ENTERED

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

RECEIVED
SEP 01 2016
NMED
Hazardous Waste Bureau

AUG 29 2016

Colonel Eric H. Froehlich
377 ABW/CC
2000 Wyoming Blvd SE
Kirtland AFB NM 87117-5000

Mr. John Kieling, Bureau Chief
Hazardous Waste Bureau (HWB)
New Mexico Environment Department (NMED)
2905 Rodeo Park Drive East, Building 1
Santa Fe NM 87505-6303

Dear Mr. Kieling

Kirtland Air Force Base (AFB) is formally requesting a Class 3 Permit Modification under 20.4.1.900 New Mexico Administrative Code (NMAC) Incorporating 40 Code of Federal Regulations (CFR) 270.42 (c) to move the following twenty one (21) Solid Waste Management Units (SWMUs) from SWMUs requiring corrective action (Table I-3) to SWMUs for which corrective action is complete without controls (Table K-1):

1. SWMU 10-21-D, Septic System Buildings 750 and 751 (ST-299)
2. SWMU 10-21-M, Septic System Building 37504 (ST-309)
3. SWMU 10-21-N, Septic Systems Buildings 37507, 37508, and 37513 (ST-310/ST-322)
4. SWMU 10-21-O, Septic System Building 37501 and Plant 1 (ST-311)
5. SWMU 10-21-Q, Septic System Buildings 37529 and 37530 (ST-313)
6. SWMU 10-21-R, Septic System Building 37570 (ST-293)
7. SWMU 10-21-U, Septic System Building 37200 (ST-318)
8. SWMU 10-21-V, Septic System Building 37541 (ST-319)
9. SWMU 10-7-V, Oil/Water Separator, Building 57007 (Former ST-267)
10. SWMU 10-21-Z, Building 1032 Septic System (ST-330)
11. SWMU 10-2-A, Corrosion Control Shop, Building 482 Storm Drain (ST-325) and
    SWMU 10-2-F, H-3/H35 Phase Dock, Building 1000 Floor Drains (ST-325)
12. SWMU 10-2-B, Paint Shop, Building 1001 Storm Drain (ST-220) and
    SWMU 10-2-C, Plating and Anodizing, Building 1001 Storm Drain (ST-220)
13. SWMU 10-2-D, Propulsion Branch Floor Drain, Building 336 (ST-329)
14. SWMU 10-2-G, C-130 Maintenance Shop, Building 1009 Storm Sewer (ST-331)
15. SWMU 10-2-H, West Storm Sewer (ST-285)
16. SWMU 10-2-I, East Storm Sewer (ST-286)
17. SWMU DP-67, Three Mine Shafts
18. SWMU RW-68, Radium Dump/Slag Pile and Cratering Area
19. SWMU SS-102, ARES Test Facility
20. SWMU DP-88, Trestle Site Disposal Area
21. SWMU ST-73, CERF Drain

These 21 sites have each met one of the five no further action (NFA) Criteria outlined in Hazardous and Solid Waste Amendments (HSWA)/Corrective Action (CA) Related Permit Modification

KAFB4447

Requests, No Further Action Proposals (3 March 1998). Approval of this request will result in changes only to Tables I-3 and K-1 of the Kirtland AFB Hazardous Waste Treatment Facility Operating Permit No. NM9570024423.

The New Mexico Environment Department (NMED) Hazardous Waste Bureau (HWB) notified Kirtland Air Force Base in formal correspondence or through verbal communication that each of these sites may be suitable for NFA status. If formal correspondence was received, copies of the notification letters are provided in Attachment 1 to this request. Provided in Attachment 2 to this request are the Draft Statements of Basis for the 21 sites. The Draft Statements of Basis summarize the history, investigative and corrective action activities performed at each site, the results of any risk assessments completed, and which of the NFA criteria apply to each site.

The Public Notice of the Permit Modification was published in the legal section of the Albuquerque Journal on 30 September 2012, refer to Attachment 3. Letters containing the Public Notice information were mailed to the names on NMED's mailing list for Kirtland AFB on 1 October 2012. Copies of this request and supporting documents were available in the public reading room at the Central New Mexico Community College Montoya Campus Library Reference Desk, 4700 Morris NE, Albuquerque, NM 87111, (505) 224-5730 an on the Kirtland AFB web page at www.kirtland.af.mil under the "Environmental Issues" section.

A 60-day public comment period, as noted in Attachment 3, was held from 1 October 2012 and ended 30 November 2012. No public comments were received by Kirtland AFB. Kirtland AFB held a public presentation and a poster session for the NFA sites on 23 October 2012 from 6:00 to 8:00 pm at the Cesar Chavez Community Center, 7505 Kathryn SE, Albuquerque, New Mexico. A copy of the Notice of Public Meeting legal ad and Public Meeting Attendance Sheets can be found in Attachment 4.

If you have any question or concerns, please contact Mr. Wayne Bitner at (505) 853-3484 or at ludie.bitner@us.af.mil.

Sincerely

ERIC H. FROEHLICH, Colonel, USAF
Commander

Attachment:
Official Notification that SWMUs are Appropriate for NFA Petition
Draft Statement of Basis
Class 3 Permit Petition Legal Advertisement
Public Meeting Legal Advertisement and Attendance List

cc:
NMED-EHD (Roberts), letter/CD
NMED-HWB (Agnew, Cobrain, Davidson), letter/CD
EPA Region 6 (King, Ellinger), letter/CD
AFCEC/CZ (Renaghan, Bodour, Clark), letter only
Public Info Repository, Administrative Record/Information Repository (AR/IR) and File

Official Notification that Solid Waste Management Units are Appropriate for No Further Action Petition

ATTACHMENT 1

AR Doc # 3559

NEW MEXICO ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

BILL RICHARDSON
Governor

DIANE DENISH
Lieutenant Governor

2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303
Phone (505) 476-6000 Fax (505) 476-6030
www.nmenv.state.nm.us

RON CURRY
Secretary

JON GOLDSTEIN
Deputy Secretary

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

March 11, 2008

Mr. John Pike
Director, Environmental Management Section
377th MSG / CEANR
2050 Wyoming Blvd. SE, Suite 116
Kirtland Air Force Base, NM 87117-5270

RE: ACCELERATED CORRECTIVE MEASURES REPORT FOR SOLID WASTE MANAGEMENT UNIT ST-73, SEPTEMBER 2007
KIRTLAND AIR FORCE BASE, EPA ID# NM9570024423
HWB-KAFB-07-018

Dear Mr. Lanz:

New Mexico Environment Department has reviewed the subject report and has determined that Solid Waste Management Unit ST-73 is suitable for a No Further Action (NFA) petition. Therefore, KAFB may propose this site for NFA based on NMED's NFA Criterion 5: the SWMU has been characterized or remediated in accordance with current applicable state or federal regulations, and the available data indicate that contaminants pose an acceptable level of risk under current and projected future land use.

If you have any questions regarding this matter, please contact William McDonald of my staff at (505) 222-9582.

Sincerely,

John E. Kieling
Program Manager
Permits Management Program
Hazardous Waste Bureau

cc: J. Kieling, NMED, HWB
W. Moats, NMED, HWB
L. King, EPA-Region 6 (6PD-N)
File: Reading and KAFB 2008
HWB-KAFB-07-018

AR Doc #3573
LWB, 8-15-2011

NEW MEXICO
ENVIRONMENT DEPARTMENT

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BILL RICHARDSON
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DIANE DENISH
Lieutenant Governor

RON CURRY
Secretary

SARAH COTTRELL
Deputy Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

November 10, 2010

Mr. Wayne Bitner
Chief, Restoration Section
377th CES / CEVR
2050 Wyoming Blvd. SE, Suite 118
Kirtland Air Force Base, NM 87117-5270

RE: RESOURCE CONSERVATION AND RECOVERY ACT FACILITY INVESTIGATION AND VOLUNTARY CORRECTIVE MEASURES REPORT FOR SOLID WASTE MANAGEMENT UNIT SS-102, ARES TEST FACILITY, BUILDING 20754, DECEMBER 2009
KIRTLAND AIR FORCE BASE, EPA ID# NM9570024423
HWB-KAFB-10-027

Dear Mr. Bitner:

The New Mexico Environment Department (NMED) has reviewed the *Resource Conservation and Recovery Act Facility Investigation and Voluntary Corrective Measures Report for Solid Waste Management Unit SS-102, ARES Test Facility, Building 20754,* dated December 2009. This report summarizes past investigations, details removal of dielectric oil and polychlorinated biphenyl contaminated soils at solid waste management unit (SWMU) SS-102, and presents the results of confirmatory sampling.

NMED agrees that SS-102 passes residential risk screening and that the SWMU is suitable for petition for No Further Action. The subject report is hereby approved.

If you have any questions regarding this letter, please contact William McDonald at (505) 222-9582.

Sincerely,

John E. Kieling
Program Manager
Permits Management Program
Hazardous Waste Bureau

cc: W. McDonald, NMED HWB
File: KAFB 2010 and Reading
KAFB-10-027

W.B.
10/9/2008
AR Doc # 3316

NEW MEXICO ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

BILL RICHARDSON
Governor

DIANE DENISH
Lieutenant Governor

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RON CURRY
Secretary

JON GOLDSTEIN
Deputy Secretary

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

March 11, 2008

Mr. John Pike
Director, Environmental Management Section
377th MSG / CEANR
2050 Wyoming Blvd. SE, Suite 116
Kirtland Air Force Base, NM 87117-5270

RE: SOLID WASTE MANAGEMENT ASSESSMENT REPORT FOR INVESTIGATIONS AT SITE RW-068, JUNE 2007 KIRTLAND AIR FORCE BASE, EPA ID# NM9570024423 KAFB-07-013

Dear Mr. Lanz:

New Mexico Environment Department Personnel have reviewed the subject report and have found it acceptable.

KAFB may propose this site for No Further Action (NFA) based on NMED's NFA Criterion 5: that the SWMU has been characterized or remediated in accordance with current applicable state or federal regulations, and the available data indicate that the remaining contaminants pose an acceptable level of risk under current and projected land use.

If you have any questions please contact Mr. William McDonald of my staff at (505) 222-9582.

Sincerely,

John E. Kieling
Program Manager
Permits Management Program
Hazardous Waste Bureau

cc: W. Moats, NMED HWB
W. McDonald, NMED HWB
L. King, EPA 6PD-N
File: Reading and KAFB 2008
KAFB-07-013

W.B
4-3-09
Ac Doc
3356

NEW MEXICO ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

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RON CURRY
Secretary

JON GOLDSTEIN
Deputy Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

October 3, 2008

Mr. Wayne Bitner
Chief, Restoration Section
377th MSG / CEANR
2050 Wyoming Blvd. SE, Suite 118
Kirtland Air Force Base, NM 87117-5270

RE: ACCELERATED CORRECTIVE MEASURES REPORT FOR SOLID WASTE MANAGEMENT UNIT DP-88, TRESTLE SITE DISPOSAL AREA, APRIL 2008 KIRTLAND AIR FORCE BASE, EPA ID# NM9570024423 KAFB-08-018

Dear Mr. Bitner:

New Mexico Environment Department Personnel have reviewed the subject report and have found it acceptable. Kirtland AFB may now propose that DP-88 proceed through the No Further Action process based on Criterion 5: "The SWMU has been characterized or remediated in accordance with current applicable state or federal regulation, and the available data indicate that contaminants pose an acceptable level of risk under current and projected future land use."

If you have any questions please contact Mr. William McDonald of my staff at (505) 222-9582.

Sincerely,

John E. Kieling
Program Manager
Permits Management Program
Hazardous Waste Bureau

JEK:wsm

cc: W. Moats, NMED HWB
W. McDonald, NMED HWB
L. King, EPA 6PD-N
File: Reading and KAFB 2008
KAFB-08-018

W.B
C-309
AR Doc# 33B

NEW MEXICO
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

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RON CURRY
Secretary

JON GOLDSTEIN
Deputy Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

October 22, 2008

Mr. Wayne Bitner
Chief, Restoration Section
377 MSG/CEANR
2050 Wyoming Blvd., Suite 118
Kirtland AFB, NM 87117-5270

RE: RESOURCE CONSERVATION AND RECOVERY ACT FACILITY INVESTIGATION REPORT FOR SOLID WASTE MANAGEMENT UNIT 10-7-V, OIL/WATER SEPARATOR, BUILDING 57007 (FORMER ST-267), MARCH 2008
KIRTLAND AIR FORCE BASE, EPA ID# NM9570024423
KAFB-08-012

Dear Mr. Bitner:

The New Mexico Environment Department has reviewed the subject report and found it acceptable. Solid Waste Management Unit 10-7-V (ST-267) may be proposed for No Further Action based on criterion 5: The SWMU has been characterized or remediated in accordance with current applicable state or federal regulations, and the available data indicate that contaminants pose an acceptable level of risk under current and projected future land use.

If you have any questions please contact Mr. William McDonald of my staff at (505) 222-9582.

Sincerely,

John E. Kieling
Program Manager
Permits Management Program
Hazardous Waste Bureau

cc: W. Moats, NMED HWB
W. McDonald, NMED HWB
L. King, EPA 6PD-N
File: Reading and KAFB 2008
KAFB-08-012

Draft Statements of Basis

ATTACHMENT 2

Statements of Basis

Kirtland Air Force Base
Request for Approval of No Further Action for
21 Solid Waste Management Units

RCRA Permit No. NM9570024423

1 July 2013

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ACRONYMS AND ABBREVIATIONS

µg/kg	microgram(s) per kilogram
ACM	Accelerated Corrective Measures
AFB	Air Force Base
AOC	Area of Concern
ARES	Advanced Research Electromagnetic Simulator
AST	aboveground storage tank
bgs	below ground surface
BOP	Blast Overpressure
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act*
CERF	Civil Engineering Research Facility
CMS	Corrective Measures Study
COPC	contaminant of potential concern
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethene
DDT	dichlorodiphenyltrichloroethane
DRO	diesel range organics
EOD	Explosive Ordnance Disposal
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
ERP	Environmental Restoration Program
ft	foot(feet)
GEMS	Geographic Environmental Management System
GRO	gasoline range organics
HE	high explosives
HHRB	human health risk-based
HAS	hollow-stem auger
HSWA	Hazardous and Solid Waste Amendments
ICM	Interim Corrective Measure
J	estimated value (analyte positively detected below the analytical reporting limit)
KAFB	Kirtland Air Force Base
lbs	pounds
MDL	method detection limit
mg/kg	milligram(s) per kilogram
mg/L	milligram(s) per liter
MWSA	Manzano Weapons Storage Area

ACRONYMS AND ABBREVIATIONS (Concluded)

NFA	no further action
NMAC	New Mexico Administrative Code
MD	munitions debris
MEC	munitions and explosives of concern
NMED	New Mexico Environment Department
NMEID	New Mexico Environmental Improvement Division
OCP	organochlorine pesticides
OWS	oil/water separator
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCO	Post-Closure Operations
PID	photoionization detector
PMSL	primary mine shaft location
ppm	part(s) per million
PSH	phase-separated hydrocarbon
PVC	polyvinyl chloride
RCRA	*Resource Conservation and Recovery Act*
RESRAD	residual radioactive materials
RFI	RCRA Facility Investigation
SAR	Solid Waste Management Unit Assessment Report
SOR	Starfire Optical Range
SSL	soil screening level
SVOC	semivolatile organic compound
SWMU	solid waste management unit
TAL	Target Analyte List
TCLP	toxicity characteristic leaching procedure
TOC	total organic carbon
TOX	total organic halogens
TRPH	total recoverable petroleum hydrocarbons
TPH	total petroleum hydrocarbons
USAF	U.S. Air Force
UXO	unexploded ordnance
VOC	volatile organic compound
WW II	World War II
yd^3	cubic yard(s)

Statements of Basis

Approval of No Further Action for
Solid Waste Management Units

(RCRA Permit No. NM9570024423)

The New Mexico Environment Department (NMED) has determined that 21 solid waste management units (SWMUs) currently listed on the Hazardous and Solid Waste Amendments (HSWA) Permit, Module IV, Section E of the Kirtland Air Force Base (AFB) *Resource Conservation and Recovery Act* (RCRA) Hazardous Waste Management Facility Permit (NM9570024423) issued to Kirtland AFB in July 2010 may be appropriate for No Further Action (NFA) status. Kirtland AFB submitted a request to the NMED for a Class 3 Permit Modification to officially designate the 21 SWMUs as appropriate for NFA. These Statements of Basis provide a summary of the 21 sites that are included in the Permit Modification request.

A. Facility Description

Kirtland AFB is located in Albuquerque, Bernalillo County, New Mexico. The facility lands cover 52,223 acres in the old floodplain approximately 5 miles east of the Rio Grande.

B. History of Investigation

The U.S. Environmental Protection Agency (EPA) and New Mexico Environmental Improvement Division (NMEID) (now known as NMED) jointly issued Kirtland AFB's Hazardous Waste Permit in October 1990. In January 1996, the NMED received authorization for corrective action under the HSWA and became the administrative authority for the RCRA permit. The permit was renewed by the NMED in July 2010. One module of the permit, Module IV, Special Conditions Pursuant to the 1984 HSWA to RCRA, concerns the investigation of SWMUs. The HSWA Permit requires Kirtland AFB to determine whether or not there have been any releases of hazardous waste from any SWMU and to take appropriate corrective measures for any such releases.

These Statements of Basis describe 21 of the sites that were identified as "potentially appropriate for NFA." In summary, when Kirtland AFB's request for a permit modification is approved by NMED, these 21 sites will be listed in Module IV as being approved for NFA.

C. Investigation Results

The NFA determinations have been based upon the five NFA Criteria provided by NMED (Section II.B.4.a (4)(b), Page 1, 3 March 1998). These criteria are:

- The SWMU cannot be located, does not exist, or is a duplicate SWMU.
- The SWMU has never been used for the management (i.e., generation, treatment, storage, and/or disposal) of RCRA solid waste or hazardous wastes and/or constituents or other *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) hazardous substances.
- No release to the environment has occurred or is likely to occur in the future from the SWMU.

- A release from the SWMU to the environment occurred, but the SWMU was characterized and/or remediated under another authority (such as the NMED's Petroleum Storage Tank or Ground Water Quality Bureaus), which adequately addressed RCRA corrective action, and documentation, such as a closure letter, is available.

- The SWMU has been characterized or remediated in accordance with current applicable state or federal regulations, and the available data indicate that contaminants pose an acceptable level of risk under current and projected future land use.

Section I briefly describes the locations, history, evaluations of relevant information, and the bases for determination for each of the 21 sites proposed for NFA. More detailed descriptions of the particulars for each site can be found in the original referenced documents.

D. Permit Modification

A copy of the public notice, the Statement of Basis for each site, and the applicable supporting documents were made available at the following locations during the 60-day comment period beginning Monday, 1 October 2012.

Central New Mexico Community College
Montoya Campus Library Reference Desk
4700 Morris NE
Albuquerque, NM 87111
(505) 224-5730

Kirtland Air Force Base Web Site
www.kirtland.af.mil

E. Selected Remedy

The NMED's determination that NFA status is considered appropriate at these sites is based on one or more of the following: field surveys, historical records, aerial photographs, employee interviews, and/or confirmatory sampling activities. The results of these activities indicate that these SWMUs do not pose a threat to human health or the environment. Each site proposed for NFA is described under the applicable NFA criteria discussed in Section I.

F. Public Participation

Kirtland AFB issued a Public Notice on Sunday, 30 September 2012, informing the public that a petition was submitted to NMED requesting NFA status for 21 SWMUs. The Public Notice specified that Kirtland AFB accepted comments on the petition during the 60-day comment period, ending 30 November 2012. The Notice also stated that information on each of the 21 SWMUs would be presented in a public presentation on 23 October 2012.

G. Next Steps

At the close of the 60-day comment period, NMED will issue a Public Notice of a 45-day comment period during which NMED will accept comments on the proposed changes to the status of the 21 sites. After the close of the 45-day comment period, NMED will make a final decision, which will become effective 30 days after service of the decision unless a later date is specified or unless review is requested

under the New Mexico Hazardous Waste Management Regulations, 20 New Mexico Administrative Code (NMAC) 4.1, Subpart IX.

H. Contact Person for Additional Information

For additional information, contact the following individual:

Mr. Ludie W. Bitner
Chief, Restoration Section
377 MSG/CEANR
2050 Wyoming Blvd SE, Suite 118
Kirtland AFB, NM 87117-5270
(505) 853-3484

I. Description of Solid Waste Management Units Proposed for No Further Action

The descriptions for each of the 21 sites being proposed for NFA are presented in the following sections.

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I-1. SWMU 10-21-D, Septic System Buildings 750 and 751 (ST-299)

Location and Current Land Use

Solid Waste Management Unit (SWMU) 10-21-D (ST-299) is located 218 feet (ft) south of Building 750, a guard house, and 400 ft southwest of Building 751, an ammunition storage facility, in the northwest portion of Kirtland Air Force Base (AFB). The site is located in the Kirtland AFB urban/industrial land use area. Based on engineering drawings, inflow and outflow line lengths to the septic tank are approximately 650 ft and 15 ft, respectively, from Building 751. The septic tank discharges to a 50-ft-by-60-ft leach field to the east. The location of ST-299 is shown in Figure I-1 (United States Air Force [USAF], 1995).

Projected Future Land Use

According to the Kirtland AFB *Land Use Management Plan* (USAF, 2002), there are no proposed changes for the land use at SWMU 10-21-D (ST-299). However, due to New Mexico Environment Department's (NMED) regulatory requirements, a residential land use scenario was used for all risk-based screening assessments.

Site History

Building 751 was constructed in 1960 as a munitions storage facility and continues to serve in this capacity. Listed activities in this building have included munitions assembly, rocket propellant processing, and rocket assembly and storage. Tenants have included the New Mexico Air National Guard and the Air Force Weapons Laboratory. An as-built drawing of Building 751 shows that the sanitary sewer connection to SWMU 10-21-D (ST-299) serves as a small bathroom (toilet, urinal, and sink), water cooler, service (janitor) sink, and evaporative cooler.

Another line labeled "industrial waste" leaves the building on the west side and, approximately 30 ft from the building, abruptly turns south. Three floor drains lead into the industrial waste line: two are located in the assembly/storage area and one is located in the boiler room that also houses a diesel engine generator and a 120-gallon fuel oil day tank. The industrial waste line is not connected to the septic system and, based on engineering drawings, appears to empty into the surface stormwater drainage south of the facility.

Building 750 was constructed in 1960 as a security police guard house and served as an entry control point to the munitions area until 1978. It is currently listed as a munitions maintenance administration building. An as-built drawing of Building 750 shows that the septic system (ST-299) is connected to a bathroom (toilet, urinal, and sink) and to a floor drain located in a small boiler room. A sump pump is shown connected to the Building 750 sanitary sewer line emanating from a cable vault located in the northeast corner of the building. The sump pump dewatered accumulated stormwater from the 6½-ft-deep subsurface vault used to store telephone communication cables.

In summary, SWMU 10-21-D (ST-299) serves the bathrooms and boiler/equipment rooms of Buildings 750 and 751. The industrial waste line previously mentioned serving Building 751 is not connected to SWMU 10-21-D.

Geology and Hydrogeology

The SWMU 10-21-D (ST-299) area is underlain by unconsolidated alluvial sediment and falls within the North Soil Super Group as defined by the Sandia National Laboratories/NMED background study

(NMED, 1997). Depth to groundwater is estimated to be about 450 ft below ground surface (bgs), but shallower perched zones may occur (USAF, 1995). Regional groundwater flow is to the north. The nearest production wells are KAFB-2 (1,000 ft downgradient northwest of the site) and KAFB-7 (3,650 ft east-northeast of the site).

Previous Investigations

1995 *Appendix III Resource Conservation and Recovery Act* (RCRA) *Facility Investigation* (RFI)
SWMU 10-21-R was investigated as part of the *Appendix III RFI* in 1995 (USAF, 1995). On February 21, 1995, four boreholes were drilled and sampled using direct push drilling methods. One borehole was drilled northwest of the leach field area to collect background data for the site and three boreholes were drilled in the leach field area. Soil samples were collected from depths of 3 ft to 5 ft bgs based on engineering drawings, which indicated the leach field lines were at a depth of 3 ft bgs. Each 2-ft sample interval was field-screened for possible contamination using a beta-gamma meter and a flame ionization detector. No elevated readings were detected with these instruments. No other investigations have been performed at this site.

Four soil samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), total petroleum hydrocarbons (TPH), metals, mercury, soil pH, and soil moisture.

The analytical results of the 1995 RFI were compared to current NMED human health risk-based (HHRB) residential soil screening level (SSLs) (NMED, 2006a), NMED TPH screening guidelines (NMED, 2006b), and NMED-approved background concentrations (NMED, 1997). The analytical results of the 1995 RFI are summarized as follows:

- No VOCs were detected in any of the soil samples submitted for analysis.
- One SVOC, di-n-butyl phthalate (2.5 to 3.1 milligrams per kilogram [mg/kg]), was detected at a concentration significantly below the current NMED HHRB residential SSL.
- No TPH were detected in any samples.
- Arsenic (1.6 to 3.2 mg/kg) was detected at a concentration below the NMED-approved background concentration of 4.4 mg/kg.
- Iron (18,000 to 23,900 mg/kg) was detected at concentrations slightly above the NMED HHRB residential SSL of 23,500 mg/kg, but significantly below the industrial SSL of 100,000 mg/kg. There is no NMED-approved background concentration for iron at Kirtland AFB.
- The metals barium (85.6 to 201 mg/kg); beryllium (0.54 to 1.4 mg/kg); cadmium (0.93 to 0.95 mg/kg); cobalt (9.2 to 11.9 mg/kg); copper (30.3 to 88.2 mg/kg); lead (5.6 to 11.2 mg/kg); mercury (0.12 mg/kg); vanadium (39.9 to 49.0 mg/kg); and zinc (41.3 to 81.6 mg/kg) were detected at concentrations above NMED-approved background levels, but below current NMED HHRB residential SSLs.

All detected levels of analyzed constituents were below current NMED residential SSLs or represent concentrations of metals that are consistent with naturally occurring levels throughout Kirtland AFB and are not the result of past activities at the site. This site does not pose an unacceptable risk to human health or the environment.

Basis of Determination

On October 4, 2006 personnel from the NMED Hazardous Waste Bureau inspected the site with a representative of Kirtland AFB Environmental Restoration Program and agreed that SWMU 10-21-D (ST-299) may be suitable for No Further Action (NFA) status and subsequent removal from the Kirtland AFB RCRA Hazardous Waste Permit. This request for NFA status is based on NMED's NFA Criterion 3: No release from the SWMU to the environment has occurred or is likely to occur in the future.

References

NMED, 2006a. Technical Background Document for Development of Soil Screening Levels. New Mexico Environment Department Hazardous Waste Bureau and Groundwater Quality Bureau Voluntary Remediation Program. June 2006 update (Revision 4.0) of February 2004 document.

NMED, 2006b. *New Mexico Environment Department TPH Screening Guidelines*. New Mexico Environment Department. Santa Fe, New Mexico. October.

USAF, 2002. *Land Use Management Plan*. U.S. Air Force, Kirtland Air Force Base, New Mexico.

NMED, 1997. Hazardous Waste Bureau (formerly Hazardous and Radioactive Materials Bureau), Approved Background Concentrations, Sandia National Laboratories/Kirtland Air Force Base, New Mexico.

USAF, 1995. *Draft Final RCRA Facility Investigation Report, Appendix III Wasteline Sites, October*. Halliburton NUS Corporation, Albuquerque, New Mexico.

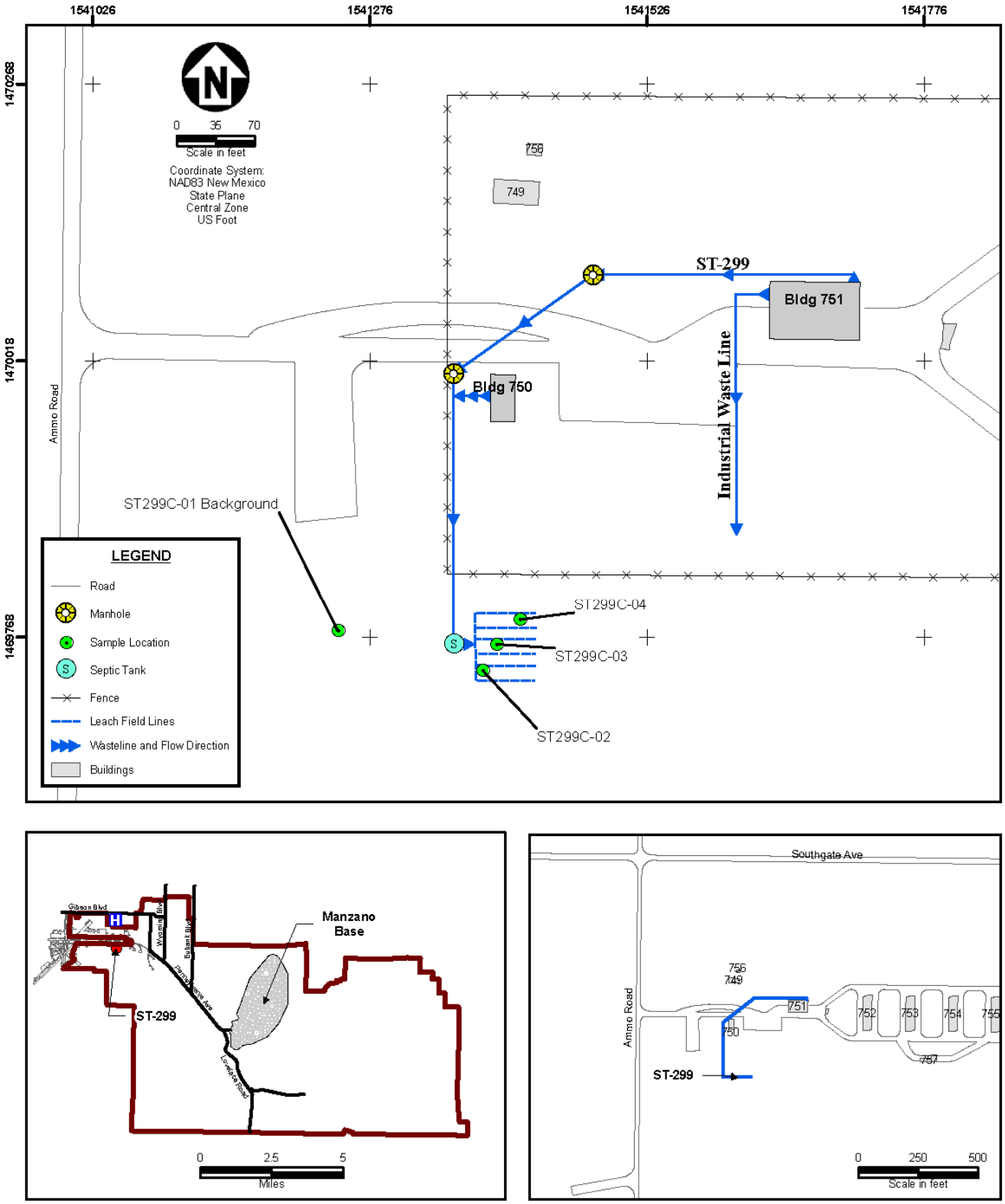

Figure I-1. RCRA Facility Investigation Sample Locations at SWMU 10-21-D, Building 750/751 Septic Tank, Leach Field, and Lines (ST-299), Kirtland Air Force Base, New Mexico

I-2. SWMU 10-21-M, Septic System Building 37504 (ST-309)

Location and Current Land Use

Solid Waste Management Unit (SWMU) 10-21-M (ST-309) is located 45 feet (ft) west-northwest of Buildings 37504, an electrical maintenance shop located inside the former Manzano Weapons Storage Area (MWSA), in the central portion of Kirtland Air Force Base (AFB). The septic tank, distribution box, and leach field were excavated and removed in 1995. Based on engineering drawings, inflow and outflow line lengths were approximately 75 ft and 10 ft, respectively. The tank discharged to a leach field to the northwest with a drainage area of approximately 80 ft by 40 ft. The site is located on the MWSA and is therefore outside of the Kirtland AFB urban/industrial land use area. The former location of SMWU 10-21-M is shown in Figure I-2 (United States Air Force [USAF], 1995a).

Projected Future Land Use

According to the Kirtland AFB *Land Use Management Plan* (USAF, 2002), there are no proposed changes for the land use at ST-309. However, due to New Mexico Environment Department's (NMED) regulatory requirements, a residential land use scenario was used for all risk-based screening assessments.

Site History

According to the Kirtland AFB Cultural-Historic Building Survey, Geographic Environmental Management System (GEMS) database (USAF, 2001), Building 37504 was built in 1951 as an electrical maintenance shop designed to provide maintenance and service to communications systems supporting missile sites. Drawings show that Building 37505, a utility building, was also connected to SWMU 10-21-M. The GEMS database indicates that Building 37505, also built in 1951, was a heating oil plant that supplied heat for the warehouse area inside the MWSA. A tall brick stack (approximately 30 ft tall) remains immediately north of Building 37505 and may have been associated with the heating oil function of the building. After excavation of the septic system in 1995, the buildings were connected to a sanitary sewer system serving the entire western portion of the MWSA. A copy of a Department of the Air Force Notification of Demolition (USAF, 1995b), listing the septic system serving Building 37504, is attached to this document along with a copy of a pre-demolition plan for the facility.

Geology and Hydrogeology

The area is underlain by unconsolidated alluvial sediment and falls within the Tijeras Soil Super Group as defined by the Sandia National Laboratories/NMED background study (NMED, 1997). Depth to groundwater is estimated to be about 320 ft below ground surface (bgs) (USAF, 1995a). The site is in an area that straddles the Tijeras/Hubbell Springs/Sandia Fault complex, and little is known about groundwater flow in this region.

Previous Investigations

1994 *Manzano Weapons Storage Area Septic Tank Drain Field Soil Investigation*
The *MWSA Septic Tank Drain Field Soil Investigation* was conducted to determine if the septic tanks and drain fields in the MWSA could be excavated without exposing construction crews to potential contaminants and to allow for proper disposal of construction excavation soils and debris (USAF, 1994).

On February 11, 1994, two soil borings were drilled to depths of 10 ft bgs. One boring was placed near the outlet of the septic tank and a second boring was placed near the middle of the leach field. A grab sample of soil was collected from a depth of 3 ft bgs and field-screened for possible contamination using an organic vapor meter and a radiological (alpha, beta, and gamma) meter. No elevated readings were detected with these instruments. An additional grab sample collected from 3 ft bgs was analyzed for volatile organic compounds (VOCs) by an offsite laboratory. A composite sample was collected from an interval between 4 ft and 10 ft bgs. This composite sample was analyzed for Target Analyte List (TAL) metals, semivolatile organic compounds (SVOCs), high explosives (HE), and total recoverable petroleum hydrocarbons (TRPH). A discrete sample was collected for geotechnical analysis including grain size, moisture content, and Atterberg limits.

The analytical results of the 1994 MWSA investigation were compared to current NMED human health risk-based (HHRB) residential soil screening levels (SSLs) (NMED, 2006a), NMED total petroleum hydrocarbons (TPH) screening guidelines (NMED, 2006b), and NMED-approved background concentrations (NMED, 1997). The analytical results are summarized as follows:

- No VOCs or SVOCs were detected above the laboratory quantitation limit in any of the soil samples submitted for analysis.

- No HE were detected above the laboratory quantitation limit in any of the soil samples submitted for analysis.

- TRPH (13.0 milligrams/kilogram [mg/kg]) was detected at a concentration significantly below the current NMED residential screening guideline of 520 mg/kg.

- Arsenic (3.67 to 5.87 mg/kg) was detected at concentrations above the NMED-approved background concentration of 4.4 mg/kg and above the current NMED HHRB residential SSL of 3.9 mg/kg.

- Copper (15.0 to 20.0 mg/kg) and vanadium (33.0 to 43.8 mg/kg) were detected at concentrations above their respective NMED-approved background concentrations, but below current NMED HHRB residential SSLs.

1995 *Appendix III Resource Conservation and Recovery Act* (RCRA) *Facility Investigation* (RFI)
SWMU 10-21-M was investigated as part of the *Appendix III RFI* in 1995 (USAF, 1995a). On March 15, 1995, four boreholes were drilled and sampled using a direct push drilling methods. One borehole was drilled northeast of the leach field area to collect background data for the site and three boreholes were drilled in the leach field area. Soil samples were collected from depths of 4 to 10 ft bgs. Each 2-ft sample interval was field-screened for possible contamination using a beta-gamma meter and a flame ionization detector. No elevated readings were detected with these instruments.

Four soil samples were analyzed for VOCs, SVOCs, TPH, metals, mercury, soil pH, and soil moisture.

