ERID-251748

LA-UR-13-29479
December 2013
EP2013-0301

2013 Biennial Ordnance Survey Report, Solid Waste Management Units 00-011(a, d, and e), Guaje/Barrancas/Rendija Canyons Aggregate Area

Prepared by the Environmental Programs Directorate

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December 2013

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EXECUTIVE SUMMARY

Solid Waste Management Units (SWMUs) 00-011(a, d, and e) are munitions-impact areas or suspected munitions-impact areas within the Guaje/Barrancas/Rendija Canyons Aggregate Area at Technical Area 00 that were used by the U.S. Department of Defense. These sites were not used after the 1940s and, with the exception of SWMU 00-011(a), are now located off U.S. Department of Energy property. Because of the potential for exposure of munitions and explosives of concern or munitions debris as a result of erosion or bioturbation at the sites, Los Alamos National Laboratory (the Laboratory) is required by the New Mexico Environment Department to conduct biennial visual surveys of the ground surface to identify and remove any site hazards related to historical munitions use.

Activities conducted in 2013 included visual inspections of the sites using lines of personnel trained to recognize unexploded ordnance (UXO). The trained personnel conducted site walkovers to identify any suspect material. No UXO was not found at the three sites. Several pieces of munitions debris were identified at SWMUs 00-011(a, d, and e). All identified munitions debris was removed and photographed by Laboratory Emergency Response personnel.

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1.0 INTRODUCTION

Los Alamos National Laboratory (LANL or the Laboratory) is a multidisciplinary research facility owned by the U.S. Department of Energy (DOE) and managed by Los Alamos National Security, LLC (LANS). The Laboratory is located in north-central New Mexico approximately 60 mi northeast of Albuquerque and 20 mi northwest of Santa Fe. The Laboratory site covers 36 mi^2 of the Pajarito Plateau, which consists of a series of finger-like mesas separated by deep canyons containing perennial and intermittent streams running from west to east. Mesa tops range in elevation from approximately 6200 to 7800 ft above sea level (asl).

Solid Waste Management Units (SWMUs) 00-011(a, d, and e) are munitions-impact areas or suspected munitions-impact areas within the Guaje/Barrancas/Rendija Canyons Aggregate Area at Technical Area 00 (TA-00) that were used by the U.S. Department of Defense (DoD) in the 1940s. Because of the potential for exposure of munitions and explosives of concern (MEC) or munitions debris (MD) as a result of erosion or bioturbation at the sites, the Laboratory is required by the New Mexico Environment Department (NMED) to conduct biennial visual surveys to identify and remove any site hazards related to historical munitions use.

1.1 General Site Information

The Guaje/Barrancas/Rendija Canyons Aggregate Area consists of SWMUs and areas of concern (AOCs) formerly part of Operable Unit 1071 within TA-00. Figure 1.1-1 shows the Guaje/Barrancas/Rendija Canyons Aggregate Area SWMUs and AOCs with respect to the Laboratory boundary and surrounding land holdings. This biennial ordnance survey report for the Guaje/Barrancas/Rendija Canyons Aggregate Area includes the following SWMUs, which are shown in Figure 1.1-2:

- SWMU 00-011(a), a mortar impact area
- SWMU 00-011(d), a “bazooka” firing area
- SWMU 00-011(e), an ammunition impact area

1.2 Report Objectives

NMED’s approval with direction of the 2007 investigation report for the Guaje/Barrancas/Rendija Canyons Aggregate Area (LANL 2007, 098670; NMED 2007, 099632) directed the Laboratory to conduct visual surveys at SWMUs 00-011(a, c, d, and e) and AOC C-00-020 every 2 yr to identify and remove any MEC, MD, or unexploded ordnance (UXO). NMED issued certificates of completion for SWMU 00-011(c) and AOC C-00-20 in May 2012 and concurred with the recommendation that visual surveys are no longer required for these sites (NMED 2012, 520388). The objective of this report is to present the results of the 2013 visual ordnance surveys conducted at the remaining three sites.

2.0 SITE DESCRIPTIONS AND OPERATIONAL HISTORY

2.1 SWMU 00-011(a)

SWMU 00-011(a) (Figure 2.1-1) is a 29-acre former mortar impact area located on DOE land about 0.4 mi east of the Sportsmen’s Club small arms firing range (AOC C-00-015) in Rendija Canyon. In the mid-1940s, the site was a mortar-impact area for 60-mm and 81-mm rounds. Operations ceased in the late 1940s (LANL 1990, 007511).

SWMU 00-011(a) is located in a relatively flat open grassland with scattered shrubs and trees. The site is bisected east to west by Rendija Road (unpaved). On the north side of the road, the site has a gradual to steep slope to the ephemeral stream channel. The slope is covered by mulch consisting of downed trees that burned during the 2000 Cerro Grande fire. Although the site is fenced and posted with DOE "No Trespassing" signs, there is evidence the site is used for recreational activities such as dirt-biking and target practice.

