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Mr. John Kieling, Manager
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Dear Mr. Kieling

Kirtland Air Force Base is pleased to submit the *Long-Term Groundwater Monitoring Summary Report for Solid Waste Management Unit (SWMU) WP-26 Sewage Lagoons and Golf Course Main Pond, February 2015.* This attached report outlines monitoring activities conducted at the Sewage Lagoons and Golf Course Main Pond between September 2013 and July 2014.

Please contact Mr. Cole Crosgrove at (505) 853-3098 or at cole.crosgrove@us.af.mil if you have any questions.

Sincerely

TOM D. MILLER, Colonel, USAF
Commander

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KIRTLAND AIR FORCE BASE
ALBUQUERQUE, NEW MEXICO

Long-Term Groundwater Monitoring Summary Report for Solid Waste Management Unit (SWMU) WP-26 Sewage Lagoons and Golf Course Main Pond

February 2015

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KIRTLAND AIR FORCE BASE
ALBUQUERQUE, NEW MEXICO

LONG-TERM GROUNDWATER MONITORING SUMMARY REPORT FOR SOLID WASTE MANAGEMENT UNIT (SWMU) WP-26 SEWAGE LAGOONS AND GOLF COURSE MAIN POND

February 2015

Prepared for:
Air Force Civil Engineering Center
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Lackland Air Force Base, Texas 78236-9861

Contract No. FA8903-08-D-8602, Task Order No. R156

Prepared by
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13. ABSTRACT

This Long-Term Groundwater Monitoring Report summarizes field activities and sampling results from Solid Waste Management Unit (SWMU) at Kirtland Air Force Base , New Mexico. Annual groundwater samples were collected from monitoring wells installed at SWMU WP-26. Groundwater samples were submitted for off-site laboratory analysis for a variety of parameters. Groundwater elevation measurements were collected quarterly from September 2013 through June 2014.

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FEB 13 2015

TOM D. MILLER, Colonel, USAF
Commander, 377th Air Base Wing

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KIRTLAND AIR FORCE BASE
377th Air Base Wing Public Affairs

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NATURAL RESOURCE INJURY

The Department of Defense (DoD) policy requires the identification of Natural Resource Injury (NRI) and, whenever practicable, the rectification of any NRI during the site assessment, investigation, and remedy selection and implementation process for cleanup actions (DoD, 2000). As stated in the policy,

DoD's objectives are:

> "…to promote earlier and more complete consideration of the risks to natural resources associated with past activities and cleanup alternatives; to ensure that Components exercise their statutory Trustee authorities to address NRI on behalf of the public; to lower the total life-cycle costs of the Components' remediation programs; and to reduce the potential for response cost recovery or natural resource damage claims against the Components."

The subject sites included in the Long-Term Groundwater Monitoring Program (LTM) at Kirtland Air Force Base (AFB) are unlikely to require an NRI program. Based on the groundwater monitoring results, the former sewage lagoons are a potential source area for trichloroethene, chloride, sulfate, and total dissolved solids in the perched groundwater beneath the site. The perched groundwater in the area of the former sewage lagoons is thin and discontinuous, and is limited in extent to the immediate area surrounding the lagoons. The perched groundwater in this region of the base is hydraulically separate from the larger perched groundwater body located to the east and does not currently serve as a source of drinking water. The nature and extent of nitrate-contaminated groundwater is not investigated under the LTM, but is currently being investigated and remediated under the Stage 2 Abatement Plan for Nitrate-Contaminated Groundwater at Site ST-105.

The LTM sampling program is designed to limit potential impacts to habitat and ecological resources. The sampling and investigation-derived waste management procedures emphasize no-impact practices to limit the amount of contamination that can enter the food chain. Because of the arid climate, the location of LTM sites, and regulatory-approved purge water discharge practices, there is a very low possibility that surface water runoff could damage aquatic resources. The vegetation associations and wildlife found on and near the sites are common and widely dispersed over Kirtland AFB, so there would be no impact to biodiversity. Restricted access and limited planned development at Kirtland AFB have benefited biological resources.

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ENVIRONMENTAL JUSTICE CONSIDERATION

Presidential Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of federal programs, policies, and activities on minority and low-income populations. For purposes of this report, the population within a 50-mile radius around Kirtland Air Force Base (AFB) was considered. Demographic and economic census information presented in Addressing Environmental Justice under the National Environmental Policy Act at Sandia National Laboratories (SNL)/New Mexico (SNL, 1997) and the United States Census Bureau web site (http://quickfacts.census.gov/qfd/states/35/3502000.html accessed on October 6, 2010) were used as primary references.

