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Document Details:

Title:	ERID-098710 1) HISTORICAL INVESTIGATION REPORT FOR MIDDLE CANADA DEL BUEY AGGREGATE AREA. 2) TARGET-CD LA-UR-07-7039
ERID Number.StartPage:	ERID-098710
Office of Record:	ERSS-DO
Date Received:	12/03/2007
Official Use Only:	N
Page Count:	52
Record Type:	Letter
Document Date:	10/31/2007
To:(Addressees - Organization) *(separate multiple values with semicolons)*	LANL
From:(Senders - Organization) *(separate multiple values with semicolons)*	LANL
Other Document Number(s): *(separate multiple values with semicolons)*	LA-UR-07-7039 EP2007-0628 EP2007-0629 LA-UR-07-7038 PKG-1729
TA: *separate multiple values with semicolons)*	N/A
PRS Number(s): *(separate multiple values with semicolons)*	N/A
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LA-UR-07-7039
October 2007
EP2007-0629

Historical Investigation Report for Middle Cañada del Buey Aggregate Area

Los Alamos
NATIONAL LABORATORY
EST.1943

Prepared by the Environmental Programs Directorate

LA-UR-07-7039
EP2007-0629

Historical Investigation Report for Middle Cañada del Buey Aggregate Area

October 2007

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EXECUTIVE SUMMARY

This historical investigation report (HIR) summarizes previous investigations and activities conducted at sites in the Middle Cañada del Buey Aggregate Area. This HIR provides the background information and supporting data that form the basis for the proposed sampling design necessary to complete the site investigations as presented in the Middle Cañada del Buey Aggregate Area investigation work plan.

The Middle Cañada del Buey Aggregate Area is located in the central portion of Cañada del Buey and Mesita del Buey and incorporates parts of Technical Areas 51 and 54 of Los Alamos National Laboratory and includes a total of 23 solid waste management units and areas of concern. Of the 23 sites, 11 have been approved for no further action, 4 are Resource Conservation and Recovery Act-permitted storage units, 1 is a Toxic Substance Control Act storage unit authorized for polychlorinated biphenyls, one (Material Disposal Area [MDA] J) was closed under New Mexico Environment Department solid waste regulations, and two (MDAs H and L) were investigated under separate work plans. A brief description of these sites is presented in this HIR. For the remaining four sites, details of site descriptions, previous investigation(s), and analytical results are provided, where available.

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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. 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 40 mi^2 of the Pajarito Plateau, which consists of a series of fingerlike 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. The location of Middle Cañada del Buey Aggregate Area with respect to the Laboratory technical areas (TAs) and surrounding land holdings is shown in Figure 1.0-1. Sites within the aggregate area are shown in Figure 1.0-2.

The Laboratory's Environmental Programs (EP) Directorate (which includes the former Environmental Restoration [ER] Project) is participating in a national effort by DOE to clean up sites and facilities formerly involved in weapons research and development. The goal of the EP Directorate is to ensure that past operations do not threaten human or environmental health and safety in and around Los Alamos County, New Mexico. To achieve this goal, the EP Directorate is investigating and, as necessary, remediating sites potentially contaminated by past Laboratory operations. The sites under investigation are designated as either solid waste management units (SWMUs) or areas of concern (AOCs).

The SWMUs and AOCs addressed in this historical investigation report (HIR) may contain both hazardous and or radioactive components. Information on radioactive materials and radionuclides, including the results of sampling and analysis of radioactive constituents, is voluntarily provided to NMED in accordance with DOE policy.

1.1 General Site Information

Middle Cañada del Buey Aggregate Area is located in the central portion of Cañada del Buey and Mesita del Buey and incorporates parts of TA-51 and -54. The aggregate area consists of the canyon bottom and that portion of the mesa top and canyon slope that drain to the north into the canyon. All SWMUs and AOCs within the Middle Cañada del Buey Aggregate Area are located on the mesa top. Mesita del Buey is a finger-shaped mesa between Pajarito Canyon and Cañada del Buey that trends southeast. The southern boundary of the aggregate area along Mesita del Buey is approximated by Pajarito Road from the west boundary of the aggregate area to the intersection of Pajarito Road, and by Mesita del Buey Road to the east of this intersection.

Middle Cañada del Buey Aggregate Area consists of 23 SWMUs and AOCs (also referred to as sites) (Table 1.1-1). The sites are presented on the basis of their regulatory status. The current status of these sites is as follows:

- Four sites will be investigated as part of the Cañada del Buey investigation work plan. These sites are discussed in section 2.0.
- Eleven sites will not be investigated as part of the Cañada del Buey investigation work plan because they have previously been approved for no further action (NFA) by the New Mexico Environment Department (NMED) or the U.S. Environmental Protection Agency (EPA). These sites are identified in section 3.0.
- Four sites are regulated as hazardous or mixed waste management units under the Resource Conservation and Recovery Act (RCRA). One other site is a Toxic Substance Control Act (TSCA) storage unit authorized for polychlorinated biphenyls (PCBs). These sites are not subject to the

corrective action requirements of the March 1, 2005, Compliance Order on Consent (the Consent Order) and will not be investigated under the Cañada del Buey investigation work plan. These sites are identified in section 4.0.

- Three sites have been addressed by other investigations or other regulatory programs and will not be investigated under the Middle Cañada del Buey investigation work plan. These sites are identified in section 5.0.

1.2 Data Quality

Data presented in this HIR include historical data collected from 1995 through 2001 as part of RCRA facility investigation (RFI) and voluntary corrective action (VCA) activities. Samples from previous investigations were analyzed for inorganic chemicals, organic chemicals, and/or radionuclides either on-site by the Chemical Sciences and Technology (CST) Division at the Laboratory, or off-site by fixed laboratories, or both. Data obtained at on-site CST Division laboratories are screening-level quality data and are used only to select sampling locations and analytical suites. These data are not discussed and are not reported. The data from mobile laboratories—the Laboratory's Chemical Science and Technology (CST) Division Mobile Chemical Analytical Laboratory (ChemVan) or the CST Mobile Radiological Analysis Laboratory (RADVan)—are also screening-level data, and they are not discussed or reported in this HIR. Some samples were shipped directly from the field to the analytical laboratory without first being submitted through SMO; the results from these samples are screening-level data and are not discussed or reported in this HIR. In some cases, individual analytical results are qualified as rejected because of various data-quality issues. Rejected analytical results are not included in this HIR. For fixed-laboratory analysis, the samples were submitted to the Laboratory's former CST Division. The samples were analyzed either at a CST laboratory or were shipped from CST to one of several off-site contract laboratories. Because CST off-site data have been reviewed by examining the original data packages and by validating and qualifying the reported results whenever possible, most CST off-site data are valid decision-level data. CST off-site data have been included to determine nature and extent if the data packages are available and were used to validate the data. From late 1995 to the present, samples have been shipped through the Sample Management Office (SMO) to off-site contract laboratories. These samples are identified by the vintage code "SMO." All historical data evaluated in this HIR are SMO data. Appendix B presents usable decision-level data from past investigations (on CD).

2.0 SITES WITH INVESTIGATIONS IN PROGRESS

Four AOCs will be investigated in accordance with the Middle Cañada del Buey Aggregate Area investigation work plan (LANL 2007, 098709). Descriptions of these sites and the results of previous investigations, if any, are provided below.

2.1 AOC 18-005(b), Former Storage Area

2.1.1 Background and Operational History

AOC 18-005(b) is an area of potentially contaminated soil associated with a former high explosives (HE) magazine (structure 18-11). This structure was located on Mesita del Buey within a portion of TA-18 that is now within the western part of TA-54 (Figure 2.1-1). The structure was located approximately 200 ft north of structure 54-1014. The magazine was used from 1945 to 1960, when it was destroyed. The magazine was a wooden structure with dimensions of 11 ft by 9 ft by 8 ft tall. It was surrounded by earthen berms on three sides and on top. In 1959, structure 18-11 was reported to be contaminated with HE. Structure 18-11 was destroyed by intentional burning in 1960 (LANL 1993, 015310).

2.1.2 Previous Investigations

No previous environmental investigations have been conducted at AOC 18-005(b).

2.2 AOC 18-005(c), Former Storage Area

2.2.1 Background and Operational History

AOC 18-005(c) is an area of potentially contaminated soil associated with a former HE magazine (structure 18-12). This structure was located on Mesita del Buey within a portion of TA-18 that is now within the western part of TA-54 (Figure 2.1-1). The structure location was approximately 200 ft north of a Laboratory water-supply storage tank (structure 54-1006). The magazine was used from 1945 to 1960, when it was destroyed. The magazine was a wooden structure measuring 11 ft by 9 ft by 8 ft tall, surrounded by earthen berms on three sides and on top. In 1959, structure 18-12 was reported to be contaminated with HE. Structure 18-12 was destroyed by intentional burning in 1960 (LANL 1993, 015310).

2.2.2 Previous Investigations

No previous environmental investigations have been conducted at AOC 18-005(c).

2.3 AOC 51-001

2.3.1 Background and Operational History

AOC 51-001 at TA-51 was an inactive/abandoned septic system that served the Experimental Engineering Test Facility (EETF) (buildings 51-11 and 51-12) and the transportable offices for buildings 51-25, 51-26, and 51-27 (Figure 2.3-1). The septic system consisted of a 1000-gal. concrete septic tank (structure 51-30), drainlines, and a 4-ft-wide by 50-ft-deep seepage pit (structure 51-31). The septic tank was connected to the seepage pit by a 4-in.-diameter vitrified clay pipe (VCP) buried in a 2-ft-wide x 6-in.-deep trench. The VCP was connected to a 4-in. perforated polyvinyl chloride drop pipe that extended to within 2 ft of the bottom of the seepage pit. The pit was backfilled with gravel to 8 ft below ground surface (bgs) and covered with compacted fill to grade level (LANL 1992, 007669).

TA-51 is the base of operations for the EETF, which supports research to develop effective isolation techniques for the burial of wastes in semiarid climates (LANL 1992, 007669). The EETF was built in 1980, and support offices for staff were built in 1986. The septic system was installed in 1988 and decommissioned in 1993 when the sanitary sewer line was installed as part of the Laboratory's Sanitary Wastewater Consolidation System (SWCS). The effluent now flows to a new manhole west of the septic tank. A greenhouse and laboratory previously occupied building 51-12; the building was equipped with sinks and lavatories. Buildings 51-25, 51-26, and 51-27 have housed offices since their construction in 1986. Building 51-11 housed the Environmental Science Laboratory.

2.3.2 Previous Investigations

The septic system was investigated during the 1995 Phase I RFI in accordance with the approved Operational Unit (OU) 1148 RFI work plan (LANL 1992, 007669).

As part of the RFI, the contents of the septic tank were sampled and analyzed. At that time, between 1 ft and 1.5 ft of liquid and sludge remained in the tank. A borehole was advanced through the center of the seepage pit to collect tuff samples beneath the pit. However, the gravel layer at the base of the seepage

pit prevented the collection of core samples and only a single tuff sample was collected from within and around the auger from between 55 ft and 60 ft bgs. The sampling locations are shown in Figure 2.3-2. The analytical suites for the sludge and tuff samples included pesticides/PCBs, cyanide, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and target analyte list (TAL) metals (Table 2.3-1). The samples were screened for gross alpha, beta, and gamma radiation.

The liquid and sludge in the septic tank at AOC 51-001 were characterized in 2000 in anticipation of implementing a VCA at the site. The septic tank contents were sampled and analyzed for pesticides/PCBs, toxicity characteristic leaching procedure (TCLP) metals, TAL metals, VOCs, SVOCs, gamma-emitting radionuclides, strontium-90, tritium, isotopic plutonium, and isotopic uranium. Constituents detected in the liquid or sludge included metals, VOCs, SVOCs, tritium, plutonium-239, uranium isotopes, nitrate, and lead-212. The VCA to remove the septic system was conducted at this site in 2001 and involved the removal of the septic tank contents and the septic tank; the drainlines were plugged. Confirmation samples were collected within the septic tank excavation, beneath the inlet drainline connection, and adjacent to the seepage pit; the excavations were subsequently backfilled with clean fill (Figure 2.3-2). In accordance with the approved VCA plan (LANL 2000, 070658), the waste characterization results were used to determine the analytical suites for the VCA confirmation samples; the analytical suite for the VCA confirmation samples included isotopic plutonium, isotopic uranium, gamma-emitting radionuclides, tritium, strontium-90, pH, VOCs, and SVOCs. In accordance with the approved VCA plan, confirmation samples were not analyzed for inorganic chemicals because they were not detected above background in the 1995 RFI samples or in the 2000 sludge characterization samples. (LANL 2000, 070658). Sampling data showed organic chemicals as potential contaminants. The nature and extent of residual contamination at AOC 51-001 have not been established.