2.2 SWMU 00-011(d)

SWMU 00-011(d) (Figure 2.2-1) is a "bazooka" firing area located largely on Los Alamos County land, except for a small section along a cliff edge on private property. The area is in a small north-trending tributary of Bayo Canyon northeast of the intersection of San Ildefonso Road and Diamond Drive in the Los Alamos townsite. The approximately 6-acre area was used in the mid-1940s as a target area for 2.36-in. bazooka rounds; operations ceased in the late 1940s (LANL 1990, 007511).

SWMU 00-011(d) is located near a hiking trail at the head of Bayo Canyon. A north-south trending drainage channel bisects SWMU 00-011(d), and a cliff is located on the eastern edge of the site. The southern section of the site is open and grassy with some shrubs and trees; the northern section of the site is forested with pine trees. The site is only partially fenced and is open to the public.

2.3 SWMU 00-011(e)

SWMU 00-011(e) (Figure 2.3-1) is a former ammunition impact area located on U.S. Forest Service (USFS) land in a tributary of Rendija Canyon known as Thirty-Seven Millimeter Canyon. The site was used from the mid- to late 1940s (LANL 1990, 007511) for training of U.S. Army personnel operating tanks firing 20-mm and 37-mm rounds. The impact area extends north along the tributary to the top of a cliff face and is approximately 15 acres in size.

SWMU 00-011(e) is located within a very steep natural amphitheater with numerous loose rocks and boulders. Vegetation at the site consists of thick weeds and small shrubs. The site is fenced with barbwire and posted with "Explosives No Trespassing" signs.

3.0 SITE CONDITIONS

Rendija Canyon is located immediately north of the Los Alamos townsite. The watershed has a drainage area of 9.5 mi^2 and drains portions of Los Alamos townsite, DOE land, and USFS land. Elevations in the watershed range from 6300 to 9800 ft asl (LANL 1997, 055622, p. 3-2). Rendija Canyon and its tributaries contain ephemeral streams arising from storm water runoff and snowmelt. As the surface water flows downstream, it infiltrates the alluvium and the underlying formations or is lost to evapotranspiration.

Most of the sites included in the biennial visual ordnance surveys have steep, rocky slopes and loose material. In particular, SWMU 00-011(e) is very steep, with grades of 40% to 50%. SWMU 00-011(a) was impacted by the 2000 Cerro Grande fire, and numerous downed trees, mulched trees, and standing dead trees are present at these sites. These site conditions make the walkover visual surveys difficult and potentially hazardous, and appropriate safety precautions are incorporated into the survey methodology.

During the month of September 2013, the Laboratory region experienced significant storm events that resulted in substantial flooding and erosion in several regional canyons and drainages. Increased soil erosion in surface water drainages in the proximity of SWMUs 00-011 (a, d, and e) was observed during the 2013 survey. However, the quantity of exposed munitions debris on the surface of these SWMUs was not significantly different than what was observed in previous years' biennial surveys.

4.0 SURVEY METHODS

Surveys were accomplished under the direction of trained UXO technicians per established DoD procedures and protocol. Surveys were conducted using a line of 4 to 10 personnel trained to recognize UXO. Each person was positioned approximately arms-length apart from the next person to conduct the visual inspection of the entire area of each SWMU. Once a survey line was completed in one direction, the line was pivoted around the individual at one end of the line to survey in the opposite direction. The individual at the pivot point visually surveyed the same area going in the opposite direction to ensure overlap of each survey line. Survey flags were placed along the ends of the survey lines to ensure appropriate coverage. The survey method is identical to the method used in previous surveys.

It was often necessary to adjust survey lines to adapt to boulders and other large obstacles and variations in the terrain. The process for establishing survey lines was also modified as appropriate in areas of downed trees and thick vegetation. At SWMU 00-011(e), survey lines were staggered so upslope personnel trailed downslope personnel to minimize the safety risks from falling rocks on this very steep site.

MD recovered during the surveys was retained by Laboratory Emergency Response personnel.

5.0 2013 SCOPE OF ACTIVITIES

Before the 2013 survey activities described in this report were conducted, approval to access each site was granted by the applicable land owner(s) through access agreements and/or special-use permits:

- SWMU 00-011(a) is located entirely on DOE land.
- SWMU 00-011(d) is located primarily on Los Alamos County land, with a small portion (visible from Los Alamos County land) located on private property.
- SWMU 00-011(e) is located primarily on USFS land, with a small portion on located on DOE land.

5.1 SWMU 00-011(a)

The site walkover and visual survey of SWMU 00-011(a) were conducted on November 13, 14, and 15, 2013. SWMU 00-011(a) is the largest of the three sites included in the 2013 biennial ordnance survey. In certain areas, the visual survey was modified, as appropriate, to adapt to the presence of mulch composed of downed trees and thick brush.

