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HOLLOMAN AIR FORCE BASE, NEW MEXICO

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APR 17 2015

DeAnna Rothhaupt
Chief, Holloman AFB Environmental
550 Tabosa Avenue
Holloman AFB NM 88330-8458

10 April 2015

Mr. John E. Kieling
Chief, Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East Bldg. 1
Santa Fe NM 87505-6063

SUBJECT: Transmittal of Final DP-030/SD-033 (Solid Waste Management Unit 113B) Interim Corrective Measures Work Plan Addendum

Dear Mr. Kieling,

Attached is the Final Interim Corrective Measures Work Plan Addendum for your review and comment. The addendum was prepared in response to the New Mexico Environment Department (NMED) review documented in the "Approval with Modification, Final DP-030/SD-033 (Solid Waste Management Unit 113B) Interim Corrective Measures Work Plan, Holloman Air Force Base, New Mexico, September 2014, Holloman Air Force Base, U.S. Environmental Protection Agency (EPA) ID# NM6572124422, HWB-HAFB-14-014" (NMED, 2015) dated February 20, 2015. Also included with this submittal is the Response to Comments documenting the comment resolution, a hardcopy of the report, and a CD that contains native and PDF files of the subject document.

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

If you have any questions regarding this submittal, please contact me at (575) 572-3931.

Sincerely,

DEANNA ROTHHAUPT, GS-12, DAFC

Attachment(s): Final DP-030/SD-033 (Solid Waste Management Unit 113B) Interim Corrective Measures Work Plan Addendum. Hard copy and CD.

cc: Mr. David Strasser, NMED HWB (Hard copy and CD)
Mr. Will Moats, NMED HWB (letter only)
C. Hendrickson, EPA, Region 6 (letter and CD)

Common Comment and Response Worksheet (Version 3)

Date	Reviewer	Document Title (version)	Contract/TO Number
20-Feb-15	NMED	Final DP-030/SD-033 (Solid Waste Management Unit 113B) Interim Corrective Measures Work Plan, Holloman Air Force Base, New Mexico	23446541.0043AA/0045AA

Item	Source	Section	Page	Para	Line	Class	ADEQ Comment	FPN/URS Response
							Final Work Plan (text)	
1	NMED						Currently, the southern extent of the groundwater contamination at SWMU 113B is not defined. Holloman Air Force Base (the Permittee) must install additional monitor wells to define the southern extent of groundwater contamination. The Permittee must submit an addendum to the work plan that proposed the installation of at least two monitor wells to complete characterization of the groundwater contamination. The Work Plan addendum must be submitted to NMED no later than May 20, 2015.	An addendum has been prepared providing for the installation of two new groundwater monitoring wells located downgradient of the current monitoring network.

NOTE: Sections and page numbers may be inferred if they were not specifically called out in the reviewer's comments.

Column A: Comment Identifier Number
Column B: Source (Commenter/Authority)
Column C: Section Number of Comment
Column D: Page Number of Comment (first page associated with
Column E: Paragraph number, on page, of Comment
Column F: Line Number (within Paragraph above) of Comment
Column G: Comment Classification
Column H: Comment
Column I: Response
Notes: Comments must be actionable ("add the following text:…", "delete…", "change text to:")
Place only one comment per row.
Classify comment as C, M, S, or A.

Comment Classifications

(C) Critical: Critical comments will result in a critical issue. Provide convincing support.
(M) Major: Major comments are significant concerns that may result in a major issue. This category may be used with a general statement of concern followed by a detailed
(S) Substantive: An entry in the document that appears to be or is potentially unnecessary, misleading, incorrect, or confusing.
(A) Administrative: Administrative comments correct inconsistencies between different sections, typographical and grammatical errors.

HOLLOMAN AIR FORCE BASE
NEW MEXICO

FINAL ADDENDUM TO THE DP-030/SD-033 (SOLID WASTE MANAGEMENT UNIT 113B) INTERIM CORRECTIVE MEASURES WORK PLAN

April 2015

49 CES/CEI
550 Tabosa Avenue
Holloman AFB, New Mexico 88330-8458

HOLLOMAN AIR FORCE BASE, NEW MEXICO

DP-030 – GREASE TRAP DISPOSAL PITS AND SD-033 – COOKING GREASE DISPOSAL TRENCHES

FINAL ADDENDUM TO THE INTERIM CORRECTIVE MEASURES WORK PLAN

April 2015

Prepared for

Department of the Air Force, 772nd ESS/PKB
3515 S. General McMullen Drive, Suite 155
Joint Base San Antonio Lackland, Texas 78226-2018

Contract FA8903-13-C-0008

Submitted by

URS Group, Inc.
7720 North 16th Street, Suite 100
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In Association with

FPM Remediations, Inc.
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NOTICE

This Final Addendum to the Interim Corrective Measures Work Plan was prepared for the Air Force Civil Engineer Center by URS Group, Inc. in association with FPM Remediations, Inc. The addendum was prepared in response to the New Mexico Environment Department's request to include installation of two new groundwater monitoring wells as part of the interim corrective measures outlined in the work plan. The work plan was prepared to aid in the implementation of a final remedial action plan under the Installation Restoration Program. As the report relates to actual or possible releases of potentially hazardous substances, its release prior to an Air Force final decision on remedial action may be in the public's interest. The limited objectives of this report and the ongoing nature of the Installation Restoration Program, along with the evolving knowledge of site conditions and chemical effects on the environment and health, must be considered when evaluating this report, since subsequent facts may become known which may make this report premature or inaccurate.

Government agencies and their contractors registered with the Defense Technical Information Center should direct requests for copies of this report to: Defense Technical Information Center, Cameron Station, Alexandria, Virginia 22304-6145.

Non-government agencies may purchase copies of this document from: National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161.

REPORT DOCUMENTATION PAGE

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DP-030 - Grease Trap Disposal Pits and SD-033 - Cooking Grease Disposal Trenches
Holloman Air Force Base, New Mexico

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Approved for public release, distribution is unlimited.

