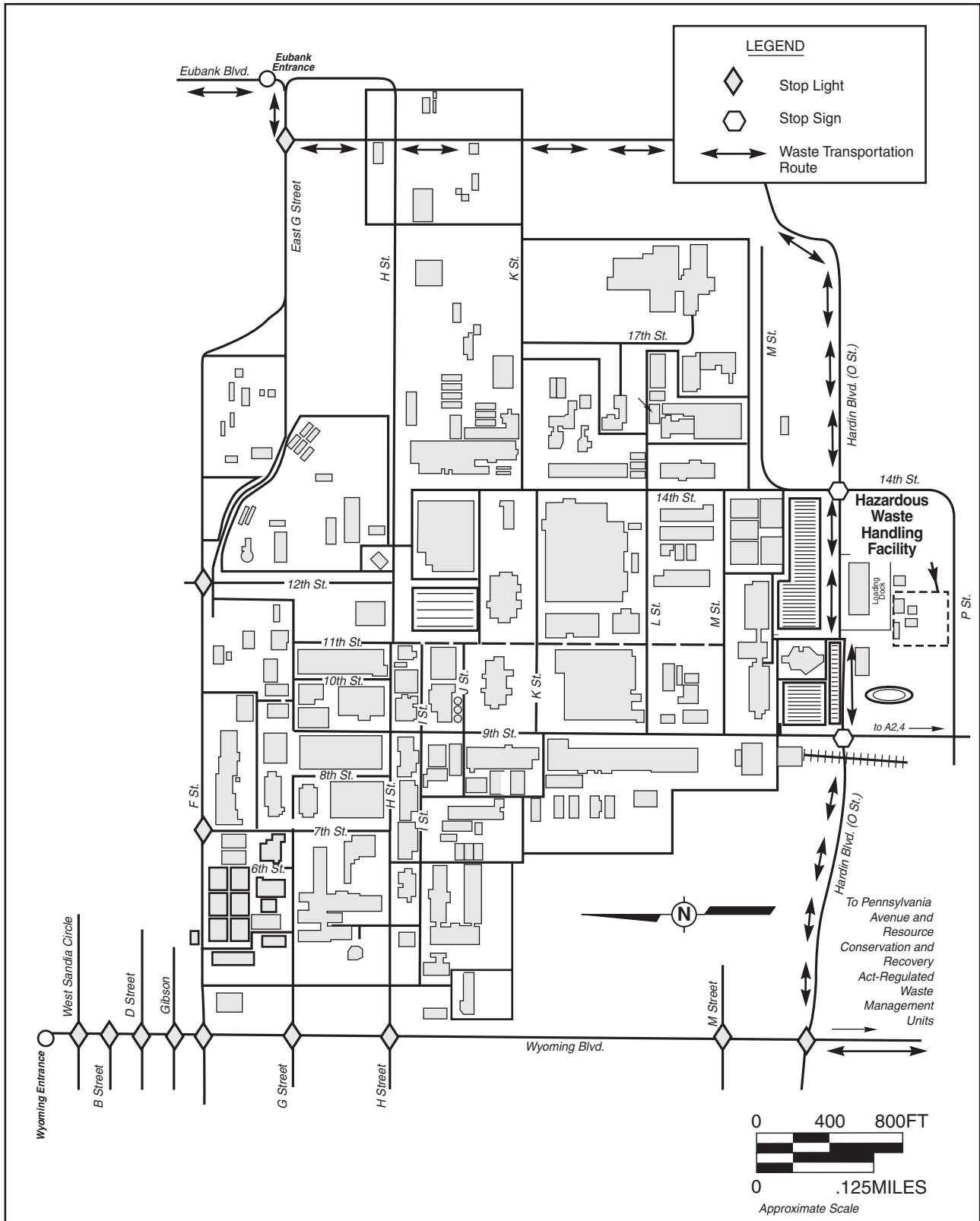
03/18/14



**Figure A-3**  
**Sandia National Laboratories/New Mexico**  
**Technical Areas (TAs) in Relation to Kirtland Air Force Base**




**Figure A-4**  
**Resource Conservation and Recovery Act-Regulated**  
**Waste Transportation Routes,**  
**Sandia National Laboratories/New Mexico**