The 2013 ordnance survey resulted in the recovery and removal of several 60-mm and 81-mm shell fragments. Figures 5.1-1 through 5.1-7 show the MD found at SWMU 00-011(a). Most of these fragments were small (less than 4 in. in the longest dimension) and were concentrated in the north-central portion of the site above the Rendija Canyon bottom. The fragments were removed, photographed, and retained by Laboratory Emergency Response personnel. Figure 2.1-1 shows the locations where MD was found at SWMU 00-011(a). No UXO or MEC were discovered or recovered at SWMU 00-011(a) during the 2013 ordnance survey.

5.2 SWMU 00-011(d)

The site walkover and visual survey of SWMU 00-011(d) were conducted on November 15, 2013. This site is relatively small and very few obstacles are present to hinder the walkover or visual inspection.

The 2013 ordnance survey resulted in the recovery and removal of two 2.36-in. expended rocket motor with fin assemblies, and one copper slug from a 2.36-in. rocket shaped-charge liner. Figures 5.2-1 and 5.2-2 show the rocket motors, and Figure 5.2-3 shows the copper slug. The rocket motors were found in the drainage below the cliff in the area designated in Figure 2.2-1. The copper fragment was found at the base of the cliff on the east side of SWMU 00-011(d). The fragments were removed, photographed, and retained by Laboratory Emergency Response personnel. No UXO or MEC were discovered or recovered at SWMU 00-011(a) during the 2013 ordnance survey. Abundant scars and holes resulting from munitions impact are present in the cliff face at SWMU 00-011(d) (Figure 5.2-4).

5.3 SWMU 00-011(e)

The visual survey and site walkover of SWMU 00-011(e) was conducted on November 18, 2013.

The 2013 ordnance survey resulted in the recovery and removal of a 37-mm caliber armor-piercing projectile, 76-mm projectiles (from Sherman tanks) fragments, and some smaller-caliber shells scattered over the entire area shown in Figure 2.3-1. Figures 5.3-1 through 5.3-5 show the MD fragments found at the site. No noticeable distribution pattern or area of significant MD concentration was found at SWMU 00-011(e). The fragments were removed, photographed, and retained by Emergency Response personnel. No UXO or MEC were discovered or recovered at SWMU 00-011(e) during the 2013 ordnance survey. In addition to the MD found at the site, there is abundant evidence of impact to cliffs and boulders from larger munitions.

6.0 CONCLUSIONS AND RECOMMENDATIONS

No UXO or MEC were found at SWMUs 00-011(a, d, and e) during the 2013 biennial survey. Several pieces of MD were found at SWMUs 00-011(a, d, and e), consistent with the documented use of those sites as impact areas. Approximately the same amount of MD has been found at SWMUs 00-011(a, d, and e) each year the sites have been surveyed.

On September 16, 2013, DOE and LANS submitted a request for extension to implement controls required by NMED for SWMUs 00-011(a, d, and e) (LANL 2013, 249600). In this letter, DOE and LANS requested that NMED reconsider a June 28, 2012, request for certificates of completion without controls for SWMUs 00-011(a, d, and e), which indicated additional biennial surveys were not necessary under the Compliance Order on Consent (the Consent Order). Explosive hazards were not found during the 2013 biennial survey, further supporting reconsideration of the request for certificates of completion without controls for SWMUs 00-011(a, d, and e). In addition, the intent of the September 16, 2013, letter is in part to establish an opportunity to meet to further clarify the implications of continuing to implement the biennial ordnance surveys under the Consent Order within the context of DOE's transfer of the Rendija Canyon tract A-14 to Los Alamos County. As requested in the September 16, 2013, letter, DOE and LANS recommend meeting with NMED to discuss these issues before future biennial ordnance surveys are performed.

7.0 REFERENCES AND MAP DATA SOURCES

7.1 References

The following list includes all documents cited in this report. Parenthetical information following each reference provides the author(s), publication date, and ER ID. This information is also included in text citations. ER IDs are assigned by the Environmental Programs Directorate's Records Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the master reference set.

Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

LANL (Los Alamos National Laboratory), November 1990. "Solid Waste Management Units Report," Vol. I of IV (TA-0 through TA-9), Los Alamos National Laboratory document LA-UR-90-3400, Los Alamos, New Mexico. (LANL 1990, 007511)

LANL (Los Alamos National Laboratory), April 1997. "Core Document for Canyons Investigations," Los Alamos National Laboratory document LA-UR-96-2083, Los Alamos, New Mexico. (LANL 1997, 055622)

LANL (Los Alamos National Laboratory), August 2007. "Investigation Report for Guaje/Barrancas/Rendija Canyons Aggregate Area at Technical Area 00," Los Alamos National Laboratory document LA-UR-07-5326, Los Alamos, New Mexico. (LANL 2007, 098670)

LANL (Los Alamos National Laboratory), September 16, 2013. "Request for Extension to Implement Controls/Certification of February 19, 2013, Letter Regarding the Transfer of Rendija Canyon Tracts," Los Alamos National Laboratory letter (EP2013-0211) to J.E. Keiling (NMED-HWB) from J. Mousseau (LANL) and P. Maggiore (DOE-NA-00-LA), Los Alamos, New Mexico. (LANL 2013, 249600)

NMED (New Mexico Environment Department), December 20, 2007. "Approval with Direction, Investigation Report for Guaje/Barrancas/Rendija Canyons, Revision 1," New Mexico Environment Department letter to D. Gregory (DOE-LASO) and D. McInroy (LANL) from J.P. Bearzi (NMED-HWB), Santa Fe, New Mexico. (NMED 2007, 099632)

NMED (New Mexico Environment Department), May 16, 2012. "Certificates of Completion, One Solid Waste Management Unit and One Area of Concern in the Guaje/Barrancas/Rendija Canyons Aggregate Area," New Mexico Environment Department letter to P. Maggiore (DOE-LASO) and M.J. Graham (LANL) from J.E. Kieling (NMED-HWB), Santa Fe, New Mexico. (NMED 2012, 520388)

7.2 Map Data Sources

Drainage. Modeled Surface Drainage, 1991; Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program, ER2002-0591; 1:24,000 Scale Data; Unknown publication date. NHD Route Drainage; National Hydrography Dataset Program, United States Geological Survey; Quadrangle 13020101; 08 October 2004.

Hypsography. Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program; 1991.

Los Alamos National Laboratory Boundaries. LANL Areas Used and Occupied; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Division; 19 September 2007. Technical Area Boundaries; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Division; 19 September 2007.

Point Feature Locations of the Environmental Restoration Project Database. Los Alamos National Laboratory, Waste and Environmental Services Division, EP2008-0189; 11 April 2008.

Potential Release Sites. Los Alamos National Laboratory, Waste and Environmental Services Division, Geotechnical Services Group, EP2008-0095; 1:2,500 Scale Data; 04 April 2008.

Roads and Trails. Forest Roads; County of Los Alamos, Information Services; as published 16 May 2006. Los Alamos County Land Parcels; County of Los Alamos, Information Services, as published 17 January 2008. Road Centerlines for the County of Los Alamos; County of Los Alamos, Information Services; as published 03 December 2007. Streets; County of Los Alamos, Information Services; as published 16 May 2006. Trails; County of Los Alamos, Information Services; as published 16 May 2006.

Watersheds. Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program; EP2006-0942; 1:2,500 Scale Data; 27 October 2006.