The analytical results of the 1995 RFI were compared to current NMED residential HHRB SSLs (NMED, 2006a), NMED TPH screening guidelines (NMED, 2006b), and NMED-approved background concentrations (NMED, 1997). The analytical results are summarized as follows:

- No VOCs were detected in any of the soil samples submitted for analysis.

- The SVOC di-n-butyl phthalate (1.2 to 1.8 mg/kg) was detected, but at a concentration significantly below the current NMED HHRB residential SSL for this compound.

- No TPH were detected in any samples.

- Arsenic (3.2 to 7.9 mg/kg) was detected at concentrations above the NMED-approved background concentration of 4.4 mg/kg and above current HHRB residential SSL of 3.9 mg/kg.

- Barium (71.6 to 301 mg/kg); cadmium (0.51 to 0.91 mg/kg); copper (144 to 928 mg/kg); nickel (6.5 to 74.2 mg/kg); silver (38.9 mg/kg); vanadium (41.3 to 60.0 mg/kg); and zinc (64 to 306 mg/kg) were detected at concentrations above their respective NMED-approved background concentrations, but below current HHRB residential SSLs.

All detected levels of analyzed constituents were below NMED HHRB residential SSLs or represent concentrations of metals that are naturally occurring throughout Kirtland AFB. Naturally occurring arsenic are commonly detected throughout Kirtland AFB at concentrations that exceed NMED HHRB residential SSLs (NMED, 2006a). This site does not pose an unacceptable risk to human health or the environment.

Basis of Determination

On October 4, 2006, the NMED Hazardous Waste Bureau visited the site with a representative of the Kirtland AFB Environmental Restoration Program and agreed that SWMU 10-21-M (ST-309) may be suitable for No Further Action (NFA) status and subsequent removal from the Kirtland AFB RCRA Hazardous Waste Permit. This request for NFA status is based on NMED's NFA Criterion 3: No release from the SWMU to the environment has occurred or is likely to occur in the future.

References

NMED, 2006a. *Technical Background Document for Development of Soil Screening Levels*. New Mexico Environment Department Hazardous Waste Bureau and Groundwater Quality Bureau Voluntary Remediation Program. June 2006 update (Revision 4.0) of February 2004 document.

NMED, 2006b. *New Mexico Environment Department TPH Screening Guidelines*. New Mexico Environment Department. Santa Fe, New Mexico. October.

NMED, 1997. Hazardous Waste Bureau (formerly Hazardous and Radioactive Materials Bureau), Approved Background Concentrations, Sandia National Laboratories/Kirtland Air Force Base, New Mexico.

USAF, 2002. *Land Use Management Plan*. U.S. Air Force, Kirtland Air Force Base, New Mexico.

USAF, 2001. Kirtland Air Force Base Cultural-Historic Building Survey, Geographic Environmental Management System (GEMS) database.

USAF, 1995a. *Draft Final RCRA Facility Investigation Report, Appendix III Wasteline Sites, October*. Halliburton NUS Corporation, Albuquerque, New Mexico.

USAF, 1995b. Memorandum. Nancy Long, 377 CEG/CERR, Kirtland Air Force Base. 02 November 1995. Subject: Notification of Demolition, MHMV 891043, Remove Septic Tanks – Manzano Area. Daniel Yocum, Project Engineer, 377 CEG/CECA, Kirtland Air Force Base. November.

USAF, 1994. *Final Data Analysis Report, Military Civil HTW Projects for USACE, Omaha District, Manzano Weapons Storage Area Septic Tank Drain Field Soil Investigations, November*. CDM Federal Programs Corporation, Albuquerque, New Mexico.

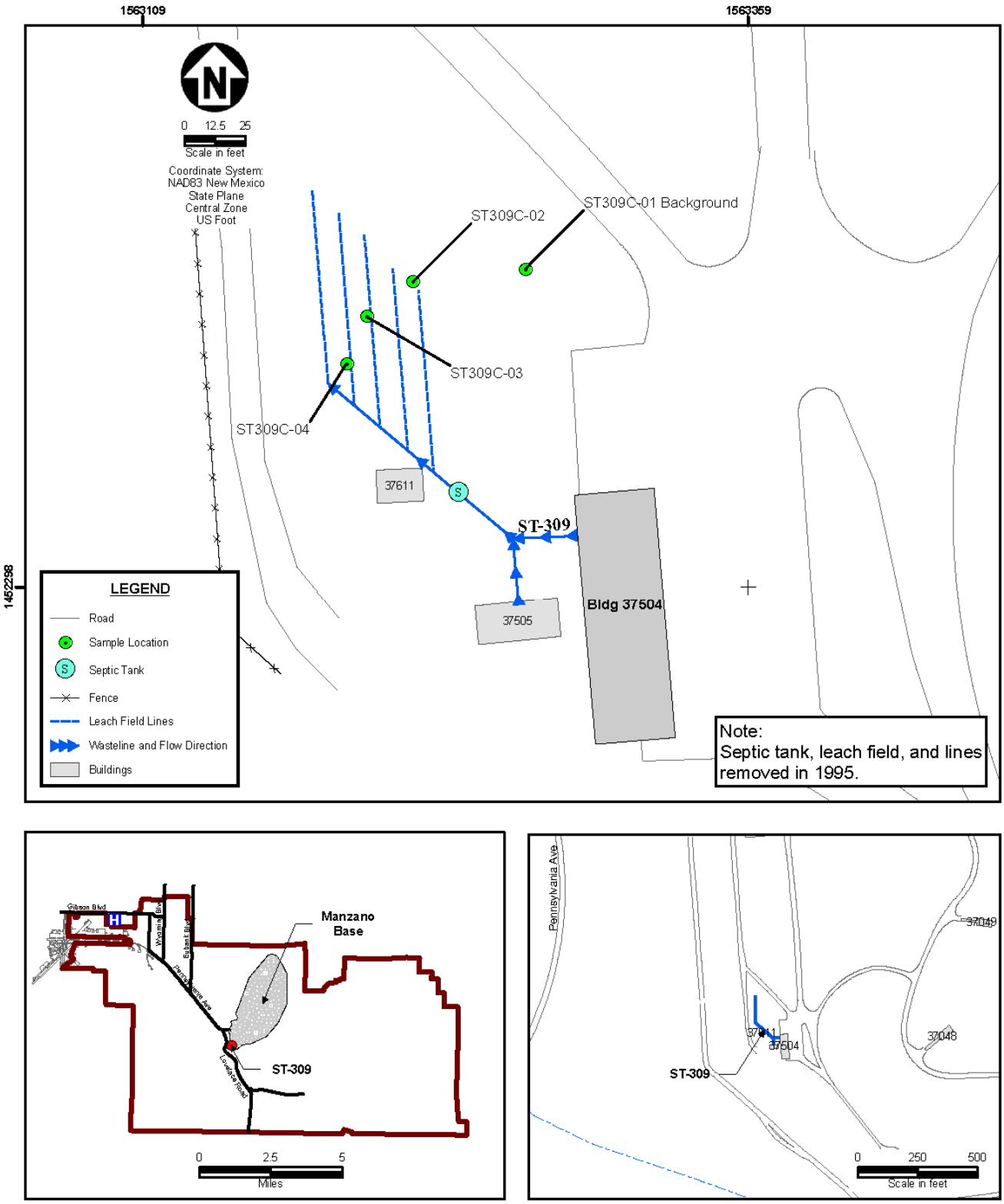

Figure I-2. RCRA Facility Investigation Sample Locations at SWMU 10-21-M, Building 37504/37505, Septic Tank, Leach Field, and Lines (ST-309), Kirtland Air Force Base, New Mexico

I-3. SWMU 10-21-N, Septic Systems Buildings 37507, 37508, 37513 (ST-310/ST-322)

Location and Current Land Use

Solid Waste Management Unit (SWMU) 10-21-N (ST-310/ST-322) is located west of Buildings 37507, 37508, and 37513, warehouse and office space inside the former Manzano Weapons Storage Area (MWSA), in the central portion of Kirtland Air Force Base (AFB). SWMU 10-21-N consisted of side-by-side septic tanks, distribution boxes, and a common leach field, all of which were excavated and removed from the site in 1995. Because these buildings are located inside the MWSA, they are outside of the Kirtland AFB urban/industrial land use area. The facilities are still being used as storage and office space. The location of SWMU 10-21-N is shown in Figure I-3 (United States Air Force [USAF], 1995a).

Projected Future Land Use

According to the Kirtland AFB *Land Use Management Plan* (USAF, 2002), there are no proposed changes for the land use at SWMU 10-21-N. However, due to New Mexico Environment Department's (NMED) regulatory requirements, a residential land use scenario was used for all risk-based screening assessments.

Site History

Building 37507 was constructed in 1953 as a supply service administration office according to the Kirtland AFB Cultural-Historic Building Survey, Geographic Environmental Management System (GEMS) database (USAF, 2001). Engineering drawings refer to Building 37507 as the "Base Spares Office."

The GEMS database lists Building 37508 as a former vehicle maintenance shop where typical vehicle maintenance was performed. The building was also used for equipment storage. Buildings 37508 and 37513 are also described as warehouse supply and equipment facilities and as shop, surveillance, and inspection facilities. Under the warehouse supply category, functions included "bulk and bin storage of materials; receiving/shipping, packing, crating, office space and war readiness storage." Under the shop, surveillance, and inspection category, functions included "initial assembly checkout, periodic inspection and maintenance of nuclear weapons, missiles, and electron optic and laser bomb guidance kits."

Based on engineering drawings, inflow and outflow line lengths were approximately 510 feet (ft) and 15 ft, respectively. The septic tank discharged to a 200-ft-by-10-ft leach field to the west. After excavation of the septic system in 1995, the buildings were connected to a sanitary sewer system serving the entire western portion of the MWSA. A copy of a Department of the Air Force Notification of Demolition (USAF, 1995b), listing the system at Buildings 37507 and 37508, is attached to this document, along with a copy of a pre-demolition plan for the facilities.

Building 37507 – Connections to the septic sewer in this building originate in the bathroom and janitor closet area (toilets, sinks, and floor drains), located on the east side of the building. The subfloor line then proceeds west to an equipment room containing a 30-gallon water heater, a furnace, and some electrical equipment. The line then exits the building on the west side on its way to the septic tank.

Building 37508 – The sanitary sewer connection serves only the bathroom on the south end of this building. In addition to toilets, urinals, sinks, and a 30-gallon water heater, the bathroom includes a shower room with two faucets and a floor drain. There is a drain line in this building serving two floor drains in the air conditioning equipment room. This line is connected to a roof drain line according to the drawing. A second floor drain is located in the northwest corner of the building serving an emergency

shower and eyewash station, and cold-water drinking fountain. The floor drain leads to a French drain on the outside of the building and is not connected to SWMU 10-21-N.

Building 37513 – The engineering drawing for this building depicts a plumbing layout that shows sewer connections to a bathroom (toilet, urinal, two sinks, and a floor drain) and a drinking fountain outside of the furnace/water heater room.

Geology and Hydrogeology

The area is underlain by unconsolidated alluvial sediment and falls within the Tijeras Soil Super Group as defined by the Sandia National Laboratories/NMED background study (NMED, 1997). Depth to groundwater is estimated to be about 320 ft below ground surface (bgs). The site is in an area that straddles the Tijeras/Hubbell Springs/Sandia Fault complex, and little is known about groundwater flow in this region.

Previous Investigations

1994 *Manzano Weapons Storage Area Septic Tank Drain Field Soil Investigation*
The *MWSA Septic Tank Drain Field Soil Investigation* was conducted to determine if the septic tanks and drain fields in the MWSA could be excavated without exposing construction crews to potential contaminants and to allow for proper disposal of construction excavation soils and debris (USAF, 1994).

On February 9 and 10, 1994, two soil borings each were drilled to depths of 10 ft bgs at ST-310 and ST-322 sites. One boring was placed near the outlet of each septic tank and a second boring was placed near the middle of each drain field. At each septic tank/drain field location, a grab sample of soil was collected from a depth of 3 ft bgs and field-screened for possible contamination using an organic vapor meter and a radiological (alpha, beta, and gamma) meter. No elevated readings were detected with these instruments. At each location, an additional grab was sample collected from 3 ft bgs and analyzed for volatile organic compounds (VOCs) by an offsite laboratory. A composite sample was collected from the interval between 4 ft and 10 ft bgs. This composite sample was analyzed for target analyte list (TAL) metals, semivolatile organic compounds (SVOCs), high explosives (HE), and total recoverable petroleum hydrocarbons (TRPH). Composite samples were also collected and analyzed for pesticides and herbicides based on anecdotal information indicating these substances were probably stored at these locations. A discrete sample was collected for geotechnical analysis including grain size, moisture content and Atterberg limits. VOCs and SVOCs were analyzed from samples recollected from SWMU 10-21-N soil borings in October 1994.

The analytical results of the 1994 MWSA investigation were compared to current NMED human health risk-based (HHRB) residential soil screening levels (SSLs) (NMED, 2006a), NMED total petroleum hydrocarbons (TPH) screening guidelines (NMED, 2006b), and NMED-approved background concentrations (NMED, 1997). Results are summarized as follows:

- The VOCs methylene chloride (0.004 to 0.012 milligrams per kilogram [mg/kg]), acetone (0.016 to 0.034 mg/kg), carbon disulfide (0.001 mg/kg), and 2-butanone (0.005 mg/kg) – common volatile laboratory contaminants – were detected at concentrations significantly below current NMED HHRB residential SSL. Tetrachloroethene (0.001 mg/kg) was also detected at a concentration significantly below the NMED HHRB residential SSL.

- The SVOCs di-n-butyl phthalate (0.037 mg/kg) and bis(2-ethylhexyl)phthalate (0.15 to 0.35 mg/kg) were detected at concentrations significantly below current NMED HHRB residential SSLs.

- TRPH (11.0 mg/kg) were detected at a concentration significantly below the current NMED HHRB residential SSL of 520 mg/kg.

- No HE were detected above the laboratory quantitation limit in any of the soil samples submitted for analysis.

- Arsenic (2.07 to 2.96 mg/kg) was detected at a concentration below the NMED-approved background concentration of 4.4 mg/kg.

- Vanadium (27.4 to 33.4 mg/kg) was detected at a concentration above the NMED-approved background concentration, but well below the current NMED HHRB residential SSL.

1995 *Appendix III Resource Conservation and Recovery Act* (RCRA) *Facility Investigation* (RFI)
SWMU 10-21-N was investigated as part of the *Appendix III RFI* in 1995 (USAF, 1995). On March 13, 1995, seven boreholes were drilled and sampled using direct push drilling methods. One borehole was drilled northeast of the leach field area to collect background data for the site and six boreholes were drilled in the leach field area. Soil samples were collected from depths of 4 ft to 9 ft bgs. Each 2-ft sample interval was field-screened for possible contamination using a beta-gamma meter and a flame ionization detector. No elevated readings were detected with these instruments.

Seven soil samples were analyzed for VOCs, SVOCs, TPH, metals, mercury, soil pH, and soil moisture.

The analytical results of the 1995 RFI were compared to current NMED HHRB residential SSLs (NMED, 2006a), NMED TPH screening guidelines (NMED, 2006b), and NMED-approved background concentrations (NMED, 1997). The analytical results are summarized as follows:

- No VOCs were detected in any of the soil samples submitted for analysis.

- The SVOCs benzyl butyl phthalate (0.69 to 0.88 mg/kg) and di-n-butyl phthalate (1.3 to 2.9 mg/kg) were detected at concentrations significantly below current NMED HHRB residential SSLs.

- No TPH were detected in any of the soil samples submitted for analysis.

- Arsenic (1.1 to 4.0 mg/kg) was detected at a concentration below the NMED-approved background concentration of 4.4 mg/kg.

- Cobalt (7.0 to 10.0 mg/kg), copper (14.6 to 63.5 mg/kg), and nickel (8.8 to 31.3 mg/kg) were detected at concentrations above their respective NMED-approved background concentrations, but below current NMED HHRB residential SSLs.

All detected levels of analyzed constituents were below current NMED HHRB residential SSLs or represent concentrations of metals that are consistent with naturally occurring concentrations throughout Kirtland AFB. This site does not pose an unacceptable risk to human health or the environment.

Basis of Determination

On October 4, 2006, personnel from the NMED Hazardous Waste Bureau visited the site with a representative of the Kirtland AFB Environmental Restoration Program and agreed that SWMU 10-21-N (ST-310/ST-322) may be suitable for No Further Action (NFA) status and subsequent removal from the Kirtland AFB RCRA Hazardous Waste Permit. This request for NFA status is based on NMED's NFA

Criterion 3: No release from the SWMU to the environment has occurred or is likely to occur in the future.

References

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USAF, 1995b. Memorandum. Nancy Long, 377 CEG/CERR, Kirtland Air Force Base. 02 November 1995. Subject: Notification of Demolition, MHMV 891043, Remove Septic Tanks – Manzano Area. Daniel Yocum, Project Engineer, 377 CEG/CECA, Kirtland Air Force Base. November.

USAF, 1994. *Final Data Analysis Report, Military Civil HTW Projects for USACE, Omaha District, Manzano Weapons Storage Area Septic Tank Drain Field Soil Investigations, November*. CDM Federal Programs Corporation, Albuquerque, New Mexico.

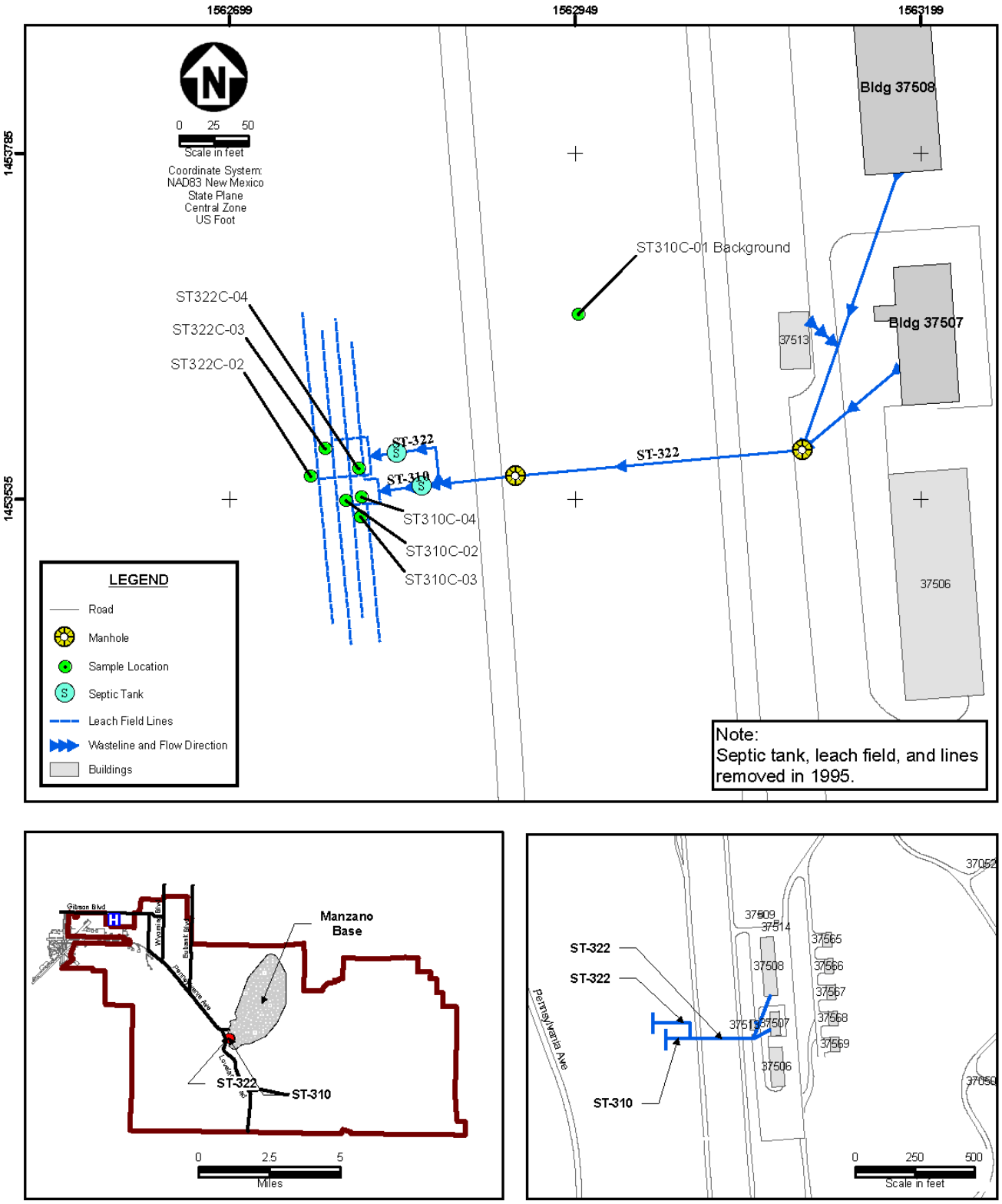

Figure I-3. RCRA Facility Investigation Sample Locations at SWMU 10-21-N, Building 37507/37508, Septic Tank, Leach Field, and Lines (ST-310/322), Kirtland Air Force Base, New Mexico

I-4. SWMU 10-21-O, Septic System Building 37501 and Plant 1 (ST-311)

Location and Current Land Use

Solid Waste Management Unit (SWMU) 10-21-O (ST-311) consisted of a septic tank, distribution box, leach field, manholes and lines located northwest of Building 37501, a guard house, and Plant 1, within the central portion of Kirtland Air Force Base (AFB). Building 37501 and Plant 1 are located inside the former Manzano Weapons Storage Area (MWSA). Building 37501 is currently being used for storage and Plant 1, one of the "tunneled" facilities within the MWSA, is being used as research space. The septic tank, distribution box, piping and leach field were excavated and removed in 1995. Based on engineering drawings, inflow and outflow line lengths were approximately 380 feet (ft) and 5 ft, respectively. Because Building 37511 is located inside the MWSA, it is outside of the Kirtland AFB urban/industrial land use area. The former location of SWMU 10-21-O is shown in Figure I-4a (United States Air Force [USAF], 1995a).

Projected Future Land Use

According to the Kirtland AFB *Land Use Management Plan* (USAF, 2002), there are no proposed changes for the land use at SWMU 10-21-O. However, due to New Mexico Environment Department's (NMED) regulatory requirements, a residential land use scenario was used for all risk-based screening assessments.

Site History

Past activities attributed to Building 37501 include Reserve Fire Team Facility; Air Conditioning Plant; Compressed Air Plant, and Base Engineer Covered Storage Facility for Storage of Civil Engineering Resources. Building 37501 is listed at 2,261 square ft. Category Codes on file with the Kirtland AFB real estate office for Plant 1 include Shipping Surveillance and Inspection; Disaster Preparedness; and Electric Power Station Building. Kirtland AFB Cultural-Historic Building Survey, Geographic Environmental Management System (GEMS) database indicates Plant 1 was historically used for weapons systems maintenance (USAF, 2001). After excavation and removal of the septic system in 1995, the building was connected to a sanitary sewer system serving the entire western portion of the MWSA. A copy of a Department of the Air Force Notification of Demolition (USAF, 1995b) listing the system at Building 37501 and Plant 1 is attached to this document along with a copy of a pre-demolition plan for the facility.

Geology and Hydrogeology

The area is underlain by unconsolidated alluvial sediment and falls within the Tijeras Soil Super Group as defined by the Sandia National Laboratories/NMED background study (NMED, 1997). Depth to groundwater is estimated to be about 320 ft below ground surface (bgs) (USAF, 1995a). The site is in an area that straddles the Tijeras/Hubbell Springs/Sandia Fault complex, and little is known about groundwater flow in this region.

Previous Investigations

1994 *Manzano Weapons Storage Area Septic Tank Drain Field Soil Investigation*
The *MWSA Septic Tank Drain Field Soil Investigation* was conducted to determine if the septic tanks and drain fields in the MWSA could be excavated without exposing construction crews to potential contaminants and to allow for proper disposal of construction excavation soils and debris (USAF, 1994).

On February 11, 1994, one soil boring and one hand-augered boring were drilled to depths of 10 ft bgs at SWMU 10-21-O. One boring was placed near the outlet of the septic tank via hollow-stem auger drill rig and a second boring was placed near the middle of the leach field using a hand auger. A grab sample of soil was collected from a depth of 3 ft bgs and field-screened for possible contamination using an organic vapor meter and a radiological (alpha, beta, and gamma) meter. No elevated readings were detected with these instruments. An additional grab sample was collected from 3 ft bgs and analyzed for volatile organic compounds (VOCs) by an offsite laboratory. A composite sample was collected from the interval between 4 ft and 10 ft bgs. This composite sample was analyzed for target analyte list (TAL) metals, semivolatile organic compounds (SVOCs), high explosives (HE), and total recoverable petroleum hydrocarbons (TRPH). A discrete sample was collected for geotechnical analysis including grain size, moisture content, and Atterberg limits.

The analytical results of the 1994 MWSA investigation were compared to current NMED human health risk-based (HHRB) residential soil screening levels (SSLs) (NMED, 2006a), NMED total petroleum hydrocarbon (TPH) screening guidelines (NMED, 2006b), and NMED-approved background concentrations (NMED, 1997). Results are summarized as follows:

- No VOCs were detected above the laboratory quantitation limit in any of the soil samples submitted for analysis.

- The SVOC bis(2-ethylhexyl)phthalate (0.140 milligrams per kilogram [mg/kg]) was detected at a concentration significantly below the current NMED HHRB residential SSL for this compound.

- TRPH (30 to 38 mg/kg) was detected at a concentration significantly below the current NMED residential soil screening guideline of 520 mg/kg.

- No HE were detected above the laboratory quantitation limit in any of the soil samples submitted for analysis.

- Arsenic (1.89 mg/kg) was detected at a concentration below the current NMED-approved background concentration of 4.4 mg/kg.

- Iron (21,462 to 25,822 mg/kg) was detected at concentrations above the current NMED HHRB residential SSL of 23,500 mg/kg, but significantly below the industrial SSL of 100,000 mg/kg. There is no established background concentration for iron at Kirtland AFB.

- Cadmium (1.0 mg/kg); cobalt (14.2 to 22.1 mg/kg); copper (18.5 to 240 mg/kg); nickel (11.0 to 51.0 mg/kg); silver (2.0 to 2.2 mg/kg); vanadium (39.0 to 43.0 mg/kg); and zinc (116 to 258 mg/kg) were detected at concentrations above their respective NMED-approved background concentrations, but well below current NMED HHRB residential SSLs.

1995 *Appendix III Resource Conservation and Recovery Act* (RCRA) *Facility Investigation* (RFI)
SWMU 10-21-O was investigated as part of the *Appendix III RFI* in 1995 (USAF, 1995a). On March 23, 1995, four boreholes were drilled and sampled using direct push drilling methods. One borehole was drilled northeast of the leach field area to collect background data for the site and three boreholes were drilled in the leach field area. Soil samples were collected from 3 ft to 5 ft bgs based on engineering drawings indicating the leach field lines were buried at a depth of 3 ft bgs.

Each 2-ft sample interval was field-screened for possible contamination using a beta-gamma meter and a flame ionization detector. No elevated readings were detected with these instruments.

Four soil samples were analyzed for VOCs, SVOCs, TPH as gasoline-range organics (GRO) and diesel-range organics (DRO), metals, mercury, soil pH, and soil moisture.

The analytical results of the 1995 RFI were compared to current NMED residential HHRB SSLs (NMED, 2006a), NMED TPH screening guidelines (NMED, 2006b), and NMED-approved background concentrations (NMED, 1997). The analytical results are summarized as follows:

- No VOCs were detected in any of the soil samples submitted for analysis.
- The SVOCs benzyl butyl phthalate (0.78 to 0.89 mg/kg), di-n-butylphthalate (1.5 mg/kg), and di-n-butyl phthalate (1.4 to 2.6 mg/kg) were detected at concentrations significantly below current NMED HHRB residential SSL.
- No GRO were detected in any samples.
- DRO (100 mg/kg) were detected at a concentration significantly below the current NMED residential screening guideline of 520 mg/kg.
- Arsenic (0.49 to 1.1 mg/kg) was detected at concentrations below the NMED-approved background concentration of 4.4 mg/kg.
- Iron (18,200 to 28,800 mg/kg) was detected at concentrations in excess of the 23,500 mg/kg NMED HHRB residential SSL, but significantly below the industrial SSL of 100,000 mg/kg. There is no established background concentration for iron at Kirtland AFB.
- Cadmium (0.93 to 1.3 mg/kg); cobalt (11.9 to 16.9 mg/kg); copper (28.6 to 63.2 mg/kg); lead (13.4 to 14.6 mg/kg); mercury (0.14 mg/kg); vanadium (35.6 to 40.9 mg/kg); and zinc (89.8 to 106 mg/kg) were detected at concentrations above their respective NMED-approved background concentrations, but below current NMED HHRB residential SSLs.

In the absence of other indicators, these metals are presumed to be naturally occurring. Although no VOCs or SVOCs were detected, DRO concentrations were at the 100 mg/kg action level in use at that time (NMED, 2000) and additional soil sampling was recommended to define the lateral and vertical extent of potential contamination.

1996 *Phase 2 RFI*

In October 1996, an investigation was conducted to investigate the subsurface soil around borehole ST311-03 (Figure I-4b) for potential TPH contamination (USAF, 1997). Three boreholes placed adjacent to ST311-03 were sampled from 3 ft to 7 ft bgs (shallow bedrock prevented sampling to 12 ft as planned). The analytical results are summarized as follows:

- DRO were detected in concentrations ranging from 5.5 to 20.0 mg/kg. Although these concentrations were below the 100 mg/kg NMED TPH action level in use at this time, it was determined that they were likely related to the 100 mg/kg concentration detected at ST311-03.
- GRO (0.018 mg/kg) were detected at a concentration significantly below the current NMED residential screening guideline of 520 mg/kg.

- The concentrations of DRO detected in sampling during the Appendix III RFI and the Appendix III Phase 2 RFI indicated that the area of contamination was limited to the shallow subsurface near boreholes ST311-03, ST311-06, and ST311-07, probably due to fuel oil entering the septic system in limited quantities, concentrations, and/or infrequent incidents. Removal of contaminated soil from a 10-ft-by-10-ft-by-5-ft deep area centered on borehole ST311-03 was recommended.

1997 *Interim Corrective Measures*

In October 1997, the *Interim Corrective Measure* (ICM) activities were performed at site SWMU 10-21-O (USAF, 1998). The work included removal of a 10-ft-by-8-ft-by-5-ft volume of soil centered on borehole ST311-03. Soil samples collected from the sides and bottom of the excavated area showed no elevated levels of TPH. The excavated soils were disposed of in the Kirtland AFB landfill, and the excavations were backfilled with clean soil and graded.

In a letter dated April 16, 1999, the NMED approved the Kirtland AFB ICM report and findings for SWMU 10-21-O and agreed with the recommendation that the site be granted No Further Action (NFA) status.

Basis of Determination

On October 4, 2006, the NMED Hazardous Waste Bureau visited the site with a representative of the Kirtland AFB Environmental Restoration Program and agreed that SWMU 10-21-O (ST-311) may be suitable for No Further Action (NFA) status and subsequent removal from the Kirtland AFB RCRA Hazardous Waste Permit. This request for NFA status is based on NMED's NFA Criterion 5: The SWMU has been characterized or remediated in accordance with current applicable state or federal regulations, and the available data indicate that contaminants pose an acceptable level of risk under current and projected land use.

References

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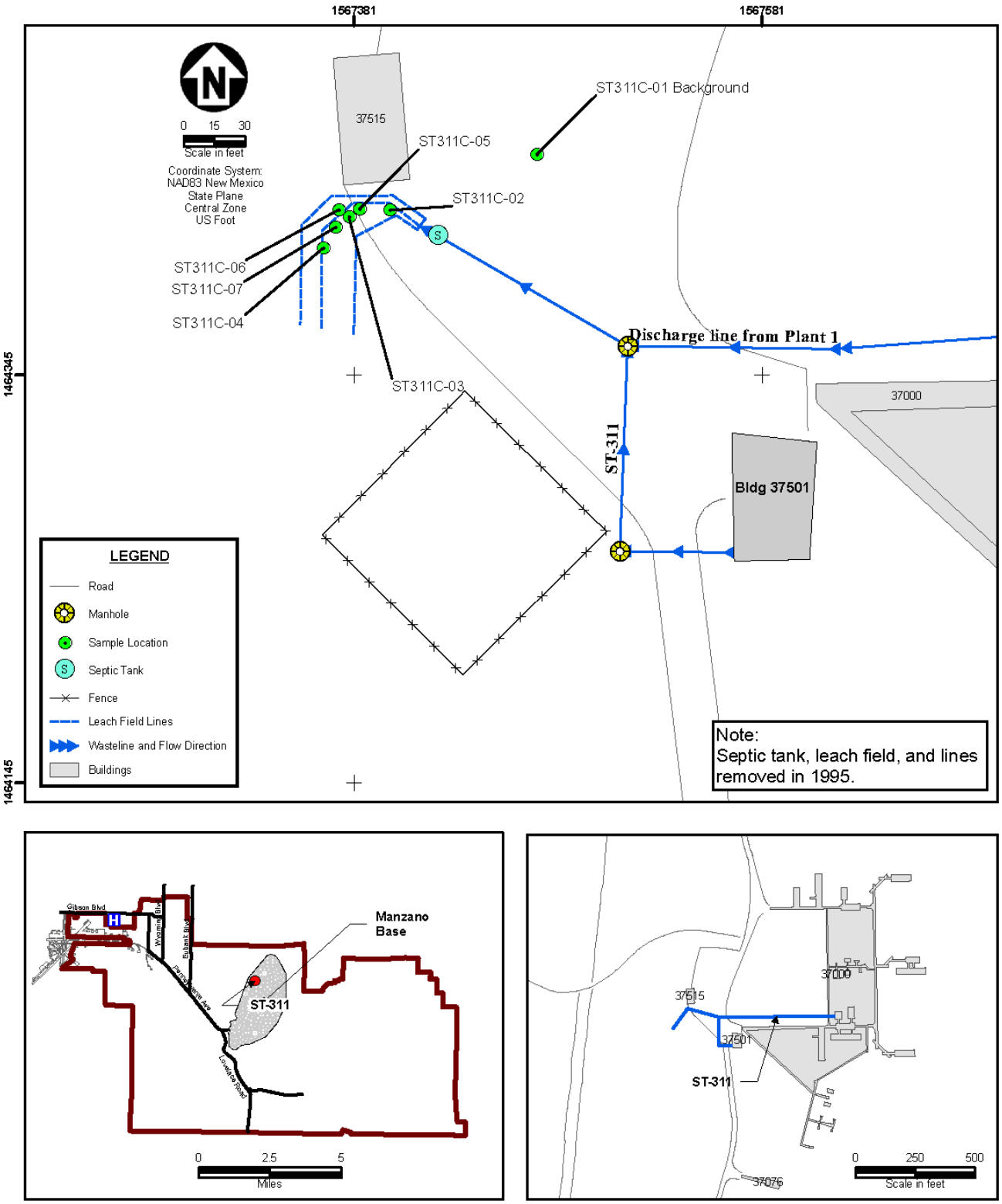

Figure I-4a. RCRA Facility Investigation Sample Locations at SWMU 10-21-O, Building 37501, Septic Tank, Leach Field, and Lines (ST-311), Kirtland Air Force Base, New Mexico

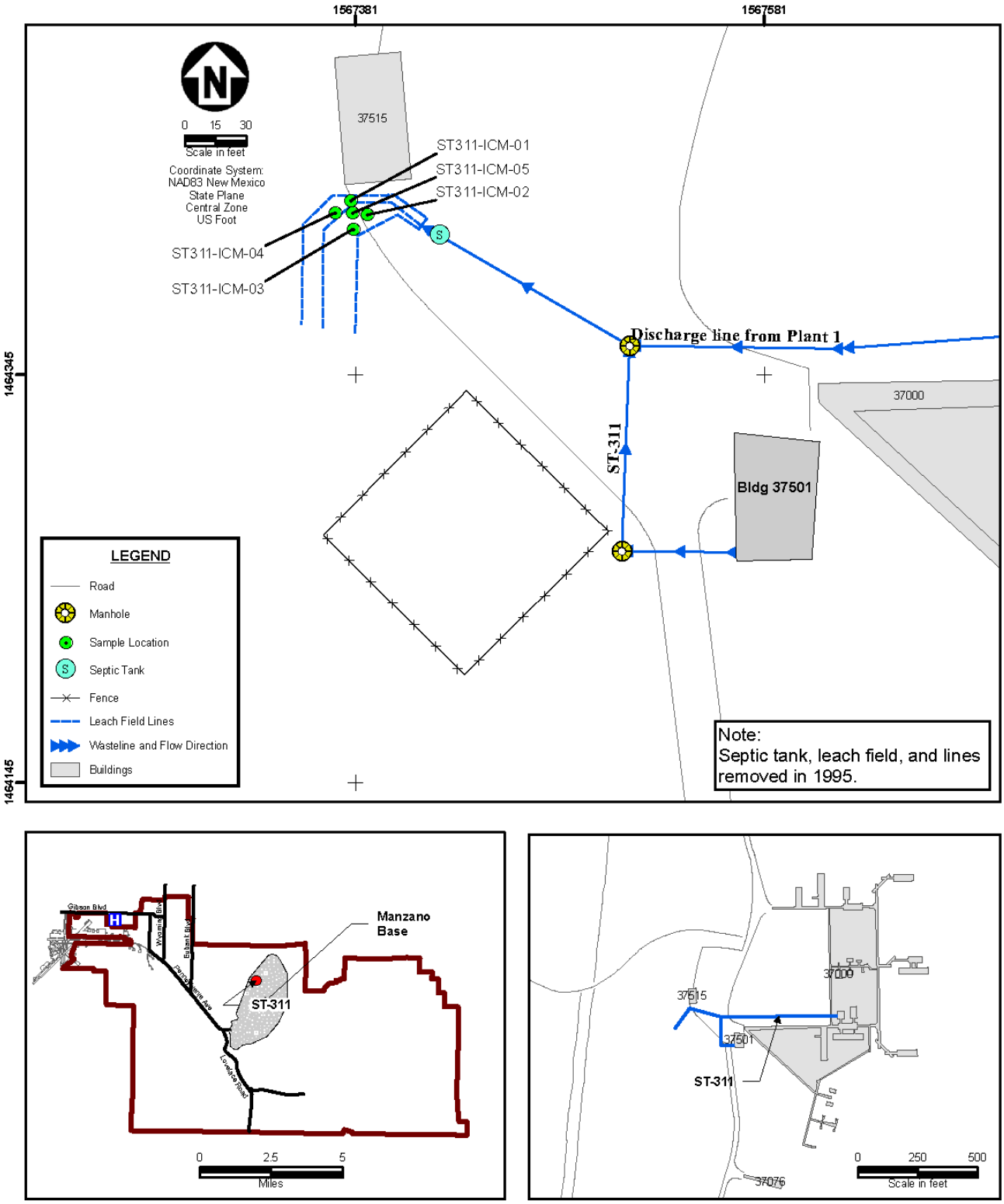

Figure I-4b. Interim Corrective Measures Sample Locations at SWMU 10-21-O, Building 37501, Septic Tank, Leach Field, and Lines (ST-311), Kirtland Air Force Base, New Mexico

I-5. SWMU 10-21-Q, Septic System Buildings 37529/37530 (ST-313)

Location and Current Land Use

Solid Waste Management Unit (SWMU) 10-21-Q (ST-313) is located near Buildings 37529 and 37530, general purpose warehouses located northeast of the western entrance to the former Manzano Weapons Storage Area (MWSA), in the central portion of Kirtland Air Force Base (AFB). The septic tank, control box, and leach field were excavated and removed and inflow and outflow lines were capped in 1995. Based on engineering drawings, inflow and outflow line lengths were approximately 510 feet (ft) and 12 ft, respectively. The tank discharged to a 200-ft-by-20-ft leach field to the west. The site is located within the MWSA and outside of the Kirtland AFB urban/industrial environmental zone. The former location of SWMU 10-21-Q is shown in Figure I-5 (United States Air Force [USAF], 1995a).