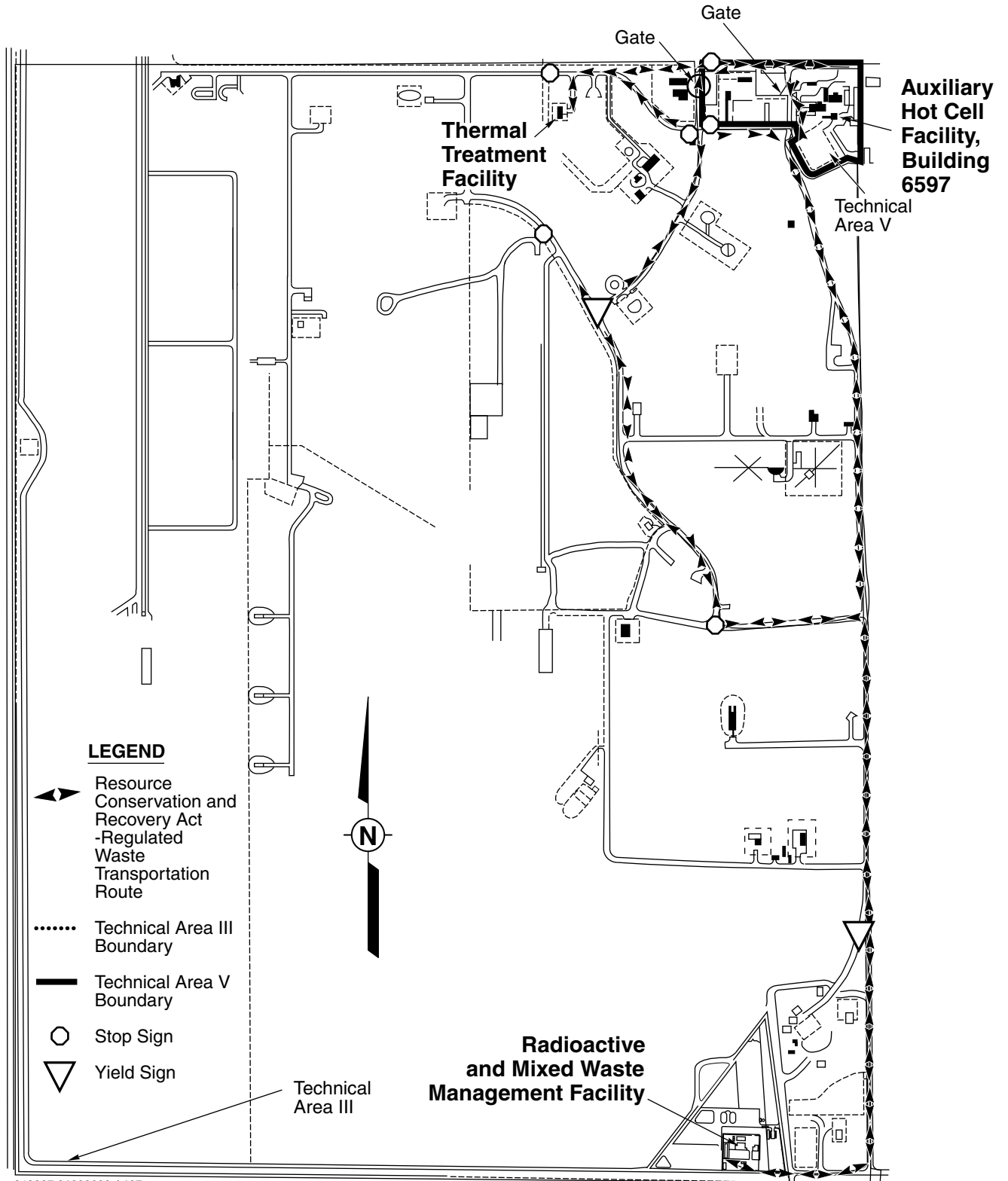


140692.02010000 A93

**Figure A-5**  
**Resource Conservation and Recovery Act-Regulated**  
**Waste Transportation Routes Around Technical Area I**

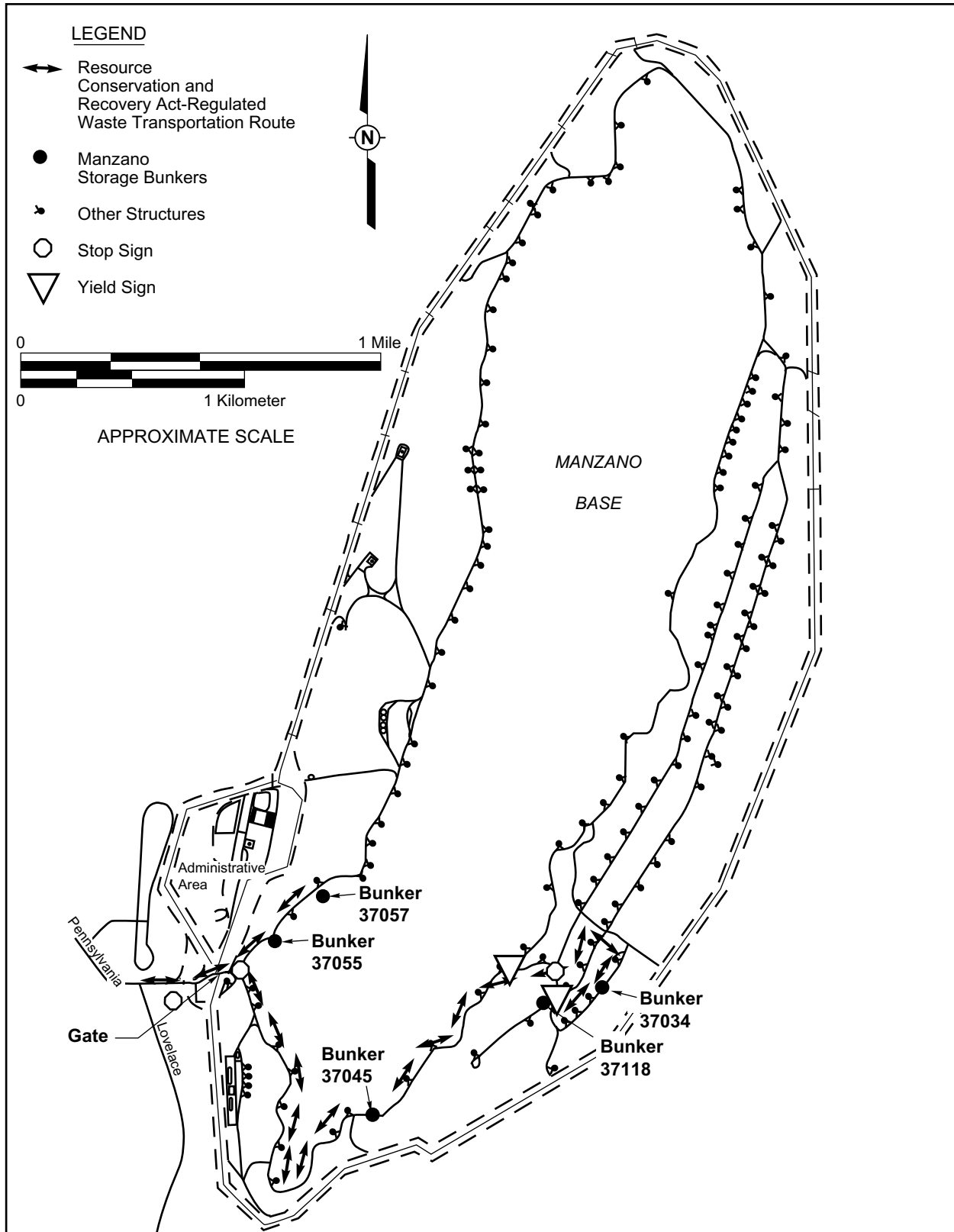
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 0 .125 .25  
  