The population living within a 50-mile radius of Kirtland AFB, which exceeds 49 percent of the total population according to census data (SNL, 1997), was evaluated with regard to health and environmental effects from activities at Kirtland AFB. Similarly, the low-income population, which exceeds 21 percent of the general population, was analyzed for effects from corrective measures activities at Kirtland AFB.

Minority populations are considered to be all people of all color except white people who are not Hispanic. In 1990, 49 percent (51 percent by 1996, 34.2 percent by 2000) of New Mexico's population was minority (Bureau of Census, 1998; http://quickfacts.census.gov/qfd/states/35/3502000.html accessed on October 6, 2010). Neighborhoods having minority population percentages exceeding the minority population percentage of 49 percent (slightly more conservative than 51 percent) were identified on a block-by-block basis, with clusters of blocks known as block groups.

The Bureau of Census characterizes persons in poverty (low-income persons) as those whose incomes are less than a statistical poverty threshold. The threshold is a weighted-average based on family size and age of family members. For instance, the 1990 census threshold for a family of four was based on a 1989 household income of $12,674 (Bureau of Census, 1990). By 1996, the household income threshold rose to $16,036 (Bureau of Census, 1997). In 1989, 21 percent of New Mexico's population was listed in poverty or designated as having low income (U.S. Bureau of Census, 1996). By 1996, the estimated percentage stood at 24 percent (U.S. Bureau of Census, 1997) and by 2000, the state-wide percent decreased to 18.4 (http://quickfacts.census.gov/qfd/states/35/3502000.html accessed on October 6, 2010). In this analysis, low-income block groups (same as above) occur where the low-income population percentage in the block group exceeds the poverty percentage for the state of New Mexico.

According to 1990 census data, approximately 280,360 minority individuals from an approximate total population of 609,500 reside within the 50-mile radius. This represents 46 percent of the total radius of-influence population (SNL, 1997).

Block groups having less than 21 percent low-income individuals were not considered to contain a large number of low-income neighborhoods because they contain less than or equal to the state average of 21 percent. Approximately 85,330 persons were identified as being low income, thus representing approximately 14 percent of the radius-of-influence population.

This distribution of low-income population has a strong correlation to minority populations of Blacks, Native Americans, and Hispanics. For example, portions of the Pueblo of Isleta, south of the city, have high percentages of low-income individuals. To the southeast of Kirtland AFB, the rural Hispanic villages of Tajique, Torreon, and Escobosa are also low income. To the north of Kirtland AFB, high concentrations of low-income populations are located in the Pueblos of Jemez, Santo Domingo, and Cochiti, as well as in the rural Hispanic villages of La Cienega and Jemez Springs. High concentrations of low-income populations occur west of Kirtland AFB, along the Rio Grande, in the predominantly Hispanic South Valley neighborhoods. In addition, small pockets of low-income populations reflect the locations of Black neighborhoods such as the Kirtland Addition and South Broadway/East San Jose areas.

Based on the findings of this report, there are no identified negative impacts from the two Long-Term Groundwater Monitoring sites that pose adverse health effects on the general human populations. Based on the analysis of any potential impacts, there would be no disproportionately high or adverse impacts to minority and low-income populations. Any impacts due to restrictions of access to cultural sites would be removed by coordination between the Kirtland AFB and the local Tribes to develop processes to allow access during periods in which safety standards and practices would be maintained.

PREFACE

This report describes the results of Long-Term Groundwater Monitoring conducted at two sites located at Kirtland Air Force Base (AFB), New Mexico. This work was performed under the authority of the Air Force Civil Engineer Center (AFCEC) – Contract No. FA8903-08-D-8602, Task Order R156. The work under this contract task order was performed between September 5, 2013 and July 10, 2014. Mr. Joe D. Urrutia, Contracting Officer's Representative, AFCEC/CZCQ has been appointed as the Primary Contracting Officer's Representative and Mr. Gregorio Armand, 772 ESS/PKB is the Contracting Officer for this Task Order.

The Environmental Restoration Branch Chief for this program is Mr. Ludie (Wayne) Bitner of Kirtland AFB. Mr. Cole G. Crosgrove is the Kirtland AFB Environmental Restoration Branch Project Manager. This report was prepared by CAPE Environmental Management, Inc.