2.3.3 Data for AOC 51-001

One tuff sample was collected beneath the seepage pit from a depth interval of 50 to 60 ft bgs during the 1995 RFI. Five soil/fill confirmation samples and seven tuff samples were collected from six locations at AOC 51-001 during the 2001 VCA. Samples were collected from two depth intervals (11 to 12 ft and 12 to 13 ft bgs) at three locations within the tank footprint, two samples were collected beneath the inlet pipe connection (4.5 to 5.5 ft and 5.5 to 6.6 ft bgs), and four samples were collected from two boreholes adjacent to the seepage pit from depth intervals of 49 to 50 ft bgs and 59 to 60 ft bgs. The analytical suites for each sample are provided in Table 2.3-1, and the sampling locations are shown in Figure 2.3-2.

The tuff sample collected beneath the seepage pit from a depth interval of 50 to 60 ft bgs during the 1995 RFI was analyzed for inorganic chemicals and total cyanide (Figure 2.3-3 and Table 2.3-1). Analytical results showed no inorganic chemicals above background; lead was detected above the tuff BV but was within the range of concentrations of the background data set (Table 2.3-2).

All 13 samples from AOC 51-001 were analyzed for SVOCs and VOCs; the single tuff sample collected beneath the seepage pit during the 1995 RFI was also analyzed for PCBs and pesticides. Two VOCs (2-butanone and trichlorofluoromethane) were detected at low concentrations at two locations below estimated quantitation limit (EQLs). Bromomethane was detected at a concentration below the EQL in the deepest sample from location 51-10001 (Figure 2.3-4 and Table 2.3-3). No SVOCs, pesticides or PCBs were detected.

The tuff sample collected beneath the seepage pit during the 1995 RFI was analyzed for gross alpha/beta radiation. All VCA confirmation samples from AOC 51-001 were analyzed by gamma spectroscopy and for isotopic plutonium, isotopic uranium, tritium, and strontium-90. Cesium-137 was detected in one fill

sample at 0.0761 pCi/g at location 51-0002 at a depth of 5.5 to 6.5 ft bgs. This concentration is below the soil fallout value of 1.65 pCi/g. No other radionuclides were detected.

2.4 AOC 54-007(d)

2.4.1 Background and Operational History

AOC 54-007(d) was an inactive/abandoned septic system that served the Radiation Exposure Facility located in buildings 54-1001, 54-1002, 54-1003, and 54-1004 (Figure 2.4-1). The septic system consisted of a 1500-gal. concrete septic tank (structure 54-1014), drainlines, a distribution box, and a split drain field. A 4-in. drainline from the septic tank connected to a reinforced concrete distribution box, which diverted the effluent east and west into the drain field. The drain field consists of two 60-ft-long, 4-in.-diameter tile drainlines running east and west from the distribution box (LANL 1992, 007669).

The Radiation Exposure Facility was in operation from 1962 to the mid-1970s. The facility was used for biomedical research on the exposure of animals to gamma radiation from sealed cobalt-60 sources. The radiation sources were removed from the facility in the 1970s when research was terminated. The septic system was constructed in 1962. The facility was subsequently used for research on the exposure of animals to nitrogen oxides. The septic system was decommissioned in 1993 when the sanitary sewer line was installed as part of the Laboratory's SWCS. The effluent now flows to a new manhole, structure 54-151, constructed south of the former septic tank location.

2.4.2 Previous Investigations

The septic system was investigated during the 1995 Phase I RFI in accordance with the approved OU 1148 RFI work plan (LANL 1992, 007669). Phase I RFI data were summarized in the VCA plan (LANL 2000, 070658).

As part of the RFI, the contents of the septic tank were sampled and analyzed. At that time, between 3 and 3.5 ft of liquid and sludge remained in the tank. The sludge and liquid samples were analyzed for pesticides/PCBs, VOCs, SVOCs, and TAL metals.

The liquid and sludge in the septic tank at AOC 54-007(d) were characterized in anticipation of implementing a VCA at the site in 2000. The septic tank contents were sampled and analyzed for pesticides/PCBs, TCLP metals, TAL metals, VOCs, SVOCs, gamma-emitting radionuclides, tritium, isotopic plutonium, and isotopic uranium. Constituents detected in the liquid or sludge included metals, VOCs, SVOCs, nitrate, and uranium isotopes. The VCA to remove the septic system was conducted at this site in 2001 and involved the removal of the septic tank contents and the septic tank; the drainlines were plugged. Confirmation samples were collected within the septic tank excavation, beneath the inlet drainline connection, and from the drain field; the excavations were subsequently backfilled with clean fill Figure 2.4-2). In accordance with the approved VCA plan (LANL 2000, 070658), the waste characterization results were used to determine the analytical suites for the post-VCA confirmation samples; the analytical suites for the VCA confirmation samples included VOCs and SVOCs. Sampling data showed organic chemicals as potential contaminants (LANL 2001, 071473). The nature and extent of residual contamination at AOC 54-007(d) have not been established.

2.4.3 Data for AOC 54-007(d)

One tuff sample and 31 soil/fill samples were collected from 16 locations at AOC 54-007(d) during the 2001 VCA. Six samples were collected within the tank footprint from two depth intervals (10.5 to

11.5 ft bgs and 11.5 to 12.5 ft bgs). Two soil samples were collected beneath the inlet pipe from two depth intervals (5.25 to 6.25 ft bgs and 6.25 to 7.25 ft bgs). During the VCA it was determined that the tile drain field had collapsed and samples could not be collected using a hand auger. Therefore, a backhoe was used to trench across the tile drain field at the targeted depths; samples were collected and the sampling locations surveyed. A total of 24 samples were collected from 12 locations in the trenches within the drain field at depth intervals ranging from 3.7 to 8 ft bgs. The analytical suites for each sample are provided in Table 2.4-1, and the sampling locations are shown in Figure 2.4-2.

All 32 confirmation samples were analyzed for VOCs and SVOCs. Organic chemicals detected in drain field samples included benzene; bis(2-ethylhexyl) phthalate; bromomethane; 2-butanone; isopropylbenzene; 4-isopropyltoluene; 4-methyl-2-pentanone; toluene; trichlorofluoromethane; and trimethylbenzene[1,2,4-]. These organic chemicals were detected at concentrations less than or slightly above their respective EQLs in one or more samples. None of these organic chemicals were detected in the contents of the septic tank (LANL 2001, 071473). At most locations, the concentrations of organic chemicals decreased slightly with depth or remained unchanged (Table 2.4-2 and Figure 2.4-3).

3.0 SITES FOR WHICH NFA HAS BEEN APPROVED

Eleven SWMUs/AOCs in Middle Cañada del Buey Aggregate Area have previously been approved for NFA and no further investigation is required. These sites are listed in Table 3.0-1, and brief descriptions are provided below. Four of these sites are SWMUs that were listed in Module VIII of the Laboratory's Hazardous Waste Facility Permit. NMED approved removal of these sites from Module VIII before the effective date of the Consent Order (NMED 1998, 063042; NMED 2001, 070010; NMED 2003, 078138). The remaining seven sites are AOCs that were not listed in Module VIII. These sites were approved for NFA by EPA before the effective date of the Consent Order and do not require additional actions under the Consent Order (EPA 2005, 088464).

3.1 AOC C-18-002, Former Building

AOC C-18-002 (building 18-10) was located north of Pajarito Road on the mesa above the present location of TA-18.

- 1993: AOC C-18-002 was proposed for NFA in the OU 1093 RFI work plan (LANL 1993, 015310, p. 6-12).
- 1994: EPA approved the OU 1093 work plan and the NFA proposal (EPA 1994, 055161.49).
- 2005: EPA confirmed the NFA status in a letter to NMED (EPA 2005, 088464).

3.2 AOC C-51-001, Former Storage Area

AOC C-51-001 is a former storage area for clean soil to be used at TA-51.

- 1992: AOC C-51-001 was proposed for NFA in the OU 1148 RFI work plan (LANL 1992, 007669, p. 6-12).
- 1994: EPA approved the OU 1148 work plan and the NFA proposal (EPA 1993, 038812).
- 2005: EPA confirmed the NFA status in a letter to NMED (EPA 2005, 088464).

3.3 AOC 51-002(a), Environmental Research Caisson

AOC 51-002(a) was an environmental research caisson located at building 51-38.

- 1992: AOC 51-002(a) was proposed for NFA in the OU 1148 RFI work plan (LANL 1992, 007669, p. 6-12).
- 1994: EPA approved the OU 1148 work plan and the NFA proposal (EPA 1993, 038812).
- 2005: EPA confirmed the NFA status in a letter to NMED (EPA 2005, 088464).

3.4 AOC 51-002(b), Environmental Research Caisson

AOC 51-002(b) was an environmental research caisson located at building 51-39.

- 1992: AOC 51-002(b) was proposed for NFA in the OU 1148 RFI work plan (LANL 1992, 007669, p. 6-12).
- 1994: EPA approved the OU 1148 work plan and the NFA proposal (EPA 1993, 038812).
- 2005: EPA confirmed the NFA status in a letter to NMED (EPA 2005, 088464).

3.5 AOC C-51-002, Former Buildings

AOC C-51-002 is the former location of two magazine structures and associated soils contamination.

- 1992: AOC C-51-002 was proposed for NFA in the OU 1148 RFI work plan (LANL 1992, 007669, p. 6-16).
- 1994: EPA approved the OU 1148 work plan and the NFA proposal (EPA 1993, 038812).
- 2005: EPA confirmed the NFA status in a letter to NMED (EPA 2005, 088464).

3.6 SWMU 54-001(c), Storage Area

SWMU 54-001(c), a portable, inflatable temporary berm containing a steel tank, was proposed for storing waste oil and hazardous materials at MDA L. However, the tank collected only rainwater, and it was never used to store waste oil or hazardous materials.

- 1995: SWMU 54-001(c) was proposed for removal from the permit in the March 1995 Request for Permit Modification (LANL 1995, 045365).
- 1998: NMED removed SWMU 54-001(c) from Module VIII of the Hazardous Waste Facility Permit (HWFP) on December 23, 1998 (NMED 1998, 063042).

3.7 SWMU 54-007(c), Former Septic System

SWMU 54-007(c) is a former septic system that served an office building (building 54-34) and the Radioassay and Nondestructive Testing (RANT) Facility (Building 54-38).

- 2002: SWMU 54-007(c) was proposed for removal from the permit in the September 2002 Request for Permit Modification (LANL 2002, 073668).
- 2003: NMED removed SWMU 54-007(c) from Module VIII of the HWFP on August 6, 2003 (NMED 2003, 078138).

3.8 AOC 54-007(e), Former Septic System

AOC 54-007(e) is a former septic system that served an animal-holding facility (building 54-1015) from the time of construction in the mid-1960s to the late 1980s.

- 2002: SWMU 54-007(e) was proposed for removal from the permit in the September 2002 Request for Permit Modification (LANL 2002, 073668).
- 2003: NMED removed SWMU 54-007(e) from Module VIII of the HWFP on August 6, 2003 (NMED 2003, 078138).

3.9 SWMU 54-013(a), Proposed Facility

SWMU 54-013(a) was an area designated for a truck-washing pit at TA-54 West. Plans to build the facility were subsequently canceled.

- 1995: SWMU 54-013(a) was proposed for removal from the permit in the March 1995 Request for Permit Modification (LANL 1995, 045365).
- 1998: NMED removed SWMU 54-013(a) from Module VIII of the HWFP on December 23, 1998 (NMED 1998, 063042).

3.10 SWMU 54-015(h) Former Storage Area

SWMU 54-015(h) is a former storage area located inside Building TA-54-38, the Nondestructive Testing (NDT) Facility.

- 1995: SWMU 54-015(h) was proposed for removal from the permit in the March 1995 Request for Permit Modification (LANL 1995, 045365).
- 2001: NMED removed SWMU 54-015(h) from Module VIII of the HWFP on May 2, 2001 (NMED 2001, 070010).

3.11 AOC 54-016(a), Sump

AOC 54-016(a) is a sump used to collect snowmelt and rainwater that is located in the NDT Facility inside building 54-38.

- 1992: AOC 54-016(a) was proposed for NFA in the OU 1148 RFI work plan (LANL 1992, 007669, p. 6-16).
- 1994: EPA approved the OU 1148 work plan and the NFA proposal (EPA 1993, 038812).
- 2005: EPA confirmed the NFA status in a letter to NMED (EPA 2005, 088464).

4.0 RCRA UNITS

SWMU 54-001(a) and AOCs 54-001(b), 54-001(d), 54-001(e), and 54-002 in Middle Cañada del Buey Aggregate Area are active waste management units used to store hazardous, mixed, and PCB wastes. Four of these sites are permitted under the Laboratory's HWFP for storing hazardous wastes, and two of these sites also store mixed wastes in accordance with interim status requirements. The fifth site is used to store PCB wastes in accordance with TSCA requirements and is included in the Laboratory's Part B Permit Renewal Application seeking approval for storing hazardous and mixed wastes. These sites are,

or will be, subject to the closure and postclosure care requirements of 20.1.4.500 New Mexico Administrative Code (NMAC). Therefore, in accordance with Section III.W.1 of the Consent Order, they are not subject to the corrective action requirements of the Consent Order and are not included in the Middle Cañada del Buey Aggregate Area investigation work plan (LANL 2007, 098709). A brief description of these sites is provided below.