Projected Future Land Use

According to the Kirtland AFB *Land Use Management Plan* (USAF, 2002), there are no proposed changes for the land use at SWMU 10-21-Q. However, due to New Mexico Environment Department's (NMED) regulatory requirements, a residential land use scenario was used for all risk-based screening assessments.

Site History

According to the Geographical Environmental Management Systems (GEMS) database, Buildings 37529 and 37530 were constructed in 1951 and 1950, respectively, as general purpose warehouses in support of weapons stockpile (USAF, 2001). Specific uses include storage of Security Police mobility gear, furniture, and rocket motors for both Manzano Base and for Sandia National Laboratories. After excavation of the septic system in 1995, the buildings were connected to a sanitary sewer system serving the entire western portion of the MWSA. A copy of a Department of the Air Force Notification of Demolition (USAF, 1995b), listing the septic system serving Buildings 37529 and 37530, is attached to this document along with a copy of a pre-demolition plan for the facility.

Building 37529 – According to engineering drawings, the main warehouse area has three floor drains connected by a north-south drain line. This line runs west and connects with drains from a bathroom and shower area in the northwest corner of the building. The line exits the building in the northwest corner on its way to the septic tank.

Building 37530 – Engineering drawings show floor drains in the center of the main shop area and in the warehouse area. The floor drain located in the designated shop area drains via a 3-inch drain line that flows to the west-center portion of the building where it then connects with drains from the bathroom area that contains two floor drains, toilets, and sinks. The line exits the building on its way to the septic tank.

Geology and Hydrogeology

The area is underlain by unconsolidated alluvial sediment and falls within the Tijeras Soil Super Group as defined by the Sandia National Laboratories/NMED background study (NMED, 1997). Depth to groundwater is estimated to be about 320 ft below ground surface (bgs) (USAF, 1995a). The site is in an area that straddles the Tijeras/Hubbell Springs/Sandia Fault complex, and little is known about groundwater flow in this region.

Previous Investigations

1994 *Manzano Weapons Storage Area Septic Tank Drain Field Soil Investigation*
The *MWSA Septic Tank Drain Field Soil Investigation* was conducted to determine if the septic tanks and drain fields in the MWSA could be excavated without exposing construction crews to potential contaminants and to allow for proper disposal of construction excavation soils and debris (USAF, 1994).

On February 10, 1994, two soil borings were drilled to depths of 10 ft bgs. One boring was placed near the outlet of the septic tank and a second boring was placed near the middle of the leach field. A grab sample of soil was collected from 3 ft bgs and field-screened for possible contamination using an organic vapor meter and a radiological (alpha, beta, and gamma) meter. No elevated readings were detected with these instruments. An additional grab sample collected from 3 ft bgs and analyzed for volatile organic compounds (VOCs) by an offsite laboratory. A composite sample was collected from an interval between 4 ft and 10 ft bgs. This composite sample was analyzed for target analyte list (TAL) metals, semivolatile organic compounds (SVOCs), high explosives (HE), and total recoverable petroleum hydrocarbons (TRPH). A discrete sample was collected for geotechnical analysis including grain size, moisture content, and Atterberg limits.

The analytical results of the 1994 MWSA investigation were compared to current NMED human health risk-based (HHRB) residential soil screening levels (SSLs) (NMED, 2006a), NMED total petroleum hydrocarbon (TPH) screening guidelines (NMED, 2006b), and NMED-approved background concentrations (NMED, 1997). Results are summarized as follows:

- Acetone (0.021 milligrams per kilogram [mg/kg]) was detected at a concentration significantly below the current NMED HHRB residential SSL of 2,810 mg/kg.

- The SVOC bis(2-ethylhexyl)phthalate (0.052 to 0.240 mg/kg) was detected at a concentration significantly below the current NMED HHRB residential SSL of 347 mg/kg.

- No HE were detected above the laboratory quantitation limit in any of the soil samples submitted for analysis.

- TRPH (11.0 mg/kg) was detected at a concentration significantly below the current NMED residential screening guideline of 520 mg/kg.

- Arsenic (1.58 to 1.63 mg/kg) was detected at concentrations below the NMED-approved background concentration of 4.4 mg/kg.

- Cobalt (10.0 to 13.0 mg/kg); copper (18.0 to 18.5 mg/kg); lead (9.2 to 15.2 mg/kg); silver (1.4 to 2.0 mg/kg); and vanadium (35.0 to 46.0 mg/kg) were detected at concentrations above their respective NMED-approved background concentrations, but below current NMED HHRB residential SSLs.

1995 *Appendix III Resource Conservation and Recovery Act* (RCRA) *Facility Investigation* (RFI)
SWMU 10-21-Q was investigated as part of the *Appendix III RFI* in 1995 (USAF, 1995a). On March 20, 1995, four boreholes were drilled and sampled using direct push drilling methods. One borehole was drilled northeast of the leach field area to collect background data for the site and three boreholes were drilled in the leach field area. Soil samples were collected from a depth of 3 ft to 8 ft bgs. Each 2-ft sample interval was field-screened for possible contamination using a beta-gamma meter and a flame ionization detector. No elevated readings were detected with these instruments.

Four soil samples were analyzed for VOCs, SVOCs, TPH, metals, mercury, soil pH, and soil moisture.

The analytical results of the 1995 RFI were compared to current NMED HHRB residential SSLs (NMED, 2006a), NMED TPH screening guidelines (NMED, 2006b), and NMED-approved background concentrations (NMED, 1997). The analytical results are summarized as follows:

- No VOCs or SVOCs were detected in any of the soil samples submitted for analysis.
- No TPH were detected in any samples.
- Arsenic (1.5 mg/kg) was detected at a concentration below the NMED-approved background concentration of 4.4 mg/kg.
- Iron (16,600 to 27,400 mg/kg) was detected at concentrations above the current NMED HHRB residential SSL of 23,500 mg/kg, but significantly below the industrial SSL of 100,000 mg/kg. There is no NMED-approved background concentration for iron at Kirtland AFB.

All detected levels of analyzed constituents were below current NMED SSLs or represent concentrations of metals that are consistent with naturally occurring levels throughout Kirtland AFB. This site does not pose an unacceptable risk to human health or the environment.

Basis of Determination

On October 4, 2006, the NMED Hazardous Waste Bureau visited the site with a representative of the Kirtland AFB Environmental Restoration Program and agreed that SWMU 10-21-Q (ST-313) may be suitable for No Further Action (NFA) status and subsequent removal from the Kirtland AFB RCRA Hazardous Waste Permit. This request for NFA status is based on NMED's NFA Criterion 3: No release from the SWMU to the environment has occurred or is likely to occur in the future.

References

NMED, 2006a. *Technical Background Document for Development of Soil Screening Levels*. New Mexico Environment Department Hazardous Waste Bureau and Groundwater Quality Bureau Voluntary Remediation Program. June 2006 update (Revision 4.0) of February 2004 document.

NMED, 2006b. *New Mexico Environment Department TPH Screening Guidelines*. New Mexico Environment Department. Santa Fe, New Mexico. October.

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USAF, 1994. *Final Data Analysis Report, Military Civil HTW Projects for USACE, Omaha District, Manzano Weapons Storage Area Septic Tank Drain Field Soil Investigations, November*. CDM Federal Programs Corporation, Albuquerque, New Mexico.

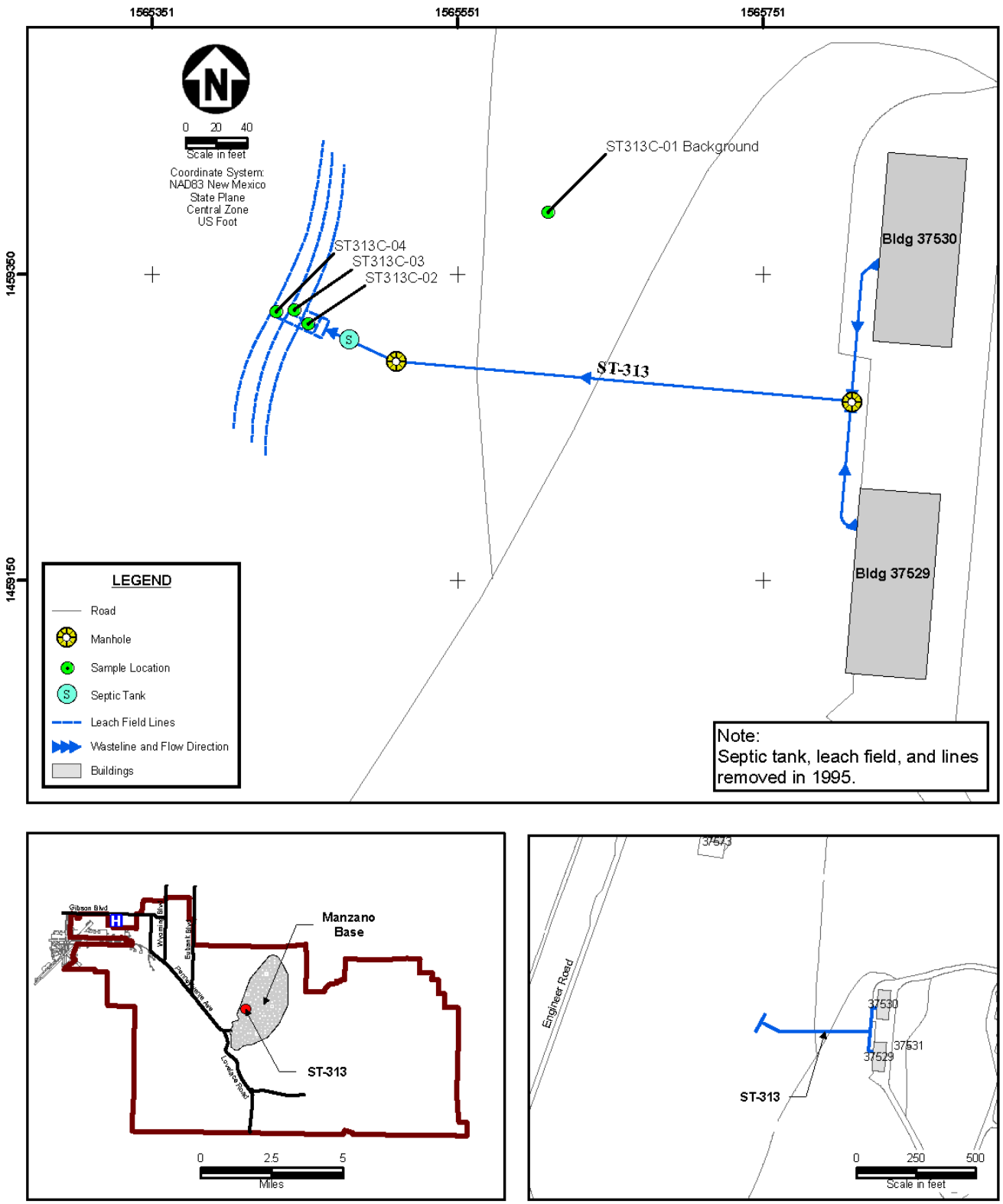

Figure I-5. RCRA Facility Investigation Sample Locations at SWMU 10-21-Q, Building 37529/37530, Septic Tank, Leach Field, and Lines (ST-313), Kirtland Air Force Base, New Mexico

I-6. SWMU 10-21-R, Septic System Building 37570 (ST-293)

Location and Current Land Use

Solid Waste Management Unit (SWMU) 10-21-R (ST-293) was located approximately 75 feet (ft) west of Building 37570, a test/storage facility located inside the former Manzano Weapons Storage Area (MWSA) in the central portion of Kirtland Air Force Base (AFB). The septic system consisted of a septic tank, seepage pit, and lines that were excavated and removed in 1995. Based on engineering drawings, inflow and outflow line lengths were approximately 75 ft and 20 ft, respectively. The septic tank discharged to a 48-inch-diameter, concrete seepage pit. Because of the isolated location of Building 37570 inside the MWSA, it is outside of the Kirtland AFB urban/industrial land use area. The facility is not currently in use. The location of SWMU 10-21-R is shown in Figure I-6 (United States Air Force [USAF], 1995a).

Projected Future Land Use

According to the Kirtland AFB *Land Use Management Plan* (USAF, 2002), there are no proposed changes for the land use at SWMU 10-21-R. However, due to New Mexico Environment Department's (NMED) regulatory requirements, a residential land use scenario was used for all risk-based screening assessments.

Site History

Building 37570 was constructed in 1964 as a Test Vehicle Preparation Building according to engineering drawings and as a general storage warehouse according to the Kirtland AFB Cultural-Historic Building Survey, Geographic Environmental Management System (GEMS) database (USAF, 2001). The GEMS database indicates Building 37570 was used for storage until 1992, at which time it was listed as a research and testing facility. After excavation of the septic system in 1995, the building was connected to a sanitary sewer system serving the entire western portion of the MWSA. A copy of a USAF Notification of Demolition (USAF, 1995b) listing the system at Building 37570 is attached to this document, along with a copy of a pre-demolition plan for the facility. An engineering drawing of the Building 37570 plumbing floor plan shows that the septic tank system (ST-293) served as a small bathroom (two toilets, urinal, sink, and floor drain), water cooler, service sink, and evaporative cooler. Also connected to the outflow line was a floor drain located in an equipment room housing a boiler, a hot water heater, and an air conditioning unit.

Geology and Hydrogeology

The area is underlain by unconsolidated alluvial sediment and falls within the Tijeras Soil Super Group as defined by the Sandia National Laboratories/NMED background study (NMED, 1997). Depth to groundwater is estimated to be about 320 ft below ground surface (bgs) (USAF, 1995a). The site is in an area that straddles the Tijeras/Hubbell Springs/Sandia Fault complex, and little is known about groundwater flow in this region. No production wells exist near the site.

Previous Investigations

1994 *Manzano Weapons Storage Area Septic Tank Drain Field Soil Investigation*
The 1994 *MWSA Septic Tank Drain Field Soil Investigation* was conducted to determine if the septic tanks and drain fields in the MWSA could be excavated without exposing construction crews to potential contaminants and to allow for proper disposal of construction excavation soils and debris (USAF, 1994).

On January 14, 1994, two backhoe test pits were excavated to a depth of 10 ft bgs. One test pit was placed near the outlet of the septic tank and a second test pit was excavated near the seepage pit. A grab sample of soil was collected from a depth of 3 ft bgs and field-screened for possible contamination using an organic vapor meter and a radiological (alpha, beta, and gamma) meter. No elevated readings were detected with these instruments. An additional grab sample was collected from 3 ft bgs and analyzed for volatile organic compounds (VOCs) by an offsite laboratory. A composite sample was collected from the interval between 4 ft and 10 ft bgs. This composite sample was analyzed for target analyte list (TAL) metals, semivolatile organic compounds (SVOCs), high explosives (HE), and total recoverable petroleum hydrocarbons (TRPH). A discrete sample was collected for geotechnical analysis including grain size, moisture content, and Atterberg limits.

The analytical results of the 1994 MWSA investigation were compared to current NMED human health risk-based (HHRB) residential soil screening levels (SSLs) (NMED, 2006a), NMED total petroleum hydrocarbons (TPH) screening guidelines (NMED, 2006b), and NMED-approved background concentrations (NMED, 1997). Results are summarized as follows:

- No VOCs or SVOCs were detected above the laboratory quantitation limit in any of the soil samples submitted for analysis.

- No HE were detected above the laboratory quantitation limit in any of the soil samples submitted for analysis.

- TRPH (12.0 milligrams per kilogram [mg/kg]) was detected at a concentration significantly below the current NMED residential screening guideline of 520 mg/kg.

- Arsenic (1.67 to 2.11 mg/kg) was detected at concentrations below the NMED-approved background concentration of 4.4 mg/kg.

- Cobalt (8.1 to 9.7 mg/kg) and copper (15.4 to 20.6 mg/kg) were detected at concentrations above their respective NMED-approved background concentrations, but below current NMED HHRB residential SSLs.

1995 *Appendix III Resource Conservation and Recovery Act* (RCRA) *Facility Investigation* (RFI)
SWMU 10-21-R was investigated as part of the *Appendix III RFI* in 1995 (USAF, 1995a). On March 21, 1995, four boreholes were drilled and sampled using direct-push drilling methods. One borehole was drilled northeast of the leach field area to collect background data for the site and three boreholes were drilled in the leach field area. Soil samples were collected from depths of 3 ft to 8 ft bgs. Each 2-ft sample interval was field-screened for possible contamination using a beta-gamma meter and a flame ionization detector. No elevated readings were detected with these instruments.

Four soil samples were analyzed for VOCs, SVOC, TPH, metals, mercury, soil pH, and soil moisture.

The analytical results of the 1995 RFI were compared to current NMED HHRB residential SSLs (NMED, 2006a), NMED TPH screening guidelines (NMED, 2006b), and NMED-approved background concentrations (NMED, 1997). The analytical results of the 1995 RFI are summarized as follows:

- No VOCs were detected in any of the soil samples submitted for analysis.

- The SVOC bis(2-ethylhexyl)phthalate (0.41 mg/kg) was detected at a concentration significantly below the current NMED HHRB residential SSL.

- TPH was not detected above the laboratory reporting limit in any samples.

- Arsenic (0.97 to 2.2 mg/kg) was detected at concentrations below the NMED-approved background concentration of 4.4 mg/kg.

- Iron (19,700 to 23,200 mg/kg) was detected at concentrations below the current NMED HHRB residential SSL of 23,500 mg/kg. There is no established background concentration for iron at Kirtland AFB.

- Barium (142 to 246 mg/kg); cobalt (11.1 to 12.9 mg/kg); copper (21.7 to 53.9 mg/kg); and vanadium (36.9 to 41.9 mg/kg) were detected at concentrations above their respective NMED-approved background concentrations, but below current NMED HHRB residential SSLs.

All detected levels of analyzed constituents were below current NMED HHRB residential SSLs, or represent concentrations of metals that are consistent with naturally occurring levels throughout Kirtland AFB and are not the result of past activities at the site. This site does not pose an unacceptable risk to human health or the environment.

Basis of Determination

On October 4, 2006, personnel from the NMED Hazardous Waste Bureau visited the site with a representative of the Kirtland AFB Environmental Restoration Program and agreed that SWMU 10-21-R (ST-293) may be suitable for No Further Action (NFA) status and subsequent removal from the Kirtland AFB RCRA Hazardous Waste Permit. This request for NFA status is based on NMED's NFA Criterion 3: No release from the SWMU to the environment has occurred or is likely to occur in the future.

References

NMED, 2006a. *Technical Background Document for Development of Soil Screening Levels*. New Mexico Environment Department Hazardous Waste Bureau and Groundwater Quality Bureau Voluntary Remediation Program. June 2006 update (Revision 4.0) of February 2004 document.

NMED, 2006b. *New Mexico Environment Department TPH Screening Guidelines*. New Mexico Environment Department. Santa Fe, New Mexico. October.

NMED, 1997. Hazardous Waste Bureau (formerly Hazardous and Radioactive Materials Bureau), Approved Background Concentrations, Sandia National Laboratories/Kirtland Air Force Base, New Mexico.

USAF, 1994. *Final Data Analysis Report, Military Civil HTW Projects for USACE, Omaha District, Manzano Weapons Storage Area Septic Tank Drain Field Soil Investigations, November*. CDM Federal Programs Corporation, Albuquerque, New Mexico.

USAF, 2002. *Land Use Management Plan*. U.S. Air Force, Kirtland Air Force Base, New Mexico.

USAF, 2001. Kirtland Air Force Base Cultural-Historic Building Survey, Geographic Environmental Management System (GEMS) database.

USAF, 1995a. *Draft Final RCRA Facility Investigation Report, Appendix III Wasteline Sites, October*. Halliburton NUS Corporation, Albuquerque, New Mexico.

USAF, 1995b. Memorandum. Nancy Long, 377 CEG/CERR, Kirtland Air Force Base. 02 November 1995. Subject: Notification of Demolition, MHMV 891043, Remove Septic Tanks – Manzano Area. Daniel Yocum, Project Engineer, 377 CEG/CECA, Kirtland Air Force Base. November.

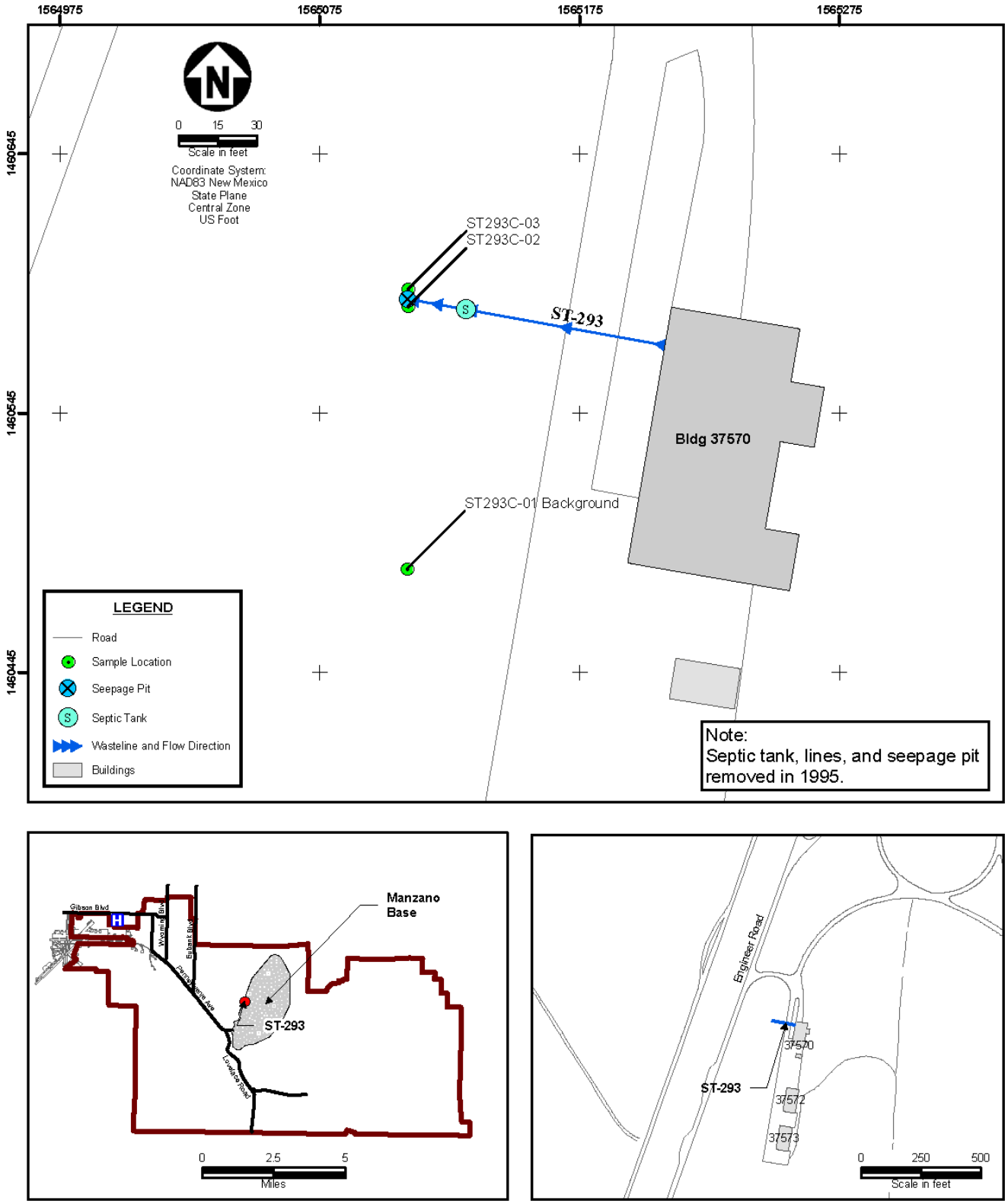

Figure I-6. RCRA Facility Investigation Sample Locations at SWMU 10-21-R, Building 37570, Septic Tank, Seepage Pit, and Lines (ST-293), Kirtland Air Force Base, New Mexico

I-7. SWMU 10-21-U, Septic System Building 37200 (ST-318)

Location and Current Land Use

Solid Waste Management Unit (SWMU) 10-21-U (ST-318) is located 95 feet (ft) west-northwest of Building 37200, also known as Plant 3, a weapons inspection and maintenance shop inside the former Manzano Weapons Storage Area (MWSA), in the central portion of Kirtland Air Force Base (AFB). SWMU 10-21-U consisted of a septic tank, distribution box, leach field, and lines, all of which were excavated and removed from the site in 1995. Because Building 37200 is located inside the MWSA, it is outside of the Kirtland AFB urban/industrial land use area. Building 37200 is currently being used for storage. The location of ST-318 is shown in Figure I-7 (United States Air Force [USAF], 1995a).

Projected Future Land Use

According to the Kirtland AFB *Land Use Management Plan* (USAF, 2002), there are no proposed changes for the land use at SMWU 10-21-U. However, due to New Mexico Environment Department's (NMED) regulatory requirements, a residential land use scenario was used for all risk-based screening assessments.

Site History

Building 37200 was constructed in 1955 as a weapons maintenance shop according to the Kirtland AFB Cultural-Historic Building Survey, Geographic Environmental Management System (GEMS) database (USAF, 2001). The database indicates that from 1955 until 1991 Building 37200 was used for weapons systems inspection and maintenance. Based on engineering drawings, inflow and outflow line lengths were approximately 130 ft and 25 ft, respectively. The septic tank discharged to a 130-ft-by-5-ft leach field to the west. After excavation of the septic system in 1995, the building was connected to a sanitary sewer system serving the entire western portion of the MWSA. A copy of a Department of the Air Force Notification of Demolition, listing the system at Building 37200, is attached to this document, along with a copy of a pre-demolition plan for the facility (USAF, 1995b).

A 1954 plumbing drawing of the building indicates that there are no floor drains in the maintenance shop. An apparent shop sink is located in a smaller room off the main shop area, adjacent to the bathroom in the northwest corner. The bathroom has two toilets, two urinals, two sinks, a shower stall with floor drain, and a service sink. This drawing does not show waste line plumbing, but it is assumed that the aforementioned sink and toilet fixtures feed into the waste line and were serviced by the SMWU 10-21-U septic system.

Geology and Hydrogeology

The area is underlain by unconsolidated alluvial sediment and falls within the Tijeras Soil Super Group as defined by the Sandia National Laboratories/NMED background study (NMED, 1997). Depth to groundwater is estimated to be about 320 ft below ground surface (bgs) (USAF, 1995a). The site is in an area that straddles the Tijeras/Hubbell Springs/Sandia Fault complex, and little is known about groundwater flow in this region.

Previous Investigations

1994 *Manzano Weapons Storage Area Septic Tank Drain Field Soil Investigation*
The *MWSA Septic Tank Drain Field Soil Investigation* was conducted to determine if the septic tanks and drain fields in the MWSA could be excavated without exposing construction crews to potential contaminants and to allow for proper disposal of construction excavation soils and debris (USAF, 1994).

On February 10, 1994, two soil borings were drilled to depths of 10 ft bgs. One boring was placed near the outlet of the septic tank and a second boring was placed near the middle of the leach field. A grab sample of soil was collected from 3 ft bgs and field-screened for possible contamination using an organic vapor meter and a radiological (alpha, beta, and gamma) meter. No elevated readings were detected with these instruments. An additional grab sample collected from 3 ft bgs was analyzed for volatile organic compounds (VOCs) by an offsite laboratory. A composite sample was collected from an interval between 4 ft and 10 ft bgs. This composite sample was analyzed for Target Analyte List (TAL) metals, semivolatile organic compounds (SVOCs), high explosives (HE), and total recoverable petroleum hydrocarbons (TRPH). A discrete sample was collected for geotechnical analysis including grain size, moisture content, and Atterberg limits.

The analytical results of the 1994 MWSA investigation were compared to current NMED human health risk-based (HHRB) residential soil screening levels (SSLs) (NMED, 2006a), NMED total petroleum hydrocarbons (TPH) screening guidelines (NMED, 2006b), and NMED-approved background concentrations (NMED, 1997). Results are summarized as follows:

- No VOCs were detected above the laboratory quantitation limit in any of the soil samples submitted for analysis.

- The SVOC bis(2-ethylhexyl)phthalate (0.055 to 0.083 milligram per kilogram [mg/kg]) was detected at concentrations significantly below the current NMED HHRB residential SSL of 347 mg/kg.

- No HE were detected above the laboratory quantitation limit in any of the soil samples submitted for analysis.

- TRPH (10.0 mg/kg) was detected at a concentration significantly below the current NMED residential soil screening guideline of 520 mg/kg.

- Arsenic (1.60 to 2.62 mg/kg) was detected at concentrations below the NMED-approved background concentration of 4.4 mg/kg.

- Iron (23,400 to 38,700 mg/kg) was detected at concentrations above the NMED HHRB residential SSL of 23,500 mg/kg, but significantly below the industrial SSL of 100,000 mg/kg. There is no NMED-approved background concentration for iron at Kirtland AFB.

- Antimony (7.7 mg/kg); barium (229 to 616 mg/kg); beryllium (1.7 mg/kg); cadmium (1.6 mg/kg); cobalt (19.4 to 25.3 mg/kg); copper (3.1 to 2.8 mg/kg); lead (8.0 to 13.3 mg/kg); nickel (10.2 to 23.2 mg/kg); silver (3.2 to 3.5 mg/kg); vanadium (43.7 to 54.3 mg/kg); and zinc (96.4 to 153 mg/kg) were detected at concentrations above their respective NMED-approved background concentrations, but below current HHRB residential SSLs.

1995 *Appendix III Resource Conservation and Recovery Act* (RCRA) *Facility Investigation* (RFI)
SMWU 10-21-U was investigated as part of the *Appendix III RFI* in 1995 (USAF, 1995a). On March 22, 1995, four boreholes were drilled and sampled using direct push drilling methods. One borehole was drilled northeast of the leach field area to collect background data for the site and three boreholes were drilled in the leach field area. Soil samples were collected from depths of 3 ft to 8 ft bgs. Each 2-ft sample interval was field-screened for possible contamination using a beta-gamma meter and a flame ionization detector. No elevated readings were detected with these instruments.

Four soil samples were analyzed for VOCs, SVOCs, TPH as gasoline-range organics (GRO) and diesel-range organics (DRO), metals, mercury, soil pH, and soil moisture.

The analytical results of the 1995 RFI were compared to current NMED residential HHRB SSLs (NMED, 2006a), NMED TPH screening guidelines (NMED, 2006b), and NMED-approved background concentrations (NMED, 1997). The analytical results are summarized as follows:

- No VOCs, SVOCs, or GRO were detected in any of the soil samples submitted for analysis.

- DRO (4.4 to 5.0 mg/kg) were detected at a concentration significantly below the 520 mg/kg NMED residential soil screening guideline.

- Arsenic (0.81 to 1.0 mg/kg) was detected at concentrations below the NMED-approved background concentration of 4.4 mg/kg.

- Iron (20,900 to 45,200 mg/kg) was detected at concentrations in excess of the 23,500 mg/kg NMED HHRB residential SSL, but significantly below the industrial SSL of 100,000 mg/kg. There is no NMED-approved background concentration for iron at Kirtland AFB.

- Barium (121 to 221 mg/kg); beryllium (0.53 to 0.81 mg/kg); cadmium (0.53 to 1.2 mg/kg); cobalt (13.0 to 25.2 mg/kg); copper (20.9 to 772 mg/kg); lead (9.9 to 12.5 mg/kg); vanadium (34.6 to 68.6 mg/kg); and zinc (66.9 to 555 mg/kg) were detected at concentrations above their respective NMED-approved background concentrations, but below current NMED HHRB residential SSLs.

All detected levels of analyzed constituents were below NMED HHRB residential SSLs or represent concentrations of metals that are consistent with naturally occurring levels throughout Kirtland AFB. This site does not pose an unacceptable risk to human health or the environment.

Basis of Determination

On October 4, 2006, personnel from the NMED Hazardous Waste Bureau visited the site with a representative of the Kirtland AFB Environmental Restoration Program and agreed that SWMU 10-21-U (ST-318) may be suitable for No Further Action (NFA) status and subsequent removal from the Kirtland AFB RCRA Hazardous Waste Permit. This request for NFA status is based on NMED's NFA Criterion 3: No release from the SWMU to the environment has occurred or is likely to occur in the future.

References

NMED, 2006a. *Technical Background Document for Development of Soil Screening Levels*. New Mexico Environment Department Hazardous Waste Bureau and Groundwater Quality Bureau Voluntary Remediation Program. June 2006 update (Revision 4.0) of February 2004 document.

NMED, 2006b. *New Mexico Environment Department TPH Screening Guidelines*. New Mexico Environment Department. Santa Fe, New Mexico. October.

NMED, 1997. Hazardous Waste Bureau (formerly Hazardous and Radioactive Materials Bureau), Approved Background Concentrations, Sandia National Laboratories/Kirtland Air Force Base, New Mexico.

USAF, 2002. *Land Use Management Plan*. U.S. Air Force, Kirtland Air Force Base, New Mexico.

USAF, 2001. Kirtland Air Force Base Cultural-Historic Building Survey, Geographic Environmental Management System (GEMS) database.

USAF, 1995b. Memorandum. Nancy Long, 377 CEG/CERR, Kirtland Air Force Base. 02 November 1995. Subject: Notification of Demolition, MHMV 891043, Remove Septic Tanks – Manzano Area. Daniel Yocum, Project Engineer, 377 CEG/CECA, Kirtland Air Force Base. November.

USAF, 1995a. *Draft Final RCRA Facility Investigation Report, Appendix III Wasteline Sites, October*. Halliburton NUS Corporation, Albuquerque, New Mexico.