Dave Bettendorf
CAPE Environmental Management, Inc.
Project Manager

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CONTENTS

Section **Page**

ACRONYMS AND ABBREVIATIONS xii

EXECUTIVE SUMMARY ES-1

1. INTRODUCTION 1-1

1.1 SWMU WP-26 Background 1-1
1.1.1 Golf Course Main Pond 1-1
1.1.2 Sewage Lagoons 1-2
1.2 Overview of Report 1-3

2. GROUNDWATER MONITORING 2-1

2.1 Introduction 2-1
2.2 KAFB-0609 Well Abandonment 2-1
2.3 Groundwater Level Measurement Results 2-2
2.3.1 Golf Course Main Pond 2-2
2.3.2 Sewage Lagoons 2-2
2.4 Groundwater Sampling Procedures and Analytical Results 2-3
2.4.1 Sampling Procedures 2-3
2.4.2 Golf Course Main Pond Groundwater Quality 2-3
2.4.3 Sewage Lagoons Groundwater Quality 2-4
2.4.4 Investigation-Derived Waste 2-6

3. CONCLUSIONS AND RECOMMENDATIONS 3-1

REFERENCES

APPENDICES

A Well Plugging Plan of Operations

B Well Gauging Data Forms for Gauging Events and Water Quality Field Data Sheets for Annual Sampling Event

C Analytical Results for the Annual Groundwater Sampling Event

D Data Quality Assessment Report

FIGURES

Figure

1-1 General Location for Solid Waste Management Unit WP-26, Golf Course Main Pond and Sewage Lagoons

1-2 Golf Course Main Pond Monitoring Well Locations

1-3 Sewage Lagoons Monitoring Well Locations

2-1 Groundwater Elevation Map, Sewage Lagoons Regional Aquifer March 2014

2-2 Groundwater Elevation Map, Sewage Lagoons Regional Aquifer June 2014

2-3 Groundwater Elevation Map, Sewage Lagoons Perched Aquifer November 2013

2-4 Groundwater Elevation Map, Sewage Lagoons Perched Aquifer March 2014

2-5 Groundwater Elevation Map, Sewage Lagoons Perched Aquifer June 2014

TABLES

Table

2-1 Groundwater Sample Analyses and Methods SWMU WP-26

2-2 Gauging Data for November 2013, March 2014, and June 2014 SWMU WP-26

2-3 Summary of Analytical Results, Golf Course Main Pond, December 2013

2-4 Summary of Analytical Results, Sewage Lagoons, November 2013 to March 2014

ACRONYMS AND ABBREVIATIONS

AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
CAPE	CAPE Environmental Management, Inc.
CB&I	CB&I Federal Services LLC
CFR	Code of Federal Regulations
DoD	Department of Defense
EPA	United States Environmental Protection Agency
ERP	Environmental Restoration Program
ICM	Interim Corrective Measures
IDW	investigation-derived waste
KAFB	Kirtland Air Force Base
LTM	Long-Term Monitoring
MCL	maximum contaminant levels
mg/L	milligram per liter
msl	mean sea level
NRI	Natural Resource Injury
QAPP	Quality Assurance Project Plan
RFI	RCRA Facility Investigation
SDWA	Safe Drinking Water Act
SNL	Sandia National Laboratories
SWMU	Solid Waste Management Unit
TCE	trichloroethene
TDS	total dissolved solids
USAF	United States Air Force
VOC	volatile organic compound
WQCC	Water Quality Control Commission

EXECUTIVE SUMMARY

This Long-Term Groundwater Monitoring Summary Report summarizes the activities performed under the Long-Term Monitoring (LTM) Program from September 2013 to June 2014 at Kirtland Air Force Base (AFB), New Mexico. The objective of the LTM Program is to monitor groundwater conditions at sites potentially impacted by past site activities. This Report describes the results of the monitoring and sampling events at Solid Waste Management Unit (SWMU) WP-26, Sewage Lagoons and Golf Course Main Pond. The Report also includes conclusions and recommendations for the upcoming year's activities.

Long-Term Monitoring Program Activities

The LTM Program activities for the period of performance included the following:

- Quarterly water-level measurements at groundwater monitoring wells located at the former sewage lagoons and golf course main pond. Water levels were collected in November 2013, March 2014, and June 2014.
- Preparing groundwater elevation maps for each site using data collected as part of the LTM Program.
- Collecting and analyzing groundwater samples from 10 groundwater monitoring wells located at the former sewage lagoons and golf course main pond. Groundwater samples were analyzed according to the site-specific parameter lists based on historical observations at each site.
- Groundwater analytical results were compared to the New Mexico groundwater protection standards, Safe Drinking Water Act (SDWA) maximum contaminant levels (MCLs), and SDWA Secondary MCLs, where applicable.