SWMU 54-001(a) is a 40-ft by 150-ft bermed container storage area located on the paved surface of Area L at TA-54. This storage pad is covered by a fabric dome building (structure 54-215). This container storage unit is currently included in the Laboratory's HWFP for storing hazardous wastes and also operates in accordance with RCRA interim status requirements for storing mixed wastes. This storage area is located over some of the inactive subsurface disposal units comprising MDA L that are subject to corrective actions under the Consent Order (see section 5.0). SWMU 54-001(a) will need to undergo RCRA closure before the Laboratory can implement corrective measures at MDA L.

AOC 54-001(b) is a container storage area located inside building 54-31 in Area L at TA-54. Building 54-31 is 13.5 ft by 14.5 ft with a paved floor that is sealed and bermed. This container storage unit is currently included in the Laboratory's HWFP for storing hazardous wastes. AOC 54-001(b) is not expected to be impacted by corrective measures at MDA L, and there is currently no schedule for closure of this storage unit.

AOC 54-001(d) consists of an enclosed PCB-contaminated waste storage building (building 54-39) and a PCB-contaminated waste storage pad (structure 54-81) located on the paved surface of Area L at TA-54. Building 54-39 has a bermed concrete floor on which wastes are stored. Structure 54-81 is 17 ft by 59 ft and is constructed of bermed, sealed concrete. Presently, these storage areas are approved by EPA for storing PCB wastes under TSCA and are subject to TSCA closure requirements. The Laboratory has also applied to NMED to have these areas permitted for storing hazardous and mixed wastes under the Laboratory's HWFP. Once this permit application is approved, AOC 54-001(d) will be subject to the closure and postclosure care requirements of 20.1.4.500 NMAC. AOC 54-001(d) is not expected to be impacted by corrective measures at MDA L, and there is currently no schedule for closure of this storage unit.

AOC 54-001(e) is a container storage area (structure 54-32) located on the paved surface of Area L at TA-54. The storage area consists of a 15.5 ft by 116.5 ft bermed, sealed concrete pad divided into six cells, each with secondary containment. The pad is covered with a 26 ft by 118 ft canopy. This container storage unit is currently included in the Laboratory's Hazardous Waste Facility Permit for the storage of hazardous wastes. AOC 54-001(e) is not expected to be impacted by corrective measures at MDA L, and there is currently no schedule for closure of this storage unit.

AOC 54-002 is a container storage area (structure 54-216) located on the paved surface of Area L at TA-54. The area is used to store compressed gas cylinders and is located within a fabric dome building. This container storage unit is currently included in the Laboratory's HWFP for storing hazardous wastes and also operates in accordance with RCRA interim status requirements for storing mixed wastes. This storage area is located over some of the inactive subsurface disposal units comprising MDA L that are subject to corrective actions under the Consent Order (see section 5.0). AOC 54-002 will have to undergo RCRA closure before the Laboratory can implement corrective measures at MDA L.

5.0 SITES ADDRESSED BY OTHER INVESTIGATIONS OR PROGRAMS

Three SWMUs within Middle Cañada del Buey Aggregate Area are being addressed by other investigations/corrective actions required by the Consent Order or are addressed by other regulatory programs. These sites are MDAs H, J, and L, all located within TA-54.

MDA H (SWMU 54-004) was used to dispose of classified wastes from May 1960 to August 1986. The site consists of nine disposal shafts that are 6 ft in diameter and 60 ft deep. Wastes disposed of at MDA H included weapon-component mockup shapes, detonators, papers, and tritium-contaminated items. Eight of the shafts are capped with 3 ft of crushed tuff followed by 3 ft of concrete, and the remaining shaft is capped with 6 ft of concrete. The Laboratory conducted an RFI at MDA H (LANL 2001, 070158; LANL 2002, 073270) that was approved by NMED in 2003 (NMED 2003, 075939). The Laboratory conducted a corrective measures study to evaluate potential corrective measures for this site (LANL 2005, 089332). NMED is currently in the process of selecting a corrective measure for MDA H.

MDA J (SWMU 54-005) is an inactive 5.5-acre facility consisting of six pits and four shafts. The site was opened in 1961. Waste disposed of in the pits at MDA J consisted of treated barium sand and administratively controlled waste. Surface sites at MDA J previously included a small land-farming project for aeration of soil contaminated with petroleum products, a transfer facility for containers of asbestos awaiting transport to a licensed off-site facility, and two container storage areas. All pits and shafts at MDA J are covered with crushed tuff. MDA J is subject to regulation as a solid waste disposal facility under the New Mexico Solid Waste Regulations. MDA J was closed in accordance with the Solid Waste Regulations in 2002 and a Closure Certification Report was submitted to NMED in October 2002. The closure/postclosure care plan was approved by NMED in October 2003 (NMED 2003, 098535). Currently, MDA J is undergoing postclosure monitoring.

MDA L (SWMU 54-006) consists of inactive subsurface chemical waste disposal units located within Area L at TA-54, which is the location of active RCRA-permitted hazardous waste storage operations. The disposal of chemical wastes at MDA L began in the late 1950s and continued until 1985. Liquid chemical wastes were disposed of in 1 pit, 3 surface impoundments, and 34 shafts. Following the deactivation of these subsurface units, the surface of Area L was paved and has been used until the present for storage of hazardous and mixed wastes. The Laboratory conducted a RFI at MDA L (LANL 2000, 064360) and later completed investigations at MDA L in accordance with Consent Order requirements. The investigation report for MDA L (LANL 2005, 092591; LANL 2006, 091888) was approved by NMED (2007, 098409), and the Laboratory is currently conducting a corrective measures evaluation.

6.0 REFERENCES

6.1 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 number. This information is also included in text citations. ER ID numbers 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; the U.S. Department of Energy–Los Alamos Site Office; the U.S. Environmental Protection Agency, Region 6; and the Directorate. The set was developed to ensure that the administrative authority has all material

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6.2 Map Data Sources

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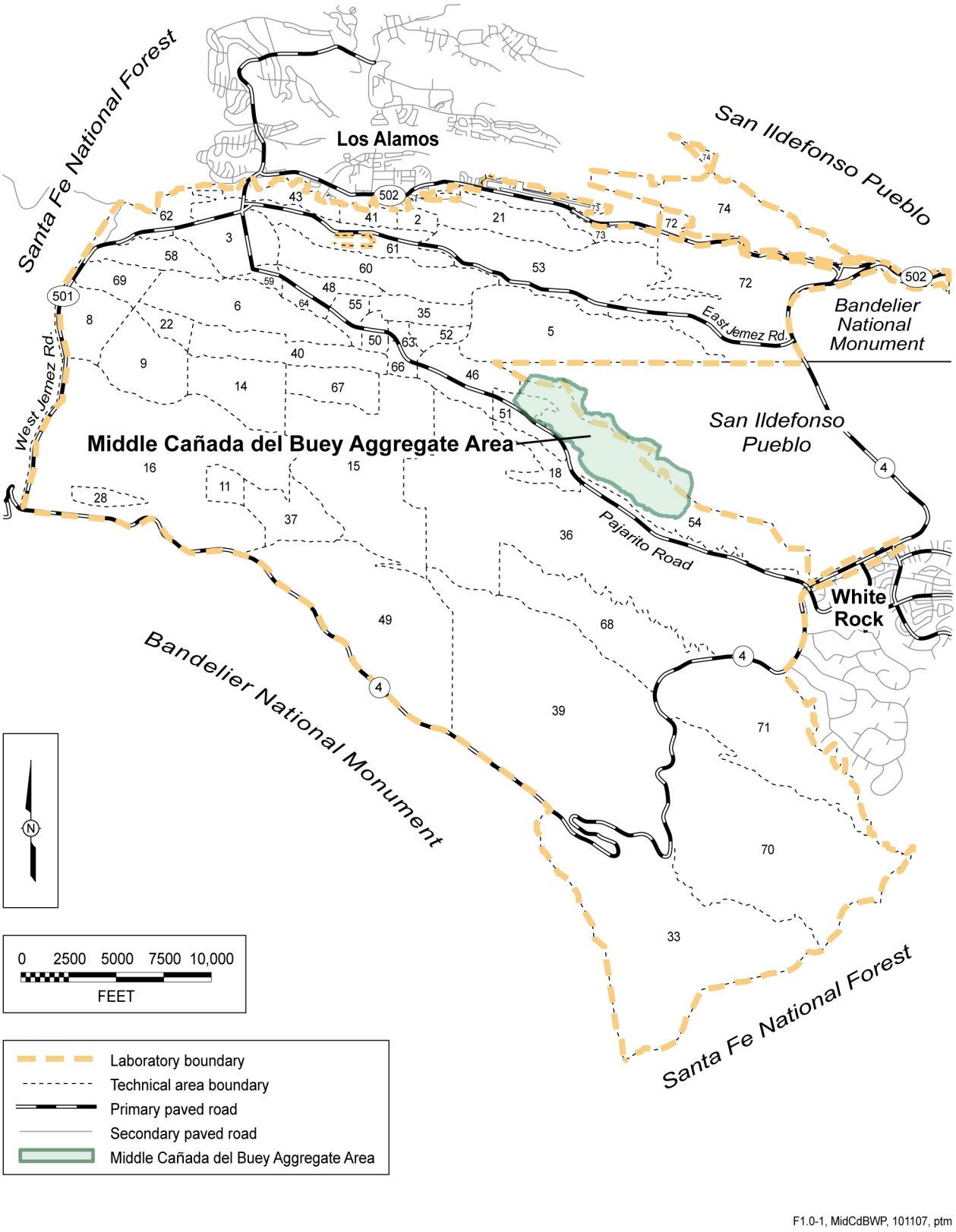

F1.0-1, MidCdBWP, 101107, ptm

Figure 1.0-1 Middle Cañada del Buey Aggregate Area with respect to the Laboratory TAs and surrounding land holdings