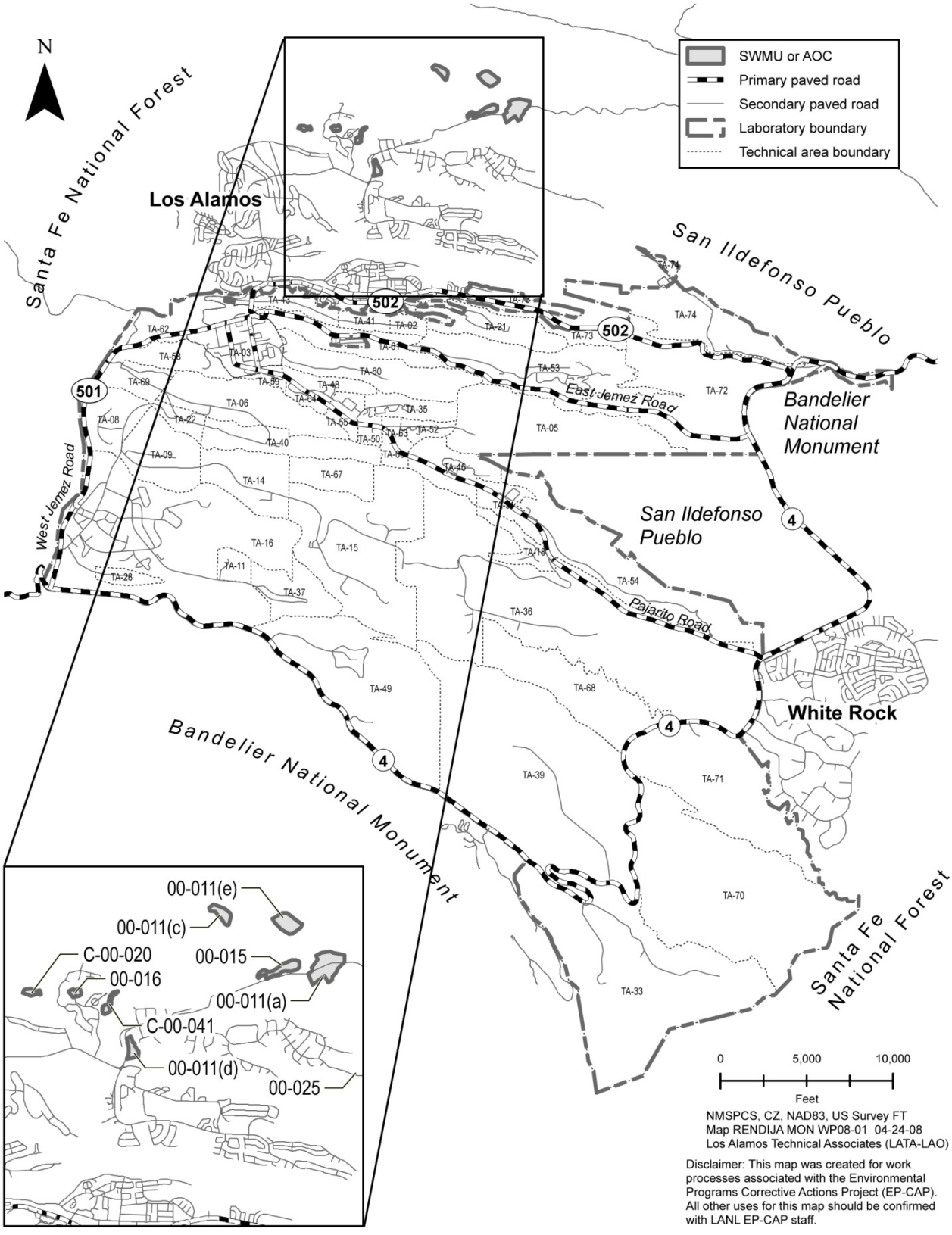

Figure 1.1-1 Guaje/Barrancas/Rendija Canyons Aggregate Area SWMUs and AOCs

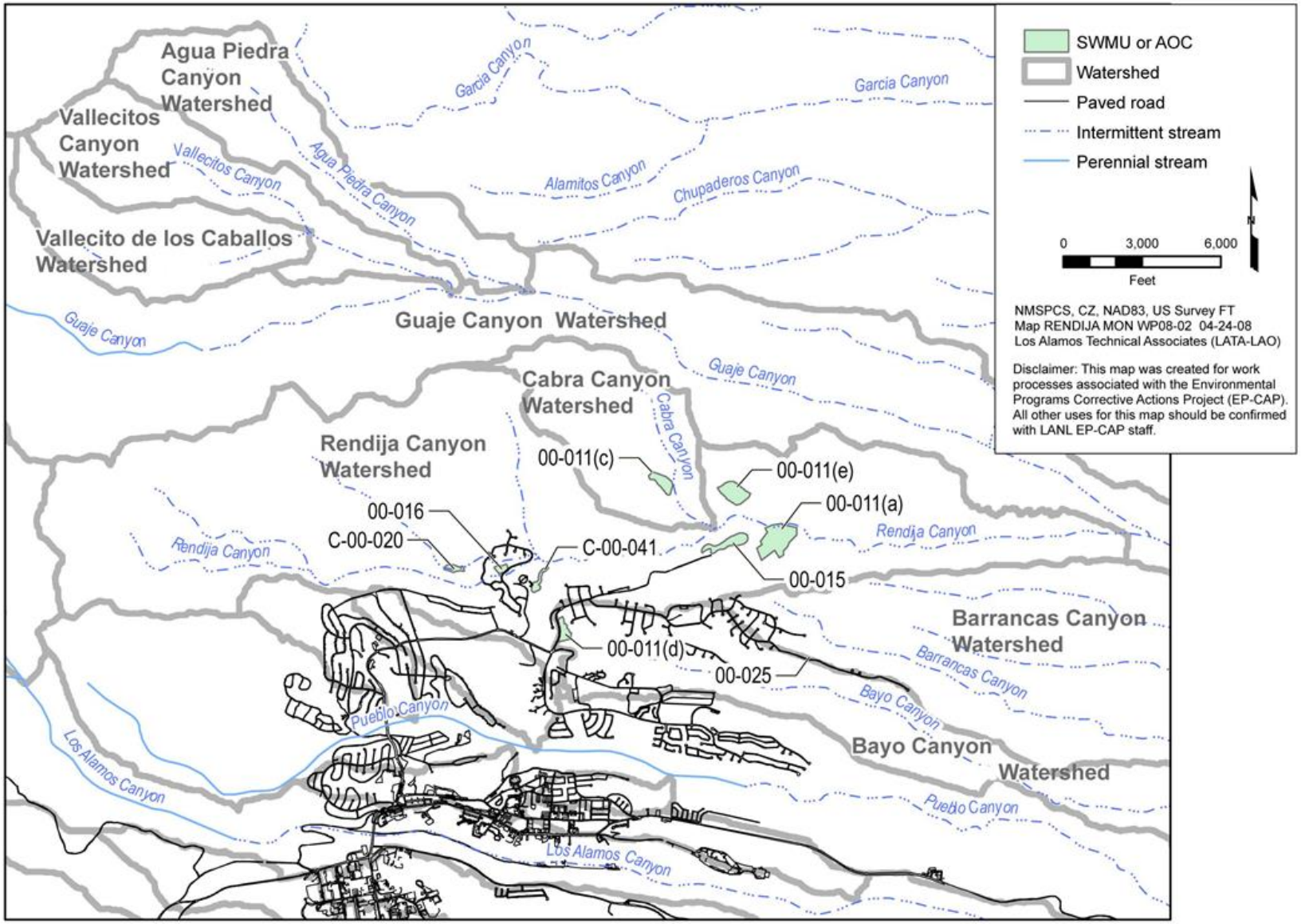