Golf Course Main Pond Results

Depth-to-groundwater measurements were collected from one perched groundwater monitoring well (KAFB-0608) at the golf course main pond in November 2013, March 2014, and June 2014. Measurements were not collected from KAFB-0609 and KAFB-0610 during the period of performance due to an accident that occurred at KAFB-0609 in December 2013 while attempting to collect groundwater samples. A stop-work order was issued while a safety investigation was conducted. Both wells were deemed unsafe following the safety investigation, which was completed in March 2014.

Monitoring well KAFB-0609 was determined to be beyond repair due to the pitless adaptor failing, which caused the pump along with drop pipe and wiring to fall to the bottom of the well. The well was abandoned on June 21 and June 22, 2014.

Groundwater samples were collected from KAFB-0608 in December 2013. The groundwater samples were analyzed for volatile organic compounds (VOCs), bromide, chloride, fluoride, nitrate, nitrite, sulfate, and total dissolved solids (TDS). No VOCs were detected in the groundwater samples. Bromide, chloride, fluoride, nitrate-nitrogen, sulfate, and TDS were detected in the groundwater samples. The nitrate-nitrogen detection of 24.7 milligrams per liter exceeds the New Mexico Water Quality Control Commission standard and the SDWA MCL of 10 milligrams per liter. All other analytes were below applicable standards. These results are consistent with past analytical results for this well.

Annual groundwater sampling and collection of quarterly groundwater level measurements of the remaining perched groundwater monitoring wells (KAFB-0609, KAFB-0610, and KAFB-0608) under the LTM Program is recommended.

Sewage Lagoons Results

Groundwater levels were measured in three regional aquifer groundwater monitoring wells and eight perched groundwater monitoring wells in March 2014 and June 2014. Groundwater levels were not measured in three perched aquifer wells and one regional aquifer well in the fourth quarter of 2013, due to the stop-work order issued in December 2013, as mentioned above.

Groundwater samples were not collected at two sewage lagoon monitoring wells (KAFB-2624 and KAFB-2631) because the wells had insufficient water columns.

Groundwater samples were collected from six perched groundwater wells and three regional aquifer wells at the former sewage lagoons between November 25, 2013 and March 20, 2014. The groundwater samples were analyzed for VOCs, dissolved Resource Conservation and Recovery Act 8 metals, dissolved iron, dissolved manganese, chloride, fluoride, nitrate-nitrogen, sulfate, ammonia, TDS, gross alpha, gross beta, and radium-226/228.

The concentrations of all constituents detected in wells screened in the perched groundwater and the regional aquifer at the sewage lagoons in samples collected between November 25, 2013 and March 20, 2014 were below applicable New Mexico Water Quality Control Commission standards or SDWA MCLs.

Continuation of annual groundwater sampling and quarterly measurements of groundwater levels of three regional groundwater monitoring wells and eight perched groundwater monitoring wells under the LTM Program is recommended.

1. INTRODUCTION

Under the Air Force Civil Engineer Center (AFCEC) Contract No. FA8903-08-D-8602, Task Order No. R156, CAPE Environmental Management, Inc. (CAPE) was tasked to perform long-term groundwater monitoring at Kirtland Air Force Base (AFB), New Mexico, at Solid Waste Management Unit (SWMU) WP-26, Golf Course Main Pond and Sewage Lagoons from September 2013 to July 2014. The procedural guidance documents for these activities are the *Quality Assurance Project Plan (QAPP) for Long-Term Groundwater Monitoring at Multiple Sites: Solid Waste Management Unit (SWMU) 6-1, Landfill 1; SWMU 6-2, Landfill 2; SWMU 6-4, Landfills 4, 5, and 6; ST-105 (CG-C564); UST-58 (PL567); WP026; and ST070* (CAPE, 2013) and the *Technical and Cost Proposal, Long Term Monitoring for Multiple Sites – ST-105 (CG-C564), UST-58 (PL567), WP026, ST070 and LF001, LF002, and LF008* (Shaw Environmental, Inc., 2013). The QAPP was prepared to meet the most recent requirements of the U.S. Department of Defense (DoD) regarding planning documents for DoD facilities and covers only groundwater monitoring.

The locations of the WP-26 sites are shown on Figure 1-1. This report summarizes the annual monitoring activities conducted by CAPE in accordance with its AFCEC task order.

Under the Long-Term Monitoring (LTM) Program, water level measurements are collected on a quarterly basis. This information is used to generate the potentiometric surface elevation contours, determine groundwater-flow direction, and calculate an average hydraulic gradient across each site. Groundwater-level measurements were collected in November 2013, March 2014, and June 2014.