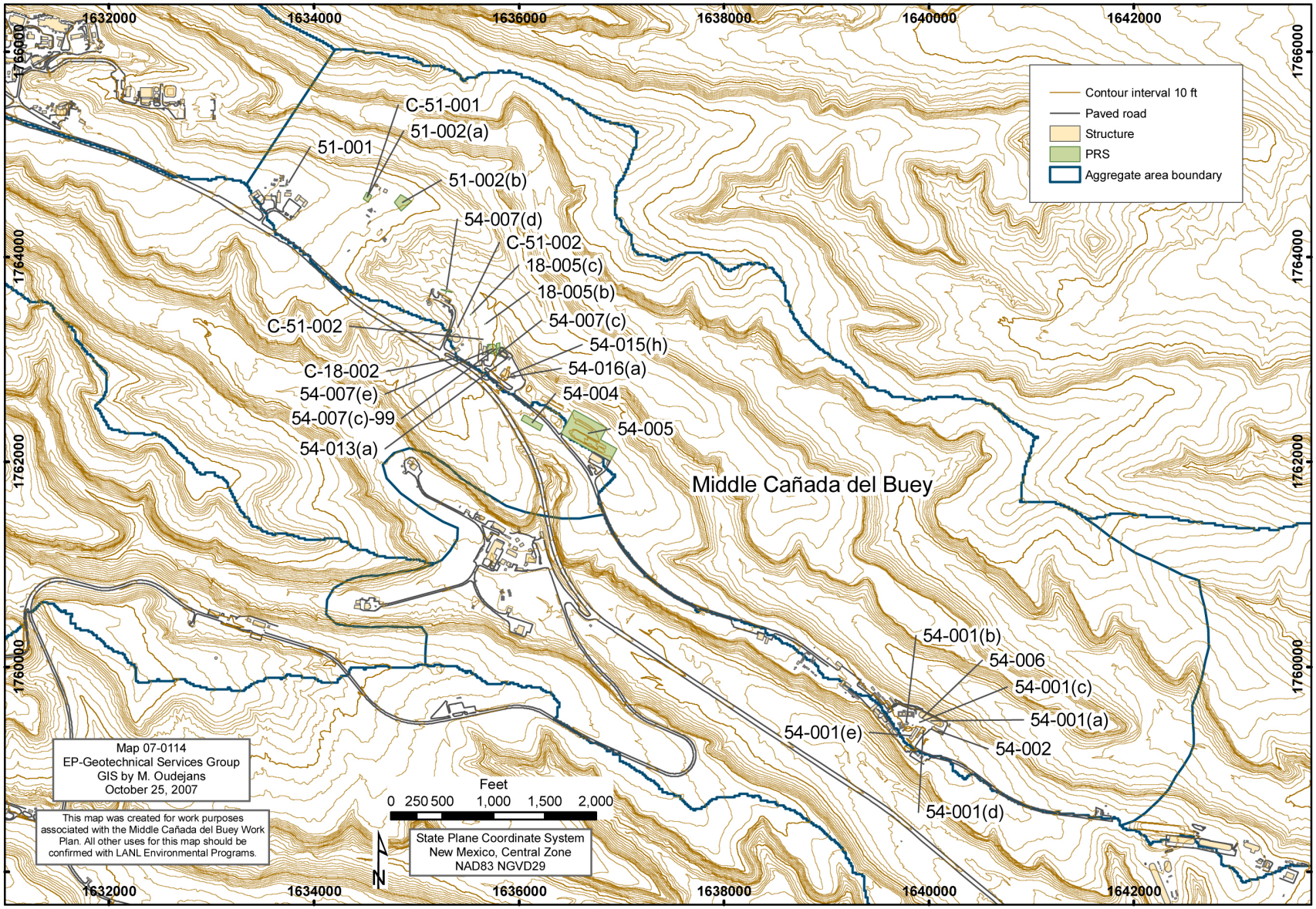

Figure 1.0-2 Sites within the Middle Cañada del Buey Aggregate Area

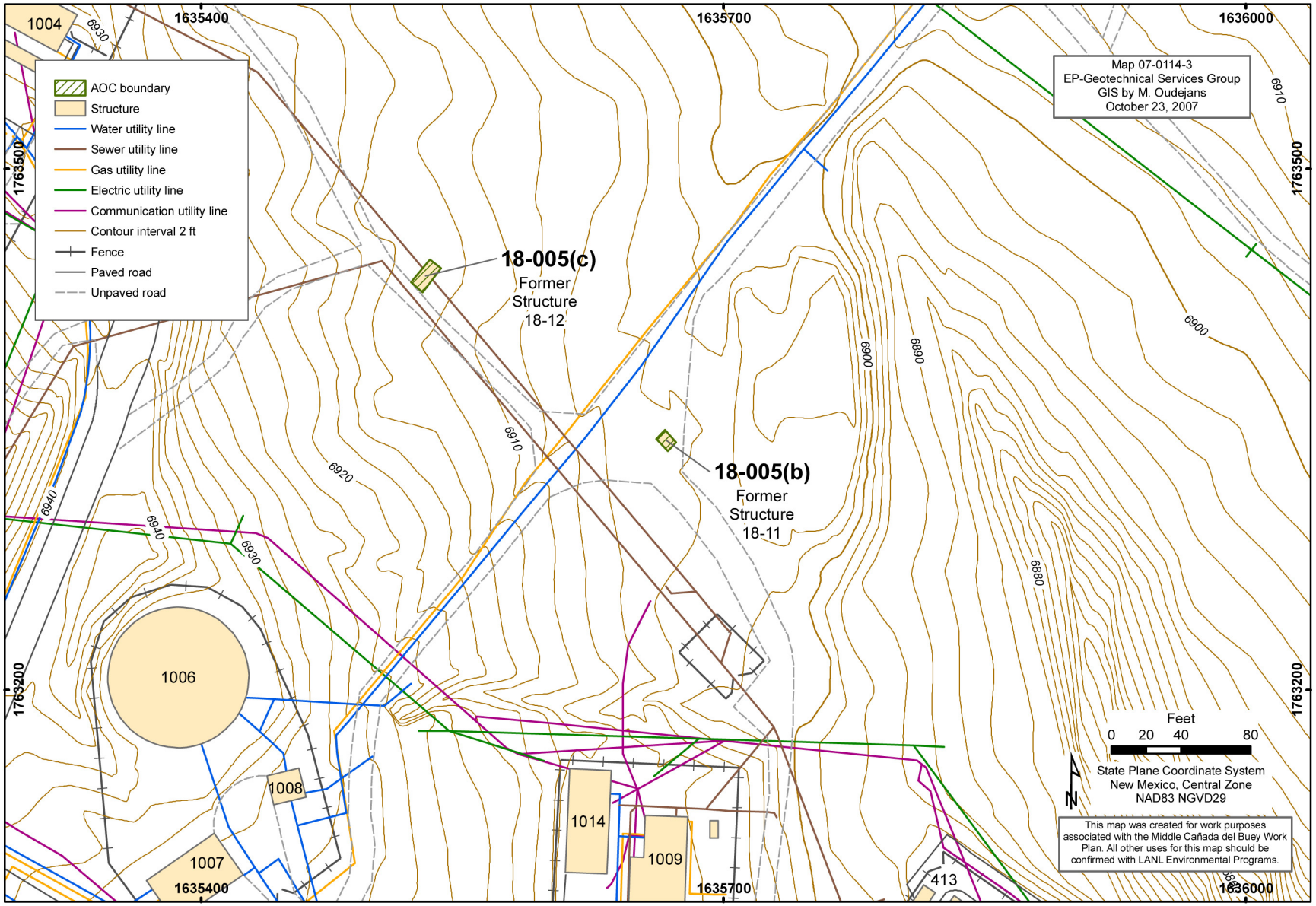

Figure 2.1-1 Locations of AOCs 18-005(b) and 18-005(c)