 SCALE IN MILES

Document: SNL/NM General Part B,  
Appendix A  
 Revision No.: 6.0  
 Date: October 2005

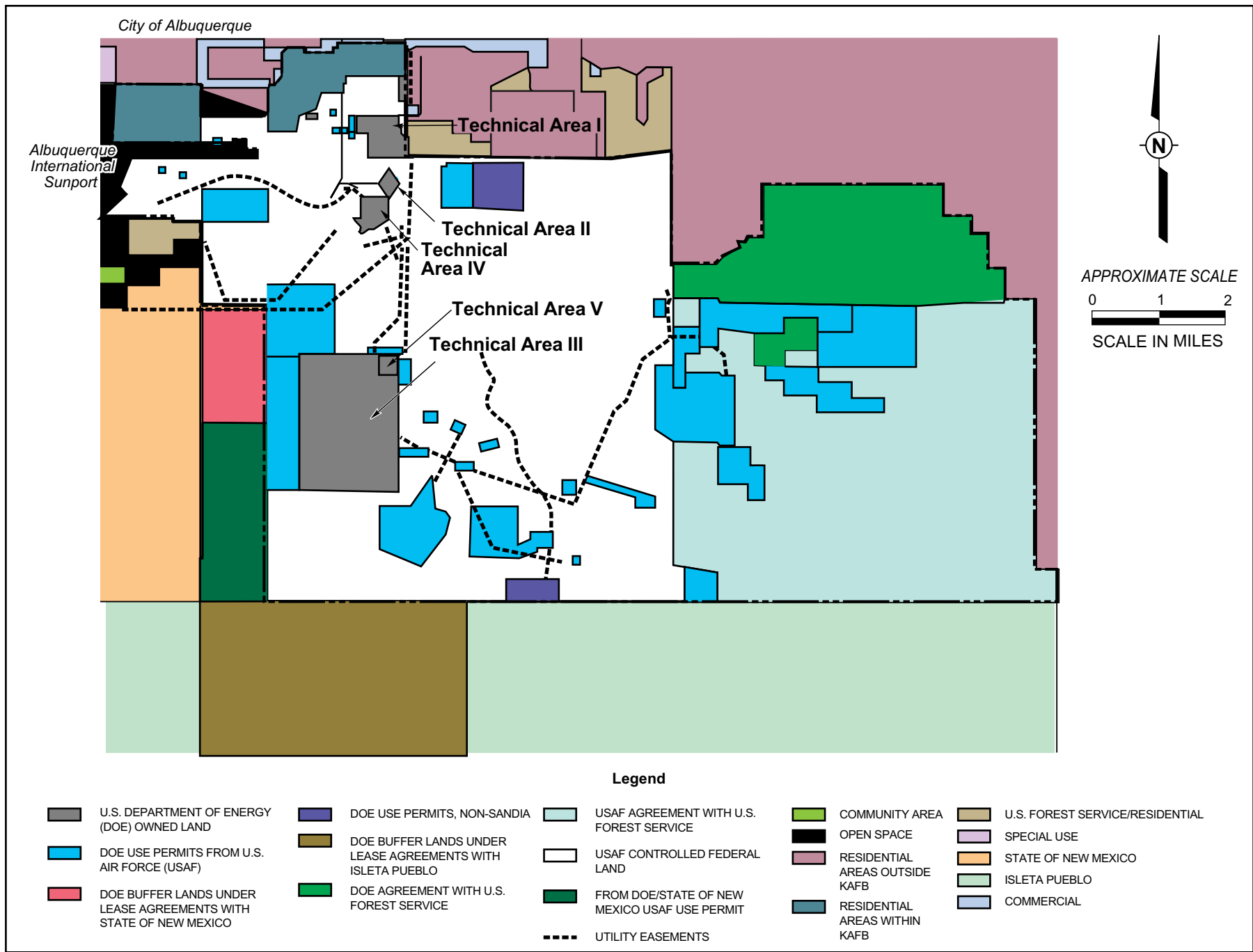


843887.01000000 A197

**Figure A-6**  
**Resource Conservation and Recovery Act-Regulated**  
**Waste Transportation Routes in Technical Areas III and V**