Groundwater samples were collected at five monitoring wells between November 25, 2013 and December 10, 2013. An accident, which occurred on December 11, 2013 while attempting to sample monitoring well KAFB-0609, led to a stop-work order and subsequent safety investigation. Groundwater sampling was delayed until March 2014, when the remaining WP-26 samples were collected.

The following appendices are included in this report:

- Appendix A – Well Plugging Plan of Operations
- Appendix B – Well Gauging Data Forms for Gauging Events and Water Quality Field Data Sheets for Annual Sampling Event
- Appendix C – Analytical Results for the Annual Groundwater Sampling Event
- Appendix D – Data Quality Assessment Report

1.1 SWMU WP-26 Background

1.1.1 Golf Course Main Pond

The golf course main pond is part of SWMU WP-26, which also includes the closed sewage lagoons. The golf course main pond is located in the northwestern portion of the Tijeras Arroyo Golf Course, between Fairways 3 and 4, approximately 100 feet east of the main golf course maintenance building (Figure 1-1). The Tijeras Arroyo Golf Course lies 3 miles south of the East Operations Area, northwest of the Manzano Base area and north of the riding stables. The pond currently covers approximately 1.85 acres. A detailed summary of site's background and history, results of previous investigations,

corrective measures, and current status is presented in the 2006 RCRA (*Resource Conservation and Recovery Act*) Facility Investigation (RFI) Comprehensive Report for SWMU WP-26 (USAF, 2007a). A site map showing monitoring well locations is provided as Figure 1-2.

The United States Air Force (USAF) installed the original, 2.6-acre pond in 1962 as a surface water catchment. The pond was constructed by excavating below the surrounding grade in a pre-existing drainage, building an earthen dam on the west end of the excavated area, and lining the base of the pond with plastic (USAF, 1993). The original pond remained in service until 1987. From 1962 to 1987, the pond received wastewater from the sewage lagoons delivered via pipeline during the months of April through October. Sewage effluent was combined with water from production well KAFB-4 and surface water runoff, and was then used as irrigation water for the Tijeras Arroyo Golf Course as part of a water-conservation program. The lagoons last received untreated sewage in October 1987, and as of January 1989, only dry sediment remained in the pond. By 1998, the pond-liner material had weathered and disintegrated in most locations, and the pond bottom had re-vegetated with native plants (USAF, 1993; 1999a).

In October 1998, the pond was reshaped and regraded as part of an Interim Corrective Measure (ICM), and returned to service in February 1999 (USAF, 1999b). During the ICM, a 40-mil high-density polyethylene liner was installed beneath the pond, and a groundwater recovery system was constructed to capture nitrate-contaminated groundwater in the vicinity of the pond and recycle it for beneficial use (USAF, 2007a). The recovered groundwater was pumped from several extraction wells and discharged to the reconditioned pond, along with potable water from production well KAFB-4, and then applied to the Tijeras Arroyo Golf Course.

In May 1999, ICM activities at the Tijeras Arroyo Golf Course included conversion of three monitoring wells (KAFB-0602, KAFB-0609, and KAFB-0610) to supplement the water supply from the newly installed extraction well for recovery of nitrate-impacted groundwater. Submersible ¾-horsepower Grundfos pumps were installed in each of the three monitoring wells using pitless adaptors. The pump intakes were set at approximately 1 foot above the bottom of the well screen (USAF, 1999a).

Production well KAFB-7 was used as a potable water supply well until nitrate-nitrogen concentrations exceeded drinking water standards in 1995 and the well was shut down. In 2002, the Interim Stage 2 Abatement Plan was implemented to provide hydraulic containment and mass removal of nitrate-contaminated groundwater by returning production well KAFB-7 to service (USAF, 2002). Well KAFB-7 was redeveloped, and a new section of pipeline was installed to connect KAFB-7 to the pond. Water from production well KAFB-7 and the extraction wells located at the pond are now used to irrigate the golf course.

In Fiscal Year 2003, eroded portions of the southern bank of the golf course main pond were repaired, and exposed liner in several areas along the perimeter of the pond was covered with additional rock. In 2006, construction activities were performed under an Interim Action-Operation to repair the pond liner at the golf course main pond, and replace the liners at the five smaller ponds at the Golf Course (USAF, 2007b). The golf course main pond is currently used to store nitrate-contaminated groundwater for application to the golf course via the site's irrigation system.