USAF, 1994. *Final Data Analysis Report, Military Civil HTW Projects for USACE, Omaha District, Manzano Weapons Storage Area Septic Tank Drain Field Soil Investigations, November*. CDM Federal Programs Corporation, Albuquerque, New Mexico.

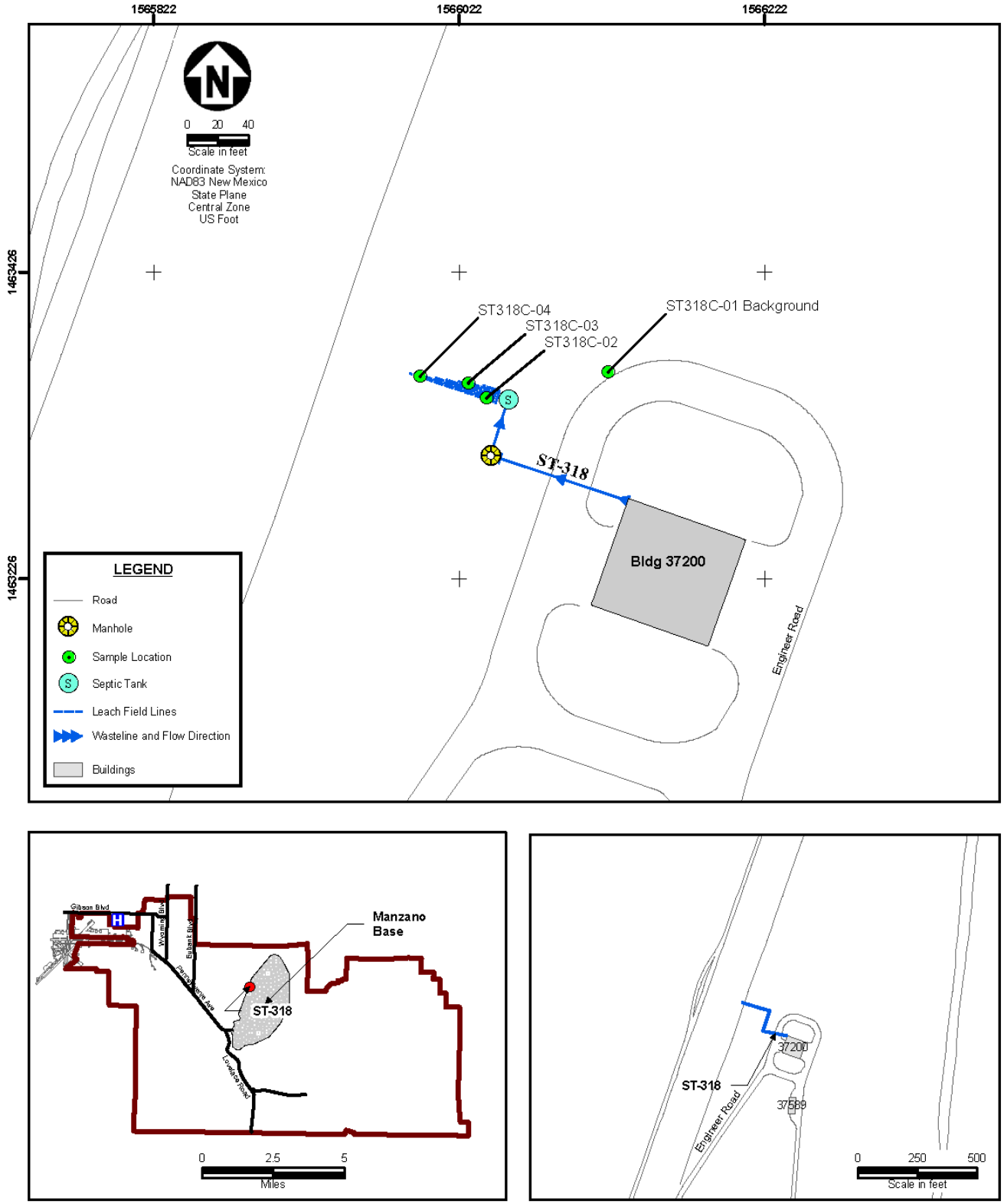

Figure I-7. RCRA Facility Investigation Sample Locations at SWMU 10-21-U, Building 37200, Septic Tank, Leach Field, and Lines (ST-318), Kirtland Air Force Base, New Mexico

I-8. SWMU 10-21-V, Septic System Building 37541 (ST-319)

Location and Current Land Use

Solid Waste Management Unit (SWMU) 10-21-V (ST-319) is located 100 feet (ft) northwest of Building 37541, also known as Plant 4, a weapons systems maintenance building inside the former Manzano Weapons Storage Area (MWSA), in the central portion of Kirtland Air Force Base (AFB). SWMU 10-21-V consisted of a septic tank, distribution box, leach field, and lines, all of which were excavated and removed from the site in 1995. Because Building 37541 is located inside the MWSA, it is outside of the Kirtland AFB urban/industrial land use area. The facility is currently listed as being used for storage. The location of SWMU 10-21-V is shown in Figure I-8 (United States Air Force [USAF], 1995a).

Projected Future Land Use

According to the Kirtland AFB *Land Use Management Plan* (USAF, 2002), there are no proposed changes for the land use at SWMU 10-21-V. However, due to New Mexico Environment Department's (NMED) regulatory requirements, a residential land use scenario was used for all risk-based screening assessments.

Site History

Building 37541 was constructed in 1953 as a special weapons magazine according to the Kirtland AFB Cultural-Historic Building Survey, Geographic Environmental Management System (GEMS) database (USAF, 2001). The database indicates that from 1953 until 1992 Building 37541 was used for weapons systems maintenance and quality assurance of thermonuclear weapons. Based on engineering drawings, inflow and outflow line lengths were approximately 130 ft and 25 ft, respectively. The septic tank discharged to a 190-ft-by-8-ft leach field to the west. After excavation of the septic system in 1995, the building was connected to a sanitary sewer system serving the entire western portion of the MWSA. A copy of a Department of the Air Force Notification of Demolition, listing the system at Building 37541, is attached to this document, along with a copy of a pre-demolition plan for the facility (USAF, 1995b).

Geology and Hydrogeology

The area is underlain by unconsolidated alluvial sediment and falls within the Tijeras Soil Super Group as defined by the Sandia National Laboratories/NMED background study (NMED, 1997). Depth to groundwater is estimated to be about 320 ft below ground surface (bgs) (USAF, 1995a). The site is in an area that straddles the Tijeras/Hubbell Springs/Sandia Fault complex, and little is known about groundwater flow in this region. No production wells exist near the site.

Previous Investigations

1994 *Manzano Weapons Storage Area Septic Tank Drain Field Soil Investigation*
The *MWSA Septic Tank Drain Field Soil Investigation* was conducted to determine if the septic tanks and drain fields in the MWSA could be excavated without exposing construction crews to potential contaminants and to allow for proper disposal of construction excavation soils and debris (USAF, 1994).

On February 10, 1994, two soil borings were drilled to depths of 9.5 ft bgs. One boring was placed near the outlet of the septic tank and a second boring was placed near the middle of the leach field. A grab sample of soil was collected from 3 ft bgs and field-screened for possible contamination using an organic vapor meter and a radiological (alpha, beta, and gamma) meter. No elevated readings were detected with

these instruments. An additional grab sample collected from 3 ft bgs was analyzed for volatile organic compounds (VOCs) by an offsite laboratory. A composite sample was collected from the interval between 4 ft and 10 ft bgs. This composite sample was analyzed for Target Analyte List (TAL) metals, semivolatile organic compounds (SVOCs), high explosives (HE), and total recoverable petroleum hydrocarbons (TRPH). A discrete sample was collected for geotechnical analysis including grain size, moisture content and Atterberg limits.

The analytical results of the 1994 MWSA investigation were compared to current NMED human health risk-based (HHRB) residential soil screening levels (SSLs) (NMED, 2006a), NMED total petroleum hydrocarbon (TPH) screening guidelines (NMED, 2006b), and NMED-approved background concentrations (NMED, 1997). Results are summarized as follows:

- Acetone (0.023 to 0.027 milligrams per kilogram [mg/kg]) was detected at a concentration significantly below the NMED HHRB residential SSL.

- The SVOC bis(2-ethylhexyl)phthalate (0.048 to 0.73 mg/kg) was detected at a concentration significantly below the current NMED HHRB residential SSL of 347 mg/kg.

- No TRPH or HE were detected above the laboratory quantitation limit in any of the soil samples submitted for analysis.

- Arsenic (1.01 to 1.04 mg/kg) was detected at concentrations below the NMED-approved background concentration of 4.4 mg/kg.

- Iron (25,627 to 28,526 mg/kg) was detected at concentrations above the current NMED HHRB residential SSL but significantly below the industrial SSL of 100,000 mg/kg. There is no NMED-approved background concentration for iron at Kirtland AFB.

- Cadmium (1.1 to 1.3 mg/kg); cobalt (15.4 to 17.0 mg/kg); copper (24.0 to 24.5 mg/kg); lead (13.2.0 to 16.2 mg/kg); silver (2.1 mg/kg); vanadium (52.0 to 54.0 mg/kg); and zinc (104 to 121 mg/kg) were detected at concentrations above their respective NMED-approved background concentrations, but below current NMED HHRB residential SSLs.

1995 *Appendix III Resource Conservation and Recovery Act* (RCRA) *Facility Investigation* (RFI)
SWMU 10-21-V was investigated as part of the *Appendix III RFI* in 1995 (USAF, 1995a). On March 21, 1995, four boreholes were drilled and sampled using direct push drilling methods. One borehole was drilled northeast of the leach field area to collect background data for the site and three boreholes were drilled in the leach field area. Soil samples were collected from depths of 3 ft to 7 ft bgs. Each 2-ft sample interval was field-screened for possible contamination using a beta-gamma meter and a flame ionization detector. No elevated readings were detected with these instruments. Four soil samples were analyzed for VOCs, SVOC, TPH, metals, mercury, soil pH, and soil moisture.

The analytical results of the 1995 RFI were compared to current NMED HHRB residential SSLs (NMED, 2006a), NMED TPH screening guidelines (NMED, 2006b), and NMED-approved background concentrations (NMED, 1997). The analytical results are summarized as follows:

- No VOCs, SVOCs, or TPH were detected in any of the soil samples submitted for analysis.
- Arsenic (0.99 mg/kg) was detected at a concentration below the NMED-approved background concentration of 4.4 mg/kg.

- Iron (21,500 to 40,000 mg/kg) was detected at concentrations in excess of the 23,500 mg/kg NMED HHRB residential SSL, but significantly below the industrial SSL of 100,000 mg/kg. There is no NMED-approved background concentration for iron at Kirtland AFB.

- Barium (142 to 246 mg/kg); cobalt (11.1 to 12.9 mg/kg); copper (21.7 to 53.9 mg/kg); and vanadium (36.9 to 41.9 mg/kg) were detected at concentrations above their respective NMED-approved background concentrations, but below current NMED HHRB residential SSLs.

All detected levels of analyzed constituents were below NMED HHRB residential SSLs or represent concentrations of metals that are naturally occurring throughout Kirtland AFB. Iron occurs naturally at levels above the NMED HHRB SSLs in this area of the Kirtland AFB.

Basis of Determination

On October 4, 2006, personnel from the NMED Hazardous Waste Bureau visited the site with a representative of the Kirtland AFB Environmental Restoration Program and agreed that SWMU 10-21-V (ST-319) may be suitable for No Further Action (NFA) status and subsequent removal from the Kirtland AFB RCRA Hazardous Waste Permit. This request for NFA status is based on NMED's NFA Criterion 3: No release from the SWMU to the environment has occurred or is likely to occur in the future.

References

NMED, 2006a. *Technical Background Document for Development of Soil Screening Levels*. New Mexico Environment Department Hazardous Waste Bureau and Groundwater Quality Bureau Voluntary Remediation Program. June 2006 update (Revision 4.0) of February 2004 document.

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USAF, 1995b. Memorandum. Nancy Long, 377 CEG/CERR, Kirtland Air Force Base. 02 November 1995. Subject: Notification of Demolition, MHMV 891043, Remove Septic Tanks – Manzano Area. Daniel Yocum, Project Engineer, 377 CEG/CECA, Kirtland Air Force Base. November.

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USAF, 1994. *Final Data Analysis Report, Military Civil HTW Projects for USACE, Omaha District, Manzano Weapons Storage Area Septic Tank Drain Field Soil Investigations, November*. CDM Federal Programs Corporation, Albuquerque, New Mexico.

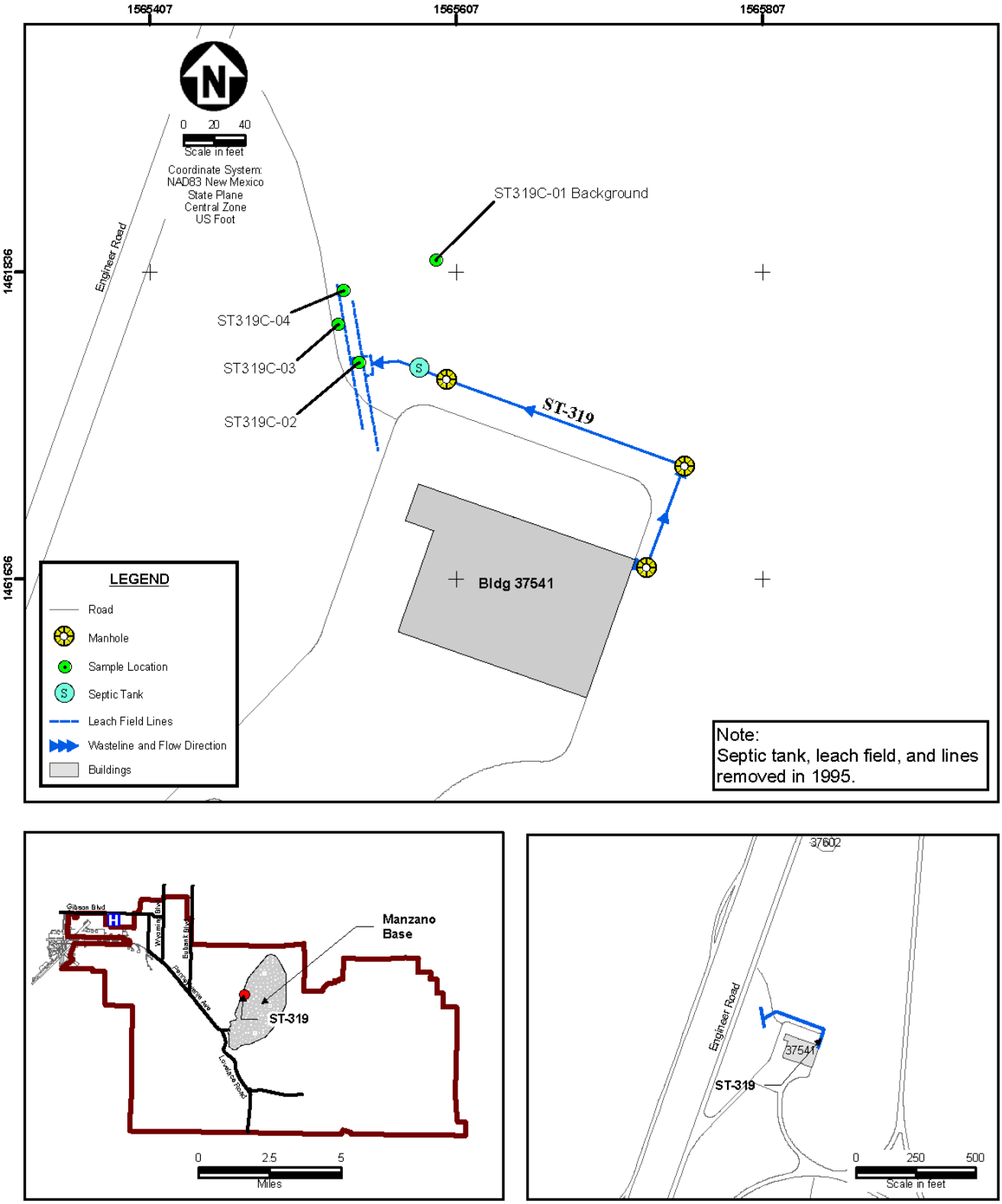

Figure I-8. RCRA Facility Investigation Sample Locations at SWMU 10-21-V, Building 37541, Septic Tank, Leach Field, and Lines (ST-319), Kirtland Air Force Base, New Mexico

I-9. SWMU 10-7-V, Oil/Water Separator, Building 57007 (Former ST-267)

Location and Current Land Use

Solid Waste Management Unit (SWMU) 10-7-V (former ST-267) was an oil/water separator (OWS) located near the center of a concrete washrack west of Building 57007, a vehicle maintenance facility in the southeast portion of Kirtland Air Force Base (AFB). The OWS was a sand and sediment trap that collected inflow from the washrack area and stormwater from Building 57007. The OWS unit was approximately 4.8 feet (ft) long by 2.8 ft wide and 4 ft deep with a capacity of 400 gallons with one outflow pipe near the top of the unit. Outflow from the OWS flowed through a corrugated pipe into a drainage ditch. The OWS was removed from service in March 2006, the bottom broken out and the former OWS was filled with dirt and gravel. Because of the isolated location of the OWS, it is considered to be outside the Kirtland AFB urban and industrial land use area. Building 57007 was demolished in the late 1990s. The location of SWMU 10-7-V is shown in Figure I.9 (United States Air Force [USAF], 2008).

Projected Future Land Use

According to the Kirtland AFB *Land Use Management Plan* (USAF, 2002), there are no proposed changes for the land use at SWMU 10-7-V. However, a residential land use scenario was used for all risk-based screening assessments to consider the most restrictive possible land use.

Site History

The SWMU 10-7-V oil/water separator was built in 1972 for use in washing vehicles and heavy equipment prior to maintenance activities. Maintenance activities occurred inside Building 57007 and consisted of changing fluids, changing tires, and general upkeep of vehicles and heavy equipment used in the field. The washrack area was mainly used for removal of mud and caked-on dirt from the vehicles. Soaps and detergents were not used at the SWMU.

Initial characterization of the materials present in the SWMU 10-7-V OWS was conducted in 1990 (USGS, 1993). Materials present in the OWS were sampled and properly disposed of by Kirtland AFB twice yearly from 1990 through 1996. In each sampling event, the OWS materials was analyzed for soil pH, total organic carbon (TOC), total organic halogens (TOX), and toxicity characteristic leaching procedures (TCLP) metals.

Building 57007 was demolished in the late 1990's. The OWS was removed from service in March 2006. The discharge pipe was abandoned in place.

Geology and Hydrogeology

The area is underlain by unconsolidated alluvial fan sediment and falls within the Coyote Test Fields Super Group as defined by the Sandia National Laboratories/New Mexico Environment Department (NMED) background study (NMED, 1997). Depth to groundwater is estimated to be about 275 ft below ground surface. Groundwater flow in this area is generally west to northwest. No production wells exist near the site.

Previous Investigations

1994 *Appendix II Stage 2B Resource Conservation and Recovery Act* (RCRA) *Facility Investigation* (RFI)
An *Appendix II Stage 2B RFI* was conducted in 1994 and consisted of the drilling of four boreholes and collection of eight soil samples. Samples were collected from just below the OWS and 5 ft below the OWS. Samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), total petroleum hydrocarbons (TPH), metals, mercury, soil pH, and soil moisture (USAF, 1995a).

The analytical results for the *Appendix II Stage 2B RFI* were compared to the NMED human health risk-based (HHRB) residential soil screening levels (SSLs) (NMED, 2006a), NMED TPH screening guidelines (NMED, 2006b), and NMED-approved background concentrations (NMED, 1997). Results are summarized as follows:

- TPH-diesel range organics (DRO) were detected in all collected samples at concentrations of 0.48 milligram per kilogram (mg/kg) to 2.1 mg/kg. These concentrations are significantly less the than TPH screening guideline for waste oil of 2,500 mg/kg.

- Eight VOCs (acetone, benzene, bromodicholormethane, chloroform, ethylbenzene, methylene chloride, tetracholorethene, and total xylenes) were detected at very low concentrations in the soil samples. All detected VOCs were well below their respective NMED residential SSLs.

- Phenol, an SVOC, was detected in one sample at a concentration of 0.16 mg/kg. The detected concentration is well below the NMED residential SSL of 18,300 mg/kg.

- Barium, chromium, copper, lead, and nickel were detected at concentrations that exceed their respective NMED-approved background concentrations. None of the detected metal concentrations exceed the NMED residential SSLs.

- Mercury was not detected above the laboratory quantitation limit in any of the soil samples submitted for analysis.

1995 *Appendix III Wasteline Sites RFI*
The 1995 *Appendix III Wasteline Sites RFI* was conducted to investigate the possibility of a release from the SWMU 10-7-V outflow pipe. Three soil samples were collected and analyzed for VOCs, SVOCs, TPH, metals, mercury, soil pH, and soil moisture (USAF, 1995b).

Analytical results for the *Appendix III Wasteline Sites RFI* were compared to the NMED HHRB residential SSLs (NMED, 2006a), NMED TPH screening guidelines (NMED, 2006b), and NMED-approved background concentrations (NMED, 1997). Results are summarized as follows:

- TPH-DRO were detected in two samples at concentrations of 6.5 to 12 mg/kg. These concentrations are less than the TPH screening guideline for waste oil of 2,500 mg/kg.

- Methylene chloride, a VOC, was detected in all collected soil samples at concentration of 0.006 to 0.007 mg/kg. Methylene chloride was also detected in the laboratory method blank indicating that the methylene chloride detected in the soil samples is a result of laboratory contamination.

- Cadmium and copper were detected at concentrations that exceed their respective NMED-approved background concentrations. None of the metal concentrations exceeds the NMED residential SSLs.

- Mercury was not detected above the laboratory quantitation limit in any of the soil samples submitted for analysis.

2006 *RFI*

In the June 2006 *RFI*, two soil samples were collected from the OWS outfall discharge point to characterize the discharge of materials from the former OWS. Soil samples were analyzed for VOCs, SVOCs, Target Analyte List (TAL) metals, and TPH.

Analytical results for the 2006 RFI were compared to the NMED HHRB residential SSLs (NMED, 2006a), NMED TPH screening guidelines (NMED, 2006b), and NMED-approved background concentrations for metals (NMED, 1997). Results are summarized as follows:

- TPH-DRO was detected in both soil samples at concentrations of 1,300 mg/kg and 7.5 J mg/kg. These concentrations are less than the TPH screening guidelines for waste oil of 2,500 mg/kg.

- Acetone, a VOC, was detected in both soil samples at concentrations of 0.0061 J mg/kg and 0.0071 J mg/kg. These concentrations are less than the NMED residential SSL of 28,100 mg/kg.

- 2-Butanone, a VOC, was detected in one soil sample at a concentration of 0.0035 J mg/kg. This concentration is less than the NMED residential SSL of 31,800 mg/kg.

- Anthracene, an SVOC, was detected in one soil sample at a concentration of 0.047 J mg/kg. This concentration is less than the NMED residential SSL of 22,000 mg/kg.

- Zinc was detected in both soil samples at concentrations of 67 mg/kg and 16 mg/kg. The concentration of 67 mg/kg exceeds the NMED-approved background concentration for zinc. However, neither concentration exceeds the NMED residential SSL of 23,500 mg/kg.

All detected concentrations of analyzed constituents were below current NMED residential SSLs, or represent concentrations of metals that are consistent with naturally occurring levels throughout Kirtland AFB and are not the result of past activities of the site. This site does not pose any unacceptable risk to human health or the environment.

Basis of Determination

The site data do not indicate a significant release of anthropogenic contamination to the environment from the SWMU. The former OWS has been closed. Based on these data, the site is considered appropriate for No Further Action (NFA) based on NMED's Criterion 5: The SWMU has been characterized or remediated in accordance with current applicable state or federal regulations, and the available data indicate that contaminants at SWMU 10-7-V (former ST-267) pose an acceptable level of risk under current and projected future land use.

References

NMED, 2006a. *NMED Soil Screening Levels (SSL) Guidelines.* New Mexico Environment Department. Santa Fe, New Mexico. June.

NMED, 2006b. *NMED Total Petroleum Hydrocarbons (TPH) Screening Guidelines.* New Mexico Environment Department. Santa Fe, New Mexico. October.

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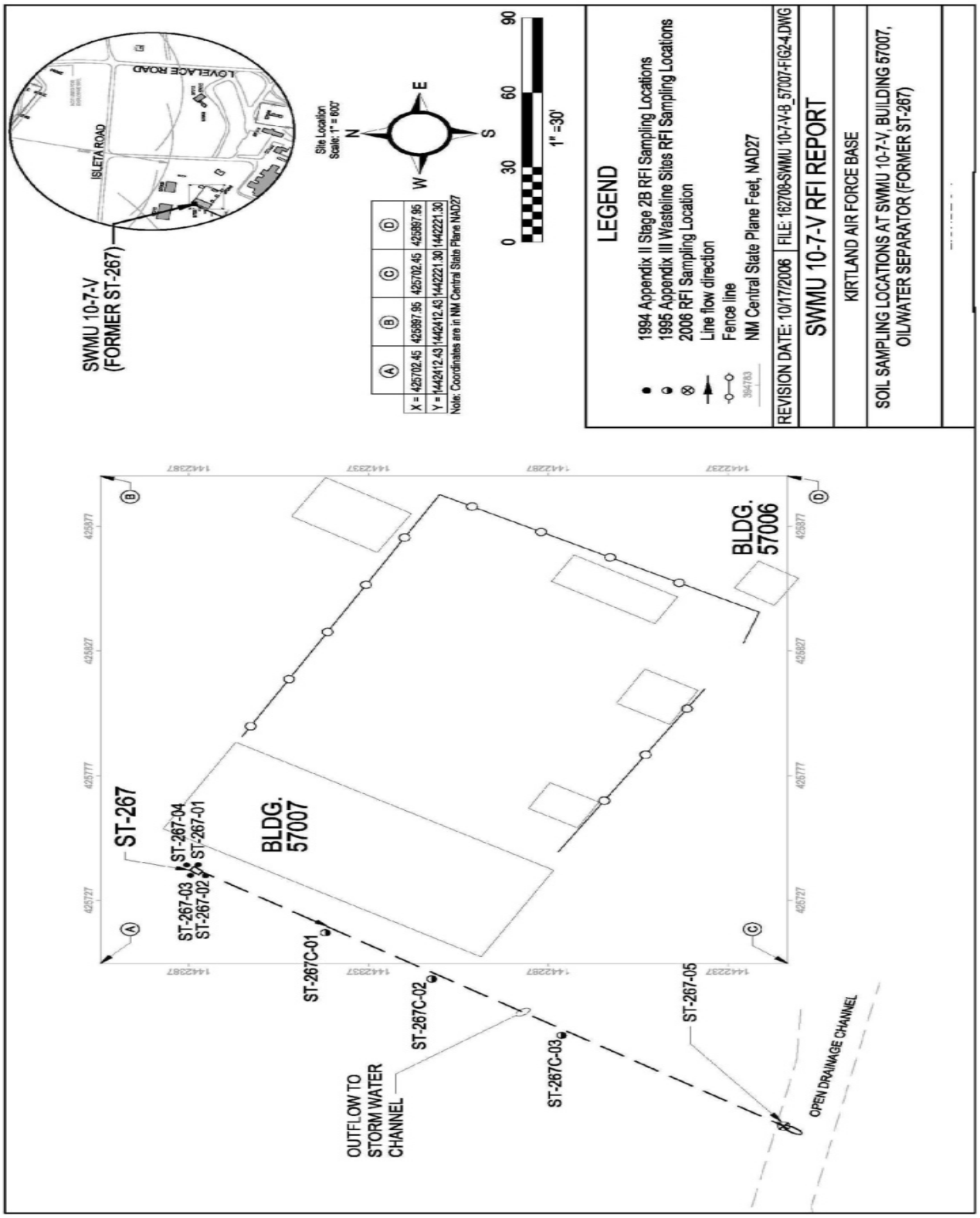

Figure I.9. RCRA Facility Investigation Sample Locations, SWMU 10-7-V, Oil/Water Separator, Building 57007 (Former ST-267), Kirtland Air Force Base, New Mexico

I-10. SWMU 10-21-Z, Building 1032 Septic System (ST-330)

Location and Current Land Use

Solid Waste Management Unit (SWMU) 10-21-Z, (ST-330) the Building 1032 septic system, is located 290 feet (ft) west of Building 1036, a Petroleum Operations Administration Building in the northwest portion of Kirtland Air Force Base (AFB), and part of the Bulk Fuels Facility. This facility is currently undergoing remediation of a jet fuel spill from failed subsurface piping associated with the former fuel offloading rack (ST-106), located approximately 250 ft northwest of the former ST-330 septic tank location. ST-330 was abandoned in place; the date is uncertain. Drawings from previous site investigations show that Building 1032 may have also been connected to ST-330. Based on engineering drawings, inflow and outflow line lengths were approximately 300 ft and 15 ft, (from Building 1036) respectively. The tank discharged to an 80-ft-by-40-ft leach field to the west. Figure I-10 shows the site location and septic system configuration.

Projected Future Land Use

According to the Kirtland AFB *Land Use Management Plan* (USAF, 2002), there are no proposed changes for the land use at ST-330. However, due to New Mexico Environment Department's (NMED) regulatory requirements, a residential land use scenario was used for all risk-based screening assessments.

Site History

Buildings 1032 and 1036 are part of the Petroleum Operations Facility, a centralized facility for the management and control of all base functions related to the handling of petroleum products, including laboratory, ready-room for fueling operations and administration. Septic system ST-330 received only domestic type waste disposal. The ST-330 site also lies within the widespread phase-separated hydrocarbon (PSH, or free product) plume associated with the ST-106 jet fuel release. Investigation into the nature and extent of the PSH plume is ongoing even while aggressive remediation of both PSH and soil vapors at the ST-106 site via soil vapor extraction (SVE) continues (USAF, 2008).

Geology and Hydrogeology

The ST-330 area is underlain by unconsolidated alluvial sediment and falls within the North Soil Super Group as defined by the Sandia National Laboratories/NMED Oversight Board background study (NMED, 1997). The most recent groundwater monitoring data at the site (USAF, 2006) indicates the depth to groundwater is approximately 500 ft below ground surface (bgs). The nearest production wells are KAFB-15 (2,200 ft west-northwest) and KAFB-16 (3,600 ft east-northeast).

Previous Investigations

1995 *Appendix III Resource Conservation and Recovery Act* (RCRA) *Facility Investigation* (RFI)
On February 8, 1995, four boreholes were drilled and sampled using a Geoprobe® during the 1995 *Appendix III* RFI (USAF, 1995). One borehole was drilled northeast of the leach field area to collect background data for the site and three boreholes were drilled in the leach field area. Soil samples were collected from a depth of 3 ft to 8 ft bgs based on engineering drawings indicating the leach field lines were at a depth of 3 ft bgs. Each 2-ft sample interval was field-screened for possible contamination using a beta-gamma meter and a flame ionization detector. No elevated readings were detected with these instruments.

Four soil samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), total petroleum hydrocarbons (TPH), metals, mercury, soil pH, and soil moisture.

No VOCs were detected in any of the soil samples submitted for analysis. SVOCs were detected at concentrations well below NMED residential screening guidelines (NMED, 2006). Arsenic was detected at concentrations above both the NMED-approved background concentration and the NMED residential soil screening levels (SSLs). In the absence of other indicators, the arsenic concentration is presumed to be naturally occurring in this area and throughout Kirtland AFB. This site does not pose unacceptable risk to human health or the environment (USAF, 1995).

All detected levels of analyzed constituents were below the SSLs or represent concentrations of metals that are naturally occurring throughout Kirtland AFB.

Basis of Determination

Based on the history of the Building 1032 activities, petroleum-related compounds would be expected to be the only anthropogenic compounds potentially released to the environment and detectable in the ST-330 leach field soil samples. The SVOCs detected (benzyl butyl phthalate and di-n-butyl phthalate) as part of the RFI investigation were compounds unrelated to the jet fuel release and were also in concentrations well below their respective residential SSLs.

On August 17, 2006, personnel from the NMED Hazardous Waste Bureau visited the site with a representative of Kirtland AFB and agreed that SWMU 10-21-Z (ST-330) may be suitable for No Further Action (NFA) status and subsequent removal from the Kirtland AFB RCRA Hazardous Waste Permit. This request for NFA status is based on NMED's NFA Criterion 3: No release from the SWMU to the environment has occurred or is likely to occur in the future.

References

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USAF, 2006. *Stage 2 Abatement Plan Quarterly Summary and Performance Report, ST-106, May*. CH2M HILL, Albuquerque, New Mexico.

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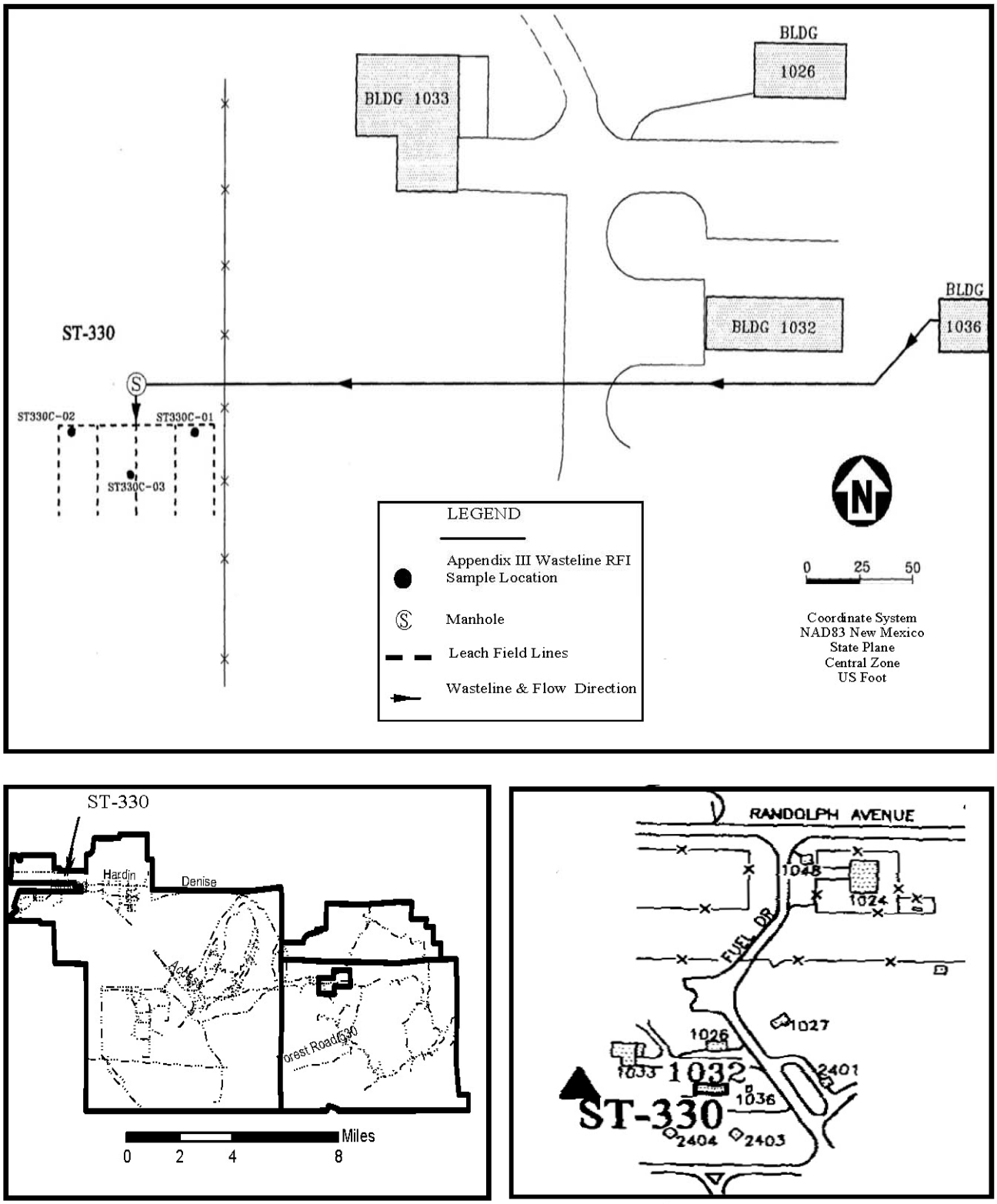

Figure I-10. RCRA Facility Investigation Sample Locations at Corrective Action Unit 10-21Z, Building 1032, Septic Tank, Leach Field, and Lines (ST-330), Kirtland Air Force Base, New Mexico

I-11. SWMU 10-2-A, Corrosion Control Shop, Building 482, Storm Drain and SWMU 10-2-F, H-3/H53, Phase Dock, Building 1000, Floor Drains (ST-325)

Location and Current Land Use

Storm sewer ST-325 is the central and the largest of the three storm sewer systems in the northwestern portion of Kirtland Air Force Base (AFB). The system is approximately 4.2 miles long and includes 0.3 miles of open drainage ditches. ST-325 runs primarily north to south, with some east to west laterals, discharging to a detention pond southeast of Pad 3, which, in turn, discharges to the Tijeras Arroyo. Solid Waste Management Unit (SWMU) 10-2-A, Building 482, and SWMU 10-2-F, Building 1000, are the two sites associated with the ST-325 storm sewer and are located within the Kirtland AFB urban/industrial land use area. The location of SWMU 10-2-A and SWMU 10-2-F are shown in Figure I-11 (United States Air Force [USAF], 2001).