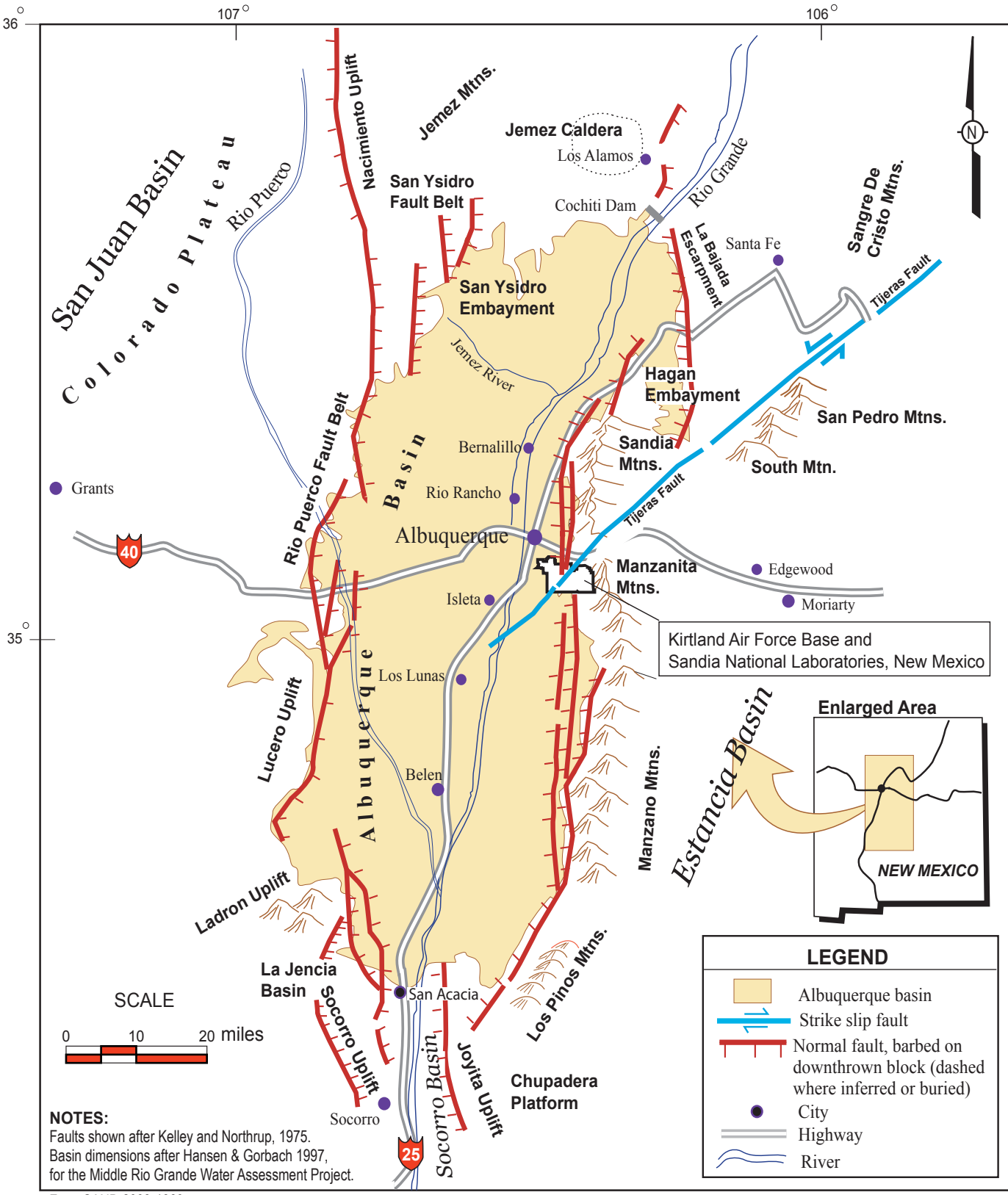
**Figure A-7**  
**Resource Conservation and Recovery Act-Regulated**  
**Waste Transportation Routes at Manzano Base**



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**Figure A-8**  
**Land Uses Adjacent to and Within Sandia National Laboratories/New Mexico and Kirtland Air Force Base**

Document: SNL/NM General Part B, Appendix A  
 Revision No.: 3.0  
 Date: November 2003