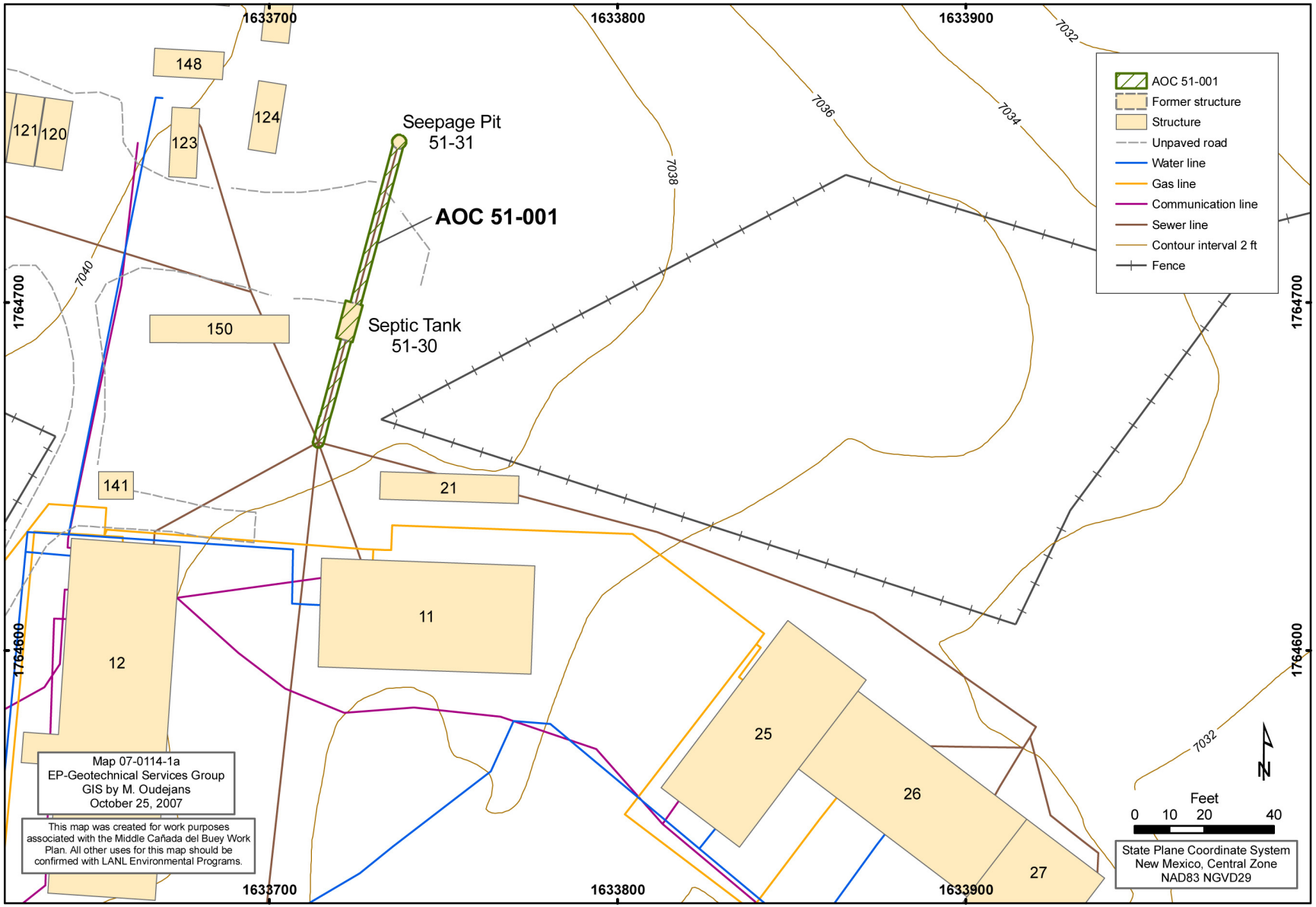

Figure 2.3-1 Location of AOC 51-001

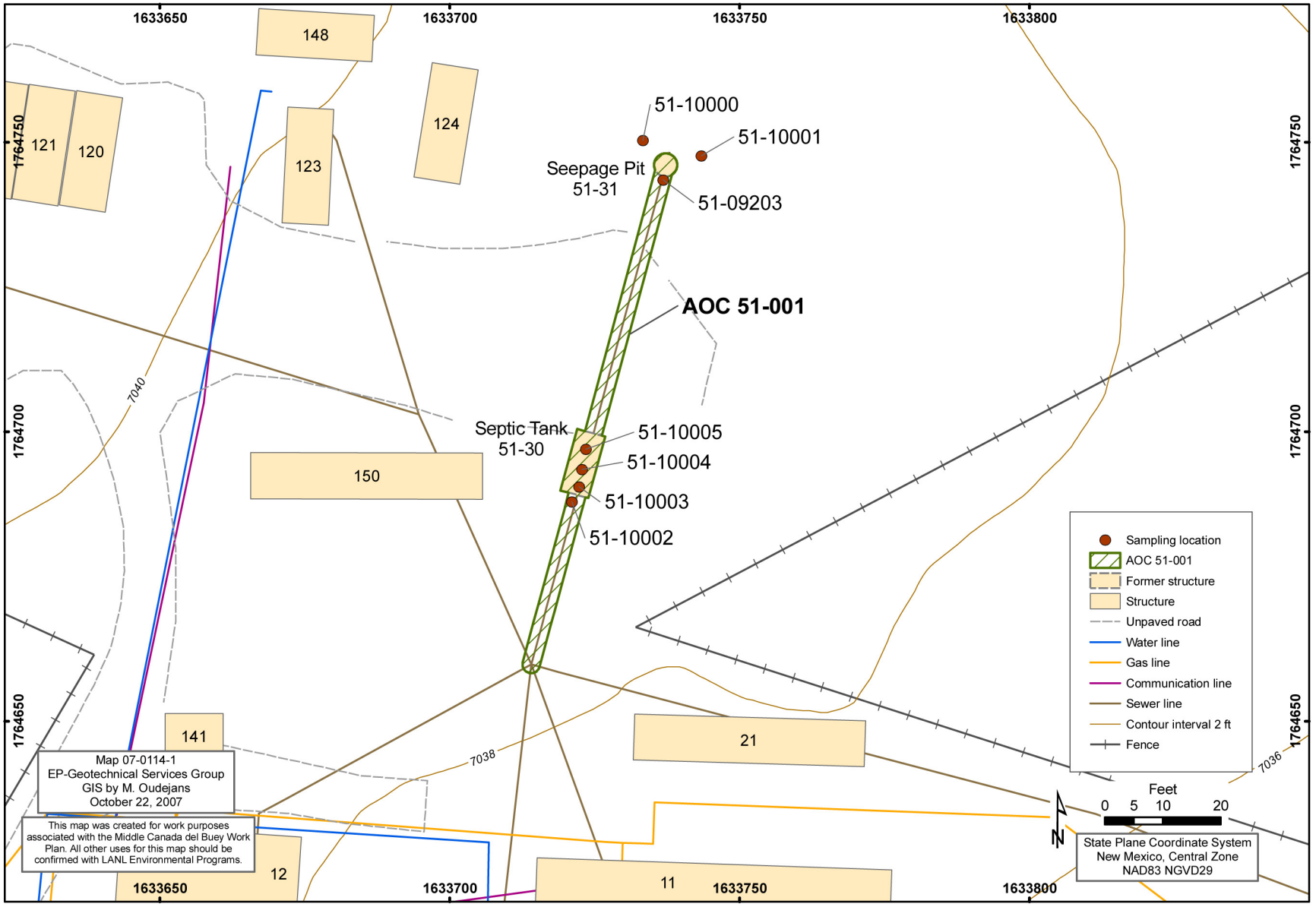

Figure 2.3-2 Historical sampling locations at AOC 51-001

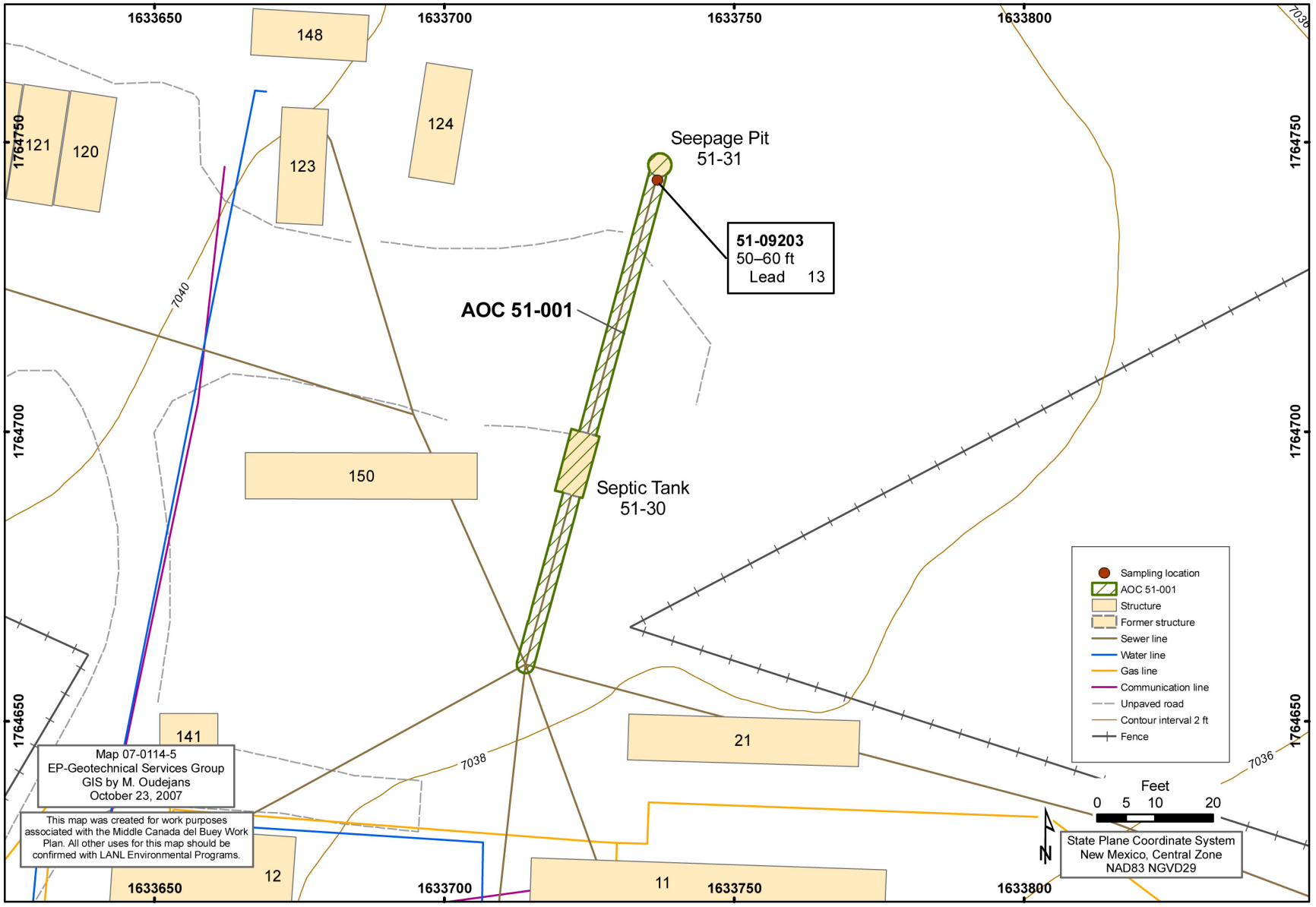

Figure 2.3-3 Inorganic chemicals above BVs at AOC 51-001

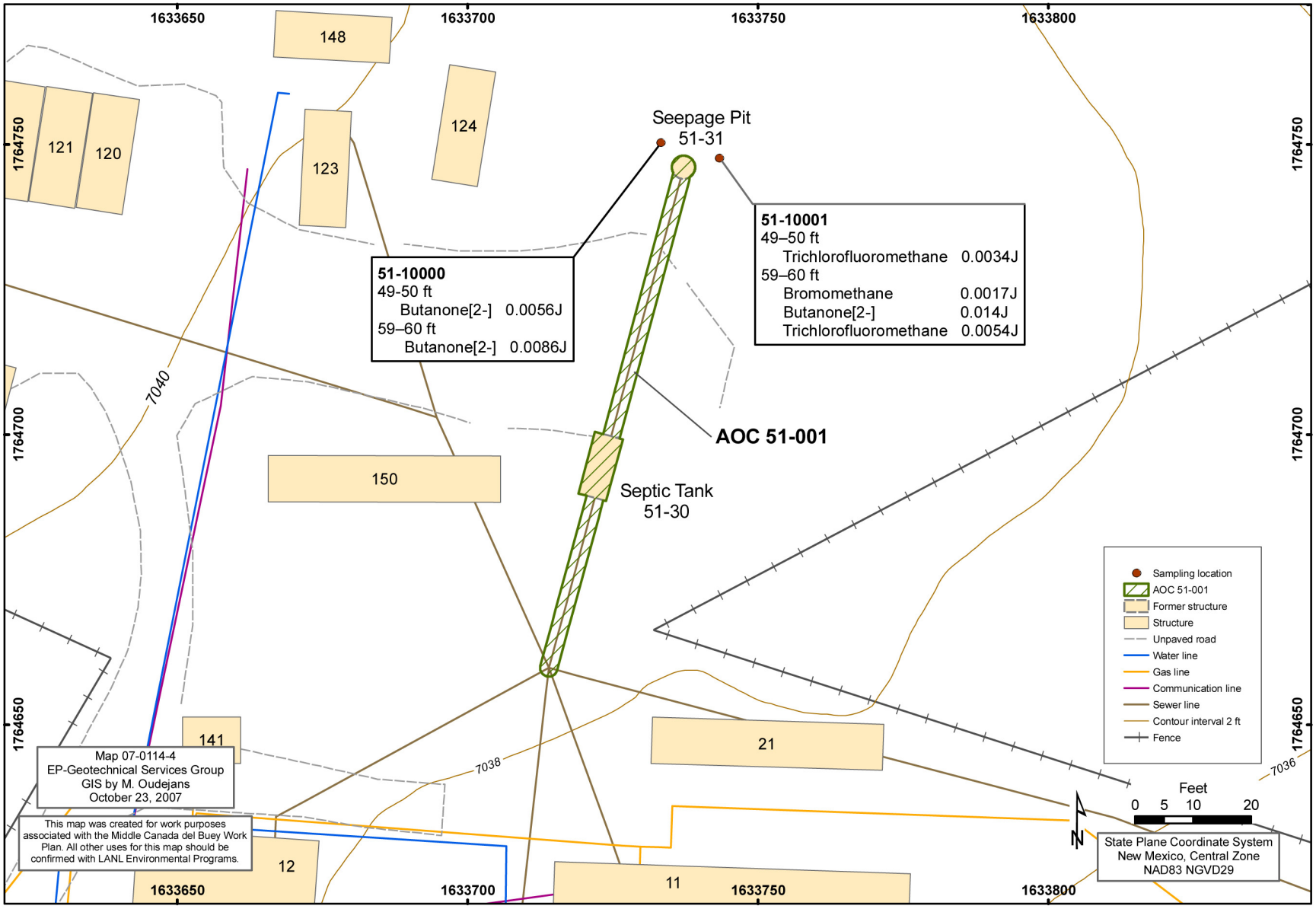

Figure 2.3-4 Organic chemicals detected at AOC 51-001

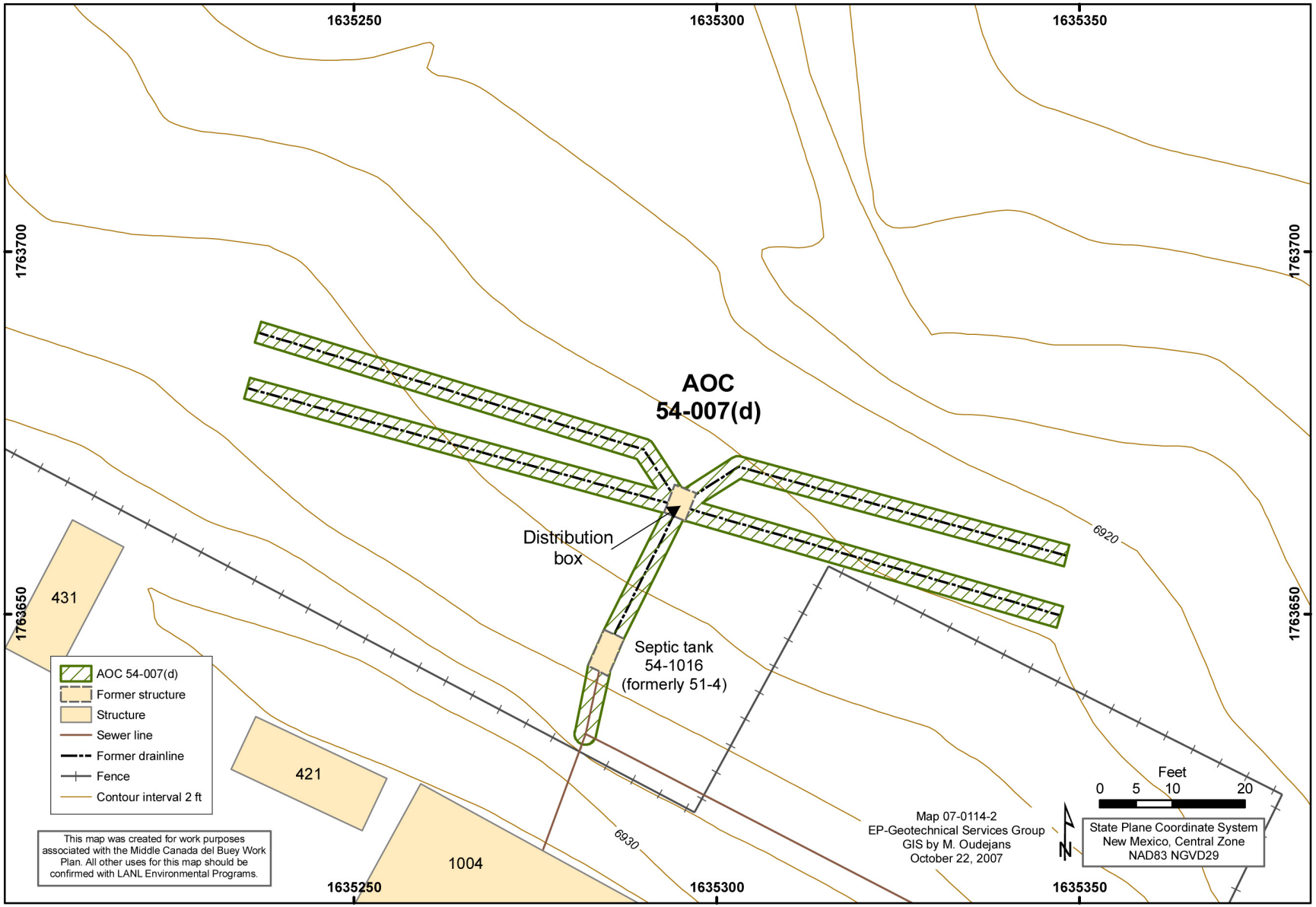

Figure 2.4-1 Location of AOC 54-007(d)