Projected Future Land Use

According to the Kirtland AFB *Land Use Management Plan* (USAF, 2002), there are no proposed changes to land use in the area of ST-325. However, due to New Mexico Environment Department's (NMED) regulatory requirements, a residential land use scenario was used for all risk-based screening assessments.

Site History

SWMU 10-2-A, Building 482, is a former corrosion control shop and SWMU 10-2-F, Building 1000, located east across the Albuquerque International Sunport (Airport) apron, was a maintenance hangar for the H-3/H53 helicopters (Figure I-11). The exact age of the ST-325 storm sewer system is unknown, but it is believed to have been constructed between 1950 and 1960. The system serves a portion of the industrial zone in which automotive and heavy equipment repair and maintenance, aircraft repair and maintenance, equipment washing and fueling operations are conducted. The underground storm sewer system pipe consists of reinforced and non-reinforced concrete pipe of varying diameters (12, 10, 8, 6, 4, and 3 inches).

Geology and Hydrogeology

The ST-325 area is underlain by unconsolidated alluvial sediment and falls within the North Super Group soils area as defined by the Sandia National Laboratories/NMED background study (NMED, 1997). Depth to groundwater is estimated to be approximately 400 feet (ft) below ground surface (bgs), but shallower perched zones may occur (USAF, 1995). The nearest production well to this site is KAFB-14, located approximately 50 ft south.

Previous Investigations

1995 *Appendix III Wasteline Resource Conservation and Recovery Act* (RCRA) *Facility Investigation* (RFI)

Three sediment samples were collected from the bottom of storm drains located upstream of the terminal end of the ST-325 sewer system during the Appendix III Wasteline *RFI* in April 1995 (USAF, 1995). Sample ST-325C-01 was collected from a storm drain (M53) northeast of Building 377. Sample ST-325C-02 was collected from a storm drain northwest of Building 376 (M52). Sample ST-325C-03 was collected from a storm drain (D7) east of Building 1015.

Each sample interval was field screened for possible contamination using a beta-gamma meter and a photoionization detector (PID). No elevated readings were detected with these instruments (USAF, 1995).

Samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), total petroleum hydrocarbons (TPH), metals (the expected contaminants associated with normal operations at this site), soil pH, and soil moisture.

No VOCs were detected in the sediment samples collected from ST-325 (SWMUs 10-2-A and 10-2-F). Several SVOCs were detected at concentrations below the NMED human health risk based residential soil screening levels (SSLs) (NMED, 2006a). The SVOC benzo(a)pyrene was detected at a concentration above the NMED residential SSL for this compound. Diesel-range TPH were detected, but at concentrations below the NMED residential screening guidelines (NMED, 2006b).

The presence of benzo(a)pyrene at concentrations above NMED residential SSLs warranted further investigation. Following is a summary of the follow-on investigation that determined the extent of the release.

1996 *Appendix III Phase 2 RFI*

In September 1996, four boreholes were drilled and sampled near each of the three storm drains where contamination was previously detected for 12 boreholes sampled (ST-325-04 through ST-325-15), as shown in Figure I-11. Two boreholes were drilled on opposite sides of each drain; additional boreholes were drilled at the first and second 10-ft downgradient joints. Two samples were collected from each borehole at 0 ft and 5 ft below the base of the storm sewer. Reportedly, the storm sewer was located at 5 ft bgs. Because elevated PID readings (at most 7.1-meter units) were observed at 5 ft to 7 ft bgs and 10 ft to 12 ft bgs, two additional samples were collected from borehole ST-325C-09 at 20 ft to 22 ft bgs and 30 ft to 32 ft bgs. Samples were again analyzed for VOCs, SVOCs, TPH, and metals.

Arsenic was detected at concentrations above the NMED residential SSLs, and slightly above the NMED-approved background concentrations. In the absence of other indicators, the arsenic concentration is presumed to be naturally occurring in this area and throughout Kirtland AFB. Neither SWMU 10-2-A nor SWMU 10-2-F pose unacceptable risk to human health or the environment. (USAF, 1997a).

1997 *Interim Corrective Measures*

The *Interim Corrective Measures* (ICMs) removed debris and potentially contaminated sediment from the storm sewer lines and drains and included sampling, analyzing, and disposing of the waste. ICMs were conducted at ST-325 from September 3 through 8, 1997. Plugs and/or sandbags were placed at several points in the drains, and sediments were pushed to a collection point, using a hydrojetting tool. The resultant slurry was collected using a vacuum truck. Several passes of the hydrojetting tool were made at each line until the lines were clean, as confirmed by video inspection (USAF, 1997b).

Basis of Determination

The NMED Hazardous Waste Bureau personnel visited the site on September 3, 2008 and concurred with the Kirtland AFB recommendation that SWMU 10-02-A and SWMU 10-2-F (ST-325) were appropriate for submittal for NFA petition. This request for NFA status is based on NMED's NFA Criterion 3: No release from the SWMUs to the environment has occurred or is likely to occur.

References

NMED, 2006a. *Technical Background Document for Development of Soil Screening Levels*. New Mexico Environment Department Hazardous Waste Bureau and Groundwater Quality Bureau Voluntary Remediation Program. Revision 4.0. August.

NMED, 2006b. *Total Petroleum Hydrocarbon Screening Guidelines*. New Mexico Environment Department. Santa Fe, New Mexico. November.

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USAF, 2002. *Land Use Management Plan*. U.S. Air Force, Kirtland Air Force Base, New Mexico.

USAF, 2001. *No Further Action Proposals for Corrective Action Units SS-77, Abandoned Railroad Spur; SS-82, Air Force Weapons Laboratory/Los Alamos Scientific Laboratories Electromagnetic Pulse Calibration and Simulation Facility; 10-2, Storm Sewer Systems; 10-21, Septic Systems; and 8-35, Waste Oil Storage Tank, Building 471*. Montgomery Watson, Albuquerque, New Mexico. January.

(USAF, 1995. *Draft Final RCRA Facility Investigation Report. Appendix III Wasteline Sites*. Halliburton NUS Corporation, Albuquerque, New Mexico. October.

USAF, 1997a. *RCRA Facility Investigation Report: Appendix III Phase 2 (HNUS)*. Draft Final. U.S. Air Force, Installation Restoration Program, Kirtland Air Force Base, New Mexico. July.

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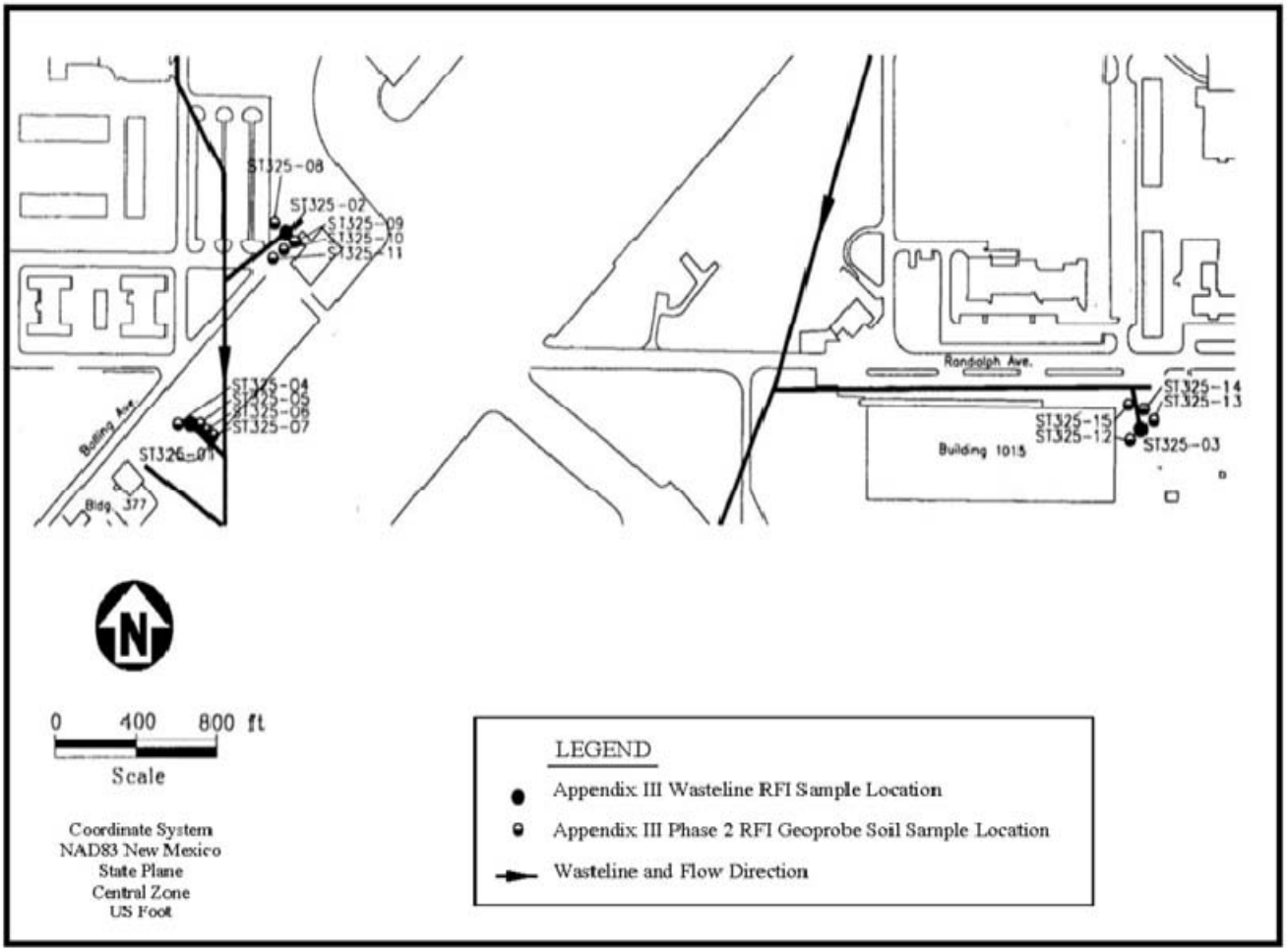
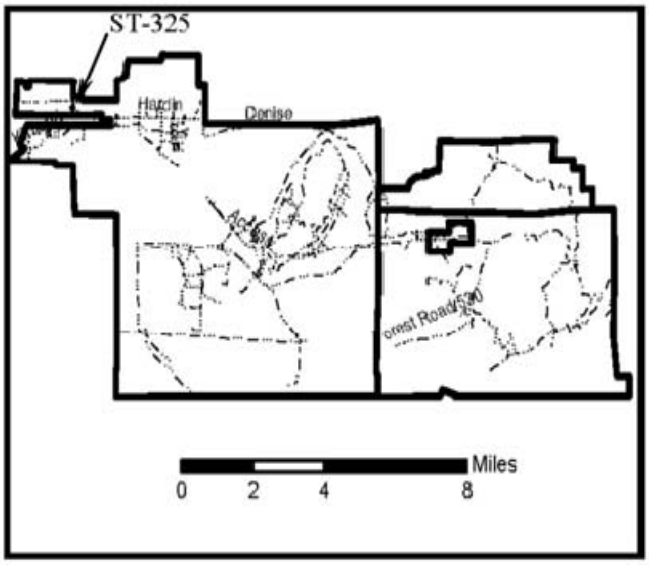
USAF, 1995. *Draft Final RCRA Facility Investigation (RFI) Report, Appendix III Wasteline Sites, October*. Halliburton NUS Corporation, Albuquerque, New Mexico.





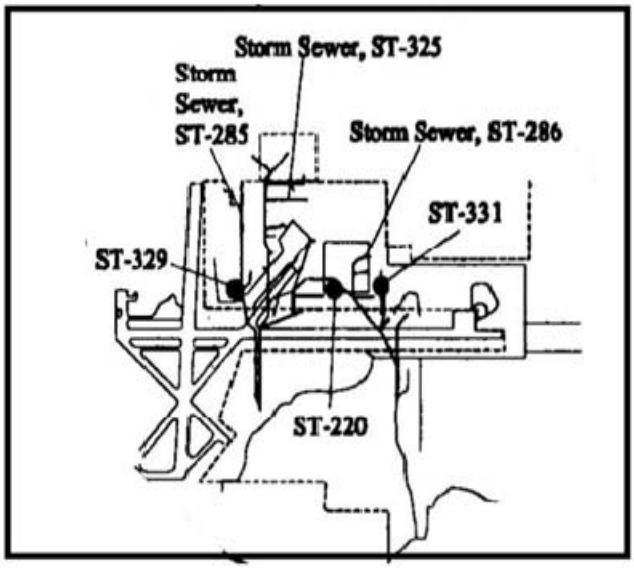


Figure I-11. RCRA Facility Investigation Sample Locations at Corrective Action Units 10-2-A and 10-2-F, Central Storm Sewer (ST-325), Kirtland Air Force Base, New Mexico

I-12. SWMU 10-2-B, Paint Shop/Plating and SWMU 10-2-C, Anodizing, Building 1001 Storm Drain (ST-220)

Location and Current Land Use

Building 1001 storm drain (ST-220) is associated with Solid Waste Management Units (SWMU) 10-2-B and 10-2-C, and consists of a concrete floor drain in the center of the south hangar bay floor of Building 1001. Building 1001 is between Randolph Avenue and the east-west runway, west of San Mateo Boulevard, in the northwestern portion of Kirtland Air Force Base (AFB). Building 1001 is located within the Kirtland AFB urban/industrial land use area. The location of ST-220 is shown in Figure I-12 (United States Air Force [USAF], 1995a).

Projected Future Land Use

According to the Kirtland AFB *Land Use Management Plan* (USAF, 2002), there are no proposed changes to land use at ST-220. However, due to New Mexico Environment Department's (NMED) regulatory requirements, a residential land use scenario was used for all risk-based screening assessments.

Site History

Floor drain ST-220 is located in the center of the south hangar bay floor of Building 1001, an aircraft operations and maintenance hangar (Figure I-12). The drain is concrete with a slotted metal grate cover and measures 11.2 feet (ft) long, 2.5 ft wide and 4.0 ft deep. Historically, the ST-220 floor drain received discharge from a series of perimeter floor drains along the west side of Building 1001, and from the floor inside the hangar where aircraft maintenance was performed. Building 1001 is also the location of a paint shop (SWMU 10-2-B) and a plating and anodizing shop (SWMU 10-2-C), presumably also potential sources of inflow to ST-220. In June 1994, at the time of the first environmental investigation of soils adjacent to floor drain ST-220 (see 1994 *Stage 2B RFI* in Previous Investigations section), site workers determined that the inflow and outflow lines had been rerouted and the former lines had been permanently sealed off. The floor drain, replaced just prior to the 1994 site investigation, historically discharged east through a buried outflow line connected to a storm sewer lateral running along the east side of Building 1001 (USAF, 1995). The rerouted floor drain ST-220 discharges to an oil/water separator that discharges to a sanitary sewer system on the west side of the building.

Geology and Hydrogeology

The ST-220 area is underlain by unconsolidated alluvial sediment and falls within the North Super Group soils area as defined by the Sandia National Laboratories/NMED background study (NMED, 1997). Depth to groundwater is estimated to be about 350 ft below ground surface (bgs), but shallower perched zones may occur (USAF, 1995). The nearest production wells to this site are KAFB-14, located 750 ft to the northwest; KAFB-12, located 4,000 ft to the northwest; and KAFB-2, located 4,300 ft to the southeast.

Previous Investigations

1994 *Stage 2B Resource Conservation and Recovery Act* (RCRA) *Facility Investigation* (RFI)
In 1992, ST-220 was observed to be out of service but still receiving flow and the potential existed for this runoff collection point to overflow or leak and impact adjacent soils. Previous Kirtland AFB environmental contractors characterized the material inside the ST-220 floor drain as having concentrations of total petroleum hydrocarbons (TPH) as high as 425,000 milligrams per kilogram (mg/kg). Concentrations of cadmium, lead, and chromium were also detected in the ST-220 material, but

at levels well below NMED residential soil screening levels (SSLs) (NMED, 2006a). This data, along with the potential for impacted soils adjacent to the ST-220 floor drain, prompted further investigation and the site was included in the *Stage 2B RFI* work plan (USGS, 1993). The objective of the Stage 2B investigation at the site was to determine if contamination existed in soil adjacent to the drain and to determine the discharge destination.

On June 13, 1994, four boreholes were drilled and sampled using direct-push drilling techniques. Boreholes were located at each of the four corners of the rectangular shaped drain. Soil samples were collected for laboratory analysis at depths of 7 ft bgs and 14 ft bgs, which were3 ft and 10 ft below the base of the drain, respectively. Each sample interval was field screened for possible contamination using a beta-gamma meter and a photoionization detector (PID). No elevated readings were detected with these instruments (USAF, 1995a).

Nine soil samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), TPH, metals, mercury, soil pH, and soil moisture. SVOCs were detected, but at concentrations significantly below the NMED residential SSLs. Both diesel-range and gasoline-range TPH were detected in all samples, also at concentrations significantly below the NMED residential screening guidelines (NMED, 2006b). Beryllium was detected but at a concentration below both the NMED-approved background concentration (NMED, 1997) and NMED residential SSLs.

1995 *Appendix III RFI*

The purpose of the *Appendix III RFI* was to determine if a release occurred to the subsurface soil adjacent to the inflow and outflow lines of storm drain ST-220 (USAF, 1995b). Storm sewer ST-220 was investigated on December 20, 1999. Eight boreholes (ST-220C-01 through ST-220C-08) were installed and sampled adjacent to the drain lines. Reportedly, the base of the drain lines was determined to be 5 ft below grade. It was proposed to collect two samples per borehole at 1 to 3 ft bgs and 4 to 6 ft bgs to represent the upper and lower 2-ft sections at the base of the drain line. Because of varying concrete thicknesses, depths to the drain line base varied from one borehole to the next.

Eight samples were analyzed for SVOCs, VOCs, TPH and metals. SVOCs and TPH were detected, but at concentrations significantly below the NMED residential SSLs. Arsenic was also detected in concentrations above both the NMED SSLs and above the NMED-approved background concentrations. The arsenic concentrations detected at ST-220 are consistent with naturally occurring levels commonly detected in soil samples throughout Kirtland AFB and are not the result of past activities at the site. This site does not pose unacceptable risk to human health or the environment.

Basis of Determination

The NMED Hazardous Waste Bureau personnel visited the ST-220 Site on September 3, 2008 to observe site conditions. During the site visit, NMED indicated that SWMU 10-2-B and SWMU 10-2-C were appropriate for submittal for the No Further Action (NFA) petition. This request for NFA status is based on NMED's NFA Criterion 3: No release to the environment has occurred or is likely to occur in the future from the SWMU.

References

NMED, 2006a. *Technical Background Document for Development of Soil Screening Levels*. New Mexico Environment Department Hazardous Waste Bureau and Groundwater Quality Bureau Voluntary Remediation Program. June 2006 update (Revision 4.0) of February 2004 document

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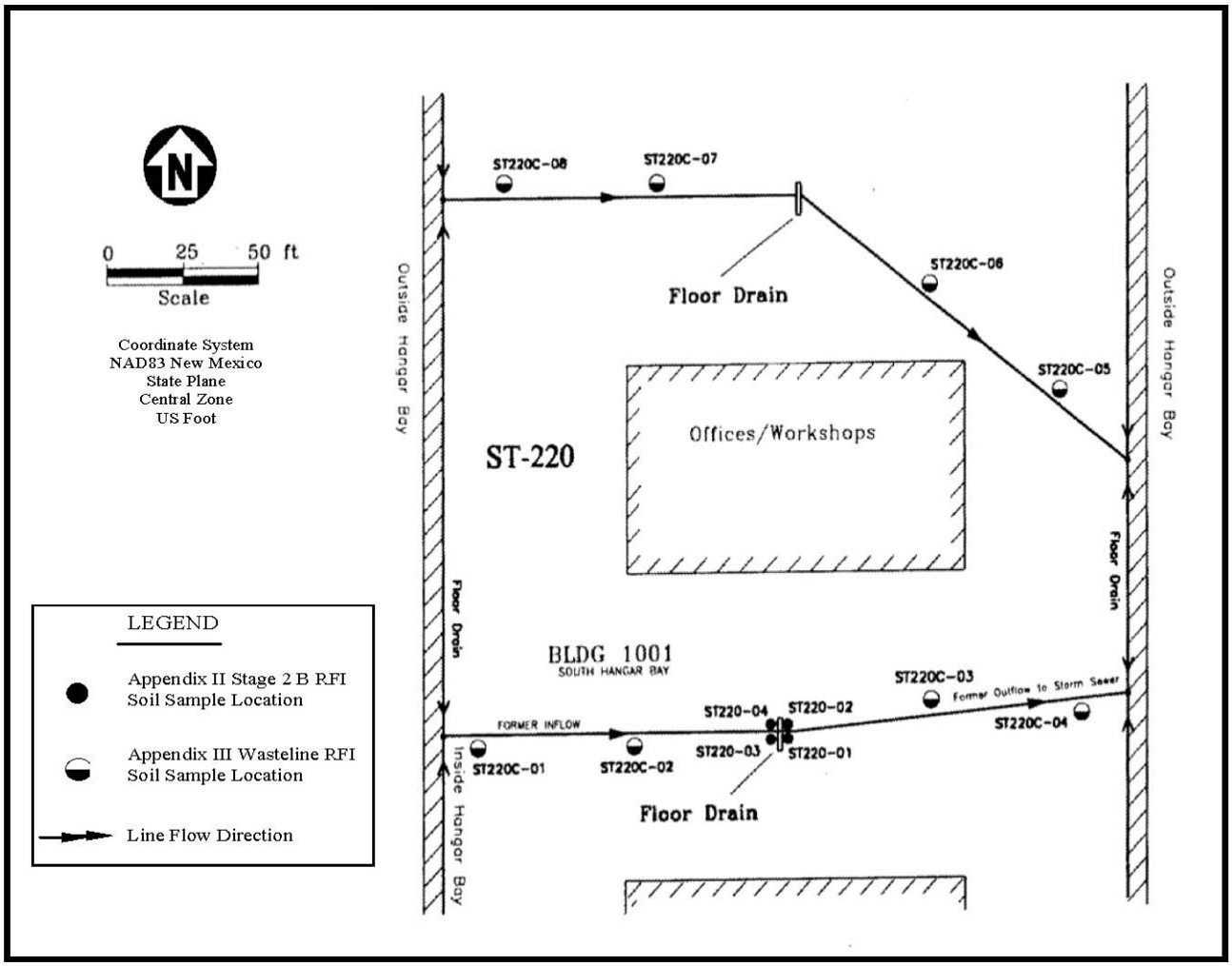

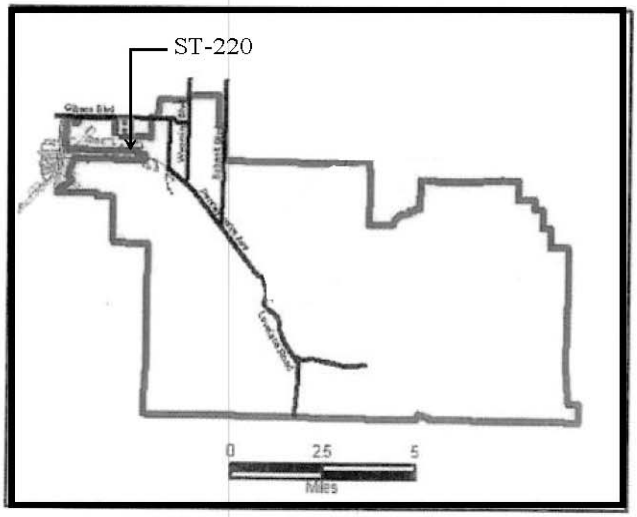

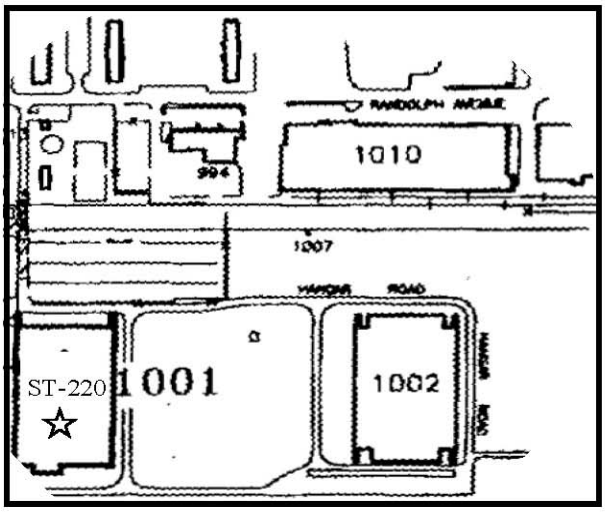

Figure I-12. SWMU 10-2-B, Paint Shop/Plating and SWMU 10-2-C, Anodizing, Building 1001 Storm Drain (ST-220), Kirtland Air Force Base, New Mexico

I-13. SWMU 10-2-D, Propulsion Branch Storm Drain Building 336 (ST-329)

Location and Current Land Use

Solid Waste Management Unit (SWMU) 10-2-D (ST-329) comprises the grease trap, drain and lines inside Building 336, located between Mather Avenue and Clark Avenue, west of Carlisle Boulevard, in the northwestern portion of Kirtland Air Force Base (AFB), New Mexico. Building 336 is located within the Kirtland AFB urban/industrial land use area. The location of ST-339 is shown in Figure I-13 (United States Air Force [USAF], 2001).

Projected Future Land Use

According to the Kirtland AFB *Land Use Management Plan* (USAF, 2002), there are no proposed changes to the urban/industrial land use scenario at ST-329. However, due to New Mexico Environment Department's (NMED) regulatory requirements, a residential land use scenario was used for all risk-based screening assessments.

Site History

Building 336 is a jet engine repair and maintenance shop. Floor drain ST-329 comprises the grease trap, drains, and lines inside Building 336. The exact age of the drain system is unknown, but was probably constructed between 1950 and 1960 (USAF, 2001). The drain lines of ST-329 discharge into oil/water separator (OWS) ST-206 and OWS ST-207 (SWMU 10-7-B). The east-side drain lines of Building 336 discharge into OWS ST-207, and the west side drain lines of Building 336 discharge into OWS ST-206. The effluent from OWS ST-206 and OWS ST207, both of which were granted No Further Action (NFA) status in 2005, discharges into storm sewer ST285 (SWMU 10-02-H).

Geology and Hydrogeology

The ST-329 area is underlain by unconsolidated alluvial sediment and falls within the North Super Group soils area as defined by the Sandia National Laboratories/NMED background study (NMED, 1997). Depth to groundwater is estimated to be approximately 350 feet (ft) below ground surface (bgs), but shallower perched zones may occur (USAF, 1995). The nearest production well to this site is KAFB-14, located approximately ½ mile to the east.

Previous Investigations

1995 *Appendix III Resource Conservation and Recovery Act* (RCRA) *Facility Investigation* (RFI)
The ST-329 drain lines were investigated in December1994 during the *Appendix III RFI* under the OWS, sediment trap, and holding tank investigations (ST-206 and ST-207) in lieu of a separate storm sewer investigation (ST-329). Thirteen boreholes (ST-206-01 through ST-206-07 and ST-207-01 through ST-207-06) were drilled and sampled. The sample depths for each borehole ranged from 2 to 8 ft bgs. Each sample interval was field screened for possible contamination using a beta-gamma meter and a photoionization detector (PID). No elevated readings were detected with these instruments.

Soil samples were collected adjacent to the drain lines to determine if a potential contaminant release to the subsurface soils had occurred. The sampling and analyses conducted during the investigation were sufficient to characterize the ST-329 internal drain lines (USAF, 1995).

Thirteen soil samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), total petroleum hydrocarbons (TPH), metals, mercury, soil pH, and soil moisture.

VOCs and SVOCs were detected at concentrations significantly below the NMED residential soil screening levels (SSLs). TPH were also detected at concentrations below the NMED residential screening guidelines (NMED, 2006). Arsenic was detected at concentrations above the NMED residential SSLs, and NMED-approved background concentrations (NMED 1997). In the absence of other indicators, the arsenic concentration is presumed to be naturally occurring in this area and throughout Kirtland AFB (USAF, 1995). This site does not pose unacceptable risk to human health or the environment.

Basis of Determination

The NMED Hazardous Waste Bureau personnel visited the site on September 3, 2008 and concurred with the Kirtland AFB recommendation that SWMU 10-02-D (ST-329) was appropriate to be petitioned for NFA. This request for NFA status is based on NMED's NFA Criterion 5: The SWMU has been characterized or remediated in accordance with current applicable state or federal regulations, and the available data indicate that contaminants pose an acceptable level of risk under current and projected land use.

References

NMED, 1997. Hazardous Waste Bureau (formerly Hazardous and Radioactive Materials Bureau), Approved Background Concentrations, Sandia National Laboratories/Kirtland Air Force Base, New Mexico.

NMED, 2006. *Total Petroleum Hydrocarbon Screening Guidelines*. New Mexico Environment Department. Santa Fe, New Mexico. November.

USAF, 2002. *Land Use Management Plan*. U.S. Air Force, Kirtland Air Force Base, New Mexico.

USAF, 2001. *No Further Action Proposals for Corrective Action Units SS-77, Abandoned Railroad Spur; SS-82, Air Force Weapons Laboratory/Los Alamos Scientific Laboratories Electromagnetic Pulse Calibration and Simulation Facility; 10-2, Storm Sewer Systems; 10-21, Septic Systems; and 8-35, Waste Oil Storage Tank, Building 471*. Montgomery Watson, Albuquerque, New Mexico. January.

USAF, 1995. *Draft Final RCRA Facility Investigation Report. Appendix III Wasteline Sites.* Halliburton NUS Corporation, Albuquerque, New Mexico. October.

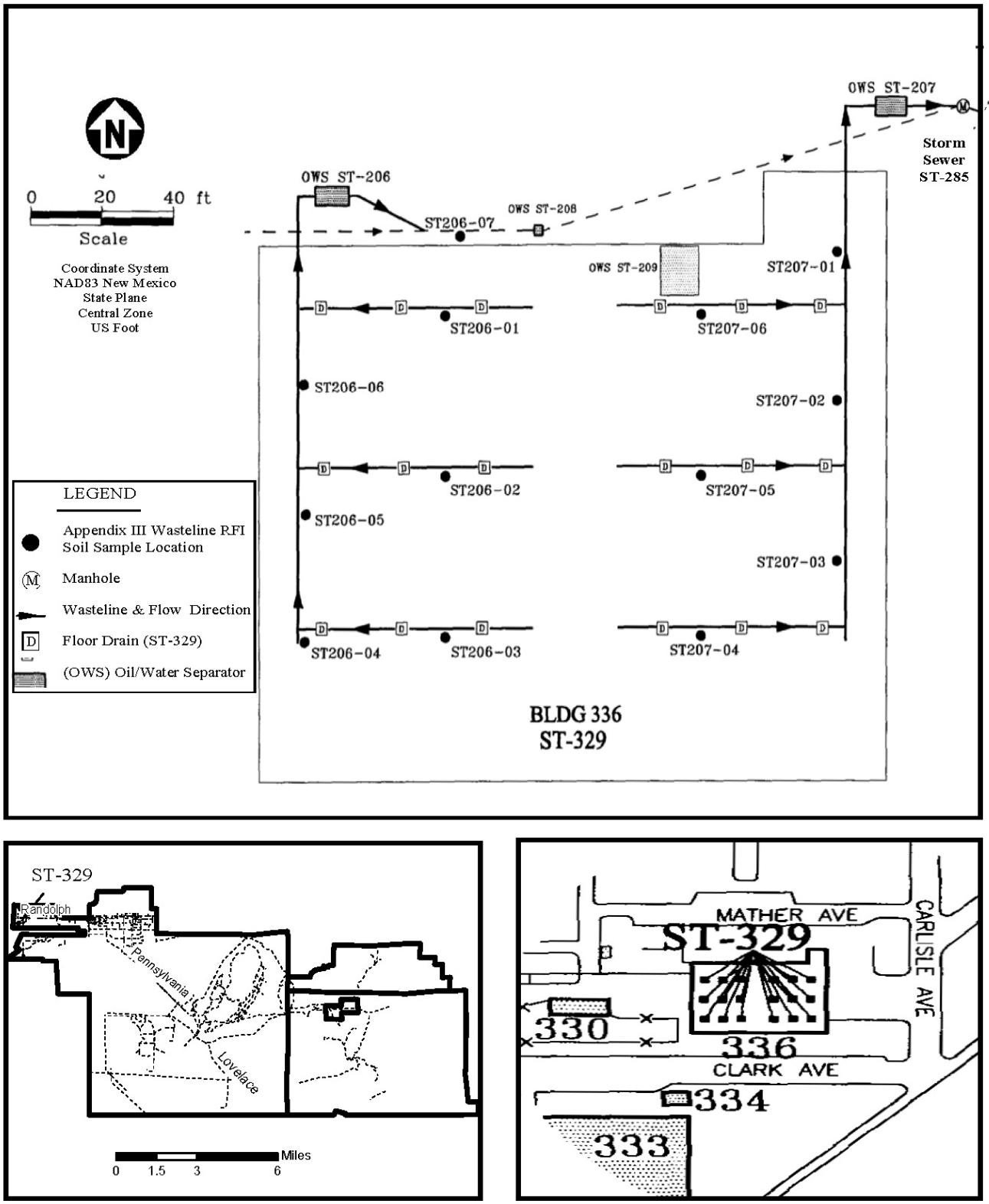

Figure I-13. RCRA Facility Investigation Sample Locations at Corrective Action Unit 10-2-D, Building 336, Grease Trap and Lines (ST-329), Kirtland Air Force Base, New Mexico

I-14. SWMU 10-2-G, C-130 Maintenance Shop, Building 1009 Storm Sewer (ST-331)

Location and Current Land Use

Solid Waste Management Unit (SWMU) 10-2-G (ST-331) is located in the parking lot of Building 1009 which is located between Randolph Avenue and the east-west Albuquerque International Sunport (Airport) runway, west of San Mateo Boulevard in the northwestern portion of Kirtland Air Force Base (AFB). Building 1009 is located within the Kirtland AFB urban/industrial land use area. The location of ST-331 is shown in Figure I-14 (United States Air Force [USAF], 2001).

Projected Future Land Use

According to the Kirtland AFB *Land Use Management Plan* (USAF, 2002), there are no proposed changes to land use at ST-331. However, due to New Mexico Environment Department's (NMED) regulatory requirements, a residential land use scenario was used for all risk-based screening assessments.

Site History

Building 1009 is a jet engine repair and maintenance shop. Storm sewer ST-331 has a metal grate cover and discharges approximately 150 feet (ft) east into SWMU 10-02-I, east storm sewer (ST-286).

Geology and Hydrogeology

The ST-331 area is underlain by unconsolidated alluvial sediment and falls within the North Super Group soils area as defined by the Sandia National Laboratories/NMED background study (NMED, 1997). Depth to groundwater is estimated to be approximately 400 ft below ground surface (bgs), but shallower perched zones may occur (USAF, 1995). The nearest production wells to this site are KAFB-2, approximately 2,800 ft (upgradient) southeast, and KAFB-14, located approximately 3,000 ft (downgradient) west-northwest.

Previous Investigations

1994 *Appendix III Resource Conservation and Recovery Act* (RCRA) *Facility Investigation* (RFI)
The ST-331 storm sewer was investigated on April 26, 1995 during the *Appendix III RFI*. One sediment sample was collected from the bottom of storm drain ST-331. The east storm sewer, SWMU 10-02-I (ST-286), and the storm drain at Building 1009 (ST-331) merge to form single outlet. Therefore, the surface soil sample that was collected from the outlet for the east storm sewer investigation was also used to characterize the outlet to the storm drain at Building 1009. Background samples collected during the *Stage 2B RFI* were used as background concentration data for samples collected for ST-331 during the *Appendix III RFI*.

Each sample interval was field screened for possible contamination using a beta-gamma meter and a photoionization detector (PID). No elevated readings were detected with these instruments (USAF, 1995).

Samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), total petroleum hydrocarbons (TPH), metals (the expected contaminants associated with normal operations at this site), soil pH, and soil moisture.