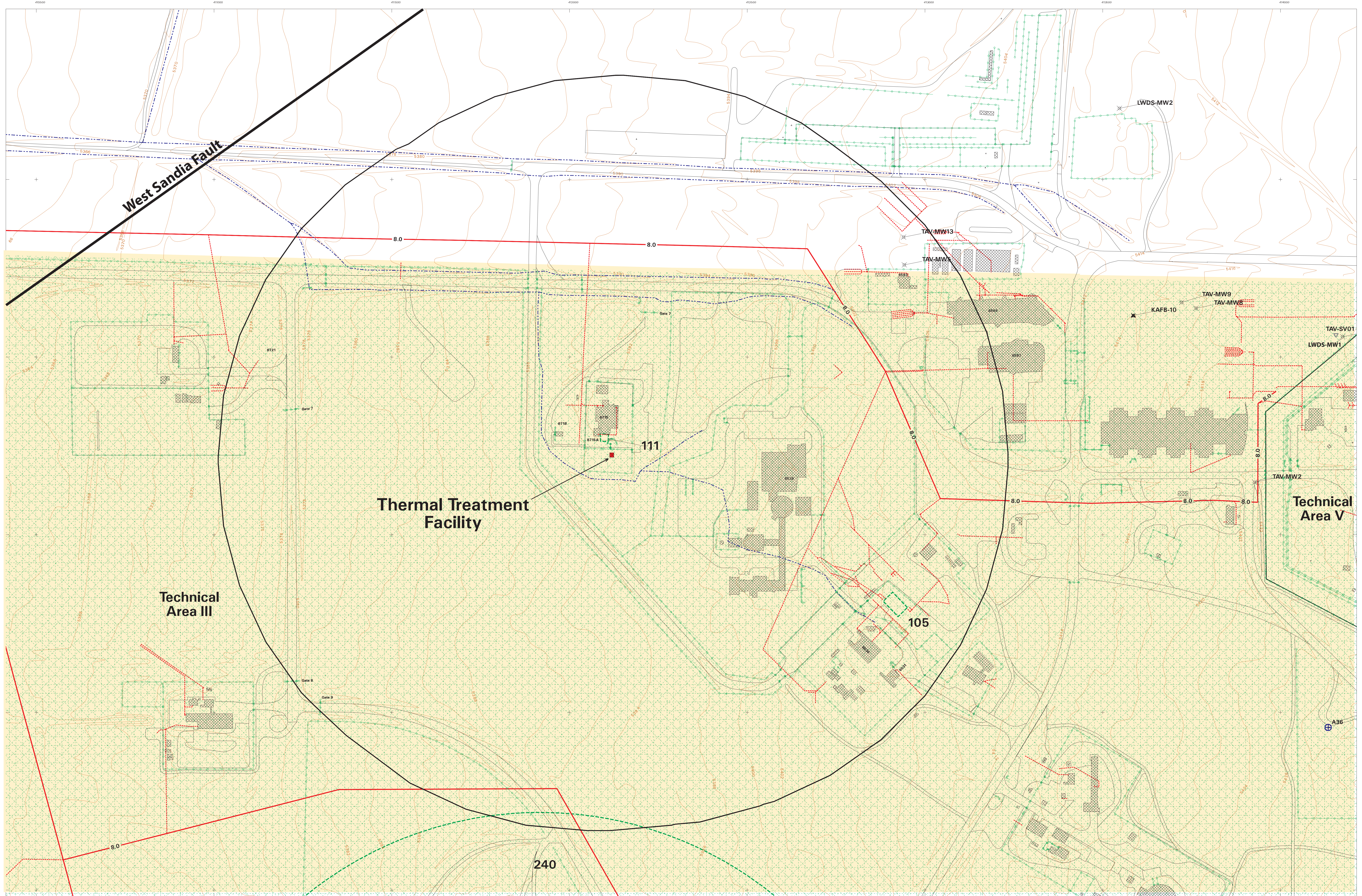


From SAND 2003-1869.