13. SUPPLEMENTARY NOTES

14. ABSTRACT
This Final Addendum to the Interim Corrective Measures Work Plan was prepared in response to the New Mexico Environment Department's request to include installation of two new groundwater monitoring wells as part of the interim corrective measures outlined in the Interim Corrective Measures Work Plan. The work plan specifies the activities that will be performed in support of the corrective measures required to address impacts attributed to historic disposal activities at the DP-030 and SD-033 sites. The trichloroethene concentrations in groundwater monitoring wells downgradient of the site have been increasing. Additional wells are required further downgradient of the existing monitoring network to evaluate the continued impacts and migration of trichloroethene in groundwater.

15. SUBJECT TERMS
Sites DP-030 and SD-033, groundwater monitoring, trichloroethene

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
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PREFACE

This Draft Addendum to the Interim Corrective Measures Work Plan addresses well installation activities to expand the groundwater monitoring network associated with the DP-030 and SD-033 sites downgradient of the existing wells. The New Mexico Environment Department has requested that two new groundwater monitoring wells be installed as part of the proposed interim corrective measures that will be performed to address wastes that were disposed in pits and trenches that comprise the DP-030, Grease Trap Disposal Pits, and SD-033, Cooking Grease Disposal Trenches, at Holloman Air Force Base, New Mexico. The new wells will be incorporated into the existing groundwater monitoring network established for the two sites.

This work will be performed under the authority of the requirements of the Air Force Civil Engineer Center Contract No. FA8903-13-C-0008. This program is conducted under the Holloman Air Force Base Installation Restoration Chief, Ms. DeAnna Rothhaupt. URS Group, Inc., as a subcontractor to FPM Remediations, Inc., has prepared this Addendum to the Interim Corrective Measures Work Plan as defined in the Performance-Based Remediation Contract for Cannon, Holloman, and Kirtland Air Force Bases located in New Mexico, and Luke Air Force Base located in Arizona. Mr. Steven Geiger is the URS Installation Manager for Installation Restoration Program Project Sites at Holloman Air Force Base.

CONTENTS

TABLES

FIGURES

ACRONYMS AND ABBREVIATIONS

AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
CFR	Code of Federal Regulations
EPA	U.S. Environmental Protection Agency
FPM	FPM Remediations, Inc.
ft/day	feet per day
HSA	hollow-stem auger
IDW	investigation-derived waste
LTM	long-term monitoring
mg/L	milligram per liter
MCL	maximum contaminant level
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NMWQCC	New Mexico Water Quality Control Commission
NS	not sampled
NTU	nephelometric turbidity unit
PID	photoionization detector
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
SOP	standard operating procedure
TCE	trichloroethene
TDS	total dissolved solids
URS	URS Group, Inc.
USAF	U.S. Air Force
VOC	volatile organic compound
µg/L	microgram per liter

1.0 INTRODUCTION

This Addendum to the Interim Corrective Measures Work Plan addresses the groundwater monitoring well installation activities that will be performed at the DP-030, Grease Trap Disposal Pits, and SD-033, Cooking Grease Disposal Trenches, sites at Holloman Air Force Base (AFB), New Mexico, hereinafter referred to as the Sites. The locations of the Sites are shown in Figure 1. This plan was prepared in accordance with the requirements of the Air Force Civil Engineer Center (AFCEC) Contract No. FA8903-13-C-0008. URS Group, Inc. (URS), as a subcontractor to FPM Remediations, Inc. (FPM), has prepared this addendum in accordance with in the Performance-Based Remediation Contract for Cannon, Holloman, and Kirtland AFBs located in New Mexico, and Luke AFB located in Arizona.

The *Final DP-030/SD-033 (Solid Waste Management Unit 113B) Interim Corrective Measures Work Plan* (U.S. Air Force [USAF], 2014a) specifies the activities that will be performed in support of the corrective measures required to address impacts attributed to historic disposal activities at the Sites. In addition, the groundwater underlying the Sites is impacted with trichloroethene (TCE), which is attributed to waste contained in the pits and trenches that comprise the Sites. The work plan provides for the source removal and monitoring of groundwater to evaluate the natural degradation of TCE which should occur following removal of the waste.

1.1 Purpose and Scope

This addendum has been prepared in response to the "Approval with Modification, Final DP-030/SD-033 (Solid Waste Management Unit 113B) Interim Corrective Measures Work Plan, Holloman Air Force Base, New Mexico, September 2014, Holloman Air Force Base, U.S Environmental Protection Agency (EPA) ID# NM6572124422, HWB-HAFB-14-014" (New Mexico Environment Department [NMED], 2015). The approval letter required that Holloman AFB install at least two new groundwater monitoring wells to complete characterization of the groundwater impacts associated with the Sites. The addendum delineates the requirements for installation of two new groundwater monitoring wells downgradient of the existing monitoring well network.

1.2 Addendum Organization

This addendum is divided into six sections including:

- Section 1.0 – Introduction
- Section 2.0 – Groundwater Evaluation
- Section 3.0 – Procedures for Implementation
- Section 4.0 – Reporting
- Section 5.0 – References

2.0 GROUNDWATER EVALUATION

As part of the remedial investigation conducted in 1991 (Radian, 1992), four groundwater monitoring wells were installed, including MW30&33-01, MW30&33-02, MW30&33-03, and MW30&33-04. Field slug tests were performed to estimate the hydraulic conductivity of the lithology around each monitoring well. The hydraulic conductivities were determined to be 4.23 feet per day (ft/day), 0.61 ft/day, 0.22 ft/day, and 0.92 ft/day, respectively. In addition, the groundwater velocity was estimated to be 0.2 to 1.0 foot per year, based on a hydraulic gradient of 0.0006 foot per foot.