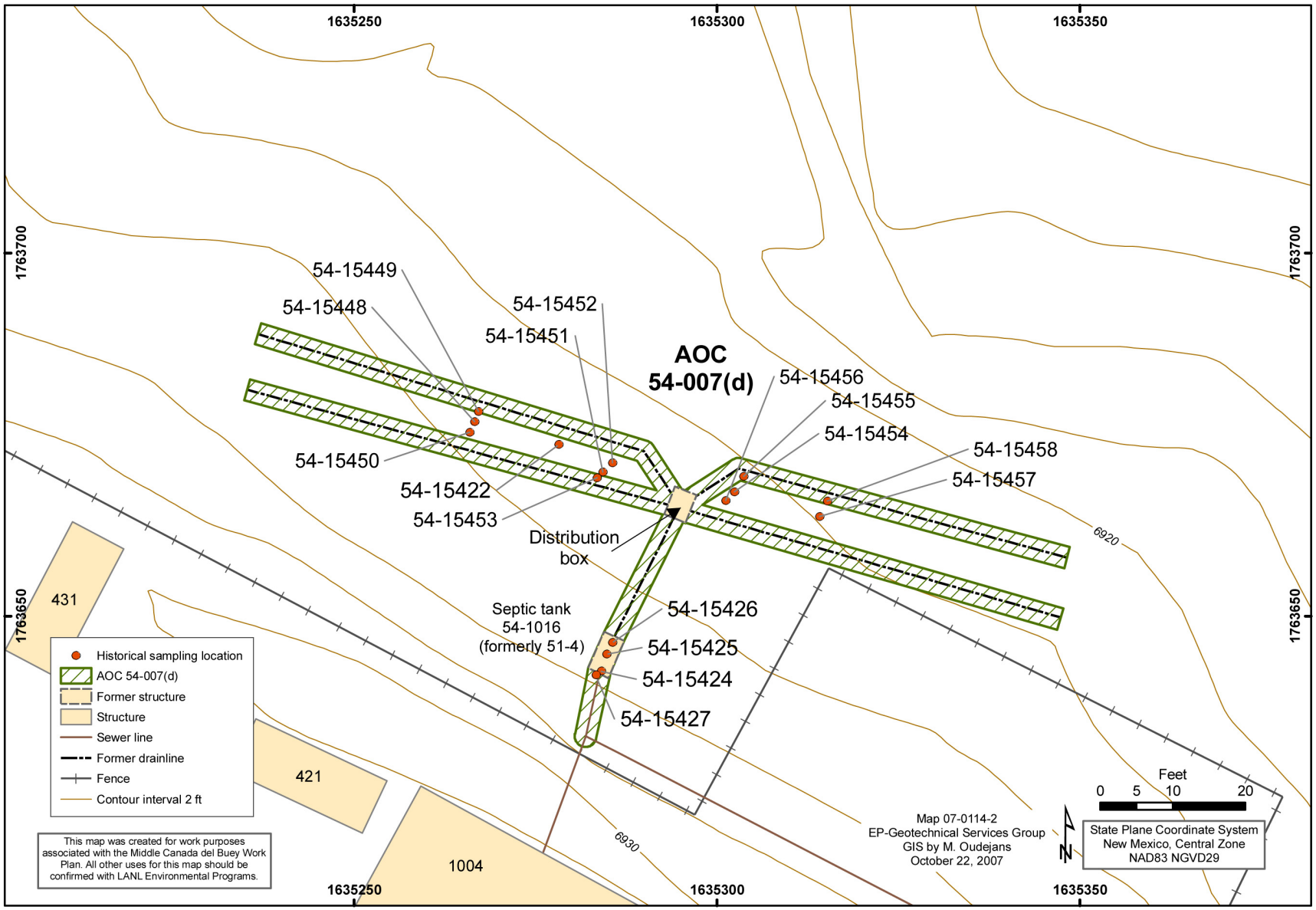

Figure 2.4-2 Historical sampling locations at AOC 54-007(d)

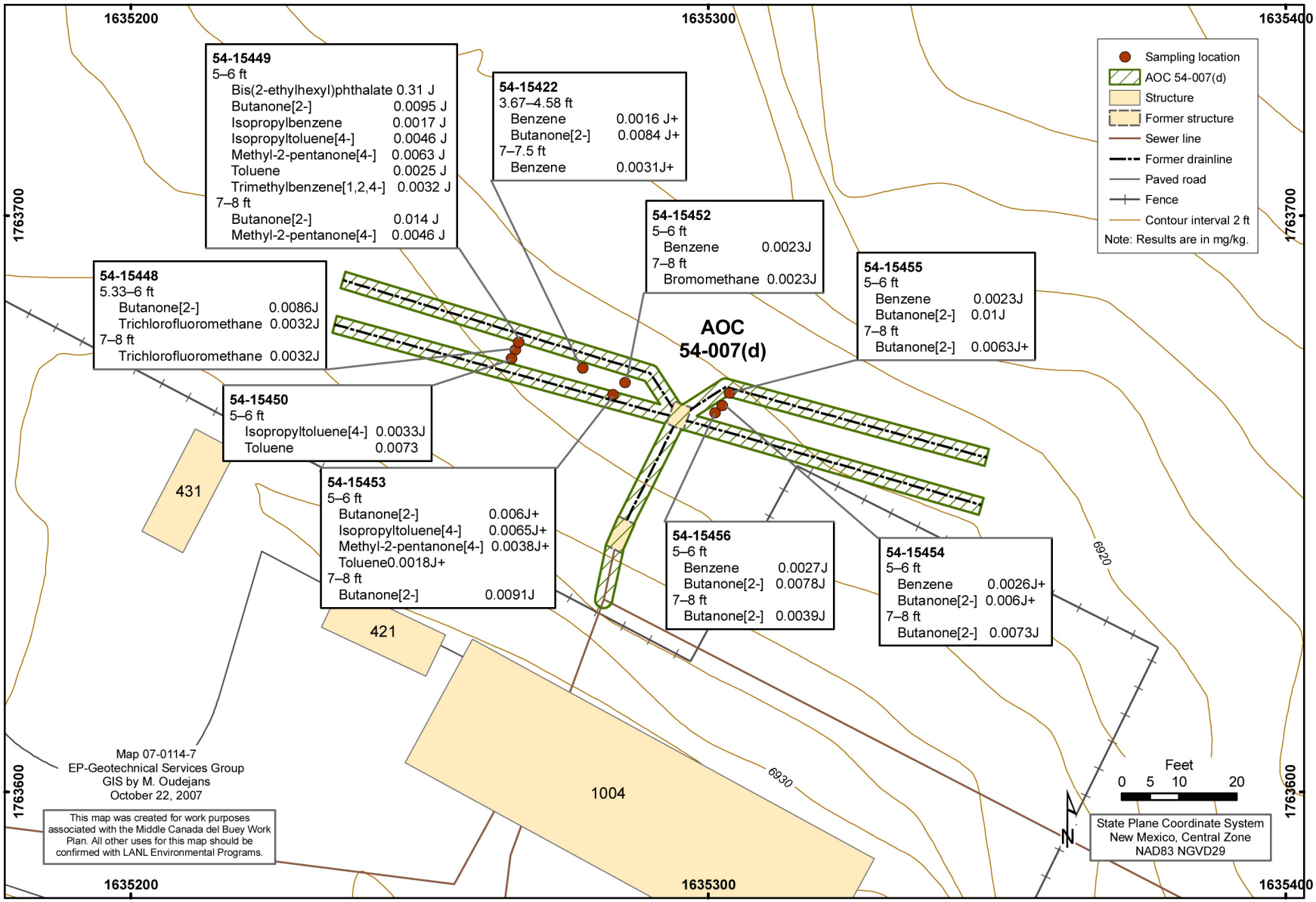

Figure 2.4-3 Organic chemicals detected at AOC 54-007(d)

Table 1.1-1
Summary of SWMUs and AOCs in Middle Cañada del Buey Aggregate Area

Site	Description	Status
Sites To Be Investigated		
AOC 18-005(b)	Former explosive storage magazine	Investigation in progress
AOC 18-005(c)	Former explosive storage magazine	Investigation in progress
AOC 51-001	Former septic system	Investigation in progress
AOC 54-007(d)	Former septic system	Investigation in progress
Sites Previously Approved for NFA		
AOC 51-002(a)	Subsurface environmental research caissons	NFA approved by EPA (2005, 088464)
AOC 51-002(b)	Subsurface environmental research caissons	NFA approved by EPA (2005, 088464)
SWMU 54-001(c)	Former tank storage area	Removed from Module VIII HWFP by NMED (1998, 063042)
SWMU 54-007(c)	Former septic system	Removed from Module VIII HWFP by NMED (2003, 078138)
AOC 54-007(e)	Former septic system	NFA approved by NMED (2002, 071424)
SWMU 54-013(a)	Proposed truck washing pit–never constructed	Removed from Module VIII HWFP by NMED (1998, 063042)
SWMU 54-015(h)	Drum storage area	Removed from Module VIII HWFP by NMED (1998, 063042)
AOC 54-016(a)	Secondary containment sump	NFA approved by EPA (2005, 088464)
AOC C-18-002	Former assembly building	NFA approved by EPA (2005, 088464)
AOC C-51-001	Drum storage area	NFA approved by EPA (2005, 088464)
AOC C-51-002	Former explosive storage magazines	NFA approved by EPA (2005, 088464)
Active Waste Management Units		
SWMU 54-001(a)	Hazardous/mixed waste storage area	RCRA-permitted storage unit
AOC 54-001(b)	Hazardous waste storage area	RCRA-permitted storage unit
AOC 54-001(d)	PCB waste storage area	TSCA-approved storage unit
AOC 54-001(e)	Hazardous waste storage area	RCRA-permitted storage unit
AOC 54-002	Hazardous/mixed waste storage area	RCRA-permitted storage unit
Sites Included in Other Investigations/Programs		
SWMU 54-004	MDA H	Investigation complete (NMED 2003, 075939), corrective measures study ongoing
SWMU 54-005	MDA J	Closed under NMED Solid Waste Regulations (NMED 2003, 098535)
SWMU 54-006	MDA L	Investigation complete (NMED 2007, 098409), corrective measures evaluation ongoing

Table 2.3-1
Summary of Samples Collected and Analyses Requested at AOC 51-001

Sample ID	Location ID	Depth (ft)	Media	Cyanide	METALS	PCBs	Pesticides	SVOCs	VOCs	Gamma Spectroscopy	Gross Alpha/Beta	Tritium	Isotopic Plutonium	Isotopic Uranium	Strontium-90
0551-95-2016	51-09203	50–60	Qbt 3	1685[a]	1685	1684	1684	1684	1684	—[b]	1686	—	—	—	—
MD51-01-0001	51-10000	49–50	Qbt 3	—	—	—	—	8332R	8332R	8334R	—	8334R	8334R	8334R	8334R
MD51-01-0002	51-10000	59–60	Qbt 3	—	—	—	—	8332R	8332R	8334R	—	8334R	8334R	8334R	8334R
MD51-01-0003	51-10001	49–50	Qbt 3	—	—	—	—	8332R	8332R	8334R	—	8334R	8334R	8334R	8334R
MD51-01-0004	51-10001	59–60	Qbt 3	—	—	—	—	8332R	8332R	8334R	—	8334R	8334R	8334R	8334R
MD51-01-0005	51-10002	4.5–5.5	Soil	—	—	—	—	8308R	8308R	8310R	—	8310R	8310R	8310R	8310R
MD51-01-0006	51-10002	5.5–6.5	Fill	—	—	—	—	8308R	8308R	8310R	—	8310R	8310R	8310R	8310R
MD51-01-0007	51-10003	11–12	Soil	—	—	—	—	8308R	8308R	8310R	—	8310R	8310R	8310R	8310R
MD51-01-0008	51-10003	12–13	Qbt 3	—	—	—	—	8308R	8308R	8310R	—	8310R	8310R	8310R	8310R
MD51-01-0009	51-10004	11–12	Soil	—	—	—	—	8308R	8308R	8310R	—	8310R	8310R	8310R	8310R
MD51-01-0010	51-10004	12–13	Qbt 3	—	—	—	—	8308R	8308R	8310R	—	8310R	8310R	8310R	8310R
MD51-01-0011	51-10005	11–12	Fill	—	—	—	—	8308R	8308R	8310R	—	8310R	8310R	8310R	8310R
MD51-01-0012	51-10005	12–13	Qbt 3	—	—	—	—	8308R	8308R	8310R	—	8310R	8310R	8310R	8310R

[a] Request numbers.

[b] — = Analysis not requested.

Table 2.3-2
Inorganic Chemicals above BV at AOC 51-001

Sample ID	Location ID	Depth (ft)	Media	Antimony	Lead	Mercury	Selenium	Silver
Qbt 2,3,4 BV[a]				**0.5**	**11.2**	**0.1**	**0.3**	**1**
Residential SSL[b]				**31.3**	**400**	**23**[c]	**391**	**391**
Industrial SSL[b]				**454**	**800**	**340**[c]	**5680**	**5680**
0551-95-2016	51-09203	50.0–60.0	Qbt 3	11 (UJ)	13	0.27 (U)	1.1 (U)	2.1 (U)

[a] BVs from LANL 1998, 059730.

[b] SSLs from NMED 2006, 092513, unless otherwise noted.

[c] Value from EPA Region 6 (EPA 2007, 095866).

Table 2.3-3
Organic Chemicals Detected at AOC 51-001

Sample ID	Location ID	Depth (ft)	Media	Bromomethane	Butanone[2-]	Trichlorofluoromethane
Residential SSL[a]				**8.51**	**31800**	**390**[b]
Industrial SSL[a]				**32.8**	**48700**	**1300**[b]
MD51-01-0001	51-10000	49.0–50.0	Qbt 3	—[c]	0.0056 (J)	—
MD51-01-0002	51-10000	59.0–60.0	Qbt 3	—	0.0086 (J)	—
MD51-01-0003	51-10001	49.0–50.0	Qbt 3	—	—	0.0034 (J)
MD51-01-0004	51-10001	59.0–60.0	Qbt 3	0.0017 (J)	0.014 (J)	0.0054 (J)

[a] SSLs from NMED 2006, 092513, unless otherwise noted.