**Figure A-9**  
**Geologic Features in Relation to Sandia National Laboratories/New Mexico**

**Revised Figure 6**

**Part 2: General Part B  
Module II: Thermal Treatment Facility**



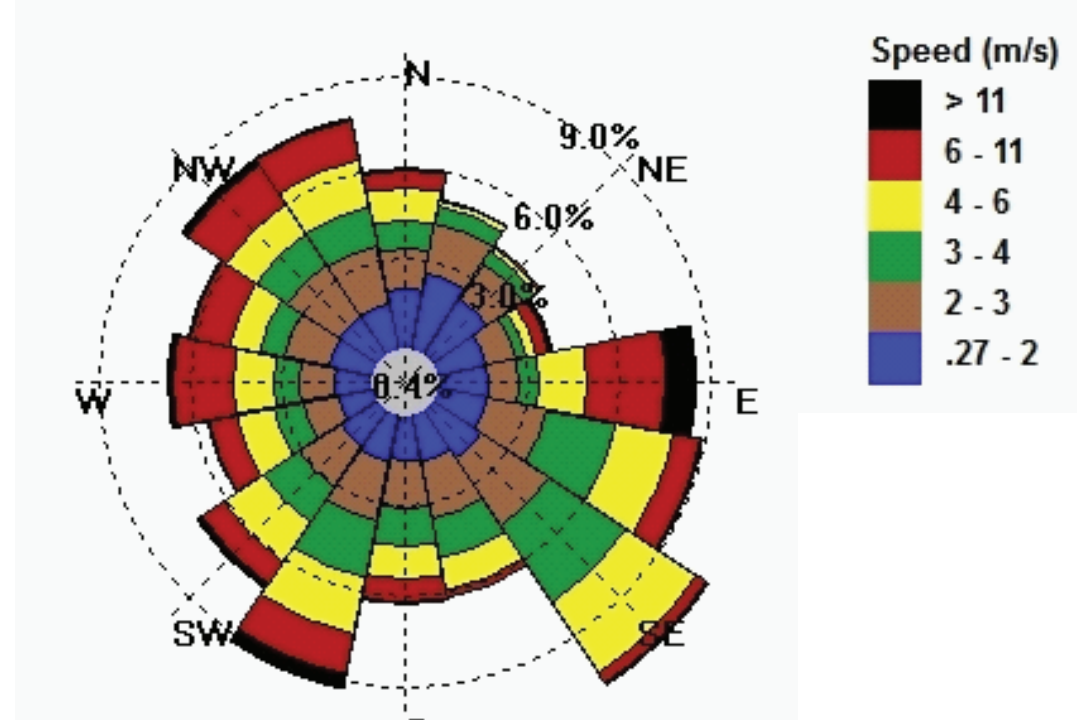
**Wells and Water Features**

- ▽ Vapor Monitoring Well
- ⊗ Monitoring Well
- ⊕ Observation Well
- △ Production Well
- △ Production Well (Potable)
- ⊕ Production Well (Out of Commission)
- ⊕ Production Well (Abandoned)
- ⊕ Production Well (Non-Potable)
- ⊕ Plugged and Abandoned Well
- ⊕ Spring
- Unknown Water Feature

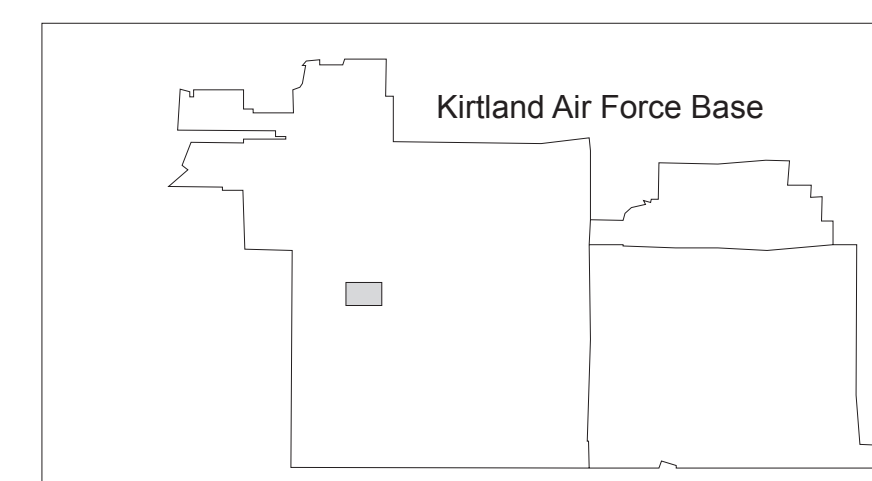
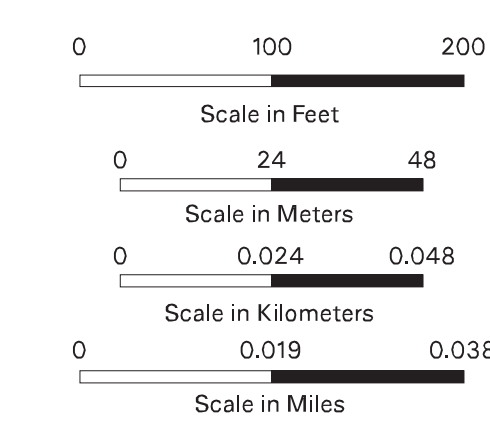
**Legend**

- ⊕ Meteorological Tower
- Contours (2 Ft)
- Road (all types)
- Fence
- Surface Drainage
- Solid Waste Management Unit
- Building and Concrete Pad
- Sanitary Sewer Main (active)
- Sanitary Sewer Service (active and inactive)
- Fault (exposed or concealed)
- Thermal Treatment Facility (TTF)
- Sandia National Laboratories Technical Area
- 1000 Foot Buffer Around TTF
- Industrial
- Undefined

2011 Annual Windrose from Tower A36

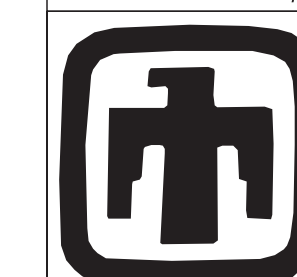


Note: The wind direction is the direction from which the wind is blowing. This diagram shows the frequency of occurrence for each wind direction and speed. The color indicates the wind speed.