A single round of groundwater samples were collected and analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds, oil and grease, total metals, gross alpha/beta, organochlorinated and organophosphorous pesticides, polychlorinated biphenyls, chlorinated herbicides, anions, and total dissolved solids (TDS). No constituents were detected above background and groundwater standards in place at the time. Low concentrations of halogenated VOCs were detected in the samples collected from monitoring well MW30&33-04. The TDS concentrations ranged from 19,000 milligrams per liter (mg/L) to 40,000 mg/L.

A subsequent Decision Document was signed by NMED and the Base Commander in September 1995 (USAF, 1995) recommending No Further Action for groundwater with groundwater monitoring based on the absence of exposure pathways and receptors and the remote locations of the two sites with long-term monitoring commencing in 1995. In 2005, the *Supplemental RCRA Facility Investigation, DP-30/SD-33 (SWMU 113), SS-39 (SWMUs 165, 177, 179, and 181), and SD-27 (SWMU 141), Holloman Air Force Base, Alamogordo, New Mexico* (USAF, 2007) was prepared and submitted to the NMED to address additional characterization requirements at these sites. Upon review of the plan, NMED recommended that semi-annual groundwater monitoring would be required at DP-030 and SD-033.

In response to the *Draft Supplemental RCRA Facility Investigation Work Plan, Holloman Air Force Base, Alamogordo, New Mexico* (USAF, 2005), NMED requested the installation of a groundwater monitoring well immediately downgradient and adjacent to DP-030. The additional groundwater monitoring well (MW30&33-05) was installed in June 2006 to a depth of 30 feet below ground surface, approximately eight feet below the top of the underlying water table as measured at the time of drilling.

As discussed in the *Supplemental RCRA Facility Investigation – DP-30/SD-33 (SWMU 113), SS-39 (SWMUs 165, 177, 179, and 181) and SD-27 (SWMU 141), Holloman Air Force Base, Alamogordo, New Mexico* (USAF, 2007), the four pre-existing wells and the newly installed monitoring well were sampled in July 2006 and again in January 2007. Sixteen VOCs, 16 total and/or dissolved metals, and TDS were detected in the groundwater samples. The TDS results ranged from 21,500 mg/L to 35,400 mg/L. TCE was the only VOC detected at concentrations exceeding regulatory levels with a maximum concentration of 59.3 micrograms per liter (µg/L) in well MW-30&33-05 as compared to the EPA maximum contaminant level (MCL) of 5 µg/L. Iron was detected at a concentration of 1,410 µg/L in well MW-30&33-05 as compared to the irrigation New Mexico Groundwater Quality Control Commission (NMWQCC) standard of 1,000 µg/L, but was not detected in the dissolved metals sample indicating that the reported concentration was associated with the sample turbidity. None of the dissolved metals data obtained exceeded regulatory criteria.

During the July 2009 sampling event, monitoring well MW-30&33-05 was found damaged and not sampled. The well was abandoned and a replacement monitoring well (MW-30&33-05R) installed. Results from the 2009 and 2010 sample events again demonstrated that natural TDS levels are above 10,000 mg/L, exceeding the threshold at which groundwater is no longer considered a potential domestic or agricultural water supply. TCE continued to exceed regulatory levels with a maximum concentration of 30.6 µg/L obtained for well MW-30&33-05R. For total metals analyses, antimony, selenium, and arsenic

exceeded regulatory levels, with antimony and selenium being below levels of regulatory concern for dissolved metals. Arsenic was the only dissolved metal for which the concentration in groundwater samples exceeded both the New Mexico Water Quality standard of 0.448 µg/L and the EPA MCL of 10 µg/L with a maximum concentration of 31.6 µg/L. Depth to water for the five wells averages approximately 22 feet below ground surface with an overall slight gradient to the south-southeast.

The 2009/2010 long-term monitoring (LTM) Report (USAF, 2010) recommended that LTM be discontinued and conditional site closure be granted for sites DP-030 and SD-033 with Land-Use Restrictions. The Land-Use Restrictions would restrict the construction of buildings due to the risk of vapor intrusion. Groundwater monitoring has subsequently been continued with samples collected in January 2011, October 2012, and March 2013. Table 1 summarizes the TCE results for the years 2006 through 2013. Because the end goal of this project is Site Closeout without any restrictions, LTM of the five existing wells and two new monitoring wells will continue in accordance with the Interim Measures Work Plan (USAF, 2014a).

As can be seen from examination of the analytical data, the TCE concentrations in downgradient wells MW30&33-02 and MW30&33-03 have been increasing with the notable exception of the sample collected for well MW30&33-03 in January 2007. For well MW30&33-05R, concentrations have been holding relatively steady, although less than the concentrations encountered in the original well MW30&33-05. Based on the increasing TCE concentrations experienced for the two downgradient wells, NMED has requested the installation of a minimum of two additional groundwater monitoring wells to be located further downgradient of the existing monitoring well network.

As shown in Figure 2, the TCE concentration plume is extending to the south of the DP-030 and SD-033 sites with groundwater flowing primarily in a south to south-easterly direction. The concentrations for wells MW30&33-02 and MW30&33-03 which currently form the southern extent of the monitoring network for the sites already exceed the EPA MCL of 5 µg/L with concentrations of 16.9 µg/L and 17.1 µg/L, respectively. Based upon the concentrations shown in Figure 2, it is proposed that one new well be installed near the 10 µg/L isoconcentration line with a second well located downgradient of the estimated extent of the 5 µg/L isoconcentration line representing the drinking water standard. This second well will serve as a sentinel well to evaluate the downgradient migration of the TCE contamination.

3.0 PROCEDURES FOR IMPLEMENTATION

This section includes general procedures for installation of the two new monitoring wells at sites DP-030 and SD-033. Several supporting project-related plans have also been prepared as described in the following sections, including a Site-specific quality assurance project plan (QAPP), a health and safety plan, and a groundwater monitoring plan.