No VOCs were detected in the sediment sample collected from ST-331. Several SVOCs were detected at concentrations below the NMED human health risk-based (HHRB) residential soil screening levels (SSLs) (NMED, 2006a). However, the SVOC benzo(a)pyrene was detected at a concentration above its

NMED residential SSL. Diesel-range TPH were detected, but at concentrations below the NMED residential screening guidelines (NMED, 2006b). Several metals, including arsenic and lead, were detected, but at concentrations below the NMED residential SSLs (USAF, 1995).

The presence of benzo(a)pyrene at concentrations above NMED residential SSLs, and TPH near the NMED Petroleum Storage Tank Bureau's action level of 100 milligrams per kilogram (mg/kg), warranting further investigation. The following is a summary of the follow-on investigation activities to determine the extent of the release.

1996 *Appendix III Phase 2 RFI*

On October 21 and 22, 1996, four boreholes (ST-331C-O1 through ST-331C-05) were installed and sampled near the ST-331 storm drain (Figure I-14). Two boreholes were drilled on opposite sides of the drain; an additional borehole was drilled at the first 10-ft downgradient joint. An additional borehole (ST-331C-05) was drilled at the junction of the storm drain line and the storm sewer. Two samples were collected from each borehole at 0 ft and 5 ft below the base of the storm drain. Reportedly, the storm sewer was located at 5 ft bgs (USAF, 2001). Samples were again analyzed for VOCs, SVOCs, TPH, metals, soil pH, and soil moisture.

SVOC compounds were detected in samples collected during the Phase 2 RFI at concentrations below the NMED residential SSLs. No other analytes were detected in concentrations above detection limits.

Arsenic was detected at concentrations above the NMED residential SSLs, and slightly above the NMED-approved background concentrations. In the absence of other indicators, the arsenic concentration is presumed to be naturally occurring in this area and throughout Kirtland AFB. This site does not pose unacceptable risk to human health or the environment.

Basis of Determination

The NMED Hazardous Waste Bureau personnel visited the site on September 3, 2008 and concurred with the Kirtland AFB recommendation that SWMU 10-02-G (ST-331) was suitable for NFA petition. This request for NFA status is based on NMED's NFA Criterion 5: The SWMU has been characterized or remediated in accordance with current applicable state or federal regulations, and the available data indicate that contaminants pose an acceptable level of risk under current and projected land use.

References

NMED, 2006a. *Technical Background Document for Development of Soil Screening Levels*. New Mexico Environment Department Hazardous Waste Bureau and Groundwater Quality Bureau Voluntary Remediation Program. Revision 4.0. August.

NMED, 2006b. *Total Petroleum Hydrocarbon Screening Guidelines*. New Mexico Environment Department. Santa Fe, New Mexico. November.

NMED, 1997. Hazardous Waste Bureau (formerly Hazardous and Radioactive Materials Bureau), Approved Background Concentrations, Sandia National Laboratories/Kirtland Air Force Base, New Mexico.

USAF, 2002. *Land Use Management Plan*. U.S. Air Force, Kirtland Air Force Base, New Mexico.

USAF, 2001. *No Further Action Proposals for Corrective Action Units SS-77, Abandoned Railroad Spur; SS-82, Air Force Weapons Laboratory/Los Alamos Scientific Laboratories Electromagnetic Pulse Calibration and Simulation Facility; 10-2, Storm Sewer Systems; 10-21, Septic Systems; and 8-35, Waste Oil Storage Tank, Building 471*. Montgomery Watson, Albuquerque, New Mexico. January.

USAF, 1995. *Draft Final RCRA Facility Investigation Report. Appendix III Wasteline Sites.* Halliburton NUS Corporation, Albuquerque, New Mexico. October.

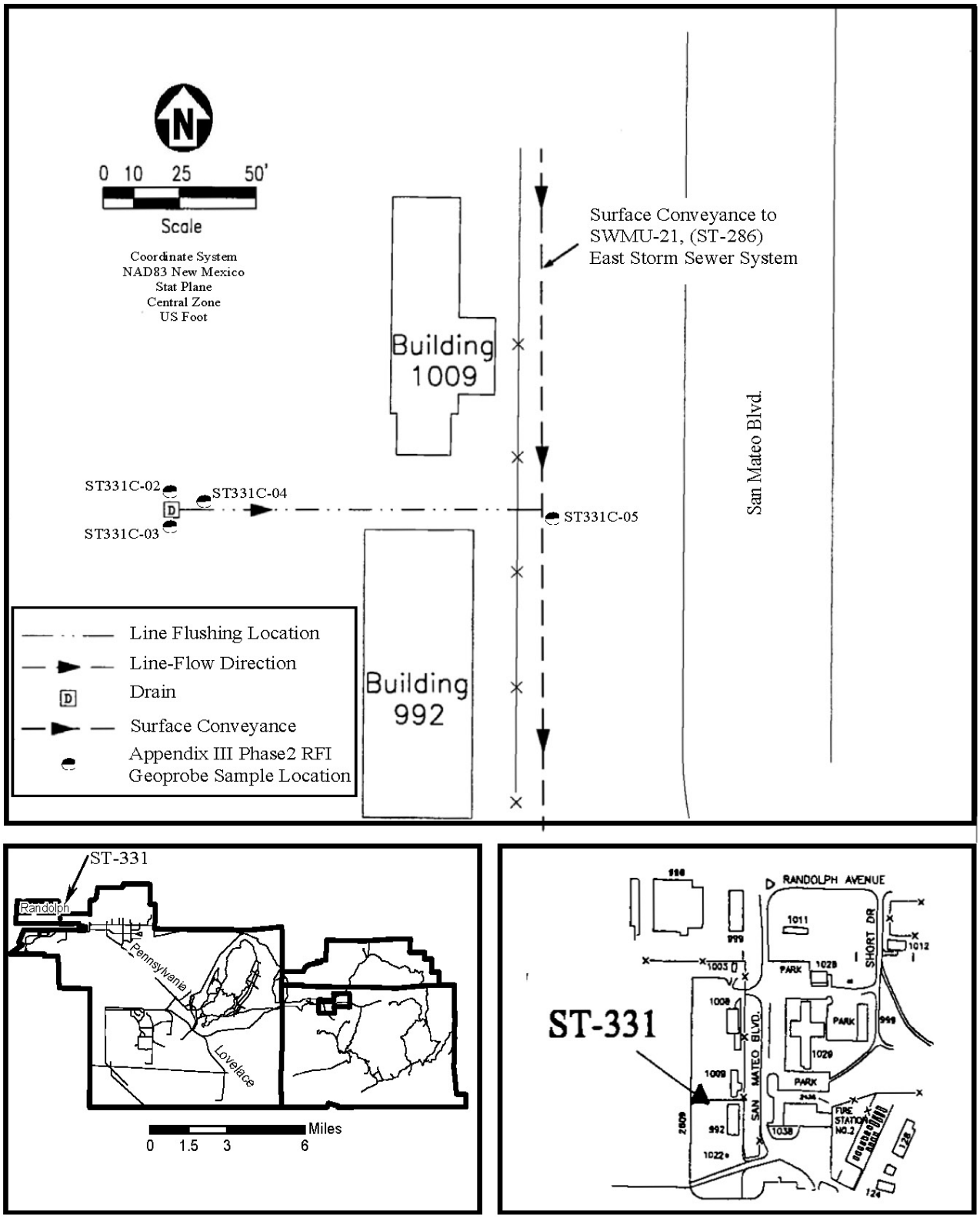

Figure I-14. RCRA Facility Investigation Sample Locations at Corrective Action Unit 10-2-G, C-130 Maintenance Shop, Building 1009, Storm Sewer (ST-331), Kirtland Air Force Base, New Mexico

I-15. SWMU 10-2-H, West Storm Sewer (ST-285)

Location and Current Land Use

Solid Waste Management Unit (SWMU) 10-2-H (ST-285) is the western-most independent stormwater system serving the urban/industrial zone in the northwestern portion of Kirtland Air Force Base (AFB). ST-285 consists of an approximately 1.6-mile-long storm sewer system that begins approximately at the intersection of Gibson and Carlisle Boulevards, and runs south to where it merges with ST-325 to form a single outlet that discharges to a detention pond southeast of Pad 3. The location of ST-285 is shown in Figure I-15 (United States Air Force [USAF], 2001).

Projected Future Land Use

According to the Kirtland AFB *Land Use Management Plan* (USAF, 2002), there are no proposed changes to land use in the area of ST-285. However, due to New Mexico Environment Department's (NMED) regulatory requirements, a residential land use scenario was used for all risk-based screening assessments.

Site History

The exact age of the ST-285 storm sewer system is unknown, but it is believed to have been constructed between 1950 and 1960. The system serves a portion of the industrial zone in which automotive and heavy equipment repair and maintenance, aircraft repair and maintenance, equipment washing and fueling operations are conducted. The underground storm sewer system pipe consists of reinforced and non reinforced concrete pipe of varying diameters (12, 10, 8, 6, 4, and 3 inches).

Geology and Hydrogeology

The ST-285 area is underlain by unconsolidated alluvial sediment and falls within the North Super Group soils area as defined by the Sandia National Laboratories/NMED background study (NMED, 1997). Depth to groundwater is estimated to be approximately 500 feet (ft) below ground surface (bgs), but shallower perched zones may occur (USAF, 1995a). The nearest production well to this site is KAFB-14, located approximately 2,600 ft to the east.

Previous Investigations

1995 *Appendix III Wasteline Resource Conservation and Recovery Act* (RCRA) *Facility Investigation* (RFI)

Three sediment samples were collected from storm drains and one surface soil sample was collected from the terminal end of the ST-285 sewer system during the *Appendix III Wasteline RFI* in April 1995 (USAF, 1995a). Sample ST-285C-01 was collected from a storm drain (C48) at the northwest corner of Clark Avenue and Carlisle Boulevard. Sample ST-285C-02 was collected from a storm drain (C41) west of the southwest corner of the Mather Street and Carlisle Boulevard intersection. Sample ST-285C-03 was collected from a storm drain (C30) south of Building 381. Sample ST-285C-04 was collected from the mouth of the terminal ST-285 culvert outlet.

Each sample interval was field screened for possible contamination using a beta-gamma meter and a photoionization detector (PID). No elevated readings were detected with these instruments (USAF, 1995a).

Samples were analyzed for the expected contaminants associated with normal operations at this site, including volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), total petroleum hydrocarbons (TPH) and metals. Soils were also analyzed for soil pH and soil moisture.

VOCs were detected in the sediment samples collected from ST-285C-03 at concentrations below U.S. Environmental Protection Agency (EPA) Region 6 human health risk-based (HHRB) residential soil screening levels (SSLs) (EPA, 1999). Several SVOCs, including benzo(a)anthracene, benzo(a)pyrene, benzo(a)fluoranthene and indeno(1,2,3-c,d)pyrene, were detected at concentrations above the NMED HHRB residential SSLs (NMED, 2006a).

Diesel-range TPH were detected at concentrations above the NMED TPH screening guidelines (NMED, 2006b).

Lead was detected at a concentration above NMED residential SSLs.

The presence of SVOCs, TPH, and lead at concentrations above NMED residential SSLs warranted further investigation. The following is a summary of the follow-on investigation activities to determine the extent of the release.

1996 *Appendix III Phase 2 RFI*
In September 1996, 12 boreholes were drilled and sampled near each of the three storm drains where contaminants were previously detected. Two boreholes were drilled on opposite sides of each drain; additional boreholes were drilled at the first and second 10-ft downgradient joints. Two samples were collected from each borehole at 0 ft and 5 ft below the base of the storm sewer. Reportedly, the storm sewer was located at 5 ft bgs. Because elevated PID readings (8.7 meter units) were observed at the 10-to-12-ft-bgs interval, an additional sample was collected from borehole ST-285C-08 at 20 to 22 ft bgs. Samples were again analyzed for VOCs, SVOCs, TPH, and metals.

Concentrations of all soils analytes (except arsenic) submitted for laboratory analysis during the *Appendix III Phase 2 RFI* were found to be below HHRB action levels (USAF, 1995b).

Arsenic was detected at concentrations above the NMED residential SSLs, and slightly above the NMED-approved background concentrations (NMED, 1997). In the absence of other indicators, the arsenic concentration is presumed to be naturally occurring in this area and throughout Kirtland AFB. This site does not pose unacceptable risk to human health or the environment.

1997 *Interim Corrective Measures*
The *Interim Corrective Measure* (ICM) conducted at ST-285 removed debris and potentially contaminated sediment from the storm sewer lines and drains and included sampling, analyzing, and disposing of the waste. ICMs were conducted at ST-285 from September 4 through 11, 1997. Plugs and/or sandbags were placed at several points in the drains, and sediments were pushed to a collection point, using a hydrojetting tool. The resultant slurry was collected using a vacuum truck. Several passes of the hydrojetting tool were made at each line until the lines were clean, as confirmed by video inspection (USAF, 1997).

Basis of Determination

The NMED Hazardous Waste Bureau personnel visited the site on September 3, 2008 and concurred with the Kirtland AFB recommendation that SWMU 10-02-H (ST-285) was appropriate for submittal for a No Further Action (NFA) petition. This request for NFA status is based on NMED's NFA Criterion 5: The SWMU has been characterized or remediated in accordance with current applicable state or federal

regulations, and the available data indicate that contaminants pose an acceptable level of risk under current and projected land use.

References

EPA, 1999. *Human Health Medium-Specific Screening Levels*. EPA Region 6, Dallas, Texas. June.

NMED, 1997. Hazardous Waste Bureau (formerly Hazardous and Radioactive Materials Bureau), Approved Background Concentrations, Sandia National Laboratories/Kirtland Air Force Base, New Mexico.

NMED, 2006a. *Technical Background Document for Development of Soil Screening Levels*. New Mexico Environment Department Hazardous Waste Bureau and Groundwater Quality Bureau Voluntary Remediation Program. Revision 4.0. August.

NMED, 2006b. *Total Petroleum Hydrocarbon Screening Guidelines*. New Mexico Environment Department. Santa Fe, New Mexico. November.

USAF, 2002. *Land Use Management Plan*. U.S. Air Force, Kirtland Air Force Base, New Mexico.

USAF, 2001. *No Further Action Proposals for Corrective Action Units SS-77, Abandoned Railroad Spur; SS-82, Air Force Weapons Laboratory/Los Alamos Scientific Laboratories Electromagnetic Pulse Calibration and Simulation Facility; 10-2, Storm Sewer Systems; 10-21, Septic Systems; and 8-35, Waste Oil Storage Tank, Building 471*. Montgomery Watson, Albuquerque, New Mexico. January.

USAF, 1997. *Final Draft Interim Corrective Measures Report for Solid Waste Management Units: 10-2H, West Storm Sewer System (ST-285), 10-2I, East Storm Sewer System (ST-286), 10-2F, H-3H/H-53 Phase Dock, Building 1000, Storm Sewer (ST-325), and 10-2G, C-130 Maintenance Shop, Building 1009, Storm Sewer (ST-331)*. December.

USAF, 1995a. *Draft Final RCRA Facility Investigation Report. Appendix III Wasteline Sites*. Halliburton NUS Corporation, Albuquerque, New Mexico. October.

USAF, 1995b. *Final RCRA Facility Investigation (RFI) Report, Appendix 1I, Stage 2B with Notice of Deficiency Response*. U.S. Air Force, Installation Restoration Program, Kirtland Air Force Base, New Mexico. July 5.

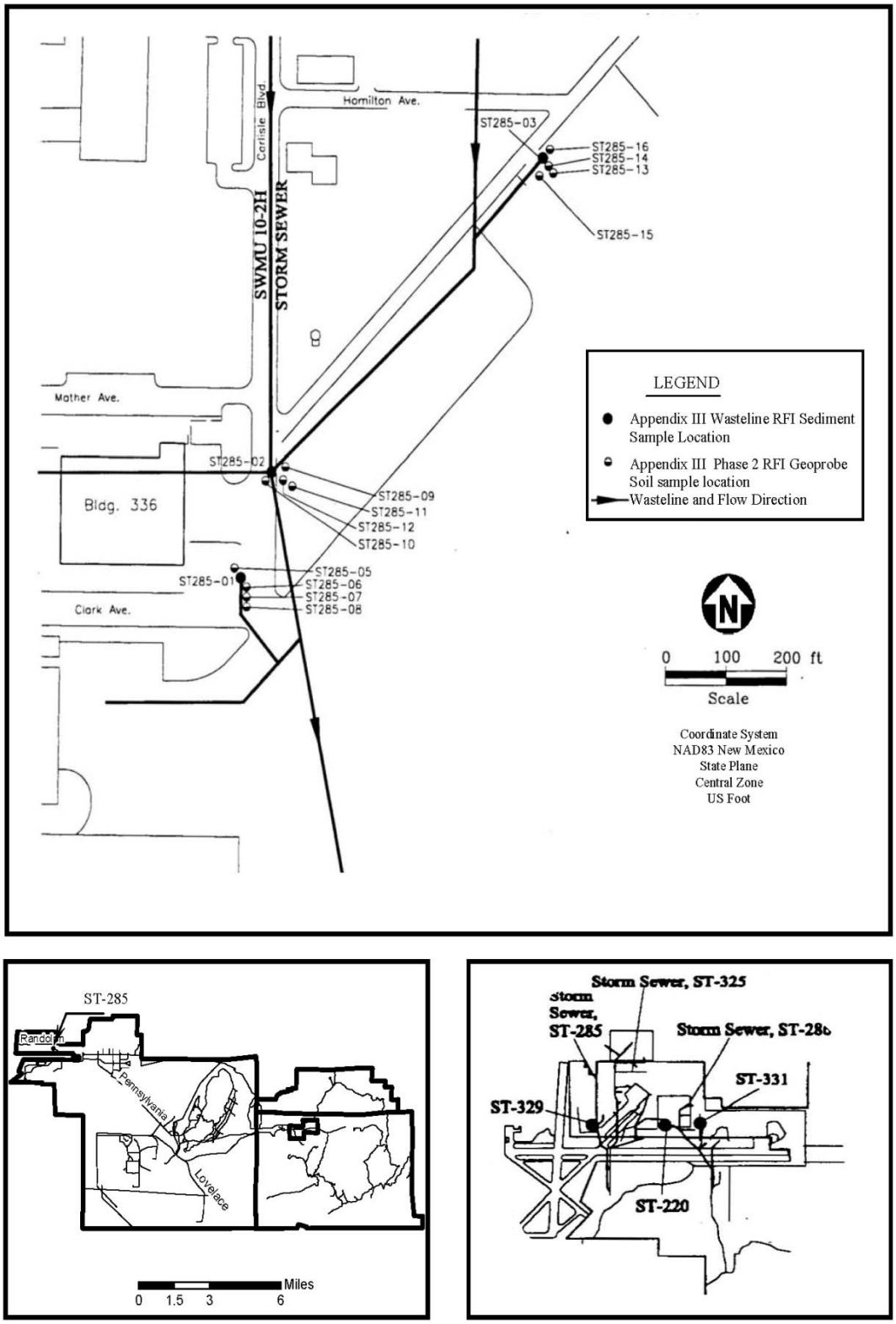

Figure I-15. RCRA Facility Investigation Sample Locations at Corrective Action Unit 10-2-H, West Storm Sewer System (ST-285), Kirtland Air Force Base, New Mexico

I-16. SWMU 10-2-I, East Storm Sewer (ST-286)

Location and Current Land Use

Solid Waste Management Unit (SWMU) 10-2-I (ST-286) is the eastern-most independent stormwater system serving the urban/industrial zone in the northwestern portion of Kirtland Air Force Base (AFB). ST-286 consists of an approximately 2.1-mile-long storm sewer system that begins approximately at the intersection of Truman and Randolph Avenues, and runs south to where it eventually discharges to the Tijeras Arroyo. The location of ST-285 is shown in Figure I-16 (United States Air Force [USAF], 2001).

Projected Future Land Use

According to the Kirtland AFB *Land Use Management Plan* (USAF, 2002), there are no proposed changes to land use in the area of SWMU 10-2-I. However, due to New Mexico Environment Department's (NMED) regulatory requirements, a residential land use scenario was used for all risk-based screening assessments.

Site History

The exact age of the ST-286 storm sewer system is unknown, but it is believed to have been constructed between 1950 and 1960. The system serves a portion of the industrial zone in which automotive and heavy equipment repair and maintenance, aircraft repair and maintenance, equipment washing and fueling operations are conducted. The system includes 0.3 miles of open drainage ditches. The underground portion of the storm sewer system pipe consists of reinforced and non-reinforced concrete pipe of varying diameters (12, 10, 8, 6, 4, and 3 inches).

Geology and Hydrogeology

The ST-286 area is underlain by unconsolidated alluvial sediment and falls within the North Super Group soils area as defined by the Sandia National Laboratories/NMED background study (NMED, 1997). Depth to groundwater is estimated to be approximately 400 feet (ft) below ground surface (bgs), but shallower perched zones may occur (USAF, 1995). The nearest production well to this site is KAFB-15, located approximately 700 feet to the east.

Previous Investigations

1995 *Appendix III Resource Conservation and Recovery Act* (RCRA) *Facility Investigation* (RFI)
Two sediment samples were collected from storm drains and two surface soil samples were also collected along the ST-286 sewer system in April 1995 during the *Appendix III RFI* (USAF, 1995). Sediment samples ST-286C-02 and ST-286C-03 were collected from the bottoms of storm drains (C48) located west of Building 1002 and at the northeast corner of the intersection of Randolph and Truman Streets, respectively. Sample ST-286C-01 was collected from a ditch intersecting the flightline upstream of the terminal end of the sewer system. Sample ST-286C-04 was collected at the mouth of the ST-286 terminal culvert.

Each sample interval was field screened for possible contamination using a beta-gamma meter and a photoionization detector (PID). No elevated readings were detected with these instruments (USAF, 1995).

Samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), total petroleum hydrocarbons (TPH), metals (the expected contaminants associated with normal operations at this site), soil pH, and soil moisture.

Several SVOCs, including benzo(a)anthracene, benzo(a)pyrene and benzo(b)fluoranthene, were detected in the storm drain bottom samples at concentrations above the NMED human health risk-based (HHRB) residential soil screening levels (SSLs) (NMED, 2006a).

TPH were detected in the ST-286C-01 sample at a concentration above the NMED TPH screening guidelines (NMED, 2006b).

Lead was detected in sample ST-286C-02 at a concentration above NMED residential SSLs.

The presence of SVOCs, TPH, and lead at concentrations above NMED residential SSLs warranted further investigation. The following is a summary of the follow-on investigation activities to determine the extent of the release.

1996 *Appendix III Phase 2 RFI*
In November 1996, four boreholes were drilled and sampled near each of the two storm drains where contamination was detected in storm drain sediments (ST-286C-02 and ST-286-C03) in the initial RFI. Two boreholes were installed on opposite sides of each drain; additional boreholes were installed at the first and second 10-ft downgradient joints. Two samples were collected from each borehole at 0 ft and 5 ft below the base of the storm sewer. The storm sewer was found at 7 ft bgs at borehole ST-286C-02 and 5 ft bgs at borehole ST-286C-03. Because elevated PID readings were observed at 7 to 9 ft bgs and 12 to 14 ft bgs, two additional samples were collected from borehole ST-286C-05 at 22 to 24 ft bgs and 32 to 34 ft bgs.

SVOCs and TPH previously detected in storm drain sediment at concentrations above the NMED residential SSLs were not detected in any of the soil samples collected outside the storm drain system. Lead was again detected in storm drain sediment but at concentrations well below NMED residential SSLs.

Concentrations of all soils analytes submitted for laboratory analysis during the *Appendix III Phase 2 RFI* were found to be below NMED residential SSLs.

1997 *Interim Corrective Measures*
The *Interim Corrective Measure* (ICM) at ST-285 removed debris and potentially contaminated sediment from the storm sewer lines and drains, and included sampling, analyzing, and disposing of the waste. ICMs were conducted at ST-285 from September 15 through 18, 1997. Plugs and/or sandbags were placed at several points in the drains, and sediments were pushed to a collection point, using a hydrojetting tool. The resultant slurry was collected using a vacuum truck. Several passes of the hydrojetting tool were made at each line until the lines were clean, as confirmed by video inspection. (USAF, 1997). This site does not pose unacceptable risk to human health or the environment (USAF, 2001).

Basis of Determination

The NMED Hazardous Waste Bureau personnel visited the site on September 3, 2008 and concurred with the Kirtland AFB recommendation that SWMU 10-02-H (ST-286) was appropriate for submittal for a No Further Action (NFA) petition.
This request for NFA status is based on NMED's NFA Criterion 5: The SWMU has been characterized or remediated in accordance with current applicable state or federal regulations, and the available data indicate that contaminants pose an acceptable level of risk under current and projected land use.

References

NMED, 2006a. *Technical Background Document for Development of Soil Screening Levels*. New Mexico Environment Department Hazardous Waste Bureau and Groundwater Quality Bureau Voluntary Remediation Program. Revision 4.0. August.

NMED, 2006b. *Total Petroleum Hydrocarbon Screening Guidelines*. New Mexico Environment Department. Santa Fe, New Mexico. November.

NMED, 1997. Hazardous Waste Bureau (formerly Hazardous and Radioactive Materials Bureau), Approved Background Concentrations, Sandia National Laboratories/Kirtland Air Force Base, New Mexico.

USAF, 2002. *Land Use Management Plan*. U.S. Air Force, Kirtland Air Force Base, New Mexico.

USAF, 2001. *No Further Action Proposals for Corrective Action Units SS-77, Abandoned Railroad Spur; SS-82, Air Force Weapons Laboratory/Los Alamos Scientific Laboratories Electromagnetic Pulse Calibration and Simulation Facility; 10-2, Storm Sewer Systems; 10-21, Septic Systems; and 8-35, Waste Oil Storage Tank, Building 471*. Montgomery Watson, Albuquerque, New Mexico. January.

USAF, 1997. *Final Draft Interim Corrective Measures Report for Solid Waste Management Units: 10-2H, West Storm Sewer System (ST-285), 10-2I, East Storm Sewer System (ST-286), 10-2F, H-3H/H-53 Phase Dock, Building 1000, Storm Sewer (ST-325), and 10-2G, C-130 Maintenance Shop, Building 1009, Storm Sewer (ST-331)*. December.

USAF, 1995. *Draft Final RCRA Facility Investigation Report. Appendix III Wasteline Sites*. Halliburton NUS Corporation, Albuquerque, New Mexico. October.

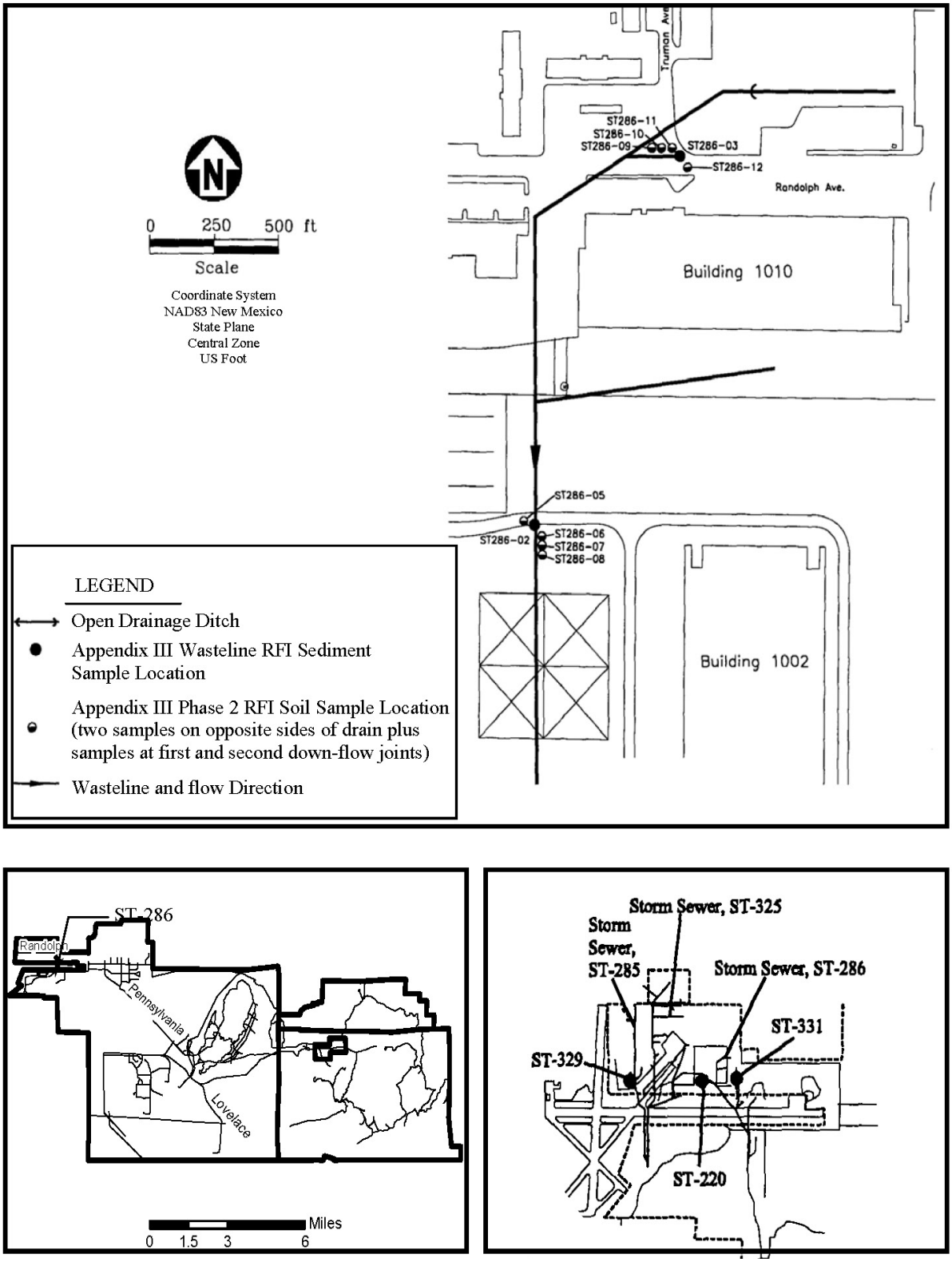

Figure I-16. RCRA Facility Investigation Sediment and Soil Sample Locations at Corrective Action Unit 10-02-I, East Storm Sewer (ST-286), Kirtland Air Force Base, New Mexico

I-17. SWMU DP-67, Three Mine Shafts

Location and Current Land Use

Solid Waste Management Unit (SWMU) DP-67 is associated with three separate areas: DP-67-1, DP-67-2, and DP-67-3. DP-67-1 is located 1,500 feet (ft) northeast of the Starfire Optical Range (SOR). DP-67-2 and DP-67-3 are located approximately 2 miles southeast of DP-67-1. These sites are located on withdrawn U.S. Forest Service land south of the Explosive Ordnance Disposal (EOD) Range in the southeast portion of Kirtland Air Force Base (AFB). SWMU DP-67 is located within the Kirtland AFB urban/industrial land use area. The location of SWMU DP-67 is shown in Figure I-17.

Projected Future Land Use

According to the Kirtland AFB *Land Use Management Plan* (USAF, 2002), there are no proposed changes to land use at SWMU DP-67. However, due to New Mexico Environment Department's (NMED) regulatory requirements, a residential land use scenario was used for all risk-based screening assessments.

Site History

The SWMU DP-67 mine shaft areas were mined for fluorite and other metal-containing minerals primarily during the 1940s. In addition to actual mine shafts, there are several shallow trenches and pits that were likely abandoned for lack of ore. The areas surrounding SWMU DP-67 were used as munitions ranges as evidenced by the presence of munitions debris (MD) and munitions and explosives of concern (MEC) on the surface in the areas around SWMU DP-67.

In 1995, DP-67 (until then listed as an Area of Concern [AOC]), was investigated as part of the *Appendix V Resource Conservation and Recovery Act* (RCRA) *Facility Investigation* (RFI) to determine if contaminants were present in site soils (USAF, 1996). Earlier site reports had indicated evidence of post-mining activity that may have released contamination to the environment. Pending results of the RFI, AOC DP-67 was listed as an SWMU on the Kirtland AFB RCRA Part B permit. The RFI did not identify contaminants at the site and the site was proposed for No Further Action (NFA) status, which was granted by the NMED in 2005. During a 2007 field survey, two new mine shafts in the DP-67-1 area were identified including one location that appears to be a former mine shaft where MD were gathered and placed in the shaft. MD was also was observed near several other mine shafts and tailings piles in the area. As a result, in October 2007, the NMED instructed Kirtland AFB that SWMU DP-67 would be reopened for further investigation.

Geology and Hydrogeology

The subject mine shafts are in an area of Precambrian granitic and metamorphic rocks between the Coyote Fault and an unnamed fault that runs along the base of the foothills east of the SOR. The mine shafts were prospected for fluorite, lead, and minor silver mineralization that occur as pressure-vein fillings in the fractured rocks of this area. Mine shaft DP-67-1 is 1,500 ft northeast of the SOR. Granitic bedrock is exposed at the surface in this area, but only minor mineralization of bedrock was noted in outcrops. Mine shaft DP-67-2 is in granitic bedrock 3,000 ft northeast of the SOR. The shaft was excavated along a fracture zone in the granite. Mineralization observed on the walls and in tailings includes fluorite, galena, barite, and quartz. Mine shaft DP-67-3 is 6,500 ft east-southeast of the SOR. It also was apparently excavated along a fracture zone in the granite. Abundant mineralization was observed on the shaft walls and in tailings and consisted of fluorite, galena, barite, and quartz. Depth to groundwater is generally estimated at 90 to 100 ft below ground surface (bgs) (Sandia National

Laboratories [SNL], 1995). Groundwater flow is presumably west in this area. Near the foothills, groundwater probably occurs in shallow alluvial aquifers underlying the drainages emerging from the mountains and in multiple, confined bedrock aquifer systems. The nearest production well to this site is KAFB-1920, located approximately 7,700 ft to the west.

Previous Investigations

1995 *Appendix V RFI*
The *Appendix V RFI* at SWMU DP-67 was conducted to determine if contaminants were present in the area. Samples were collected at all three mine shaft sites, DP-67-1, DP-67-2, and DP-67-3. Samples were collected from the bottom of mine shafts, from adjacent tailings piles and, at DP-67-3, from a slag pile near the shaft. A total of 10 samples were collected and analyzed. Grab samples from the bottom of shafts and tailings piles from each location were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), metals, gross alpha and gross beta, and explosives. In addition, the slag sample collected at SWMU DP-67-3 was analyzed for toxicity characteristic leaching procedure (TCLP), VOCs, SVOCs, and metals. All samples were field-screened for possible contamination using a beta-gamma meter and a flame-ionization detector for VOCs.

Trace VOC and SVOC concentrations were detected at several orders of magnitude below the NMED residential soil screening levels (SSLs) (NMED, 2006). Lead and arsenic were detected in concentrations above their respective NMED SSLs. In the absence of other indicators, these metals concentrations are presumed to be naturally occurring in this area. No explosives compounds were detected in any of the soil samples collected at SWMU DP-67 during the *Appendix V RFI*. As a result of these findings, SWMU DP-67 was granted NFA status in 2005.

2008 *Solid Waste Management Unit Assessment Report*
During a 2007 field survey, additional mine shafts were discovered near DP-67-1. SWMU DP-67 was reopened by the NMED to reevaluate the site based on the discovery of MD that appeared to have been deliberately gathered and dumped in a mine shaft adjacent to DP-67-1, identified as the primary mine shaft location (PMSL). A total of 10 former mining sites, including the three original SWMU DP-67 sites, were evaluated and presented in a 2008 *Solid Waste Management Unit Assessment Report* (SAR). The SAR also reported that MD was observed near some of the other former mining sites (USAF, 2008).

2009 *Accelerated Corrective Measures*
In response to the 2008 SAR, a removal action was conducted at SWMU DP-67 in 2009 under an *Accelerated Corrective Measures* (ACM) work plan. The action was conducted to remove munitions related items from the PMSL and areas surrounding the other mine shaft locations near DP-67-1 and at DP-67-2 and DP-67-3 where MD and MEC had previously been observed.

Surface clearances of munitions-related items were conducted by qualified unexploded ordnance (UXO) technicians at DP-67-1, DP-67-2, and DP-67-3. As a result of the surface clearances, 1,071 pounds (lbs) of MD were recovered from approximately 200 ft out from the central mine shaft location at each of the three areas (USAF, 2010). The PMSL shaft was excavated to a depth of 35 ft bgs and 65,505 lbs of MD were recovered. Soils collected from the bottom of the PMSL excavation were analyzed for explosives compounds using U.S. Environmental Protection Agency (EPA) Test Method 8330. The results were non-detect for analyzed constituents.

Twelve projectiles recovered from the PMSL during the excavation were determined by qualified UXO technicians to be an explosive hazard (that is, MEC) and consequently were destroyed by the 377th EOD at the EOD range on Kirtland AFB.