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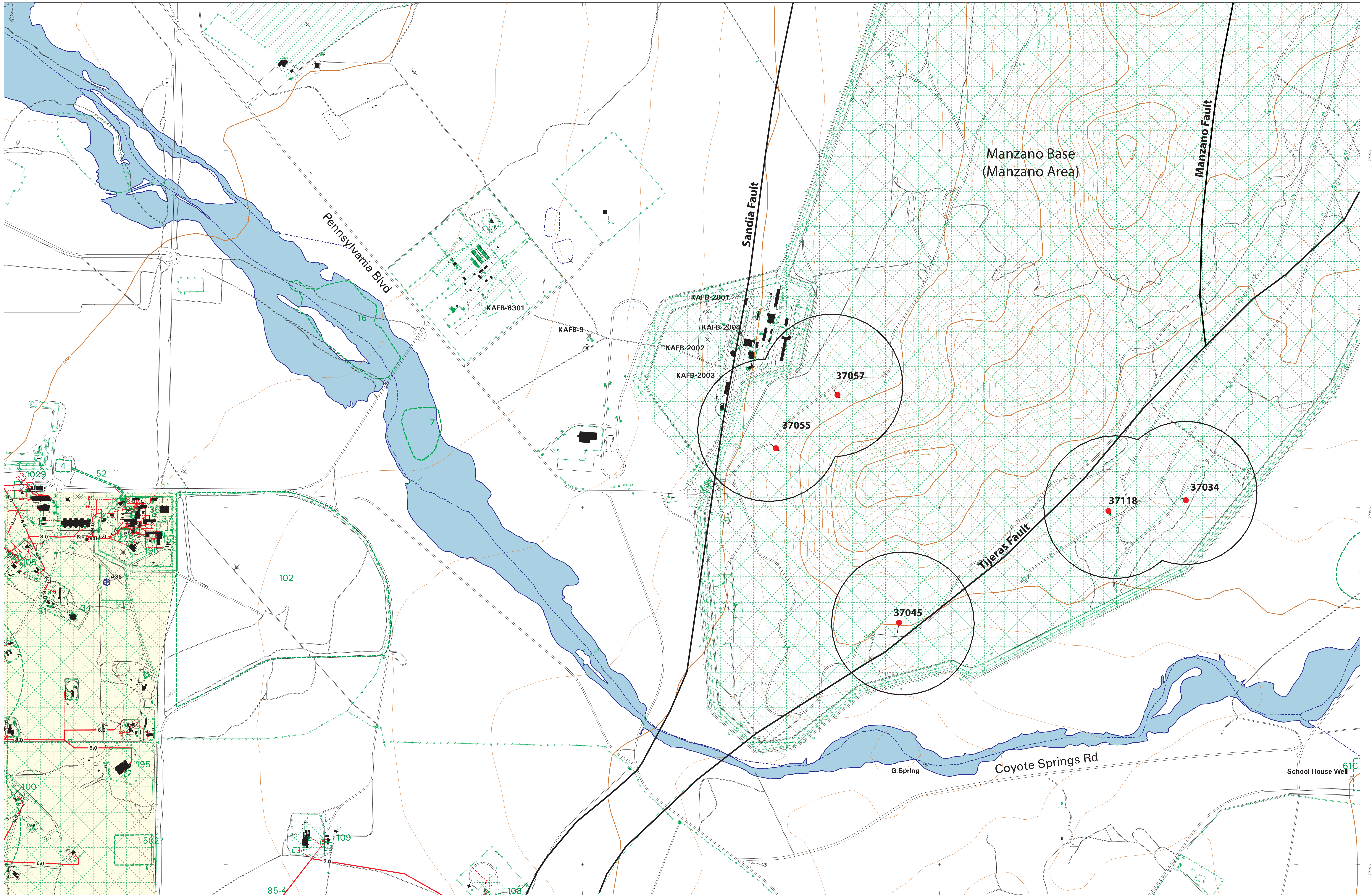
**Figure 6**  
**Topographic Map**  
**Thermal Treatment Facility (TTF)**  
**March 26, 2014**  
**Sandia National Laboratories**  
**New Mexico**



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mbarth	SNL EGIS.ORG.4142
dh120107.aml	3/16/14