The following specific tasks will take place at the Sites under this addendum:

- Pre-mobilization activities
- Mobilization/site setup
- Monitoring well installation
- Surveying
- Monitoring well development

3.1 Applicable Regulations and Standards

Federal and state regulations and standards that may be applicable to these activities include the following:

- Holloman AFB RCRA Permit No. NM6572124422, February 2004 (NMED, 2004).
- RCRA Permit No. NM6572124422 Modification, October 2009 (NMED, 2009).
- NMED residential soil screening levels
- EPA residential screening levels
- NMWQCC groundwater cleanup levels protective of human health (20.6.2.3103 New Mexico Administrative Code [NMAC]).
- New Mexico Hazardous Waste Act (New Mexico State Rules Act [NMSA] 1978, §74-4-1).
- New Mexico Hazardous Waste Management Regulations, (20.4.1.100 NMAC).
- RCRA, 40 Code of Federal Regulations (CFR) 260-268, Management of Hazardous Waste. In the event that investigation-derived waste (IDW) sampling and analysis indicate the presence of constituents of potential concern at concentrations rendering them hazardous, storage and disposal protocols will be followed in accordance with RCRA hazardous waste regulations, as adopted by NMED.
- United States Department of Transportation 49 CFR 172, 173, and 178: Applies to packaging IDW for removal off Site and addresses hazard-class diamond labeling.

The latest revision of NMED and EPA documents at the time of addendum approval and/or execution of the field work will be used.

3.2 Pre-Mobilization Activities

Prior to mobilization of equipment, subcontracted services (e.g., drilling subcontractor, licensed surveyor, analytical laboratory) will be procured. All necessary permits (e.g., digging permits) will be initiated. All Site activities will be coordinated with appropriate Holloman AFB personnel.

Prior to initiating intrusive activities, a completed and approved Air Force Form 332 will be obtained for authorization of construction work at Holloman AFB. A request for locating underground utilities in the area will be submitted to the local one-call utility notification center, as applicable. Additionally, Air Force Form 103 will be submitted to request that the location of underground utilities be marked at the specified areas. Drilling locations will be identified with paint, flags, or stakes, as appropriate to the surface material. Utility clearance approvals will be completed by the appropriate Holloman AFB utility office (e.g., telephone, sewer, water, natural gas, etc.).

3.3 Mobilization Setup

Personnel, equipment, and resources necessary to implement this addendum will be mobilized to the Site. Site setup will occur at the DP-030/SD-033 Site. Warning signs and safety fencing may be used, where necessary, to indicate the danger of entering a work zone and to keep the work area clear of obstructions such as facility worker vehicles. Setup will also include establishing a location for material storage and other equipment staging areas.

3.4 Monitoring Wells

Two new groundwater monitoring wells will be installed downgradient of the existing monitoring network to evaluate the migration of TCE that is impacting groundwater underlying the Sites. The groundwater flow is predominantly in a southerly direction. One soil sample will be collected from the saturated zone from each new monitoring well borehole from the interval with the highest photoionization detector (PID) reading and analyzed by an off-Site laboratory for VOCs. After allowing a sufficient time for the well to equilibrate following installation, the water level will be measured for each new well and groundwater samples will be collected. The groundwater samples will be analyzed in accordance with the requirements delineated in the *Final Long-Term Monitoring Plan, DP-030/SD-033* (USAF, 2014b).

3.4.1 Monitoring Well Installation

Well drilling activities will be performed by an individual with a current and valid well driller license issued by the State of New Mexico. The monitoring wells will be installed using the hollow-stem auger (HSA) drilling technique in accordance with NMED Ground Water Quality Bureau Monitoring Well Construction and Abandonment Guidelines (NMED, 2011). The boreholes will be advanced into the water table using an HSA such that the borehole diameter will be at least 4 inches larger than the outside diameter of the well casing to allow for proper placement of the filter pack and sealant. Care will be taken to ensure that the completed monitoring wells are sufficiently straight and plumb to allow passage of measuring and sampling devices.

During drilling, a URS Geologist or Engineer will document the following information for each boring:

- Boring or well identification (this identification will be unique, and ensure it has not been used previously at the Base)
- Purpose of the boring (e.g., soil sampling, monitoring well)
- Location in relation to an easily identifiable landmark
- Names of drilling subcontractor and logger
- Start and finish dates and times
- Drilling method
- Diameters of surface casing, casing type, and methods of installation

- Descriptions and quantities of materials placed in the annular space of the boring.
- Depth at which saturated conditions were first encountered
- Lithologic descriptions and depths of lithologic boundaries
- Sampling-interval depths
- Other pertinent field observations.

Field forms, including soil boring logs for documentation of field activities, will be completed. Well installation equipment will be decontaminated in accordance with established procedures.

The soil sample from the saturated zone will be collected using a split-spoon sampling device during the advancement of the well boring. As indicated previously, the interval with the highest PID reading will be targeted. Should an interval not be encountered with elevated PID readings, the interval immediately above groundwater will be sampled. Soil samples will be analyzed for the parameters outlined above. All samples will be collected in accordance with the protocols outlined in the QAPP.

Well borings will be advanced approximately 8 feet into the water table and completed such that the well screen intersects the water table. The wells will be constructed of 2-inch diameter Schedule 40 polyvinyl chloride riser and screen. The screened section of the wells will consist of 10 feet of 0.010-inch slotted screen (or other field-determined slot size). A silica sand filter pack will be placed around the screen to approximately 2 feet above the top of the screen. A 2-foot thick bentonite seal will be placed above the filter pack. The remaining annular space will be grouted with neat cement.

Monitoring wells will be completed as “flush-mounted” and constructed with water-tight well vaults that are rated to withstand traffic loads and fitted with locking, expandable well plugs. Concrete pads (2-foot minimum radius, 4-inch minimum thickness) will be poured around the well vaults. Vault covers will be secured with bolts. Additionally, the vault cover will indicate that the wellhead of a monitoring well is contained within the vault. The concrete and surrounding soil must be sloped to direct rainfall and runoff away from the well vault.