1.1.2 Sewage Lagoons

The former sewage lagoons are part of SWMU WP-26, which also includes the golf course main pond. The sewage lagoons site is located in the northwestern region of the Kirtland AFB, north of the Tijeras Arroyo and 0.5 miles southeast of the main runway at the Albuquerque International

Sunport (Figure 1-1). A detailed summary of the site's background and history, results of previous investigations, and corrective measures, is presented in the 2006 RFI Comprehensive Report for SWMU WP-26 (USAF, 2007a). A site map showing monitoring well locations is provided as Figure 1-3.

The sewage lagoons were constructed in 1962 of native soil and local fill and consisted of unlined north and south square cells separated by an earthen wall. Modifications to the lagoons occurred in 1970 and 1975, when the sides and slopes were reinforced with soil cement and capped with concrete to minimize erosion (USAF, 1993). Two pipes discharged raw sewage into the center of each lagoon from a splitter box located between and on the eastern boundary of the lagoons. Liquid levels in each lagoon were contained by an elevated soil berm surrounding the perimeter. The lagoons shared a common berm containing a pipe connecting the lagoons, which allowed liquids to pass freely between the north and south cells. Wastewater was transferred from the lagoons to the golf course main pond by way of a gravity-fed 15-inch sewage effluent line (SWMU ST-051) (USAF, 1993).

The combined north and south lagoons covered an area of 14 acres and were generally filled to a depth of 6 feet during use, therefore resulting in a storage capacity of approximately 84-acre-feet (27.4 million gallons). The sewage lagoons operated with a turnover rate of approximately 2 weeks, allowing approximately 330 million gallons of raw sewage to be handled from April through October each year. From November to March, base sewage was routed to the city of Albuquerque sanitary sewer system. Operations ended in October 1987. A locked, fenced enclosure currently limits access to the former lagoons area.

The waste stream discharged to the lagoons was municipal wastewater with commercial and light industrial components that received some pretreatment through sumps, catch basins, and oil/water separators. Residence time in the lagoons allowed for settling, oxidation, and digestion by facultative bacteria of the raw sewage. Sewage effluent infiltrated into the subsurface beneath the unlined lagoons, creating a perched groundwater mound during operation. Based on the components of the waste stream, the contaminants of concern identified at the site are volatile organic compounds (VOCs) (USAF, 2007a, 2009).

1.2 Overview of Report

The Report is divided into the following sections:

- Section 1 presents an introduction to the project, summarizes background information, and provides an overview of the report.
- Section 2 summarizes results of quarterly gauging and annual groundwater monitoring events from November 2013 to June 2014.
- Section 3 provides recommendations for future monitoring activities.

All figures and tables are located at the end of their respective sections.

Appendix A includes the Well Plugging Plan of Operations for well KAFB-0609. Appendix B contains the Well Gauging Data Forms and Water Quality Field Data Sheets for the groundwater monitoring activities conducted at WP-26. Appendix C includes the analytical data for the annual groundwater sampling event. Appendix D contains the data quality assessment report.

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2. GROUNDWATER MONITORING

2.1 Introduction

CAPE performed groundwater sampling at SWMU WP-26 as specified in the QAPP (CAPE, 2013). The following wells were gauged and sampled at each site.

Golf Course Main Pond

- Perched monitoring well—KAFB-0608.

Sewage Lagoons

- Regional monitoring wells— KAFB-0506, -2622, -2625, -2626, -2630, and -2632;
- Perched monitoring wells—KAFB-0505, -2628, and -2629.

Groundwater samples were not collected at two sewage lagoon monitoring wells (KAFB-2624 and KAFB-2631) because the wells had insufficient water columns. Monitoring wells KAFB-0609 and KAFB-0610 at the golf course main pond were not sampled because they were determined to be unsafe for access following an accident that occurred while attempting to sample well KAFB-0609 in December 2013. Due to the nature of the wells with a pitless adaptor construction, as well as the condition of the pitless adaptor, it was determined that additional work was needed at these wells for safe sampling. Additionally, the accident caused a stop-work order to be issued while a safety investigation was conducted by the subcontractor performing the groundwater sampling, CB&I Federal Services LLC (CB&I). The stop-work order affected the completion of the quarterly water level gauging, which began in November 2013. As a result, water levels at monitoring wells KAFB-0506, -2631, -2632, -2629, -0609, and -0610 were not collected.

The groundwater samples were analyzed for the parameters listed in Table 2-1. Sample handling, analyses, and quality assurance/quality control procedures were implemented in accordance with the, QAPP (CAPE, 2013), Base-Wide Plans (USAF, 2004) and the LTM Plan (USAF, 2006).