Figure 1.1-2 SWMUs 00-011(a, d, and e) within the Rendija watershed

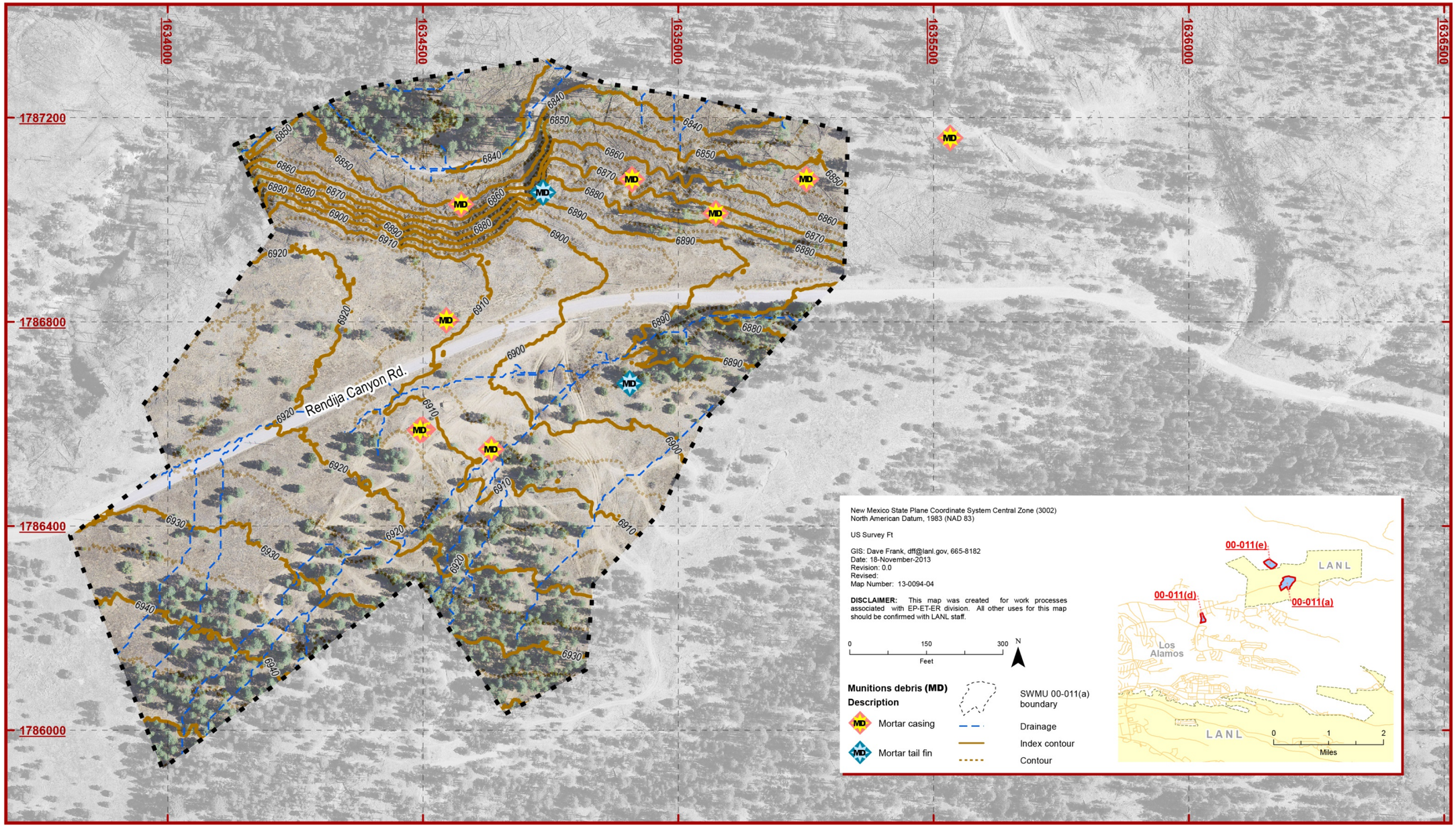

Figure 2.1-1 Aerial photograph of SWMU 00-011(a)