[b] Value from EPA Region 6 (2007, 095866)

[c] — = Analyte was not detected.

Table 2.4-1
Summary of Samples Collected
and Analyses Requested at AOC 54-007(d)

Sample ID	Location ID	Depth (ft)	Media	SVOCs	VOCs
MD54-01-0021	54-15422	3.67–4.58	Fill	8201R*	8201R
MD54-01-0022	54-15422	7–7.5	Qbt 3	8201R	8201R
MD54-01-0025	54-15424	10.5–11.5	Soil	8283R	8283R
MD54-01-0026	54-15424	11.5–12.5	Soil	8283R	8283R
MD54-01-0027	54-15425	10.5–11.5	Soil	8283R	8283R
MD54-01-0028	54-15425	11.5–12.5	Soil	8283R	8283R
MD54-01-0029	54-15426	10.5–11.5	Soil	8283R	8283R
MD54-01-0030	54-15426	11.5–12.5	Soil	8283R	8283R
MD54-01-0031	54-15427	5.25–6.25	Soil	8283R	8283R
MD54-01-0032	54-15427	6.25–7.25	Soil	8283R	8283R
MD54-01-0068	54-15448	5.33–6	Fill	8322R	8322R
MD54-01-0069	54-15448	7–8	Soil	8322R	8322R
MD54-01-0070	54-15449	5–6	Fill	8322R	8322R
MD54-01-0071	54-15449	7–8	Fill	8322R	8322R
MD54-01-0072	54-15450	5–6	Fill	8322R	8322R
MD54-01-0073	54-15450	7–8	Fill	8322R	8322R
MD54-01-0074	54-15451	5–6	Fill	8322R	8322R
MD54-01-0075	54-15451	7–8	Fill	8322R	8322R
MD54-01-0076	54-15452	5–6	Fill	8322R	8322R
MD54-01-0077	54-15452	7–8	Fill	8322R	8322R
MD54-01-0078	54-15453	5–6	Fill	8322R	8322R
MD54-01-0079	54-15453	7–8	Fill	8322R	8322R
MD54-01-0080	54-15454	5–6	Fill	8322R	8322R
MD54-01-0081	54-15454	7–8	Fill	8322R	8322R
MD54-01-0082	54-15455	5–6	Fill	8322R	8322R
MD54-01-0083	54-15455	7–8	Fill	8322R	8322R
MD54-01-0084	54-15456	5–6	Fill	8322R	8322R
MD54-01-0085	54-15456	7–8	Fill	8322R	8322R
MD54-01-0086	54-15457	5–6	Fill	8322R	8322R
MD54-01-0087	54-15457	7–8	Fill	8322R	8322R
MD54-01-0088	54-15458	5–6	Fill	8322R	8322R
MD54-01-0089	54-15458	7–8	Fill	8322R	8322R

*Request numbers.

Table 2.4-2
Organic Chemicals Detected at AOC 54-007(d)

Sample ID	Location ID	Depth (ft)	Media	Benzene	Bis(2-ethylhexyl)phthalate	Bromomethane	Butanone[2-]	Isopropylbenzene
Residential SSL[a]				**10.3**	**347**	**8.51**	**31800**	**na**[b]
Industrial SSL[a]				**25.8**	**1370**	**32.8**	**48700**	**na**
MD54-01-0021	54-15422	3.7–4.6	Fill	0.0016 (J+)	—[c]	0.0023 (J+)	0.0084 (J+)	—
MD54-01-0022	54-15422	7.0–7.5	Qbt 3	0.0031 (J+)	—	0.002 (J+)	—	—
MD54-01-0068	54-15448	5.33–6.0	Fill	—	—	—	—	—
MD54-01-0069	54-15448	7.0–8.0	Soil	—	—	—	0.0086 (J)	—
MD54-01-0070	54-15449	5.0–6.0	Fill	—	0.31 (J)	—	0.0095 (J)	0.0017 (J)
MD54-01-0071	54-15449	7.0–8.0	Fill	—	—	—	0.014 (J)	—
MD54-01-0072	54-15450	5.0–6.0	Fill	—	—	—	—	—
MD54-01-0076	54-15452	5.0–6.0	Fill	0.0023 (J)	—	—	—	—
MD54-01-0077	54-15452	7.0–8.0	Fill	—	—	0.0023 (J)	—	—
MD54-01-0078	54-15453	5.0–6.0	Fill	—	—	—	0.006 (J+)	—
MD54-01-0079	54-15453	7.0–8.0	Fill	—	—	—	0.0091 (J)	—
MD54-01-0080	54-15454	5.0–6.0	Fill	0.0026 (J+)	—	—	0.006 (J+)	—
MD54-01-0081	54-15454	7.0–8.0	Fill	—	—	—	0.0073 (J)	—
MD54-01-0082	54-15455	5.0–6.0	Fill	0.0023 (J)	—	—	0.01 (J)	—
MD54-01-0083	54-15455	7.0–8.0	Fill	—	—	—	0.0063 (J+)	—
MD54-01-0084	54-15456	5.0–6.0	Fill	0.0027 (J)	—	—	0.0078 (J)	—
MD54-01-0085	54-15456	7.0–8.0	Fill	—	—	—	0.0039 (J)	—

Table 2.4-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Isopropyltoluene[4-]	Methyl-2-pentanone[4-]	Toluene	Trichlorofluoromethane	Trimethylbenzene[1,2,4-]
Residential SSL[a]				**na**	**5510**	**252**	**390[d]**	**58.0**
Industrial SSL[a]				**na**	**7010**	**252**	**1300[d]**	**213**
MD54-01-0021	54-15422	3.7–4.6	Fill	—	—	—	—	—
MD54-01-0022	54-15422	7.0–7.5	Qbt 3	—	—	—	—	—
MD54-01-0068	54-15448	5.33–6.0	Fill	—	—	—	0.0032 (J)	—
MD54-01-0069	54-15448	7.0–8.0	Soil	—	—	—	0.0032 (J)	—
MD54-01-0070	54-15449	5.0–6.0	Fill	0.0046 (J)	0.0063 (J)	0.0025 (J)	—	0.0032 (J)
MD54-01-0071	54-15449	7.0–8.0	Fill	—	0.0046 (J)	—	—	—
MD54-01-0072	54-15450	5.0–6.0	Fill	0.0033 (J)	—	0.0073	—	—
MD54-01-0076	54-15452	5.0–6.0	Fill	—	—	—	—	—
MD54-01-0077	54-15452	7.0–8.0	Fill	—	—	—	—	—
MD54-01-0078	54-15453	5.0–6.0	Fill	0.0065 (J+)	0.0038 (J+)	0.0018 (J+)	—	—
MD54-01-0079	54-15453	7.0–8.0	Fill	—	—	—	—	—
MD54-01-0080	54-15454	5.0–6.0	Fill	—	—	—	—	—
MD54-01-0081	54-15454	7.0–8.0	Fill	—	—	—	—	—
MD54-01-0082	54-15455	5.0–6.0	Fill	—	—	—	—	—
MD54-01-0083	54-15455	7.0–8.0	Fill	—	—	—	—	—
MD54-01-0084	54-15456	5.0–6.0	Fill	—	—	—	—	—
MD54-01-0085	54-15456	7.0–8.0	Fill	—	—	—	—	—

[a] SSLs from NMED 2006, 092513, unless otherwise noted.

[b] na = Not available.

[c] — = Analyte was not detected.

[d] Value from EPA Region 6 (EPA 2007, 095866).

Table 3.0-1
Sites Previously Approved for NFA

Site	Description	Reference
AOC 51-002(a)	Environmental research site (structure 51-38) consisting of seven 6-ft diameter and six 18-in.-diameter caissons installed in the ground to a depth of 20 ft. Caissons were filled with earthen materials to perform flow and transport experiments.	EPA 2005, 088464
AOC 51-002(b)	Environmental research site (structure 51-39) consisting of seven 6-ft diameter and six 18-in.-diameter caissons installed in the ground to a depth of 20 ft. The caissons were constructed but never used.	EPA 2005, 088464
SWMU 54-001(c)	Portable, inflatable temporary berm containing a steel tank proposed for storing waste oil and hazardous materials at TA-54 Area L. Site was never used for storage and was removed.	NMED 1998, 063042
SWMU 54-007(c)	Former 1000-gal. septic tank, drainline, and drain field constructed in late 1980s and decommissioned in 1992. Tank was removed and drainlines capped during VCA in 2000–2001.	NMED 2003, 078138
AOC 54-007(e)	Former 1500-gal. septic tank, drainline, and drain field constructed in mid-1960s and decommissioned in 1992. Tank was removed and drainlines capped during VCA in 2000–2001.	NMED 2002, 071424
SWMU 54-013(a)	Planned truck-washing pit proposed for vehicle decontamination. Site was cancelled and was never constructed.	NMED 1998, 063042
SWMU 54-015(h)	Drum storage area located inside building 54-38 used to store drums of transuranic waste awaiting nondestructive testing.	NMED 1998, 063042
AOC 54-016(a)	Secondary containment sump located inside building 54-38 and used to collect snowmelt and rainwater dripping from trucks entering the building.	EPA 2005, 088464
AOC C-18-002	Former 12-ft by 25-ft assembly building (building 18-10) used to assemble explosive devices tested at TA-18 or -27. Building was constructed in 1944 and moved to TA-05 in 1948.	EPA 2005, 088464
AOC C-51-001	Drum storage area used to store drums of clean soil used in the research caissons [AOC 51-002(a)].	EPA 2005, 088464
AOC C-51-002	Two former explosives storage magazines. These magazines are duplicates of AOC 18-005(b) and AOC 18-005(c).	EPA 2005, 088464

Appendix A

Acronyms and Abbreviations, Glossary,
Metric Conversion Table, and Data Qualifier Definitions

A-1.0 ACRONYMS

AOC	area of concern
bgs	below ground surface
CST	Chemical Science and Technology (Laboratory Division)
DOE	Department of Energy (U.S.)
EETF	Experimental Engineering Test Facility
EP	Environmental Programs Directorate
EPA	Environmental Protection Agency (U.S.)
EQL	estimated quantitation limit
ER	Environmental Restoration Project
HE	high explosive(s)
HIR	historical investigation report
HWFP	Hazardous Waste Facility Permit
LANL	Los Alamos National Laboratory
LLW	low-level radioactive waste
MDA	material disposal area
NFA	no further action
NMED	New Mexico Environment Department
NMAC	New Mexico Administrative Code
OU	operable unit
PCB	polychlorinated biphenyl
PVC	polyvinyl chloride
RANT	Radioassay and Nondestructive Testing
RCRA	Resource Conservation and Recovery Act
RFI	RCRA facility investigation
RPF	Records Processing facility
SMO	Sample Management Office
SVOC	semivolatile organic compound
SWMU	solid waste management unit
SWCS	Sanitary Wastewater Consolidation System
TA	technical area
TAL	target analyte list (EPA)
TCLP	toxicity characteristic leaching procedure
TSCA	Toxic Substances Control Act
VCA	voluntary corrective action
VOC	volatile organic compound

A-2.0 GLOSSARY

aggregate—At the Los Alamos National Laboratory, an area within a *watershed* containing solid waste management units (SWMUs) and/or areas of concern (AOCs), and the media affected or potentially affected by releases from those SWMUs and/or AOCs. Aggregates are designated to promote efficient and effective corrective action activities.

area of concern—(1) A release that may warrant investigation or remediation and is not a solid waste management unit (SWMU). (2) An area at Los Alamos National Laboratory that may have had a release of a hazardous waste or a hazardous constituent but is not a SWMU.

analysis—A critical evaluation, usually made by breaking a subject (either material or intellectual) down into its constituent parts, then describing the parts and their relationship to the whole. Analyses may include physical analysis, chemical analysis, toxicological analysis, and knowledge-of-process determinations.

analyte—The element, nuclide, or ion a chemical analysis seeks to identify and/or quantify; the chemical constituent of interest.

background level—(1) The concentration of a substance in an environmental medium (air, water, or soil) that occurs naturally or is not the result of human activities. (2) In exposure assessment, the concentration of a substance in a defined control area over a fixed period of time before, during, or after a data-gathering operation.

background value (BV)—A statistically derived concentration (i.e., the upper tolerance limit [UTL]) of a chemical used to represent the background data set. If a UTL cannot be derived, either the detection limit or maximum reported value in the background data set is used.

canyon—A stream-cut chasm or gorge, the sides of which are composed of cliffs or a series of cliffs rising from the chasm's bed. Canyons are characteristic of arid or semiarid regions where downcutting by streams greatly exceeds weathering.

chemical—Any naturally occurring or human-made substance characterized by a definite molecular composition.

chemical of potential concern (COPC)—A detected chemical compound or element that has the potential to adversely affect human receptors as a result of its concentration, distribution, and toxicity.

cleanup—A series of actions taken to deal with the release, or threat of a release, of a hazardous substance that could affect humans and/or the environment. The term cleanup is sometimes used interchangeably with the terms remedial action, removal action, or corrective action.