To document specific details of the monitoring well installations, the URS Geologist or Engineer will prepare drilling logs and as-built well construction diagrams in the field as the activity is taking place. The monitoring wells will be constructed in accordance with NMED requirements.

3.4.2 Surveying

Surveying of the new monitoring well locations will be conducted by a State of New Mexico licensed surveyor. Elevation data for monitoring wells will include the ground surface elevation of the well locations, as well as the elevation of the measuring point on the inner casing. Surveying data will be provided in a spreadsheet format for import into the geographic information system, and the data will be incorporated into the well completion report figures.

Horizontal coordinates will be referenced to the New Mexico Central State Plane Coordinate System and surveyed to an accuracy of ±1.0 foot. Vertical elevations will be reference to North American Datum 1983 coordinate system to an accuracy of ±0.01 foot.

Geospatial information will also be submitted as a separated deliverable to the USAF. All applicable federal, U.S. Department of Defense, and USAF geospatial data standards will be followed. Spatial data will be compliant with The Spatial Data Standards for Facilities, Infrastructure, and Environment which can be accessed at http://www.sdsfieonline.org/.

Each geospatial data set will be accompanied by metadata that conforms to the Spatial Data Facilities, Infrastructure, and Environment standards. The horizontal accuracy of any geospatial data created will be tested and reported in accordance with the National Standard for Spatial Data Accuracy, and the results will be recorded in the metadata.

3.4.3 Monitoring Well Development

The newly installed monitoring wells will be developed to create an effective filter pack around the well screen, remove fine particles from the formation near the borehole, and assist in restoring the natural water quality of the aquifer in the vicinity of the well. All newly installed monitoring wells will be developed no sooner than 48 hours after installation to allow for grout curing. Monitoring wells will be developed using surge blocks, bailers, or pumps to achieve effective well development.

During well development, documentation of the activity will take place and will include recording of water level and depth to bottom measurements, water quality parameters, discharge water color, water volume, and time period. Well development will continue until the following criteria are met:

- Water that has been removed from the well is visually clear, and the turbidity measures less than or equal to 10 nephelometric turbidity units (NTUs).
- The pH, temperature, and specific conductance parameters have stabilized (less than 10 percent variation for three successive readings).

In the event that fine-grained deposits are present in the subsurface, it may be difficult to achieve a turbidity of 10 NTUs during well development. This is primarily a concern when a well has been screened in a formation that contains a high level of fine material (silt and clay). Silt and clay can occasionally travel through filter packs on properly constructed wells, resulting in turbid water. While selection of proper filter pack and screen materials minimizes turbidity, fine-grained particles may still flow through. Proper well construction and development procedures will be followed to reduce measured turbidity in monitoring wells. If turbidity remains greater than 10 NTUs after 4 hours of continuous well development, well development will cease. If the well is pumped dry, it will be allowed to recharge and be re-pumped as much as practical within the 4-hour time limit.

3.4.4 Groundwater Monitoring

Groundwater sampling will occur no sooner than two days following monitoring well development at any monitoring well. Groundwater samples will be collected from Site monitoring wells in accordance with the *Final Long-Term Monitoring Plan, DP-030/SD-033* (USAF, 2014b). If groundwater at the Site exceeds NMED water quality standards, the TDS levels from nearby monitoring wells will be used to develop a TDS survey to determine if the present-day groundwater in the immediate vicinity of the Site is above the NMED 10,000 mg/L TDS potable water threshold. The Ground Water Quality Bureau does not regulate groundwater that has a TDS over this threshold. Regardless, if contaminant concentrations exceed regulatory thresholds, it will be necessary to assess potential risks associated with vapor intrusion and/or ecological receptors.

Groundwater monitoring wells will be sampled using low-flow sampling techniques. Field parameters (e.g., temperature, conductivity, pH, and turbidity) will be measured. Groundwater samples will be collected when the field parameters stabilize with minor fluctuations (less than 10%) between consecutive readings. Groundwater samples will be analyzed for the parameters discussed above. Quality assurance/quality control samples will be collected in accordance with the requirements set forth in the QAPP.

3.5 Decontamination

Equipment decontamination will be conducted where contaminated materials have been encountered. A decontamination area will be established such that the potential for downwind contamination from the site is mitigated. Decontamination operations will comply with the requirements set forth in the *Health and Safety Plan – Selected Sites Under the Air Force Civil Engineer Center (AFCEC) Contract No. FA8903-13-C-0008 (SS-017; SS-018; DP-030/SD-033; SS-039; OT-037/OT-038; SS-065; SS-069; SD-027)* (USAF, 2014c).

Dry decontamination procedures will be used at the beginning of the decontamination effort. If these procedures are not successful, the equipment will be moved onto a clean decontamination pad or plastic and sprayed with a high-pressure water spray from a portable unit. The subcontractor will provide a design for the decontamination pad with approval of the contractor. All equipment will be surveyed and visually inspected to ensure that all source contamination has been removed. If additional decontamination is required, further decontamination efforts will be conducted until the equipment is clean and may be released. The equipment will remain in the area where remediation is occurring until it is adequately decontaminated as verified by field surveillance methods.

Management of waste generated during decontamination efforts will remain within the area of contamination for temporary storage until final waste disposition. Tools used for equipment decontamination will be decontaminated, surveyed for contamination, and released for reuse.

3.6 Long-Term Groundwater Monitoring

The *Final Long-Term Monitoring Plan, DP-030/SD-033* (USAF, 2014b) has been developed to provide guidance for long-term groundwater monitoring at the Site. Annual groundwater monitoring and well gauging will be performed at the five monitoring wells and two new monitoring wells located at the Sites (see Figure 2). Samples will be collected and analyzed for the suite of analyses as provided in Table 1 of the monitoring plan.