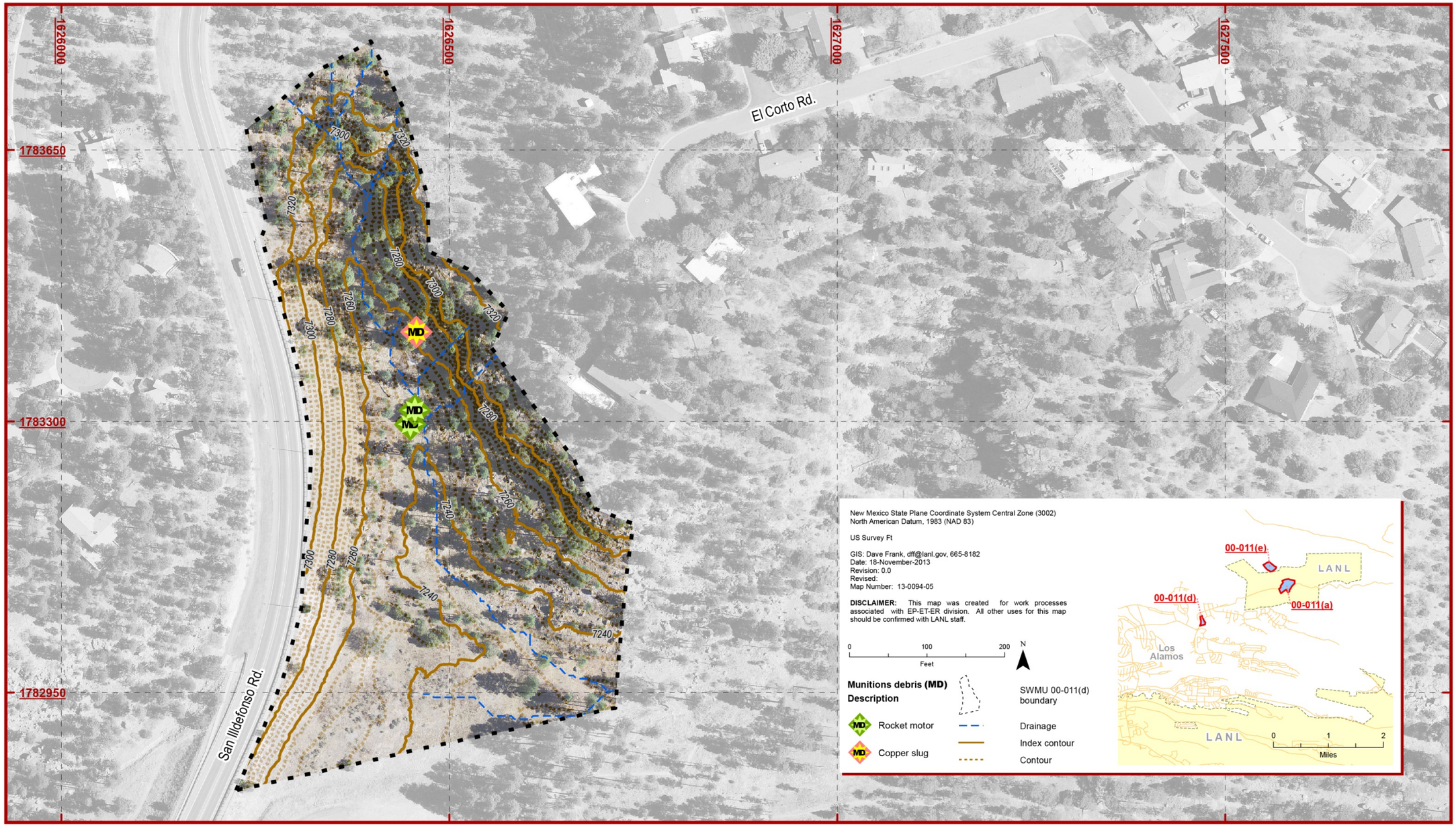

Figure 2.2-1 Aerial photograph of SWMU 00-011(d)