**Revised Figure 7**

**Part 2: General Part B**  
**Module VI: Manzano Storage Bunkers**



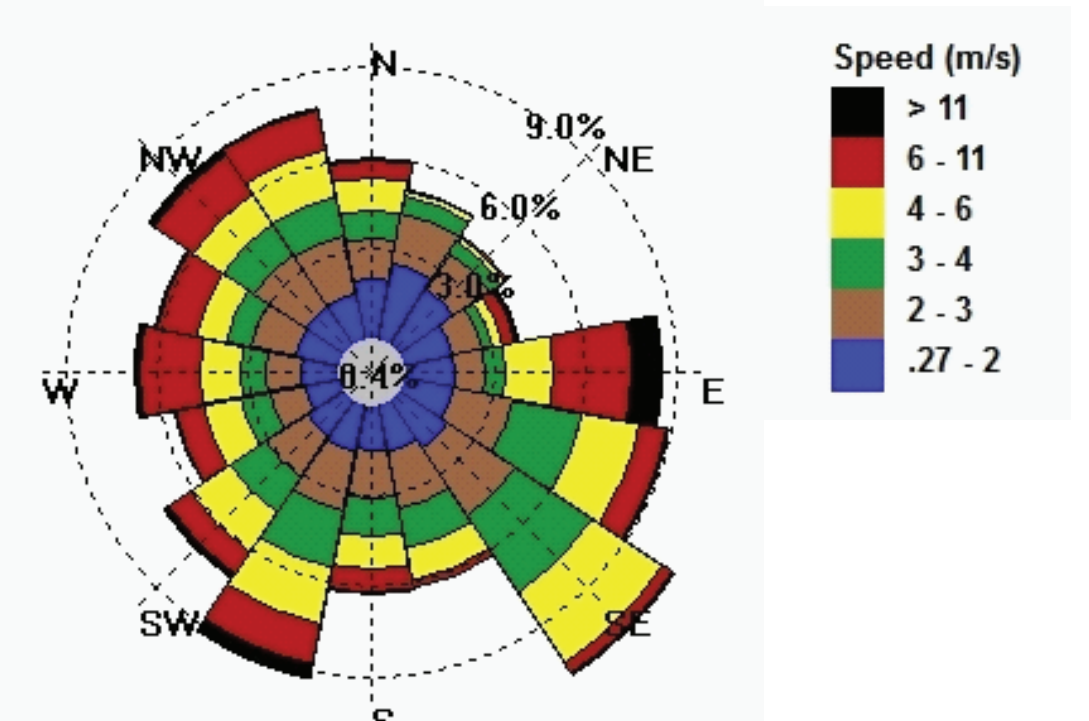
**Wells and Water Features**

- ▽ Vapor Monitoring Well
- Monitoring Well
- ⊗ Observation Well
- △ Production Well
- ▲ Production Well (Potable)
- ⊕ Production Well (Out of Commission)
- ⊖ Production Well (Abandoned)
- ⊗ Production Well (Non-Potable)
- ⊕ Plugged and Abandoned Well
- ⊗ Spring
- Unknown Water Feature

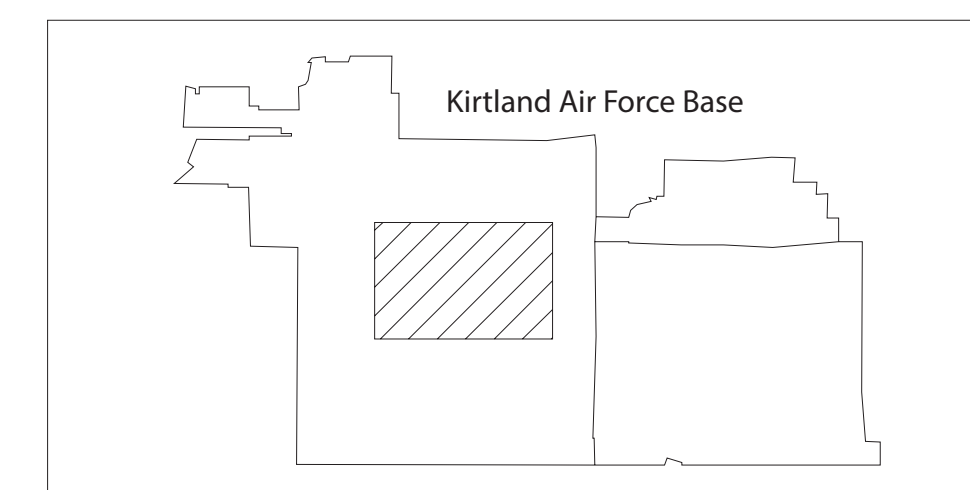
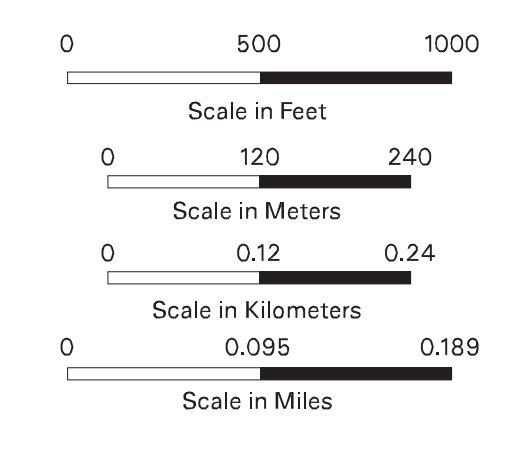
**Legend**

- ⊕ Meteorological Tower
- Buildings and Concrete Pads
- Contours (40 Ft)
- Road (all types)
- Fence
- Surface Drainage
- Sanitary Sewer Main (active)
- Sanitary Sewer Service (active and inactive)
- Solid Waste Management Unit
- Sandia National Laboratories Technical Area
- 100 Year Flood Plain Boundary
- Manzano Storage Bunkers (MSB)
- 1000 Foot Buffer Around Manzano Storage Bunkers
- Fault (exposed or concealed)
- Land Use
  - Industrial
  - Recreational
  - Undefined

2011 Annual Windrose from Tower A36



Note: The wind direction is the direction from which the wind is blowing. This diagram shows the frequency of occurrence for each wind direction and speed. The color indicates the wind speed.



Sandia National Laboratories, New Mexico  
Environmental Restoration Geographic Information System

**Figure 7**  
**Topographic Map**  
**Manzano Storage Bunkers**  
**37034, 37045, 37055, 37057 and 37118**  
**March 26, 2014**  
**Sandia National Laboratories**  
**New Mexico**

Completed by photogrammetric methods from aerial photography dated March 1988, December 1991 and April 1992. Transverse Mercator Projection, New Mexico State Plane Coordinate System, Central Zone 1983, North American Horizontal Datum, 1983 North American Vertical Datum.

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