The objective of the LTM is to provide groundwater sample analytical data of sufficient quality and quantity to adequately characterize and monitor groundwater underlying the Sites. The *Final Long-Term Monitoring Plan, DP-030/SD-033* (USAF, 2014b) is used in conjunction with the *Final Uniform Federal Policy Quality Assurance Project Plan, DP-030/SD-033* (USAF, 2014d) to ensure that the functional activities, organization, and quality assurance/quality control protocols are achieved in accordance with the project's data quality objectives.

As additional monitoring data are collected, the analyte list, well list, and sampling frequency may be adjusted to focus on those constituents and wells of interest. A monitoring report will be prepared on an annual basis to evaluate the results and provide recommendations as to future monitoring requirements. The change in monitoring scope or schedule will be documented in a revision to the *Final Long-Term Monitoring Plan, DP-030/SD-033* (USAF, 2014b), as well as the *Final Uniform Federal Policy Quality Assurance Project Plan, DP-030/SD-033* (USAF, 2014d), which will undergo review by the USAF and NMED prior to implementation.

3.7 Management of Investigation-Derived Waste

The IDW generated during the groundwater monitoring and well installation will include spent and unused sample material, personal protective equipment, miscellaneous sampling supplies, drill cuttings, decontamination water, and purge water. The IDW will be managed in accordance with established procedures. Prior to performing sampling, the field team leader will discuss with the field sampling

personnel waste reduction methods. Practices to be instituted to support waste minimization include, but are not limited to, the following:

- Restriction of materials (especially hazardous materials) to those needed for performance of work
- Substitution of recyclable materials for disposable items
- Reuse of items, when practical
- Segregation of contaminated from uncontaminated waste
- Segregation of reusable items (such as personal protective equipment and tools)
- Waste characterization will be evaluated based on the comparison of analytical results with applicable regulatory levels.

Wastewater from pre-sampling well purging and equipment decontamination will be stored in tanks pending the receipt of the groundwater analytical results. A sign posted on each tank will identify the contents and convey a warning that no material should be added or removed. Waste characterization will be performed by reviewing the groundwater sample analytical results from the wells. The detected constituent concentrations will be compared to the NMWQCC Regulations, Part 2, 3103, A, B, and C groundwater quality standards (20 NMAC 6.2).

A Notice of Intent to discharge development, purge, and decontamination water will be prepared and submitted to NMED Ground Water Quality Bureau for approval prior to discharging any groundwater to surface. Results from laboratory analyses will be summarized and concentrations evaluated for individual containers based on the volume added from the wells from which the purge water and decontamination water originated. The maximum concentrations will be used to determine whether purge water meets the discharge requirements. After NMED provides their approval, the water will be discharged to the ground surface at the Site. If the results indicate that the water cannot be released to the ground surface, it will be disposed at an appropriate facility.

All personal protective equipment and disposable equipment will be placed in double plastic bags and sealed for disposal in dumpsters at the Base.

As part of the contract with the subcontracted laboratories, all laboratory and sample waste is managed in accordance with the subcontract. Analytical waste streams may include unused/unaltered sample material, analytical residues, and sample containers. Unused/unaltered sample material will be generated from the sampling activities in the form of groundwater not required for analysis. Generally, the laboratory will be responsible for disposal of the unused/unaltered sample material. In those cases where samples must be returned from the laboratory, this excess material will be documented and disposed in accordance with the requirements for disposal of purge and decontamination water. Analytical residues will be generated from the sample analytical activities conducted by the subcontracted laboratories. Although the laboratories are required to dispose of analytical residues under terms of the subcontract, the potential does exist for return of analytical residues. If analytical residues are returned, this will be documented and the waste disposed at an appropriate facility.

Sample containers will become a waste stream following analyses. The laboratories are required to dispose of the sample containers in accordance with established waste management procedures. Sample containers will only be returned to the project should unused/unaltered sample material need to be returned as discussed above.

4.0 REPORTING

Reporting will be comprised of well completion reports and annual LTM reports.

4.1 Well Completion Reports

Well completion reports for each installed groundwater monitoring well will be prepared and submitted by the licensed driller in accordance with NMED requirements.

4.2 Long-Term Monitoring Reports

Annual LTM reports will be prepared to document the results of the groundwater sampling and well gauging activities completed during the fiscal year. The annual monitoring reports will provide evaluation of the data and associated trends and provide recommendations as to future monitoring requirements and optimization actions. Concentration versus time trend analysis for key constituents will be performed using appropriate statistical analysis software such as the Monitoring and Remediation Optimization System, which was developed by GSI Environmental Inc. of Houston, Texas and the University of Houston for the Air Force Center for Environmental Excellence in accordance with the organization's LTM Optimization guide. Other appropriate statistical methods may be employed with approval of the USAF.

In addition to the above reports, analytical data will be exported for upload to AFCEC's Environmental Restoration Program Information Management System database within 90 days of sample collection.

5.0 REFERENCES

NMED. 2015. "Approval with Modification, Final DP-030/SD-033 (Solid Waste Management Unit 113B) Interim Corrective Measures Work Plan, Holloman Air Force Base, New Mexico, September 2014, Holloman Air Force Base, EPA ID#NM6572124422, HWB-HAFB-14-014," New Mexico Environment Department letter to DeAnna M. Rothhaupt. February 20.

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_____. 2004. Holloman Air Force Base RCRA Permit No. NM6572124422. February.

NMWQCC. 2006. 2004-2006 State of New Mexico Integrated Clean Water Act §303(D)/§305(B) Report.

Radian. 1992. *Remedial Investigation Report, Investigation, Study and Recommendation for 29 Waste Sites*. October.

USAF. 2014a. *Final DP-030/SD-033 (Solid Waste Management Unit 113B) Interim Corrective Measures Work Plan*, U.S. Air Force, Holloman Air Force Base, New Mexico, September.