Compliance Order on Consent (Consent Order)—For the Environmental Remediation and Surveillance Program, an enforcement document signed by the New Mexico Environment Department, the U.S. Department of Energy, and the Regents of the University of California on March 1, 2005, which prescribes the requirements for corrective action at Los Alamos National Laboratory. The purposes of the Consent Order are (1) to define the nature and extent of releases of contaminants at, or from, the facility; (2) to identify and evaluate, where needed, alternatives for corrective measures to clean up contaminants in the environment and prevent or mitigate the migration of contaminants at, or from, the facility; and (3) to implement such corrective measures. The Consent Order supersedes the corrective action requirements previously specified in Module VIII of the Laboratory's Hazardous Waste Facility Permit.

Consent Order—See Compliance Order on Consent.

contaminant—(1) Chemicals and radionuclides present in environmental media or on debris above background levels. (2) According to the March 1, 2005, Compliance Order on Consent (Consent Order), any hazardous waste listed or identified as characteristic in 40 Code of Federal Regulations (CFR) 261 (incorporated by 20.4.1.200 New Mexico Administrative Code [NMAC]); any hazardous constituent listed in 40 CFR 261 Appendix VIII (incorporated by 20.4.1.200 NMAC) or 40 CFR 264 Appendix IX (incorporated by 20.4.1.500 NMAC); any groundwater contaminant listed in the Water Quality Control Commission (WQCC) Regulations at 20.6.3.3103 NMAC; any toxic pollutant listed in the WQCC Regulations at 20.6.2.7 NMAC; explosive compounds; nitrate; and perchlorate. (Note: Under the Consent Order, the term "contaminant" does not include radionuclides or the radioactive portion of mixed waste.)

corrective action—(1) In the Resource Conservation and Recovery Act, an action taken to rectify conditions potentially adverse to human health or the environment. (2) In the quality assurance field, the process of rectifying and preventing nonconformances.

decommissioning—The permanent removal of facilities and their components from service after the discontinued use of structures or buildings that are deemed no longer useful. Decommissioning must take place in accordance with regulatory requirements and applicable environmental policies.

decontamination—The removal of unwanted material from the surface of, or from within, another material.

detect (detection)—An analytical result, as reported by an analytical laboratory, that denotes a chemical or radionuclide to be present in a sample at a given concentration.

detection limit—The minimum concentration that can be determined by a single measurement of an instrument. A detection limit implies a specified statistical confidence that the analytical concentration is greater than zero.

discharge—The accidental or intentional spilling, leaking, pumping, pouring, emitting, emptying, or dumping of hazardous waste into, or on, any land or water.

disposal—The discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into, or on, any land or water so that such solid waste or hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including groundwaters.

effluent—Wastewater (treated or untreated) that flows out of a treatment plant, sewer, or industrial outfall. Generally refers to wastes discharged into surface waters.

Environmental Restoration (ER) Project—A Los Alamos National Laboratory project established in 1989 as part of a U.S. Department of Energy nationwide program, and precursor of today's Environmental Remediation and Surveillance (ERS) Program. This program is designed (1) to investigate hazardous and/or radioactive materials that may be present in the environment as a result of past Laboratory operations, (2) to determine if the materials currently pose an unacceptable risk to human health or the environment, and (3) to remediate (clean up, stabilize, or restore) those sites where unacceptable risk is still present.

facility—All contiguous land (and structures, other appurtenances, and improvements on the land) used for treating, storing, or disposing of hazardous waste. A facility may consist of several treatment, storage, or disposal operational units. For the purpose of implementing a corrective action, a facility is all the contiguous property that is under the control of the owner or operator seeking a permit under Subtitle C of the Resource Conservation and Recovery Act.

Hazardous and Solid Waste Amendments (HSWA)—Public Law No. 98-616, 98 Stat. 3221, enacted in 1984, which amended the Resource Conservation and Recovery Act of 1976 (42 United States Code § 6901 et seq).

hazardous constituent (hazardous waste constituent)—According to the March 1, 2005, Compliance Order of Consent (Consent Order), any constituent identified in Appendix VIII of Part 261, Title 40 Code of Federal Regulations (CFR) (incorporated by 20.4.1.200 New Mexico Administrative Code [NMAC]) or any constituent identified in 40 CFR 264, Appendix IX (incorporated by 20.4.1.500 NMAC).

Hazardous Waste Facility Permit—The authorization issued to Los Alamos National Laboratory (the Laboratory) by the New Mexico Environment Department that allows the Laboratory to operate as a hazardous waste treatment, storage, and disposal facility.

HSWA module—See Module VIII.

infiltration—(1) The penetration of water through the ground surface into subsurface soil. (2) The technique of applying large volumes of wastewater to land to penetrate the surface and percolate through the underlying soil.

material disposal area (MDA)—A subset of the solid waste management units at Los Alamos National Laboratory (the Laboratory) that include disposal units such as trenches, pits, and shafts. Historically, various disposal areas (but not all) were designated by the Laboratory as MDAs.

Module VIII—Module VIII of the Los Alamos National Laboratory (the Laboratory) Hazardous Waste Facility Permit. This permit allows the Laboratory to operate as a hazardous-waste treatment, storage, and disposal facility. From 1990 to 2005, Module VIII included requirements from the Hazardous and Solid Waste Amendments. These requirements have been superceded by the March 1, 2005, Compliance Order on Consent (Consent Order).

National Pollutant Discharge Elimination System—The national program for issuing, modifying, revoking and reissuing, terminating, monitoring, and enforcing permits to discharge wastewater or storm water, and for imposing and enforcing pretreatment requirements under the Clean Water Act.

no further action—Under the Resource Conservation and Recovery Act, a corrective-action determination whereby, based on evidence or risk, no further investigation or remediation is warranted.

operable units (OUs)—At Los Alamos National Laboratory, 24 areas originally established for administering the Environmental Remediation and Surveillance Program. Set up as groups of potential release sites, the OUs were aggregated according to geographic proximity for the purposes of planning and conducting Resource Conservation and Recovery Act (RCRA) facility assessments and RCRA facility investigations. As the project matured, it became apparent that there were too many areas to allow efficient communication and to ensure consistency in approach. In 1994, the 24 OUs were reduced to 6 administrative field units.

outfall—A place where effluent is discharged into receiving waters.

permit—An authorization, license, or equivalent control document issued by the U.S. Environmental Protection Agency or an approved state agency to implement the requirements of an environmental regulation.

polychlorinated biphenyls (PCBs)—Any chemical substance limited to the biphenyl molecule that has been chlorinated to varying degrees, or any combination that contains such substances. PCBs are colorless, odorless compounds that are chemically, electrically, and thermally stable and have proven to be toxic to both humans and other animals.

radiation—A stream of particles or electromagnetic waves emitted by atoms and molecules of a radioactive substance as a result of nuclear decay. The particles or waves emitted can consist of neutrons, positrons, alpha particles, beta particles, or gamma radiation.

radioactive material—For purposes of complying with U.S. Department of Transportation regulations, any material having a specific activity (activity per unit mass of the material) greater than 2 nanocuries per gram (nCi/g) and in which the radioactivity is evenly distributed.

radionuclide—Radioactive particle (human-made or natural) with a distinct atomic weight number.

RCRA facility investigation (RFI)—A Resource Conservation and Recovery Act (RCRA) investigation that determines if a release has occurred and characterizes the nature and extent of contamination at a hazardous waste facility. The RFI is generally equivalent to the remedial investigation portion of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process.

release—Any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing of hazardous waste or hazardous constituents into the environment.

Resource Conservation and Recovery Act—The Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act of 1976 (Public Law [PL] 94-580, as amended by PL 95-609 and PL 96-482, United States Code 6901 et seq.).

sample—A portion of a material (e.g., rock, soil, water, or air), which, alone or in combination with other portions, is expected to be representative of the material or area from which it is taken. Samples are typically either sent to a laboratory for analysis or inspection or are analyzed in the field. When referring to samples of environmental media, the term field sample may be used.

site characterization—Defining the pathways and methods of migration of hazardous waste or constituents, including the media affected; the extent, direction and speed of the contaminants; complicating factors influencing movement; or concentration profiles.

soil—(1) A material that overlies bedrock and has been subject to soil-forming processes. (2) A sample media group that includes naturally occurring and artificial fill materials.

solid waste management unit (SWMU)—(1) Any discernible site at which solid wastes have been placed at any time, whether or not the site use was intended to be the management of solid or hazardous waste. SWMUs include any site at a facility at which solid wastes have been routinely and systematically released. This definition includes regulated sites (i.e., landfills, surface impoundments, waste piles, and land treatment sites), but does not include passive leakage or one-time spills from production areas and sites in which wastes have not been managed (e.g., product storage areas). (2) According to the March 1, 2005, Compliance Order on Consent (Consent Order), any discernible site at which solid waste has been placed at any time, and from which the New Mexico Environment Department determines there may be a risk of a release of hazardous waste or hazardous waste constituents (hazardous constituents), whether or not the site use was intended to be the management of solid or hazardous waste. Such sites include any area in Los Alamos National Laboratory at which solid wastes have been routinely and systematically released; they do not include one-time spills.

standard operating procedure—A document that details the officially approved method(s) for an operation, analysis, or action, with thoroughly prescribed techniques and steps.

surface sample—A sample taken at a collection depth that is (or was) representative of the medium's surface during the period of investigative interest. A typical depth interval for a surface sample is 0 to 6 in. for mesa-top locations, but may be up to several feet in sediment-deposition areas within canyons.

target analyte—A chemical or parameter, the concentration, mass, or magnitude of which is designed to be quantified by a particular test method.

technical area (TA)—At Los Alamos National Laboratory, an administrative unit of operational organization (e.g., TA-21).

transport (transportation)—(1) The movement of a hazardous waste by air, rail, highway, or water. (2) The movement of a contaminant from a source through a medium to a receptor.

tuff—Consolidated volcanic ash, composed largely of fragments produced by volcanic eruptions.

U.S. Department of Energy—The federal agency that sponsors energy research and regulates nuclear materials for weapons production.

U.S. Environmental Protection Agency (EPA)—The federal agency responsible for enforcing environmental laws. Although state regulatory agencies may be authorized to administer some of this responsibility, EPA retains oversight authority to ensure the protection of human health and the environment.

A-3.0 METRIC CONVERSION TABLE

Multiply SI (Metric) Unit	by	To Obtain U.S. Customary Unit
kilometers (km)	0.622	miles (mi)
kilometers (km)	3281	feet (ft)
meters (m)	3.281	feet (ft)
meters (m)	39.37	inches (in)
centimeters (cm)	0.03281	feet (ft)
centimeters (cm)	0.394	inches (in)
millimeters (mm)	0.0394	inches (in)
micrometers or microns (µm)	0.0000394	inches (in)
square kilometers (km^2)	0.3861	square miles (mi^2)
hectares (ha)	2.5	Acres
square meters (m^2)	10.764	square feet (ft^2)
cubic meters (m^3)	35.31	cubic feet (ft^3)
kilograms (kg)	2.2046	pounds (lb)
grams (g)	0.0353	ounces (oz)
grams per cubic centimeter (g/cm^3)	62.422	pounds per cubic foot (lb/ft^3)
milligrams per kilogram (mg/kg)	1	parts per million (ppm)
micrograms per gram (µg/g)	1	parts per million (ppm)
liters (L)	0.26	gallons (gal)
milligrams per liter (mg/L)	1	parts per million (ppm)
degrees Celsius (°C)	9/5 + 32	degrees Fahrenheit (°F)

A-4.0 DATA QUALIFIER DEFINITIONS

Qualifier	Explanation
U	The analyte was analyzed for but not detected. Reported value is the sample-specific EQL or detection limit.
J	The reported value should be regarded as estimated.
J+	The reported value should be regarded as estimated and biased high.
J-	The reported value should be regarded as estimated and biased low.
UJ	The analyte was analyzed for but not detected. Reported value is an estimate of the sample-specific quantitation limit or detection limit.
R	The sample results were rejected because of serious deficiencies in the ability to analyze the sample and meet quality control criteria; presence or absence cannot be verified.

Appendix B

Middle Cañada del Buey Aggregate Area Analytical Data
(on CD included with this document)

Media
Target Page

The original media for this document can be obtained through the Records Processing Facility or requested through rpf_records@lanl.gov.

ERID # 098710

OUO: ☐ **Yes** ☒ **No**
UCNI: ☐ **Yes** ☒ **No**

Media Type: CD

Date: OCTOBER 2007

Other Document #(s): LA-UR-07-7039/EP2007-0629

Subject: HISTORICAL INVESTIGATION REPORT FOR MIDDLE CANADA DEL BUEY AGGREGATE AREA.

☒ **Filed in RPF**