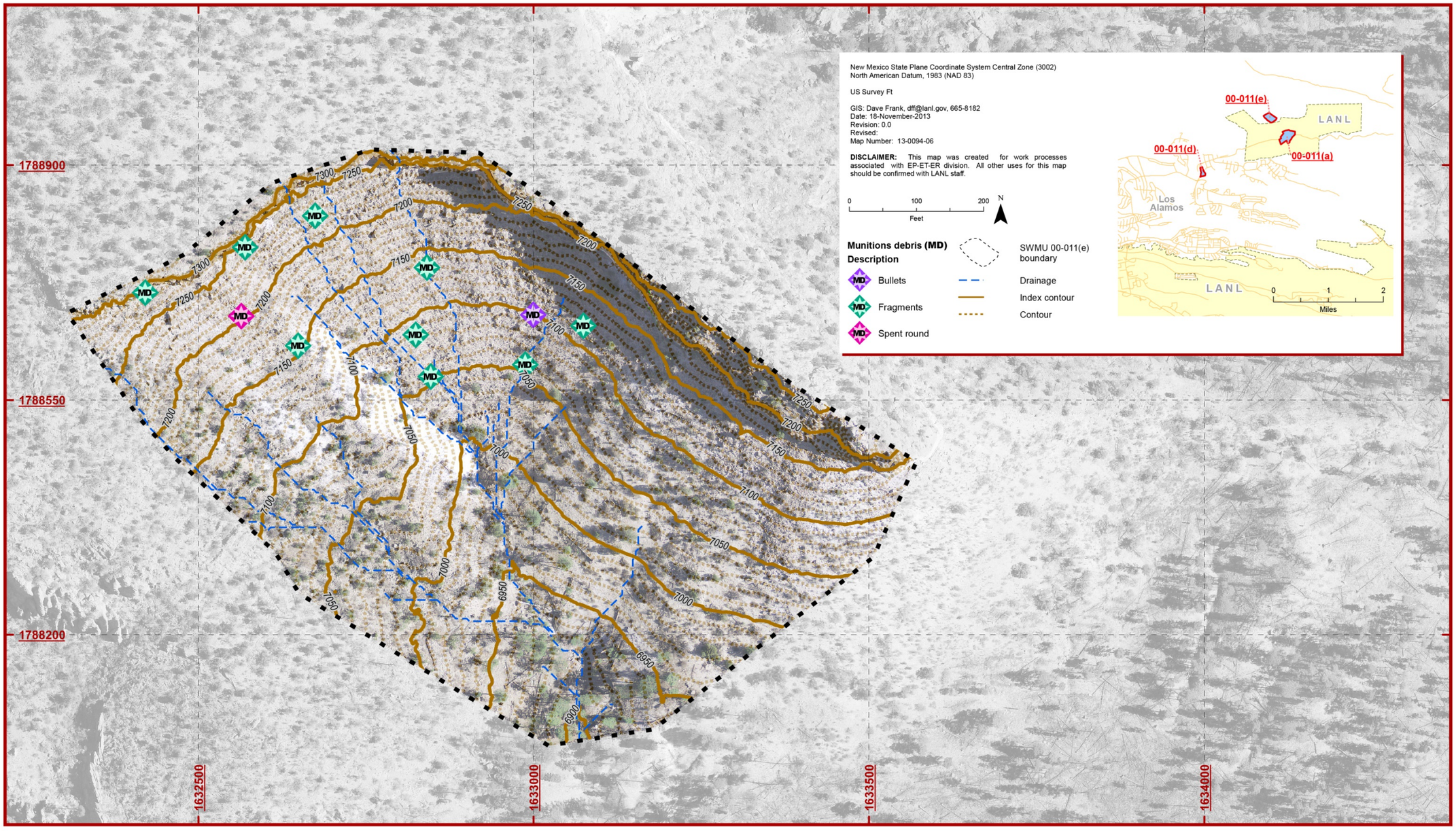

Figure 2.3-1 Aerial photograph of SWMU 00-011(e)

Figure 5.1-1 Fragment of MD found at SWMU 00-011(a) in 2013

Figure 5.1-2 Fragment of MD found at SWMU 00-011(a) in 2013

Figure 5.1-3 Fragment of MD found at SWMU 00-011(a) in 2013

Figure 5.1-4 Fragment of MD found at SWMU 00-011(a) in 2013

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Figure 5.1-7 Fragments of MD found at SWMU 00-011(a) in 2013

Figure 5.2-1 Fragment of 2.36-in. expended rocket motor with fin assembly found at SWMU 00-011(d) in 2013

Figure 5.2-2 Fragment of 2.38-in. expended rocket motor with fin assembly found at SWMU 00-011(d) in 2013

Figure 5.2-3 Copper projectile found at SWMU 00-011(d) in 2013

Figure 5.2-4 Impact scars in the cliff face at SWMU 00-011(d)

Figure 5.3-1 Fragment of MD found at SWMU 00-011(e) in 2013

Figure 5.3-2 Fragment of MD found at SWMU 00-011(e) in 2013

Figure 5.3-3 Fragments of MD found at SWMU 00-011(e) in 2013

Figure 5.3-4 37-mm armor-piercing projectile with expended tracer found at SWMU 00-011(e) in 2013

Figure 5.3-5 Fragment of fuze found at SWMU 00-011(e) in 2013