_____. 2014b. *Final Long-Term Monitoring Plan, DP-030/SD-033*. U.S. Air Force, Holloman Air Force Base, New Mexico. September.

_____.2014c. *Health and Safety Plan – Selected Sites Under the Air Force Civil Engineer Center (AFCEC) Contract No. FA8903-13-C-0008 (SS-017; SS-018; DP-030/SD-033; SS-039; OT-037/OT-038; SS-065; SS-069; SD-027)*. U.S. Air Force, Holloman Air Force Base, New Mexico. July.

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TABLES

Table 1. Trichloroethene Concentrations in µg/L

Sample Date	Monitoring Well				
	MW30&33-01	MW30&33-02	MW30&33-03	MW30&33-04	MW30&33-05/05R[a]
July 15, 2006	< 0.0495	1.56	3.53	14.2	59.3
January 17, 2007	< 1	1.76	21.1	15.6	58.1
July 19, 2007	< 1	3	5.8	11	51
January 16, 2008	< 1	3.9	3.6	8	43
July 11, 2008	< 0.32	5.2	6.1	10.1	42.5
January 9, 2009	0.36 J	7.4	13.8	7.5	35.2
July 8, 2009	< 0.32	7.7	6.9	4.4	21[b]
January 7, 2010	< 0.32	10.6	8.2	5.2	30.6
July 6, 2010	< 0.24	9	12	6.5	22.2
January 24, 2011	< 0.26	14.5	19.1	6.9	24
October 10, 2012	NS	15.6	16.7	6.3	25.1
March 5, 2013	NS	16.9 J	17.1 J	4.6 J	26.8 J

a. Monitoring well MW30&33-05 was replaced in 2009 by monitoring well MW30&33-05R.

b. The sample for replacement well MW30&33-05R was collected on October 6, 2009.