The recovered MD, stored on site in sealed, steel containers, will be demilitarized and recycled by a demilitarization contractor.

Basis of Determination

The NMED Hazardous Waste Bureau personnel visited the DP-67-1 site on September 29, 2009 to observe the PMSL excavation. Based on the 100-percent surface sweep of all accessible areas of DP-67; the complete excavation and recovery of all MD and demolition of material documented as an explosive hazard from the PMSL; and the results of the 1995 RFI, it is recommended that the site be approved for NFA status under NMED's NFA Criterion 3: No release from the SWMU to the environment has occurred or is likely to occur in the future.

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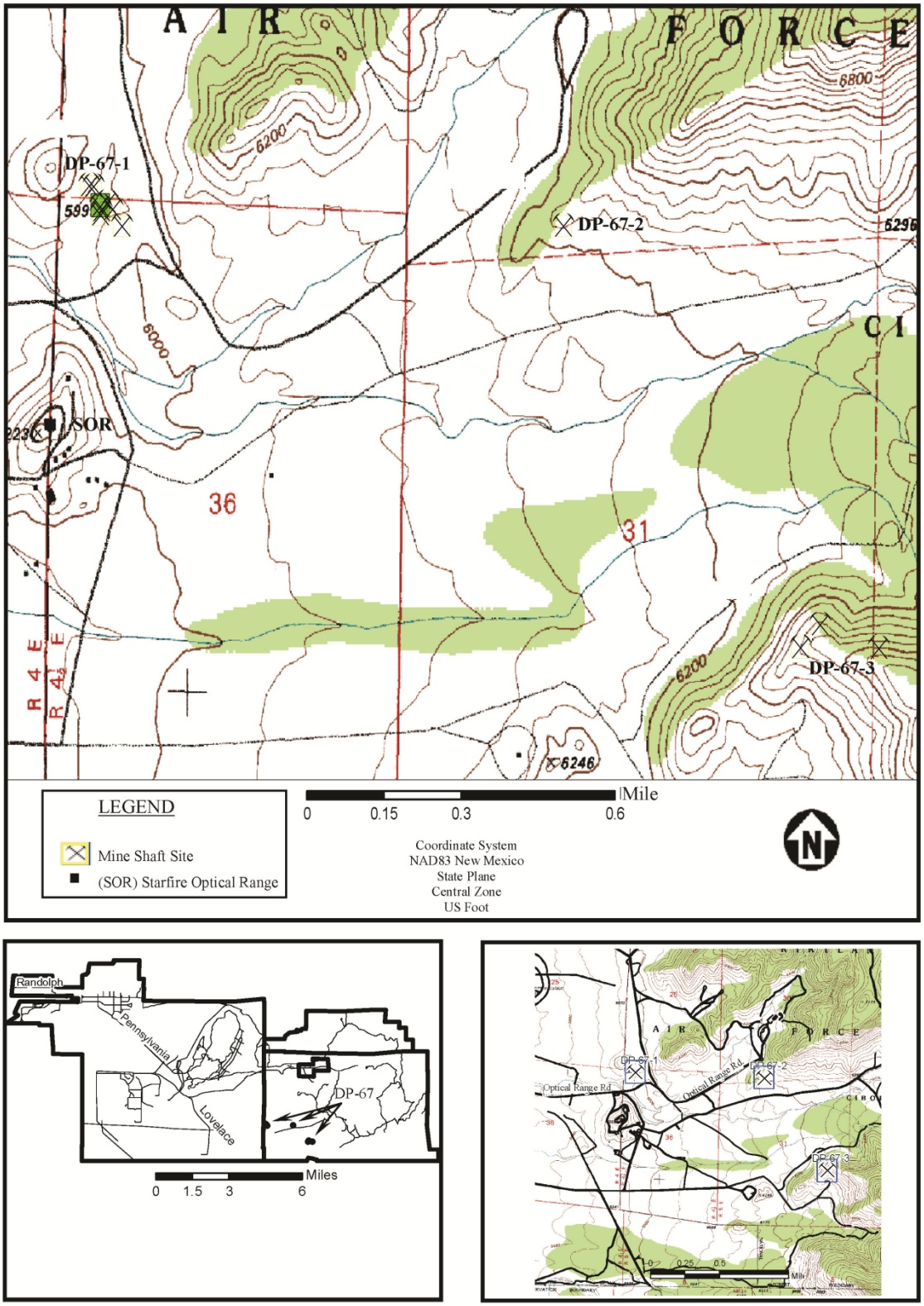

Figure I-17. SWMU DP-67, Three Mine Shafts, Kirtland Air Force Base, New Mexico

I-18. SWMU RW-068 Site, Radium Dump/Slag Pile and Cratering Area

Location and Current Land Use

Solid Waste Management Unit (SWMU) RW-068 is located on Optical Range Road east of Lovelace Road near the Starfire Optical Range (SOR) in the southeastern portion of Kirtland Air Force Base (AFB). The site originally consisted of two separate areas encompassing a total of 45 acres. The cratering area is adjacent to an abandoned dirt runway north of Optical Range Road and just north of a training facility. The slag pile area of the site is in the floodplain of a large arroyo south of Optical Range Road, north of the Lake Christian site, OT-046. Both areas are vacant, unused areas and are considered to lie within the Kirtland AFB urban/industrial land use area. The location of RW-068 is shown in Figure I-18 (United States Air Force [USAF], 2007a).

Projected Future Land Use

According to the Kirtland AFB *Land Use Management Plan* (USAF, 2002), there are no proposed changes to land use at RW-068. However, due to New Mexico Environment Department's (NMED) regulatory requirements, a residential land use scenario was used for all risk-based screening assessments.

Site History

The cratering area at SWMU RW-068 was used for research to determine damage sustainability and other vulnerabilities of captured, vintage World War II (WW II) aircraft under simulated combat conditions. Upon completion of the tests, which subjected the aircraft to direct fire and/or explosive detonations, the aircraft hulls were moved from the cratering area to the radium dump/slag pile area south of Optical Range Road (formerly Mortar Range Road) where they were incinerated. Aircraft used during the proximity fuze development program were also reported to have been incinerated at the site. The RW-068 site was previously remediated and approved for No Further Action (NFA) in 2003. However, a late-2006 inspection of the site revealed the continued presence of aircraft debris and possible areas of elevated radioactivity.

Geology and Hydrogeology

RW-068 is located east of the Hubbell Springs Fault and overlies the Santa Fe Group, which contains unconsolidated alluvial fill overlying Permian siltstones and Pennsylvanian fractured limestone bedrock. This area falls within the Coyote Test Field Spatial Super Group for soil data as defined by the Sandia National Laboratories (SNL)/NMED background study (NMED, 1997). The vadose zone on the eastern side of the fault ranges from 50 to 150 feet (ft) thick and is composed primarily of alluvial fan material (sands, gravels, silts, and clays) (SNL, 1995).

According to the *Environmental Restoration Program (ERP) Site-Specific Summaries* (USAF, 2005), RW-068 is in Hydrogeologic Region 3, described as the eastern area of Kirtland AFB, an area of bedrock outcrops representing uplifted terrain. The two monitoring wells installed during the *Corrective Measures Study* (USAF, 1998) encountered groundwater at 117.5 ft below ground surface (bgs) in the upgradient well and at 96.5 ft bgs in the downgradient well. Investigations at LF-015 (Landfill B) did not go deeper than 25 feet, and referred to three wells at Lake Christian that encountered ground water at approximately 80 ft bgs, flowing toward the southwest.

Previous Investigations

Early Site Characterization

In 1992, the Kirtland AFB Bioenvironmental Engineering Squadron performed a radiological survey of the radium dump/slag piles portion of RW-068 and collected samples from the slag piles for analysis. The analytical results confirmed the presence of radium-226 at the site (Caputo, 1992; Caputo, 1993). In 1994, samples were collected from the slag piles at the site and extracted using the toxicity characteristic leaching procedure (TCLP) and analyzed for metals. The analysis results indicated the following metals concentrations exceeded regulatory levels: cadmium at a concentration of 3.37 milligrams per liter (mg/L), lead at a concentration of 709 mg/L, and selenium at a concentration of 1.58 mg/L.

In 1995, an investigation was conducted by Foster Wheeler to determine the nature and extent of the contamination at the radium dump/slag piles area of the site (USAF, 1995). This investigation included intrusive and nonintrusive sampling. Nonintrusive soil sampling, which included the collection of radiological readings, magnetometer readings, and metal detection readings, indicated that radiological and metallic anomalies were present in several areas of the site and, in general, these anomalies strongly correlated with the locations of the slag piles. Intrusive soil sampling analytical results revealed metals and radioactive species in ash and soil samples at concentrations above background levels, and confirmed the mixed waste contamination at the site.

Also in 1995, an investigation was conducted in the cratering area portion of RW-068. This investigation included collection of soil samples at 11 locations and analysis of samples for explosive compounds, metals, and gross alpha and beta emissions. Results from all explosive compound analyses were non-detect. Metals analyses were below the U.S. Environmental Protection Agency (EPA) Region 6 human health risk-based (HHRB) industrial screening levels, except for arsenic, which is known to exist naturally in high concentrations throughout Kirtland AFB (B&RE, 1995).

1996 and 1997 *Resource Conservation and Recovery Act* (RCRA) *Facility Investigation* (RFI) and *Interim Corrective Measures Study*

An *Interim Corrective Measure* (ICM) to minimize any potential threat to human health and the environment was performed in 1996 and 1997 in the radium dump/slag piles portion of RW-068 (USAF, 1997). The ICM part of the RFI included identification of waste streams, treatment processes, and disposal requirements, and implementation of remedial actions. Remedial actions included waste removal, packaging, stabilization as necessary, and treatment and disposal of mixed waste, RCRA-hazardous waste, and nonhazardous debris. Radiological and geophysical surveys were conducted concurrently with the remedial action to confirm removal of all radioactive and hazardous wastes. The surveys identified radiological anomalies above twice background levels in areas formerly beneath the slag piles. All soil areas above twice background were subsequently excavated, and the excavated materials were packaged for disposal. The ICM removed, treated, and disposed of the following amounts of waste:

- 110 cubic yards (yd^3) of mixed waste-contaminated ash
- 10 yd^3 of mixed waste-contaminated soil
- 188 yd^3 of low-level radioactive waste contaminated soil
- 5 yd^3 of RCRA-characteristic hazardous waste
- 1 yd^3 of radioactive debris
- 45 tons of nonhazardous debris

During the 1998 *Corrective Measures Study* (CMS), soil samples were collected from the cratering area and analyzed for specific radionuclides (USAF, 1998). In addition, an upgradient and an onsite groundwater monitoring well were installed at this time and groundwater samples were collected and

analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides/ herbicides, metals, and radionuclides to determine if the site had impacted groundwater quality. All results were below their respective screening levels. No potential exposure pathways of contaminants from SWMU RW-068 were found using the screening assessments during the CMS. The two groundwater monitoring wells were grouted in place and abandoned in early 2000 (IT Corp., 2000).

The results of a chemical risk assessment at SWMU RW-068 showed that all estimated excess lifetime cancer risks were 10-6 or lower for the residential risk scenario. None of the hazard indices exceeded 1.0. Consequently, no significant potential cancer risk or chronic toxicity is predicted as a result of exposure to arsenic, beryllium, or manganese under the assumed exposure conditions (USAF, 1998). Residual radioactive materials (RESRAD) model results showed that, for both sites, estimated excess lifetime cancer risks for the radionuclides fell in the 10-4 to 10-6 range (USAF, 1998).

Ecological risk assessments were conducted and found that SWMU RW-068 poses an acceptable level of risk (USAF, 1998). Only one contaminant of potential concern (COPC) (aluminum) was identified as requiring possible further evaluation. The remaining radionuclides and metals were either below background, below benchmark levels, or had a minimal nature and extent of occurrence indicating that they are not waste-related constituents. Since aluminum is believed to be naturally occurring at SWMU RW-068, there were no contaminants identified that required further remedial activities.

2007 *Post-Closure Operations*

As mentioned previously, the RW-068 site was petitioned for NFA status and approval was granted by the NMED in 2003. However, in late 2006, Kirtland Environmental Restoration (ER) staff observed apparent aircraft debris to the west of RW-068. As a result of a series of walkovers that followed, staff from NMED, Kirtland AFB ER staff, and the base Bioenvironmental Engineering unit decided that this area to the west (roughly estimated at 13 acres) contained debris similar to that which had existed at the original RW-068 (south of Optical Range Road). Therefore, Kirtland AFB reported to the NMED on 22 February 2007 that RW-068, including the newly found area to the west, would undergo Post-Closure Operations (PCO) to assure that any risks at the site would be addressed.

The overall approach to the PCO was to conduct characterization and limited remediation activities required to identify and remove radioactively contaminated soil; nonhazardous and radioactively contaminated aircraft debris; or debris containing munitions and explosives of concern (MEC). These activities were intended as maintenance of the previously remediated site. To accomplish this effort, four general activities were conducted: radiation surveys; limited spot soil remediation and disposal; MEC identification survey; and debris removal and disposal. These field activities were outlined in a Solid Waste Management Unit Assessment Report (SAR) (USAF, 2007a) and results presented in a subsequent completion report which was incorporated into the SAR as an addendum (USAF, 2007b).

The site was divided into two primary areas to accomplish these tasks (Figure I-18): RW-068 (1.2 acres) and RW-068 West (19.5 acres). RW-068 is the radium dump/slag pile area that was previously remediated and approved for NFA. The cratering area portion of the site, north of Optical Range Road, remains closed under NFA status. RW-068 West was not part of the previous remediation effort and was recently discovered to contain aircraft debris and newly discovered burn sites.

Gross gamma walkover surveys were performed across the site to identify small areas of elevated activity and determine the lateral extent of these areas. The radiological survey methodology followed guidelines set forth in the *Multi-Agency Radiation Survey and Site Investigation Manual*. A limited number of radioactive debris pieces, such as gauges with luminescent paint containing radium-226, were removed from the site and transferred to Kirtland AFB for disposal.

The radiological assessment of the site also included the collection of 165 soil samples, including 25 reference samples, for analyses of radium using gamma spectroscopy. A total of 16 samples were also collected and analyzed for uranium and thorium using alpha spectroscopy. Soils containing residual radioactivity were found both at RW-068 and RW-068 West. However, the radioactivity is unlikely to pose a significant human health risk, based on the limited quantities present and the current and future uses of the site.

The surface of the entire 20.7-acre area was visually inspected on a 10-meter-by-10-meter grid using a White's DFXTM metal detector. A number of gauges and switches containing luminescent paint were identified, classified as radiological debris, and removed. All other non-contaminated metallic and non-metallic debris greater than 1-inch square in size was removed for recycling or offsite disposal. A total of five ordnance-related scrap items (one expended flare, one piece of artillery fuse, and three portions of 5-inch rocket motors) were found and removed. Only one item, the flare, was found to have explosive residue. No unexploded ordnance was found at the site.

Also collected were 10 yd^3 of non-contaminated metallic debris and 2 yd^3 of non-metallic debris. Approximately 0.7 yd^3 of low-level radioactive soil and debris were collected and stored in drums.

Nonhazardous debris was transferred to the Kirtland AFB Hazardous and Solid Waste Management Program; radioactively contaminated debris was transferred to the Kirtland AFB Radiation Safety Officer in the 377th Bioenvironmental Engineering Branch; and ordnance-related debris was transferred to the Kirtland AFB Explosive Ordnance Disposal Branch. As a result of the limited amount of ordnance-related debris found, it is concluded that the RW-068 and RW-068 West sites do not pose a significant risk of explosive hazard.

Basis of Determination

The NMED Hazardous Waste Bureau personnel visited the site and reviewed the *Solid Waste Management Assessment Report (SAR) for the Investigations at Site RW-068* (June 2007), in which Kirtland AFB proposed that RW-068 was suitable for NFA petition. This request for NFA status is based on NMED's NFA Criterion 5: The SWMU has been characterized and remediated in accordance with current applicable state or federal regulations, and the available data indicate that contaminants pose an acceptable level of risk under current and projected land use. In a March 11, 2008 letter, NMED personnel agreed that SWMU RW-068 may be suitable for NFA status and subsequent removal from the Kirtland AFB RCRA Hazardous Waste Permit.

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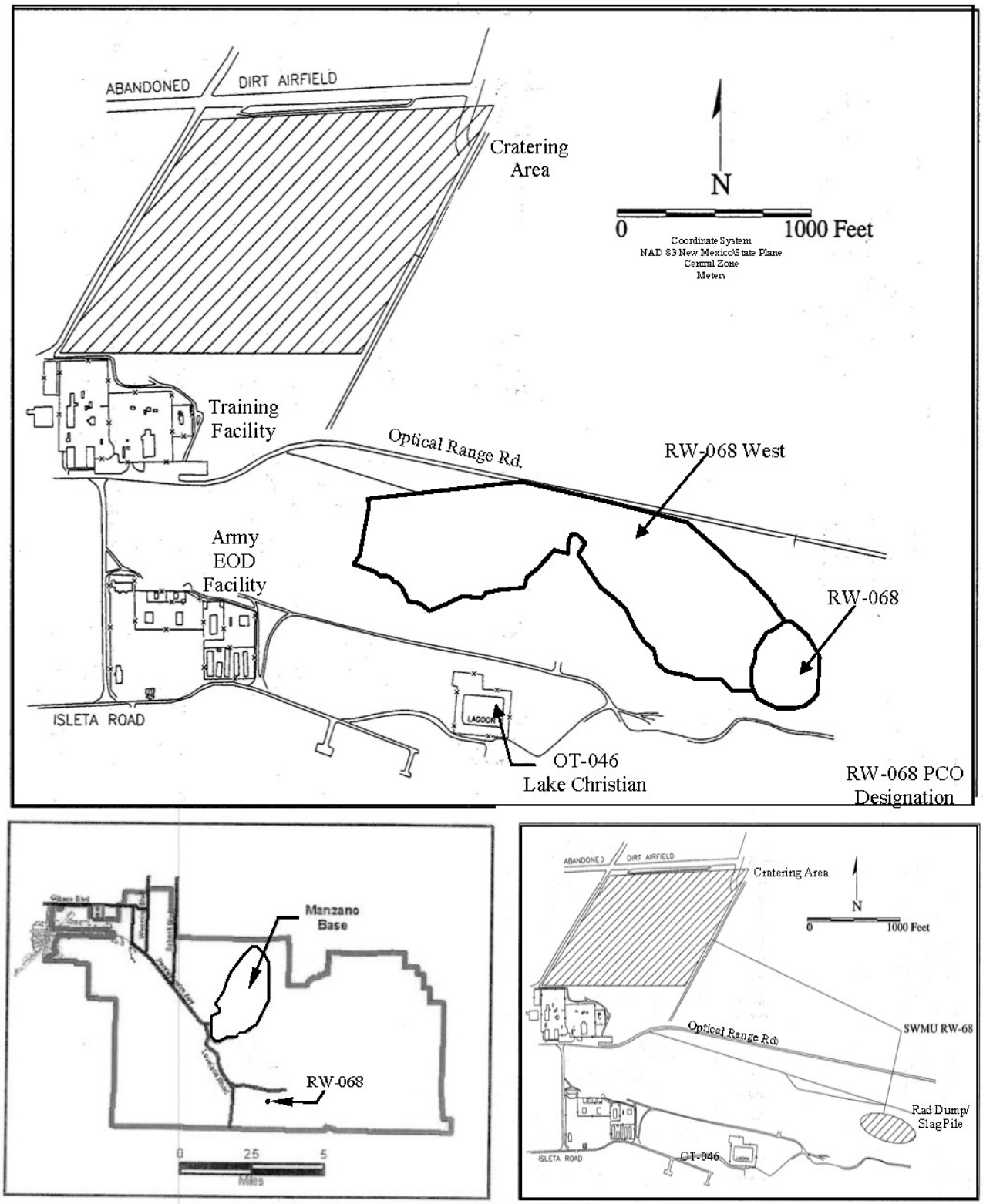

Figure I-18. Post Closure Operations at SWMU RW-068, Radium Dump/Slag Pile and Cratering Area, Kirtland Air Force Base, New Mexico

I-19. SWMU SS-102, ARES Test Facility

Location and Current Land Use

Solid Waste Management Unit (SWMU) SS-102, Advanced Research Electromagnetic Simulator (ARES) Test Facility, is located just north of the Tijeras Arroyo and south of Pennsylvania Street, near the terminus of Wyoming Boulevard, in the northwest portion of Kirtland AFB (Figure I-19). This facility, once used for electromagnetic testing, is designated as a laboratory and testing facility, similar to industrial land use. The site is no longer used for this purpose and the storage tanks used to store dielectric fluids have been disconnected and removed, and Building 20574 is being considered for demolition (USAR, 2002). Figure I-19 shows the site location.

Projected Future Land Use

According to the Kirtland AFB *Land Use Management Plan* (USAF, 2002), there are no proposed changes for the land use at SS-102. However, due to the New Mexico Environment Department's (NMED) regulatory requirements, a residential land use scenario was used for all risk-based screening assessments.

Site History

The ARES Test Facility's pulsar unit was used to study the effects of electromagnetic pulses on electrical systems. Dielectric fluid was used as an insulating medium for high-voltage, heat-generating equipment that was used at the site. The dielectric fluid was originally housed in two storage tanks at Building 20754 (also known as the Coax Cable Building or High-Voltage Generation Center): a 1,500-gallon vessel inside the building and a 4,800-gallon vessel outside the building. At an undocumented time, these storage tanks were removed and two additional tanks (6,200 gallons and 3,000 gallons) were installed in a secondary containment unit outside of and to the south of Building 20754.

Geology and Hydrogeology

The SS-102 area is underlain by unconsolidated alluvial sediment and falls within the North Soil Super Group as defined by the Sandia National Laboratories/NMED Oversight Board background study (NMED, 1997). A total of six groundwater monitoring wells and two production wells are located within a 0.5-mile radius of SS-102. Regional groundwater within the vicinity of the site is approximately 500 feet (ft) below ground surface (bgs). Based on monitoring well data, the groundwater flow appears to be to the west-northwest beneath the site (USAF, 2005).

Previous Investigations

Non-Sampling Data

A 1986 U.S. Air Force memorandum reported that between 1966 and 1969, 5 to 10 gallons of dielectric fluid per day leaked from exterior storage tanks into the soils and manways of the ARES Test Facility. Repairs to the storage tanks in 1969 reduced the volume of leaking oil and a collection system was installed.

Releases apparently continued, emanating from several sources including Building 20754, the collection system designed to divert leaking fluid through polyvinyl chloride (PVC) pipe, and from intentional discharge of dielectric fluid to stabilize the slopes of the facility and to control weeds. Waste dielectric fluid was also believed to have been dumped outside on the north side of Building 20754 (which was

built on a topographic high point) and allowed to flow down an arroyo west of the building. In 1991, oil-stained soils were documented in the arroyo beneath the facility.

In 1991, approximately 70 cubic yards (yd^3) of oil-stained soil were excavated from the area north of Building 20759 to a depth of 10 ft bgs. A 1992 NMED memorandum stated that excavation of contaminated soil constituted adequate remediation in the excavated areas (USAF, 2008).

Investigation Summaries

Internal U.S. Air Force memoranda dated from March 20, 1980 to July 19, 1990 presented information and data from sampling of site soils and dielectric fluid products that were in use at the ARES Test Facility throughout that period. Information presented indicates that dielectric fluid samples analyzed during this period were essentially non-detect for polychlorinated biphenyl (PCB) concentrations. Some reports indicated some low concentrations of PCB (for example, 18 parts per million [ppm]) in analyzed dielectric fluid samples analyzed over this period. However, these reports of positive PCB concentrations were inconsistent and not incontrovertible (USAF, 2008).

Soil sampling results were reported during site investigations conducted in 1986 and 1990. In 1986, surface soil samples collected from the ground plane area, east of Building 20754, indicated PCB results were below the detection limit of 0.5 milligram per kilogram (mg/kg). However, oil and grease analyses were reported as high as 30,600 mg/kg. In 1990, an analysis of nine hand-augered soil samples collected east of Building 20754 and north of Building 20759 from ground surface to 1 ft bgs indicated all results were below the laboratory method detection limit (MDL) of 0.5 mg/kg. Another site investigation conducted in 1990 included the results of 25 soil samples collected in and around the ARES site via hand auger to depths up to 8 ft bgs. All sample results analyzed for PCBs indicated there were no concentrations detected above the MDL. Results for oil and grease ranged from non-detect values (below 2 mg/kg) to 2,700,000 mg/kg. The highest values were found near the “pit area” north of Building 20759 where leakage was previously noted, at areas under leaking joints, on the ground plane, and in areas near the west drainage channels (USAF, 2008).

ARES Site Preliminary Characterization Study

During this 1991 field assessment, 68 soil samples were collected for various parameters including PCBs, oil and grease, total petroleum hydrocarbons (TPH), and bacteria. The previously mentioned removal of 70 cubic yards of soil preceded this investigation.

Eleven samples collected across the site were analyzed for PCBs (one sample from the pit area, five samples from the ground plane, two samples from the west drainage area, and three samples from the Coax Cable Building drip pan and product storage tanks). All samples had concentrations less than the MDL of 1.0 ppm. Twenty-nine samples collected across the site were analyzed for oil and grease. Concentrations ranged from 100 mg/kg to a maximum concentration of 2,800 mg/kg. The maximum depth of PCB analyses during this investigation was 7 ft bgs.

Three samples were analyzed for TPH. The first sample, collected near the ground plane at a depth of 19 to 23 inches bgs, had a concentration of 22,700 mg/kg. The second sample, collected near the west drain area at a depth of 41 to 49 inches bgs, had a concentration of 177 mg/kg. The third sample, collected near the pit area at a depth of 72 to 76 inches, had a concentration less than the MDL of 0.5 mg/kg.

A series of memoranda dated from August 1991 to December 1993 detail the removal of contaminated soil at the ARES site north of Building 20759. Exact sample locations were not documented. Soil samples were collected from both the oil-stained soil that was removed and from the area following the soil removal. Analysis of oil-stained soil collected near Building 20759 had a TPH concentration of

200 mg/kg. Following removal of oil- stained soil, three additional soil samples were collected and all had concentrations less than the detection limit of 100 mg/kg.

A December 1991 memorandum from the Kirtland AFB Environmental Management Division to the NMED indicated that all contaminated soil had been removed from the watercourses (drainage areas around the ARES site) and that this had been confirmed through sampling of the remaining soil. The NMED responded that, with the exception of soils extending under Building 20759 and some contaminated areas on the slope under the wire mesh of the ground plane, the excavation of contaminated soil constituted adequate remediation in the excavated areas. A subsequent correspondence from the NMED in December 1993, indicated that the Corrective Action Report had been approved and that the analytical results would serve to satisfy the final approval of the corrective actions related to the removal of contaminated soil (USAF, 2008).

2000 *Release Assessment Report*
In March 2000, six surface soil samples (6 to 12 inches bgs) were collected at the ARES site. Samples were collected east of Building 20754, north of Building 20759, and in area drainage channels or arroyos. Samples were analyzed for TPH, pesticides, herbicides, and metals. TPH were detected in soils at the site ranging from 120 mg/kg to 8,600 mg/kg. Pesticides and metals concentration in soils were detected in concentrations below NMED residential soil screening levels (SSLs). The metals (beryllium, thallium, vanadium, and zinc) were detected in concentrations above the NMED-approved background concentrations for the North Super Group of Kirtland AFB. However, the report concluded there were no indications based on historical operations that either the pesticides or the metals would be contaminants of potential concern (COPCs) at the site (USAF, 2000).

2001 *Resource Conservation and Recovery Act* (RCRA) *Facility Investigation* (RFI)
During the 2001 RFI, monitoring well SS-102-MW01 was installed at the ARES site. Two soil samples were collected during drilling: one from the saturated zone at 496 ft bgs and one composite sample from the cuttings generated during the drilling of the borehole. Additionally, one groundwater sample was collected from the monitoring well at this time. All samples were analyzed for pesticides, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), metals, herbicides, PCBs, and TPH.

Groundwater sample results were either non-detect (below laboratory reporting limits) or at concentrations below New Mexico and U.S. Environmental Protection Agency (EPA) standards for analyzed constituents. In soils no organic constituents were detected above laboratory reporting limits and no metals were detected above NMED SSLs or NMED-approved background concentrations (USAF, 2002).

2005 RFI
During a subsequent RFI conducted in 2005 (USAF, 2006), 14 soil borings were drilled to 2 ft bgs at SWMU SS-102 and surface and subsurface soil samples were collected and analyzed for VOCs, SVOCs, TPH, and PCBs. Lead was also analyzed at the one location where it had been previously detected above the NMED-approved background level.

Concentrations of TPH exceeded the NMED TPH screening guidelines for diesel-range organics in soils collected near the drain on the west side of Building 20754. One sample collected from the base of the ground plane east of Building 20754 exceeded the NMED residential SSLs for PCBs. Lead was detected in one sample collected during the 2005 RFI at a concentration above the NMED-approved background concentration for Kirtland AFB, but below the NMED residential SSL for lead.
Based on the analytical results of the 2005 RFI, recommendations were made to further characterize the extent of contamination near the drains west of Building 20754 and ground plane area east of

Building 20754. Contaminant concentrations exceeded either the NMED SSLs or NMED TPH screening guidelines in soils collected in these areas.

2008 RFI

An RFI was conducted in December 2008 to further characterize the site. Surface and subsurface samples were collected at 10 locations on the site by means of hand- and power-augering to 11 ft bgs in the areas of the ground plane east of Building 20754 and in the arroyo down slope of the drains west of Building 20754. Soil samples were analyzed for VOCs, SVOCs, polynuclear aromatic hydrocarbons (PAHs), PCBs, and TPH (USAF, 2008).

Elevated PCB concentrations were identified at two boreholes located at the base of the ground plane, though none of the concentrations exceeded the NMED residential SSLs for PCBs. Elevated TPH concentrations in excess of the NMED TPH screening guidelines were identified at two boreholes located in the drainages west of Building 20754. All other detected analytes were well below NMED residential SSLs.

Based on the results of the 2005 and 2008 RFIs, additional soil excavation was proposed to remove PCB-contaminated soil from the base of the ground plane area and TPH-contaminated soil located west of Building 20754 below drainpipes that eventually drained into the adjacent arroyo. Approximately 31 yd^3 of soil were excavated from the base of the ground plane and west of Building 20754. Confirmation soil samples were collected from the sides and bottom of the excavated areas. Results for the confirmation soil samples indicated that all analytes are at concentrations less than the NMED residential SSLs and TPH concentrations are significantly reduced, with only one sample slightly greater than NMED TPH screening guidelines.

2009 Soil Excavation and Confirmation Sampling

In November 2009, three areas at the ARES Test Facility were excavated, including an area at the base of the ground plane with elevated PCB concentrations and two drainage areas on the west side of Building 20754 that had elevated TPH concentrations. Approximately 19 yd^3 of soil were removed from the ground plane area. Approximately 2 cubic yards of soil were removed from the north drainage area and 10 cubic yards from the south drainage area west of Building 20754 (USAF, 2010).

Upon completion of soil removal activities, 13 confirmation soil samples were collected from the three excavation areas. Samples collected from the ground plane area excavation were submitted for analysis of PCBs. Samples collected from the drainage areas were submitted for analysis of TPH, VOCs, and SVOCs.

The confirmation soil samples show a significant reduction in contaminant concentrations at SWMU SS-102. Previously detected PCB concentrations were reduced to non-detects in all confirmation soil samples collected from the ground plane area. A limited number of VOCs and SVOCs were detected in a few of the soil samples; all concentrations were less than their NMED residential SSLs. TPH concentrations were reduced at all locations tested for TPH. Only one sample exceeded the NMED TPH screening guidelines for diesel-range organics and mineral oil dielectric fluid.

Basis of Determination

Results for confirmation soil samples collected after soil excavation indicate that PCBs are no longer present at the site at concentrations that exceed the NMED residential SSLs. TPH concentrations were reduced to below NMED TPH screening guidelines in all confirmation soil samples except one. The one remaining elevated TPH concentration is significantly reduced from the pre-excavation concentration and only slightly exceeds the NMED TPH screening guideline.

A human health screening assessment, utilizing the detected constituents, indicates that remaining site contamination does not represent an unacceptable risk to human health. Groundwater present below the site has not been impacted by historical operations at SWMU SS-102.

Following excavation and confirmation sampling of soil at SS-102, the SWMU is recommended for No Further Action (NFA) based on NMED's NFA Criterion 5: The SWMU has been characterized or remediated in accordance with current applicable state or federal regulations, and the available data indicate that contaminants pose and acceptable level of risk under current and projected future land use.

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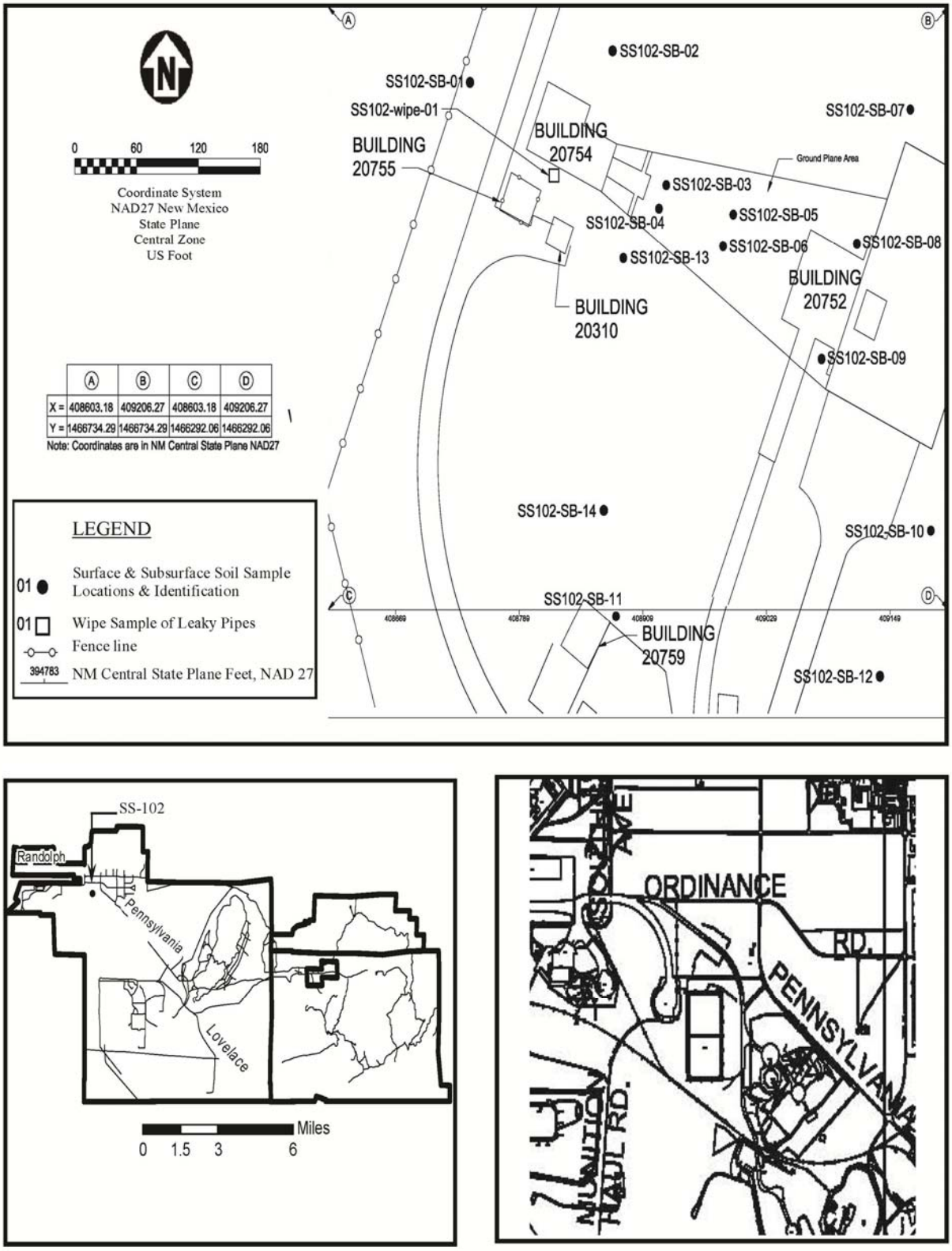

Figure I-19. 2005 RCRA Facility Investigation Soil Sampling Locations, SWMU SS-102, ARES Test Facility, Kirtland Air Force Base, New Mexico

I-20. SWMU DP-88, Trestle Site Disposal Area

Location and Current Land Use

Solid Waste Management Unit (SWMU) DP-88, trestle site disposal area is located adjacent to the U.S. Army, White Sands Missile Range "Big Crow" trestle facility on Kirtland Air Force Base (AFB). The site, comprising 7.3 fenced acres, is located at the toe of a steep slope, is relatively flat and generally covered with native shrub vegetation. Because of the location of SWMU DP-88 near the Big Crow trestle facility and the fenced enclosure, the SWMU is outside the Kirtland AFB urban/industrial land use area. The site is not currently in use. The location of DP-88 is shown in Figure I-20 (United States Air Force [USAF], 2008).