2.2 KAFB-0609 Well Abandonment

After the safety accident occurred at well KAFB-0609 in December 2013, an investigation began, which included a downhole video of the well to determine its condition. CB&I and its subcontractor, JR Drilling, attempted to remove the collapsed drop pipe, pitless adaptor, and pump from KAFB-0609 on January 29, 2014 through February 12, 2014. Approximately 275 feet of galvanized pipe, 320 feet of polyvinyl chloride pipe, and the electrical cable were successfully removed from the well. The well was determined to be beyond repair following multiple attempts to recover collapsed pumping infrastructure materials (e.g., drop-pipe, Grundfos pump, etc.). CB&I subcontracted JR Drilling to abandon KAFB-0609. Well-abandonment activities were conducted on June 21 and June 22, 2014. The Well Plugging Plan of Operations is provided in Appendix A.

2.3 Groundwater Level Measurement Results

2.3.1 Golf Course Main Pond

Depth-to-groundwater measurements were collected from one monitoring well at the golf course main pond in November 2013, March 2014, and June 2014. Measurements were not collected from KAFB-0609 and KAFB-0610 during the period of performance due to the accident that occurred at KAFB-0609. Both wells were deemed unsafe following a safety investigation. The depth-to-water measurements and groundwater elevations are documented on the Well Gauging Data forms presented in Appendix B and are summarized in Table 2-2. Due to insufficient data, groundwater elevation contour maps were not created for the golf course main pond wells.

2.3.2 Sewage Lagoons

Regional Aquifer Monitoring Wells

Groundwater-level measurements were collected from two out of the three monitoring wells installed in the regional aquifer at the sewage lagoons in November 2013. The third well (KAFB-2629) was not gauged due to the stop-work order. A groundwater elevation contour map was not created for the November 2013 gauging event due to insufficient data.

Groundwater levels were measured at three regional sewage lagoon monitoring wells in March 2014 and June 2014. The well locations and groundwater elevation contours for the two gauging events are shown on Figures 2-1 and 2-2. The groundwater elevation contour maps developed from the gauging data indicate that regional groundwater in the area flows to the southwest. The groundwater level measurements and groundwater elevations are documented on the Well Gauging Data forms presented in Appendix B and are summarized in Table 2-2.

Groundwater elevations in the regional aquifer during the period of performance ranged from 4,857.03 feet above mean sea level (msl) in well KAFB-0505 to 4,859.52 feet above msl in well KAFB-2628. Depth to the regional water table below the sewage lagoons ranged from 500.05 to 509.65 feet below the top of the well casing as measured in wells KAFB-0505, -2628, and -2629.

Perched Aquifer Monitoring Wells

Groundwater-level measurements were collected from five out of eight monitoring wells installed in the perched aquifer at the sewage lagoons in November 2013. The remaining three wells (KAFB-0506, KAFB-2631, and KAFB-2632) were not gauged due to the stop-work order. Groundwater levels were measured at eight perched sewage lagoon monitoring wells in March 2014 and June 2014. The well locations, groundwater elevations, and water table elevation contours for the three gauging events are shown on Figures 2-3 through 2-5, respectively. The groundwater elevation contour maps developed from the gauging data indicate that perched groundwater flows generally to the north. The depth-to-water measurements and groundwater elevations are documented on the Well Gauging Data forms presented in Appendix B and are summarized in Table 2-2.

Groundwater elevations in the perched aquifer during the period of performance ranged from 5,139.09 feet above msl in well KAFB-2624 to 5,161.66 feet above msl in well KAFB-2631. Depth to the perched water table below the sewage lagoons ranged from 169.25 to 217.79 feet below the top of the well casing as measured in wells KAFB-0506, -2622, -2624, -2625, -2626, -2630, -2631, and -2632.

2.4 Groundwater Sampling Procedures and Analytical Results

2.4.1 Sampling Procedures

Between November 25, 2013 and March 20, 2014, three wells screened in the regional aquifer and seven wells in the perched aquifer were sampled at the sewage lagoons. One monitoring well (KAFB-0608) screened in the perched aquifer was sampled at the golf course main pond in December 2013. Analytical results for the annual sampling are presented in Appendix C.