NS = not sampled

FIGURES

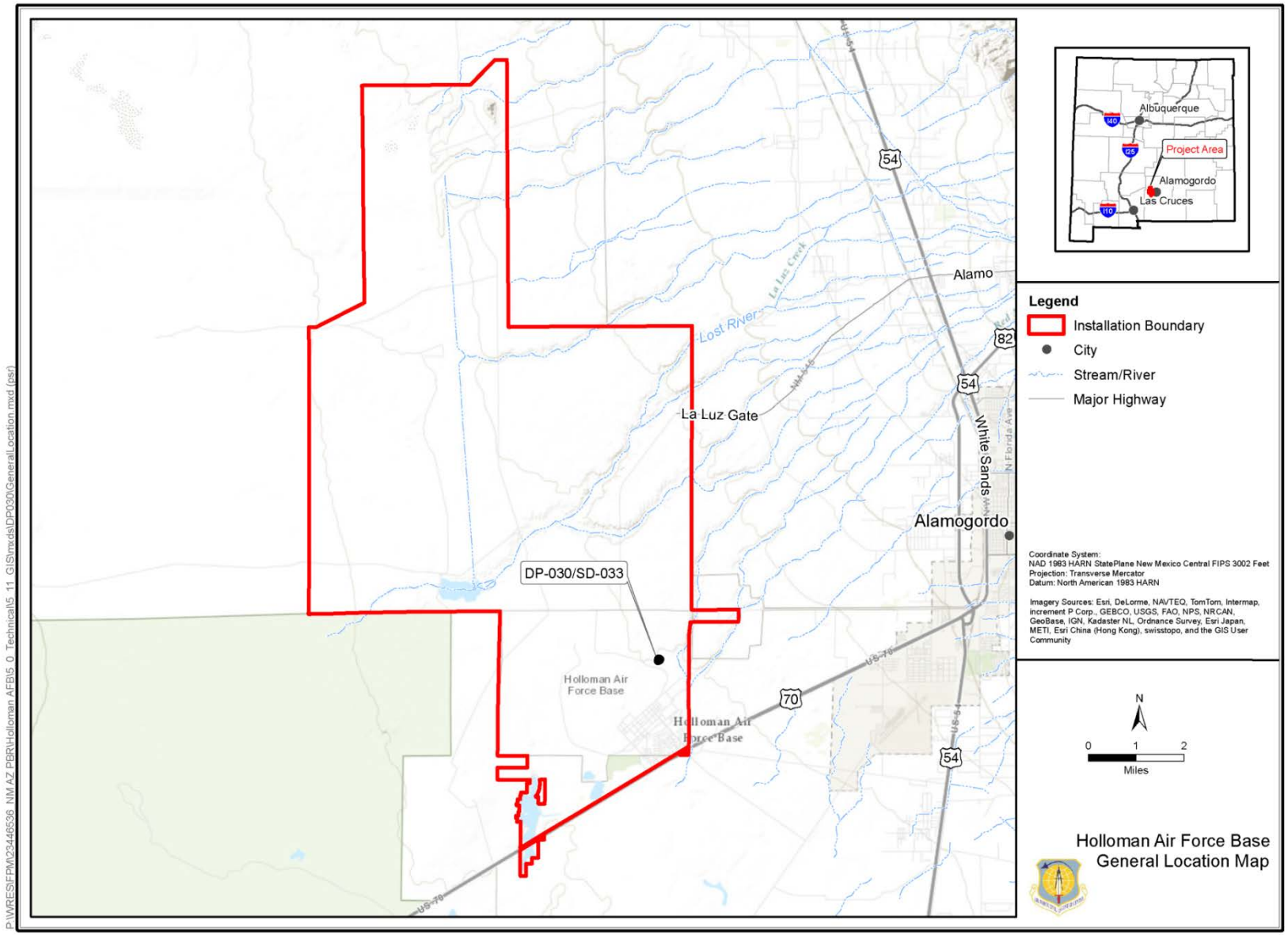

Figure 1. Site Vicinity Map

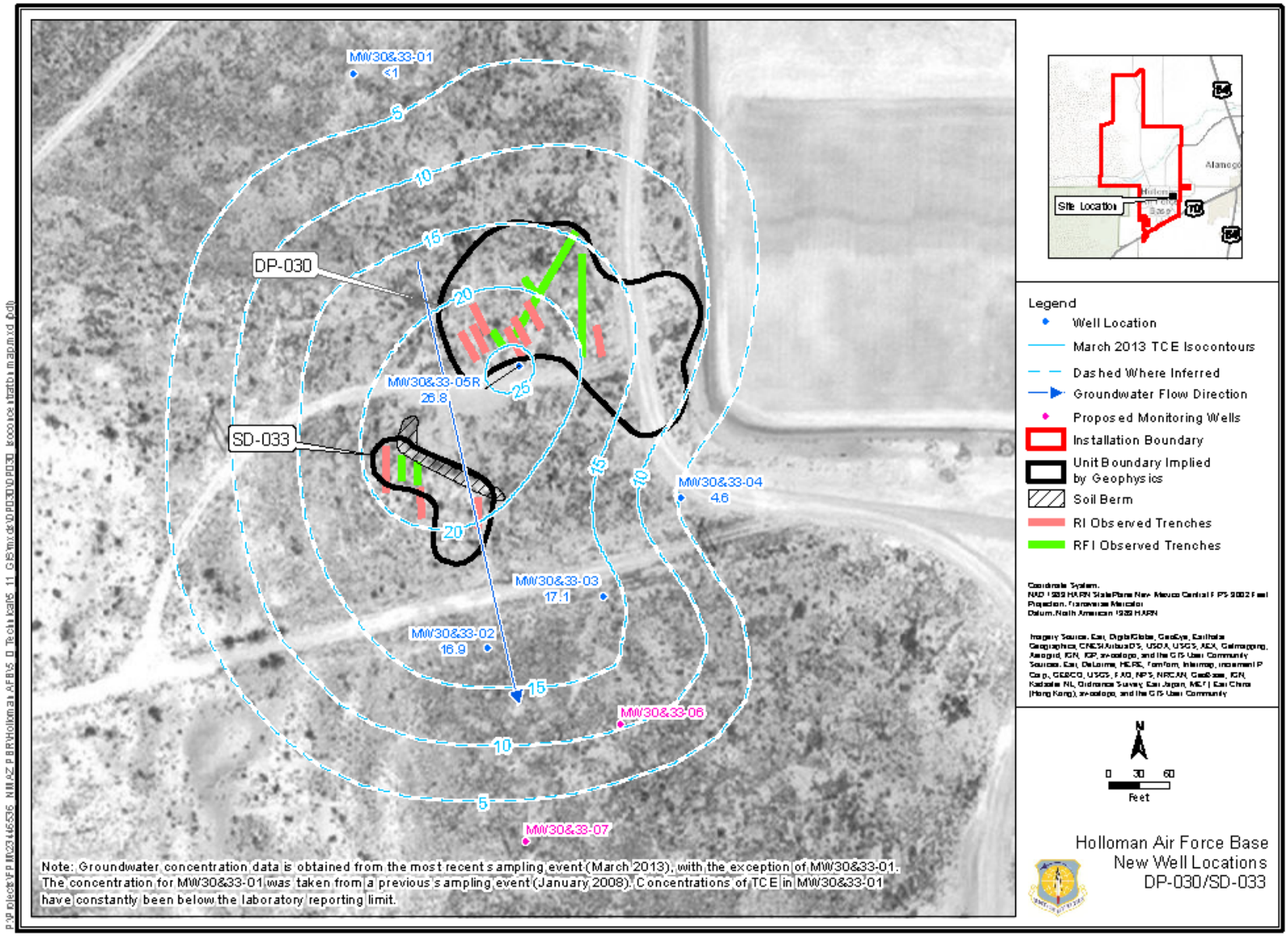

Figure 2. Trichloroethene Isoconcentration Map

SUSANA MARTINEZ
Governor
JOHN A. SANCHEZ
Lieutenant Governor

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RYAN FLYNN
Cabinet Secretary
BUTCH TONGATE
Deputy Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

February 20, 2015

DeAnna M. Rothhaupt
Chief, Holloman AFB Environmental
49th CES/CEIE
550 Tabosa Avenue
Holloman AFB, NM 88330

RE: APPROVAL WITH MODIFICATION
FINAL DP-030/SD-033 (SOLID WASTE MANAGEMENT UNIT 113B) INTERIM CORRECTIVE MEASURES WORK PLAN, HOLLOMAN AIR FORCE BASE, NEW MEXICO, SEPTEMBER 2014
HOLLOMAN AIR FORCE BASE, EPA ID# NM6572124422
HWB-HAFB-14-014

Dear Ms. Rothhaupt:

The New Mexico Environment Department (NMED) has reviewed the plan: *Final DP-030/SD-033 (Solid Waste Management Unit 113B) Interim Corrective Measures Work Plan, Holloman Air Force Base, New Mexico,* dated September 2014, and received on September 12, 2014. The subject work plan is approved with the following modification.

Currently the southern extent of the groundwater contamination at SWMU 113B is not defined. Holloman Air Force Base (the Permittee) must install additional monitor wells to define the southern extent of groundwater contamination. The Permittee must submit an addendum to the work plan that proposes the installation of at least two monitor wells to complete characterization of the groundwater contamination. The Work Plan addendum must be submitted to NMED no later than **May 20, 2015**.

If you have any questions regarding this letter, please contact Brian Salem of my staff at (505) 222-9576.

Sincerely,

John E. Kieling
Chief
Hazardous Waste Bureau

cc: D. Cobrain, NMED HWB
W. Moats, NMED HWB
B. Salem, NMED HWB
C. Amindyas, NMED HWB
D. Strasser, NMED HWB
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C. Hendrickson, EPA Region 6 (6PD-F)

File: HAFB 2015 and Reading
HWB-HAFB-14-014