Projected Future Land Use

According to the Kirtland AFB *Land Use Management Plan* (USAF, 2002), there are no proposed changes for the land use at SWMU DP-88. However, a residential land use scenario was used for all risk-based screening assessments to consider the most restrictive possible land use.

Site History

In the 1980s, the Air Force Weapons Laboratory-Phillips Laboratory operated the Big Crow Trestle Facility to test the effects of electromagnetic pulses on aircraft. In 1997, the Kirtland AFB Environmental Management office received a report of historical waste disposal activities south of the facility. The report indicated that chemical wastes were disposed of in areas adjacent to and south of the trestle facility. Based on the varied and minimally documented operational history of the trestle facility, the exact characteristics of potential wastes that may have been disposed of were unknown. However, historic documents state that dielectric oil, antifreeze, and isopropyl alcohol were stored at the trestle facility along with fuel stored in aboveground storage tanks (ASTs) (USAF, 2008).

Geology and Hydrogeology

The area is underlain by unconsolidated alluvial and fluvial sediments and falls within the North Super Group as defined by Sandia National Laboratories/New Mexico Environment Department (NMED) background study. Regional groundwater occurs at a depth of approximately 410 feet (ft) below ground surface (bgs) in the area of SWMU DP-88. Regional groundwater flow is generally to the north and northwest in this area.

Previous Investigations

1998 *Solid Waste Management Unit Assessment*
An SWMU assessment was conducted in 1998 to characterize the surface soil and subsurface soil (USAF, 1998). As part of the SWMU assessment, a geophysical survey of the site was conducted. Soil sampling locations were identified based on anomalies found during the geophysical survey. A total of 36 soil samples were collected and were analyzed for Target Analyte List (TAL) metals, semivolatile organic compounds (SVOCs), herbicides, organochlorine pesticides (OCPs), polychlorinated biphenyls (PCBs), and cyanide. Additionally, subsurface soil samples were analyzed for volatile organic compounds (VOCs).

The analytical results for the SWMU Assessment were compared to the NMED human health risk-Based (HHRB) residential soil screening levels (SSLs) (NMED, 2006) and NMED-approved background concentrations for metals (NMED, 1997). Results are summarized as follows:

- No SVOCs or chlorinated herbicides were detected above the laboratory quantitation limit in any of the soil samples submitted for analysis.

- Three VOCs were detected in soil samples at SWMU DP-88. The VOCs were detected at concentrations that were less than the reporting limits but greater than the method detection limits. All VOCs were well below the NMED residential SSLs.

- The pesticides DDE and DDT were detected in one surface soil sample at concentrations of 3.8 micrograms per kilogram (μg/kg) and 7.6 μg/kg, respectively. These concentrations are well below the NMED residential SSLs of 17,200 μg/kg, for both analytes.

- Aroclor-1260, a PCB, was detected in one surface soil sample at a concentration of 99 μg/kg which is well below the NMED residential SSL of 1,120 μg/kg.

- Cyanide was detected in 13 soil samples at a maximum concentration of 0.72 milligrams per kilograms (mg/kg). This concentration is well below the NMED residential SSL of 1,220 mg/kg.

- Arsenic was detected in all soil samples at concentrations up to 16.2 mg/kg. Some of the detected arsenic concentrations exceed the NMED-approved background surface soil concentration of 5.6 mg/kg and the NMED residential SSL of 3.9 mg/kg. Arsenic concentrations of typical of naturally occurring arsenic.

- Barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, selenium, silver, vanadium, and zinc were all detected at concentrations that exceeded their respective NMED-approved background concentrations but did not exceed their respective NMED residential SSLs.

1999 *Resource Conservation and Recovery Act* (RCRA) *Facility Investigation* (RFI)
The 1999 RFI was conducted to determine the vertical and horizontal extent of potential contaminant release and to further investigate other potential burial sites located by the 1998 *SWMU Assessment*. A total of 85 subsurface soil and surface soil samples were collected and analyzed for VOCs, SVOCs, polynuclear aromatic hydrocarbons (PAHs), PCBs, TAL metals, radionuclides (gamma speciation), gross alpha, and gross beta (USAF, 2001).

Analytical results for the 1999 RFI were compared to the NMED HHRB residential SSLs (NMED, 2006) and NMED-approved background concentrations for metals and radionuclides (NMED, 1997). Results are summarized as follows:

- Eight VOCs were detected in soil samples collected from DP-88. None of the detected constituents exceeded their NMED residential SSLs.

- Benzo(a)pyrene, an SVOC, was detected in one subsurface soil sample at a concentration of 1,000 μg/kg. This concentration exceeds the NMED residential SSL of 621 μg/kg. Benzo(a)pyrene was also detected in five subsurface soil samples at concentrations that are well below the NMED residential SSL of 621 μg/kg.

- Twenty-seven SVOCs, including PAHs, were detected in collected soil samples. The detected concentrations were well below their respective NMED residential SSLs.

- Arsenic was detected at a maximum concentration of 7.8 mg/kg. This concentration exceeds both the NMED-approved background subsurface soil concentration of 4.4 mg/kg and the NMED residential SSLs or 3.9 mg/kg. Arsenic concentrations are typical of naturally occurring arsenic.

- Iron was detected at a maximum concentration of 29,700 mg/kg. This concentration exceeds the NMED residential SSL of 23,000 mg/kg.

- Barium, beryllium, cadmium, chromium, cobalt, copper, lead, nickel, vanadium, and zinc were all detected in one or more soil samples at concentrations that exceeded their respective NMED-approved background concentrations but did not exceed their respective NMED residential SSLs.

- Cesium-137, radium-226, radium-228, thorium-232, and uranium-238, all radionuclides, were detected in one or more collected soil samples. Detected concentrations exceeded the NMED-approved background concentrations, but are typical of naturally occurring concentration ranges.

2007 *Accelerated Corrective Measures* (ACM) *Study*
In the July 2007 ACM investigation, 47 surface and subsurface soil samples were collected to further characterize the dirt mounds and areas where contaminants of potential concern (COPCs) were identified in the *SWMU Assessment* and 2008 RFI (USAF, 2008). Soil samples were analyzed for SVOCs, PAHs, PCBs, RCRA eight metals, and pesticides.

Analytical results for the 2007 ACM were compared to the NMED HHRB residential SSLs (NMED, 2006) and the NMED-approved background concentration for metals (NMED, 1997). Results are summarized as follows:

- Arsenic was detected at maximum concentration of 5.9 mg/kg, which exceeds the NMED-approved background subsurface soil concentration of 4.4 mg/kg and the NMED residential SSL of 3.9 mg/kg. Arsenic concentrations are typical of naturally occurring arsenic.

- Barium, chromium, lead, mercury, selenium, and silver were all detected at maximum concentrations that exceed their respective NMED-approved background concentrations but do not exceed their respective NMED residential SSLs.

- Sixteen SVOCs, including PAHs, were detected in surface or subsurface soil samples. All detected concentrations were below their respective NMED residential SSLs.

- The pesticides dichlorodiphenyldichloroethane (DDD), dichlorodiphenyldichloroethene (DDE), and dichlorodiphenyltrichloroethane (DDT) were detected in surface or subsurface soil samples. All detected concentrations were less than their respective NMED residential SSLs.

- Arochlor-1260, a PCB, was detected in a few surface or subsurface soil samples. The maximum detected concentration was well below the NMED residential SSL.

Some contamination, including PAHs, PCBs, and pesticides, were detected at SWMU DP-88 in the surface and shallow subsurface soils. Migration of contaminants is not likely, due to the nature of the contamination and the arid climate. Benzo(a)pyrene was the only organic contaminant detected above the NMED residential SSLs; all other concentration of organic constituents were below current NMED SSLs.

Concentrations of metals are consistent with naturally occurring levels throughout Kirtland AFB and are not the result of past activities of the site. The SWMU DP-88 area is not used for any purpose at this time. This site does not pose any unacceptable risk to human health or the environment.

Basis of Determination

Due to the limited number and low concentrations of COPCs detected at SWMU DP-88, the site is considered appropriate for No Further Action (NFA) based on NMED's Criterion 5: The SWMU has been characterized or remediated in accordance with current applicable state or federal regulations, and the available data indicate that contaminants at SWMU DP-88 pose an acceptable level of risk under current and projected future land use.

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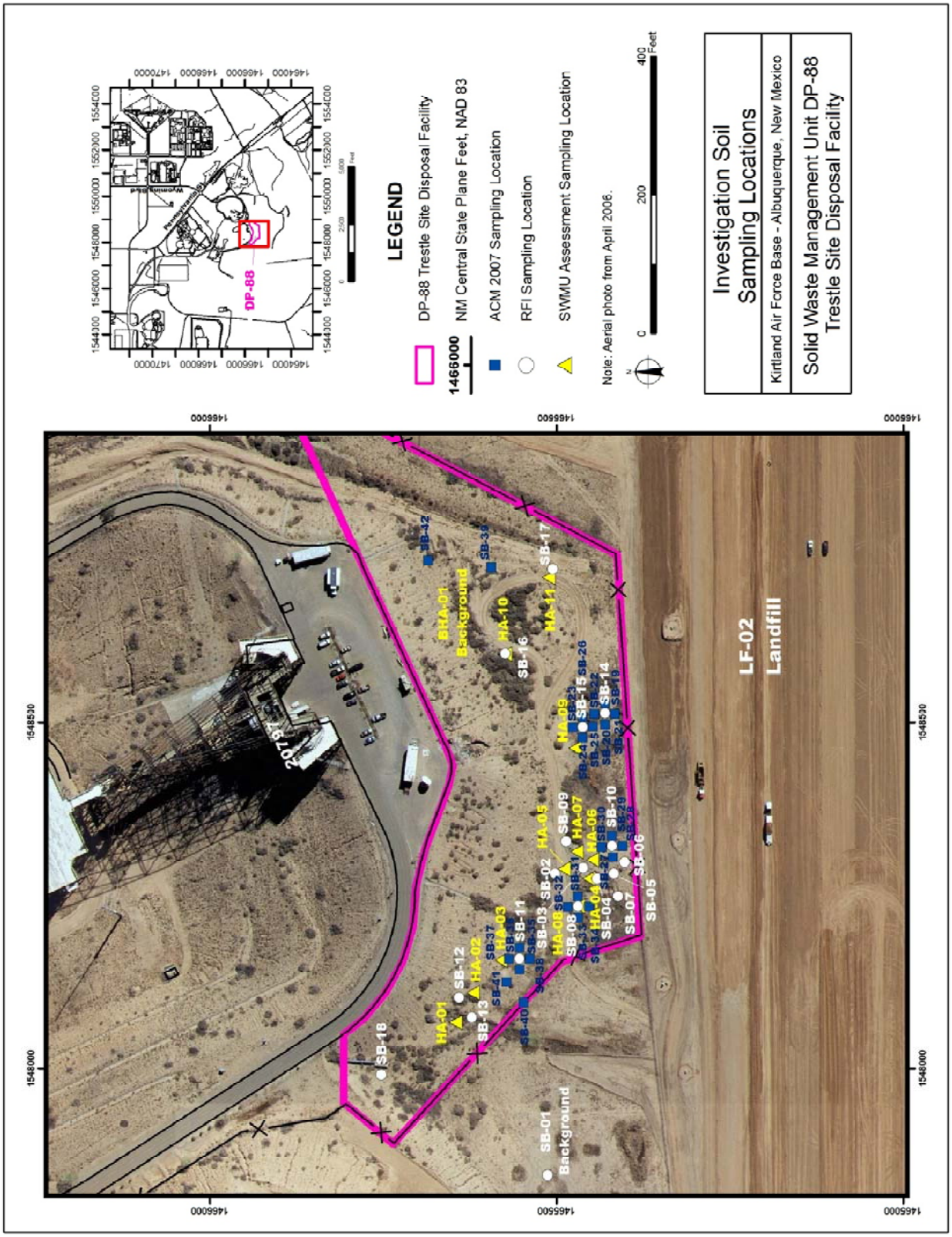

Figure I-20. Investigation Soil Sample Locations at SWMU DP-88, Trestle Site Disposal Facility, Kirtland Air Force Base, New Mexico

I-21. SWMU ST-73, CERF Drain

Location and Current Land Use

Solid Waste Management Unit (SWMU) ST-73, Civil Engineering Research Facility (CERF) drain (ST-073) at Building 57001 is located in the south-central portion of Kirtland Air Force Base (AFB). SWMU ST-73, CERF drain is a concrete exterior area drain outside Building 57001, which is currently used for limited storage. The drain is in a small depression and receives surface runoff from the surrounding asphalt-paved area and the northeast side of Building 57001.

Projected Future Land Use

Building 57001 is southwest of the intersection of Isleta Road and Lovelace Road in an industrial section of Kirtland AFB (Figure I-21). There are no proposed changes for the land use at SWMU ST-73 (U.S. Air Force [USAF], 2000). However, due to New Mexico Environment Department's (NMED) regulatory requirements, a residential land use scenario was used for all risk-based screening assessments.

Site History

Building 57001and adjacent Building 57002, a warehouse and science laboratory, are located at the former Civil Engineering Research Facility. Building 57001 housed research and development activities throughout its history. The building was originally referred to as the Shock Tube Facility on 1960 engineering plans. Engineering plans for expansion and renovation of the building in the 1960s and 1980s indicate that soil testing laboratory facilities and a photography shop were also housed in the building over time. Active operations in the building were most recently conducted by the New Mexico Engineering Research Institute through the late 1990s and may have included metal fabricating activities. The building has been unoccupied since roughly 2000 aside from being used for limited storage. The building is listed for demolition, although a schedule for demolition activities has not been set.

The SWMU ST-73 CERF drain constitutes an exterior drain that is concrete, has a metal grate cover, and is 6.8 feet (ft) by 4.8 ft by 3 ft deep. The drain is in a small depression and receives surface runoff from the surrounding asphalt-paved area and the northeast side of the building and prior to capping in 1996, from some floor drains inside Building 57001. The unit directly receives surface stormwater flow through the metal grate cover. An inflow pipe originated from the floor drains located inside the northwest corner of Building 57001, which were apparently connected to the exterior drain in the 1960's. The area drain outflow pipe discharges to a subsurface stormwater culvert that runs from east to west approximately 90 ft north of SWMU ST-73. The area drain was left in place to continue to function as a stormwater drain when the floor drains in Building 57001 that had discharged to the drain were capped.

Engineering drawing for Building 57001 indicated that the majority of the interior floor drains in the building were connected to the main sanitary sewer system and discharged to the building's septic system. However, four floor drains located in the northwest corner of the building appear to have been connected to a drain line that exited the northwest corner of the building and discharged into the exterior area storm drain. The inflow pipe that was previously connected the Building 57001 floor drains is visible entering the southern side of the CERF drain: an outflow pipe for the area drain exits the unit's north side. From the area drain, the outflow pipe angles north and west for approximately 90 ft until it intersects a larger subsurface storm drainpipe that flows from east to west. The area drain at SWMU ST-73 has not received discharges from inside Building 57001 since 1996 when the building floor drains were capped. The area drain still receives stormwater runoff from the paved area on the northwest side of Building 57001.

In 2004, previously unavailable as-built information discovered for Building 57001 revealed the presence of a small former septic tank located west of the building that was reportedly abandoned in place. The smaller septic tank was installed in 1949 and was the original septic system for the building prior to the installation of a larger septic tank in 1963 when Building 57001 was enlarged. That newer, larger septic tank was investigated and approved for No Further Action (NFA) as SWMU ST-340. The 1949 septic system is only formally part of SWMU ST-340. Due to the proximity of SWMU ST-73 and the 1949 septic system, an objective of the 2007 excavation field activities was to determine whether the 1949 septic tank was abandoned in place and whether the leach field for that tank overlapped (as indicated on the as-built drawings) with the larger leach field associated with the newer, larger SWMU ST-340 septic tank. The investigation also provided confirmatory sampling of 1949 septic tank and leach field.

Geology and Hydrogeology

Building 57001 is located on the Hubbell Bench, on the east boundary of the Albuquerque-Belen Basin. No groundwater production wells exist within several miles of SWMU ST-73. The depth to groundwater in the area of SWMU ST-73 is greater than 400 ft and there would be no associated risk to groundwater from the SWMU ST-73 (USAF, 2007).

Previous Investigations

1994 *Appendix II, Stage 2B Resource Conservation and Recovery Act* (RCRA) *Facility Investigation* (RFI)

During June and July of 1994, five borings were drilled and sampled using a direct-push drill rig and four borings were drilled using a hollow-stem auger (HSA) drill rig in the soils surrounding the CERF area drain (USAF, 1995). One of the direct-push borings was placed northwest of the site, in an area assumed to be free of known or suspected sources of contamination, to collect background concentration data. The HSA drill rig was used to collect deeper samples to define the vertical extent of contamination. From the nine boreholes, 21 soil samples were collected and analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), total petroleum hydrocarbons (TPH), metals, mercury, soil pH, and soil moisture.

The analytical results of the 1994 *Appendix II, Stage 2B RFI* investigation were compared to current NMED human health risk–based (HHRB) residential soil screening levels (SSLs) (NMED, 2012), NMED TPH screening guidelines (NMED, 2012), and NMED-approved background concentrations (NMED, 1997). The results are summarized as follows:

- Three VOCs (acetone, benzene, and methylene chloride) and three SVOCs (bis2-ethylhexylphthalate, di-n-butylphthalate, and di-n-octylphthalate) were detected. The concentrations were below the residential SSLs.

- Diesel range organics were identified in several samples at concentrations ranging from 0.07 to 1.5 milligrams per kilogram (mg/kg); detected concentrations were below the NMED screening guideline (1,000 mg/kg). No gasoline-range organics were detected in the soil samples.

- Naturally occurring metals were detected in all samples. Only chromium and arsenic were detected at concentrations above their respective residential SSLs. Antimony, arsenic, barium, beryllium, chromium, cobalt, copper, nickel, and zinc were detected at concentrations that exceed their respective NMED-approved background concentrations. All metals concentrations were indicative of naturally occurring conditions.

Appendix II, Phase 2 RFI Investigation
Additional field investigations were conducted during April 1996. The *Appendix II, Phase 2 RFI* field program was designed to define the lateral and vertical extent of potential contamination near the area drain, and consisted of drilling and sampling five boreholes (USAF, 1997). Soil samples were collected from the boreholes at 5-ft intervals from the base of the drain (6 ft below ground surface [bgs]) down to 27 ft bgs. The samples were only analyzed for metals because VOCs, SVOCs, and TPH were not determined to be contaminants of concern during the *Appendix II, Stage 2B RFI*.

The analytical results of this investigation were compared to current NMED residential SSLs (NMED, 2012) and NMED-approved background concentrations (NMED, 1997). The results are summarized as follows:

- Naturally occurring metals were detected in all samples at concentrations consistent with expected levels.

- Chromium is the only metal detected at concentrations above the residential SSL. Chromium was detected in the 6 to 7 ft bgs sample from borehole ST-266-14 at a concentration of 927 mg/kg, which is significantly greater than the approved background concentration of 12.8 mg/kg, or the 2012 SSL of 2.97 mg/kg.

- Antimony, arsenic, and thallium were not positively detected during this investigation.

- Barium, copper, nickel, selenium, silver, and zinc were each detected in at least one sample at a concentration above the associated approved background level.

2000 *Additional Soil Sampling*
During June 2000, one direct push borehole was advanced to 17 ft bgs at the same location as the previous *Appendix II, Phase 2 RFI* borehole ST-266-14. This borehole was installed to re-evaluate the possible presence of an elevated chromium concentration that had detected during the *Appendix II, Phase 2 RFI* investigation at that location. Four soil samples were collected from the 17-ft deep borehole. All samples were analyzed for metals.

The analytical results were compared to current NMED residential SSLs (NMED, 2012), and NMED-approved background concentrations (NMED, 1997). The results are summarized as follows:

- Chromium was detected in only one of the samples at a concentration of 3.01 mg/kg, which is only slightly higher than the NMED 2012 residential SSL of 2.97 mg/kg and less than the approved background concentration for chromium.

- Mercury was detected in all four of the samples. The detected mercury concentration of 0.11 mg/kg in one sample was slightly higher than the approved background concentration of less than 0.1 mg/kg. The other three detected concentrations for mercury were at or below the approved background concentration.

- All other positively detected metals concentrations were below NMED-approved background concentrations and NMED residential SSLs.

2007 *Test Pit Investigation*
During March 2007, a test-pit excavation program was undertaken at SWMU ST-73 to evaluate the apparent connection of Building 57001 floor drains to the CERF drain and the connection of the subsurface outlet piping from the area drain to a larger stormwater drain, and to collect confirmation soil samples from selected locations.

Five test pits (TP-1, TP-3, TP-4, TP-5, and TP-6) were excavated to evaluate the potential for releases to the environment from the piping that exited the northwest corner of Building 57001, passed through the exterior area drain located outside the building, and continued in a northwest direction to a connection with a larger stormwater drain. The soil samples from all but one of the test pits (TP-3), were analyzed for metals, VOCs, SVOCs, and TPH. The sample, from the test pit indentified as TP-3, was analyzed for metals only. Certain test pit samples were also analyzed for high explosives (HE). Based on the site history, HE was identified as a potential contaminant.

The analytical results of the 2007 *Test Pit Investigation* were compared to current NMED residential SSLs (NMED, 2012), NMED TPH screening guidelines (NMED, 2012), and NMED-approved background concentrations (NMED, 1997). The analytical results are summarized as follows:

- No VOCs were detected in any of the soil samples submitted for analysis.

- The SVOC dibenzo(a,h)anthracene was detected in a few samples at concentrations slightly above the 2012 NMED residential SSL of 0.148 mg/kg.

- Low-level TPH concentrations were detected in two of the test pit samples at concentrations significantly below NMED TPH screen guidelines.

- Naturally occurring metals were detected in all samples at concentrations generally consistent with NMED-approved background concentrations. Barium, beryllium, cadmium, cobalt, copper, and nickel were each detected at a concentration greater than the approved background concentration in only one sample. The detected concentration of zinc exceeded background in three of the samples, but was orders of magnitude below the residential SSL for zinc. In all samples, arsenic was detected at concentrations exceeding the NMED residential SSL; these detections are consistent with naturally occurring concentrations throughout Kirtland AFB. Chromium was detected above the approved background concentration in two of the samples, and above the NMED residential SSL in all of the samples. The chromium detections for this investigation range from 10 to 18 mg/kg (the 2012 NMED residential SSL for chromium IV is 2.97 mg/kg).

The detected levels of analyzed constituents were below current NMED residential SSLs or represent concentrations of metals that are consistent with naturally occurring concentrations throughout Kirtland AFB. This site does not pose an unacceptable risk to human health or the environment.

Basis of Determination

In a letter dated 11 March 2008 the New Mexico Environment Department stated that SWMU ST-73 is suitable for a NFA petition, and if granted, removal from the Kirtland AFB RCRA Hazardous Waste Permit. This request for NFA status is based on NMED's Criterion 5: the SWMU has been characterized or remediated in accordance with current applicable state or federal regulations, and the available data indicate that contaminants pose an acceptable level of risk under current and projected future land use.

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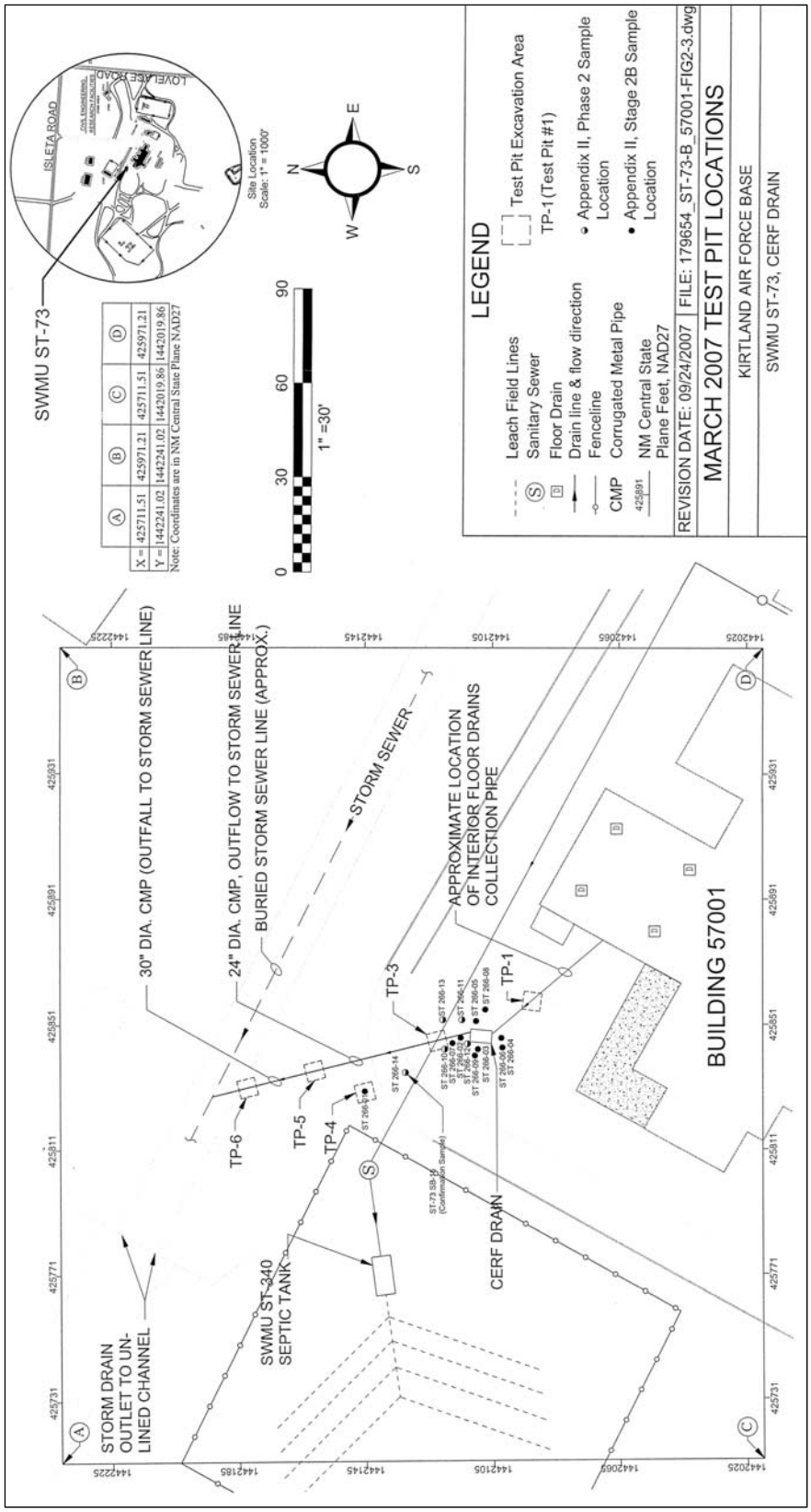

Figure I-21. RCRA Facility Investigation Sample Locations at SWMU ST-73, Building 57001, CERF Drain, Kirtland Air Force Base, New Mexico

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Kirtland Air Force Base Permit Modification Request and Public Meeting The Kirtland Air Force Base (AFB) Environmental Restoration Program is initiating a Class 3 Modification to its Resource Conservation and Recovery Act (RCRA) Permit (NM9570024423). Kirtland AFB is requesting that 21 solid waste management units (SWMUs) be moved to the inactive portion of the permit indicating corrective action is complete at each site. The sites have been investigated and remediated (as appropriate). A petition has been made to the New Mexico Environment Department (NMED) for no-further-action (NFA) on these SWMUs. A Statement of Basis with supporting documents on these 21 SWMUs is available for review at the Central New Mexico Community College Montoya Campus Library, 4700 Morris NE, Albuquerque, and on the Kirtland AFB Web page www.kirtland.af.mil under the "Environmental Issues" section. Public Poster Session Date/Time/Location Tuesday, October 23, 6-8 p.m. Cesar Chavez Community Center 7505 Kathryn SE, Albuquerque, New Mexico (off Louisiana Blvd and Zuni) A 60-Day public comment period begins with the publication of this notice and written comments on this request for permit modification will be accepted through midnight 30 November 2012. Direct all written comments along with your name and address to both individuals below: Mr. Wayne Bitner Chief, Restoration Section 377 MSG/CEVR 2050 Wyoming Blvd SE, Suite 118 Kirtland AFB, NM 87117-5270 (505) 853-3484 Mr. John E. Kieling, Program Manager New Mexico Environment Department Hazardous Waste Bureau 2905 Rodeo Park Road East, Building 1 Santa Fe, NM 87505-6316 (505) 476-6035 La Base de la Fuerza Area Kirtland Anuncia una Reunin Pblica y una Solicitud para Modificar su Permiso El Programa de Restauracin Ambiental de la Base de la Fuerza Area Kirtland iniciar una Modificacin de Clasificacin a su Permiso (NM9570024423) de la Ley de Conservacin y Recuperacin de Recursos (RCRA, por sus siglas en ingls). Kirtland AFB est solicitando que 21 Unidades de Manejo de Desperdicios Slidos (SWMUs, por sus siglas en ingls) sean removidas de la porcin inactiva del permiso indicando que se ha completado una accin correctiva para cada sitio. Los sitios han sido investigados y remediados (adecuadamente). Se ha presentado una solicitud al Departamento del Medioambiente del Estado de Nuevo Mxico (NMED, por sus siglas en ingls) para emitir la determinacin de "ninguna accin adicional" (NFA, por sus siglas en ingls) en estos SWMUs. Una Declaracin de Base con los documentos de apoyo para estos 21 SWMUs est disponible para revisin en la Biblioteca de Central de New Mexico Community College, Sede Montoya, 4700 Morris NE, Albuquerque, y en la pgina Web de la Kirtland AFB http://www.kirtland.af.mil en la seccin "Asuntos Ambientales" Fecha/Hora/Lugar de la Reunin Pblica Martes, 17 de Abril, 2012 6-8 P.M. Cesar Chavez Community Center 7505 Kathryn SE, Albuquerque, New Mexico (saliendo de Louisiana Blvd y Zuni) Un periodo de 60 das para recibir comentarios del pblico inicia con la publicacin de este anuncio; Se aceptarn comentarios escritos sobre la solicitud para modificar el permiso hasta la medianoche del 30 de noviembre del 2012. Favor dirigir todos los comentarios escritos con su nombre y direccin postal a los dos individuos identificados a continuacin: Mr. Wayne Bitner Chief, Restoration Section 377 MSG/CEVR 2050 Wyoming Blvd SE, Suite 118 Kirtland AFB, NM 87117-5270 (505) 853-3484 Mr. John E. Kieling, Program Manager New Mexico Environment Department Hazardous Waste Bureau 2905 Rodeo Park Road East, Building 1 Santa Fe, NM 87505-6316 (505) 476-6035 Journal; September 30, 2012

AFFIDAVIT OF PUBLICATION

STATE OF NEW MEXICO
County of Bernalillo SS

Linda MacEachen, being duly sworn, declares and says that she is Classified Advertising Manager of **The Albuquerque Journal**, and that this newspaper is duly qualified to publish legal notices or advertisements within the meaning of Section 3, Chapter 167, Session Laws of 1937, and that payment therefore has been made of assessed as court cost; that the notice, copy of which is hereto attached, was published in said paper in the regular daily edition, for 1 times, the first publication being on the 8th day of October 2012, and the subsequent consecutive publications on _____, 20____.

Linda MacEachen

Sworn and subscribed before me, a Notary Public, in and for the County of Bernalillo and State of New Mexico this 8th day of October of 2012.

OFFICIAL SEAL
Sandra B. Gutierrez
NOTARY PUBLIC
STATE OF NEW MEXICO
My Commission Expires: 2-18-13

Sandra B. Gutierrez

PRICE $39.10

Statement to come at end of month.

ACCOUNT NUMBER 1009587

NOTICE OF PUBLIC MEETING

United States Department of Defense (DoD) and Department of Energy (DOE) Joint Public Meeting

Citizens are invited to learn about the Environmental Restoration Program (ERP) activities on Kirtland Air Force Base (AFB), provide input and feedback to DoD and DOE officials.

The next joint Semi-Annual Public Meeting will be:
Tuesday, October 23, 2012
6:00-8:00 p.m.
Cesar Chavez Community Center
7505 Kathryn SE (off of Louisiana Blvd. and Zuni)

The meeting will be hosted by DOE and will begin with their portion at 6:00 p.m. followed by DoD at 7:00 p.m.

Kirtland Air Force Base will present information on:
- Bulk Fuels Facility (Phase-Separated Hydrocarbons (PSH)) (Site SS-111) Update
- Petition for No Further Action (NFA) for 21 Solid Waste Management Units (SWMUs)
- Public Comment

Questions concerning this meeting should be made to:
Kirtland AFB Public Affairs
377 ABW/PA
2000 Wyoming Blvd. SE
Kirtland AFB, NM 87417
(505) 846-5991

Citizens may review Air Force ERP documents at the Kirtland AFB Information Repository at the Central New Mexico Community College-Montoya Campus Library, 4700 Morris NE or by visiting the Kirtland AFB website at http://www.kirtland.af.mil in the Environmental Issues section for Public Records. DOE documents are available at the University of New Mexico, Zimmerman Library.
Journal; October 8, 2012

Kirtland Air Force Base
Public Meeting
Tuesday, October 23, 2012
6:00 p.m. – 8:00 p.m.

NAME	CONTACT INFORMATION (Mailing address or Email)	ADD TO MAILING LIST ??? *(Please Circle)* ***Disregard** *if you are already on the mailing list.*
TOM Skibitski		Yes / No
Donna Orozco-Geist	jdgeist@nmia.com	Yes / No
JOE ESTRADA	NNSA/SFO	Yes / No
Michelle Miano		Yes / No
Robert Anderson	324 Richard SE ABQ 87106	Yes / No on already
Bruce Thomson	LibTNov1@aol.com	Yes / No
Jeff Jarry		Yes / No
KATIE RICHARDSON	USRep Martin Heinrich	Yes / No
Ronnie Schelby	Ronnie.schelby@usace.army.mil USACE	Yes / No
Diane Tcary	1008 Betts ST NE	Yes / No
Lewis Reif	916 Georgia St SE	Yes / No
Judy [illegible]		Yes / No
Henry Misseruille	24 MATISSE Rd APT D	Yes / No
Janet Greenwald	215 Montline SW 87105	Yes / No
Amelia Symonds	Kontactus@cardnm.org amelia.symonds@gmail	Yes / No
Steve Cabaniss	cabaniss@unm.edu	Yes / No
John Hawley	hgeomatters@questoffice.net	Yes / No
		Yes / No

Kirtland Air Force Base
Public Meeting
Tuesday, October 23, 2012
6:00 p.m. – 8:00 p.m.

NAME	CONTACT INFORMATION (Mailing address or Email)	ADD TO MAILING LIST ??? *(Please Circle)* ***Disregard** *if you are already on the mailing list.*
Charles Dickerman		
Rick Shean	ABCWUA	Yes / No
Mike Nugy	SNL	Yes / No
Bob Gilkeson	nngilkeson@aol.com	Yes / No
Joseph Wexler		Yes / No
Tami Moore	DOE	Yes / No
Dwight F Denton	1408 RIDGECREST PL SE ALB, NM 8708	Yes / No
Marie Vanover	KAFB	Yes / No
Susan Lucas Kamat	NMED	Yes / No
DB McCoy	Citizen Action	Yes / No
Tom Valdez	S. San Pedro N.A.	Yes / No
Billy Gallegos	COA	Yes / No
Rey Garduño	City	Yes / No
Eric Nuttall	nuttall@unm.edu	Yes / No
Lilly K. Rendt	Ex Public Schools	Yes / No
David Mill	SNL	Yes / No
Lorna Marchand		Yes / No
Suzanne Ziegler		Yes / No
Katrina Wagner	SNL	Yes / No

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NAME	CONTACT INFORMATION (Mailing address or Email)	ADD TO MAILING LIST ??? *(Please Circle)* ***Disregard** *if you are already on the mailing list.*
J Barry Shupe	JAMES.SHUPE@US.AF.MIL	Yes / No
Mark Gram		Yes / No
Karen Jarocki	kejarocki@yahoo.com	(Yes) / No
Anita Reiser	~~[illegible]~~	Yes / No
JOHN WECKERLE		Yes / No
Wayne Fitzner	KAFB	Yes / No
John Cochran	Sandia Labs	Yes / No
NANCY MUSINSKI	nmusinski@abcwua.org	Yes / No
Renee Pino	TLI	Yes / No
		Yes / No
		Yes / No
		Yes / No
		Yes / No
		Yes / No
		Yes / No
		Yes / No
		Yes / No
		Yes / No