All samples were collected using a stake bed truck equipped with a Bennett pump and Teflon® tubing. CB&I conducted sampling activities following the "Low-Flow Purging with Non-Dedicated Submersible Piston Pumps" technique specified in the Kirtland Monitoring Well Sampling Standard Operating Procedure B4.1. Decontamination of the pump was performed prior to installation at each well, and tubing was discarded after each sample was collected. Equipment rinsate samples were collected as described in the QAPP (CAPE, 2013) to determine if decontamination procedures were effective.

Purge water was contained at each wellhead in 55-gallon drums while waste characterization was conducted.

The quality control program for groundwater samples collected at each site included the collection of duplicate samples, equipment rinsates, and additional volumes for matrix spike/matrix spike duplicates to support data validation. Additionally, trip blanks were included in each cooler containing samples for VOC analysis. The data quality assessment report is included as Appendix D. All data were determined to be usable for the purpose of this Report and qualified as necessary.

2.4.2 Golf Course Main Pond Groundwater Quality

Groundwater samples were collected from KAFB-0608 at the golf course main pond in December 2013. Due to an error on the chain-of-custody form, no ammonia as nitrogen analysis was requested for samples from well KAFB-0608. When the error was identified, the analysis holding time for the ammonia sample was already expired. Field data sheets for the groundwater sampling event are included in Appendix B. Groundwater analytical results for the annual sampling event at the golf course main pond are summarized in Table 2-3 and Appendix B. The data quality assessment report for the sampling event is included in Appendix D.

The analytical results showed that VOCs were not detected in samples collected from KAFB-0608 (Table 2-3). The following inorganic parameters were detected in KAFB-0608 samples:

- Bromide (0.321 milligrams per liter [mg/L])
- Chloride (24.3 mg/L)
- Fluoride (0.356 mg/L)
- Nitrate-nitrogen (24.7 mg/L)
- Sulfate (94.3 mg/L)
- Total dissolved solids (TDS) (491 mg/L)

With the exception of nitrate-nitrogen, all the concentrations detected in samples collected from KAFB-0608 were below applicable New Mexico Water Quality Control Commission (WQCC) standards or Safe Drinking Water Act (SDWA) maximum contaminant levels (MCLs). The nitrate-nitrogen detection of 24.7 mg/L exceeds the WQCC standard and the SDWA MCL of 10 mg/L. Nitrate-nitrogen has historically exceeded the WQCC groundwater standard in the perched groundwater wells sampled at

the site, including upgradient well KAFB-0609. The historic detected concentrations of nitrate-nitrogen above the WQCC groundwater standard in the upgradient well indicate a potential upgradient source or natural occurrence at elevated levels.

Nitrate-impacted groundwater is currently being addressed at the golf course main pond under the Stage 2 Abatement Plan (USAF, 2011). Likely sources of nitrate-nitrogen in the perched and regional aquifers at the base include effluent from the sewage lagoons (including effluent from office buildings, flight line units, aircraft maintenance shops); former septic tank leach fields and the Old Acid Waste Line Outfall at Sandia National Laboratory (SNL) Technical Areas II and IV; the 2003 Albuquerque Bernalillo County Water Utility Authority (ABCWUA) sewer line rupture; and atmospheric deposition.

2.4.3 Sewage Lagoons Groundwater Quality

Groundwater samples were collected from six perched groundwater wells and three regional aquifer wells at the former sewage lagoons between November 25, 2013 and March 20, 2014. Field data sheets for the groundwater sampling event are included in Appendix B. Groundwater analytical results for the annual sampling event at the former sewage lagoons are summarized in Table 2-4 and Appendix C. The data quality assessment report is included in Appendix D.

Perched Groundwater

The following VOCs, metals, inorganics, and radiological parameters were detected in perched groundwater at the sewage lagoons:

- Volatile Organic Compounds:
  - 1,1-Dichloroethane (KAFB-0506, -2622, -2625, -2630, and -2632)
  - 1,1-Dichloroehene (KAFB-2622)
  - 1,2,4-Trimethylbenzene (KAFB-2622)
  - 1,2-Dichlorobenzene (KAFB-2622)
  - 1,3-Dichlorobenzene (KAFB-2625)
  - 1,4-Dichlorobenzene (KAFB-2625)
  - Benzene (KAFB-2626)
  - Chloromethane (KAFB-0506, -2630, and -2632)
  - cis-1,2-Dichloroethene (KAFB-2622 and KAFB-2625)
  - Naphthalene (KAFB-2622)
  - Tetrachloroethene (KAFB-2622)
  - Toluene (KAFB-2622)
  - Trichloroethene (TCE) (KAFB-0506, -2622, -2625, -2626, -2630, and -2632)
  - Xylenes (KAFB-2626)
- Dissolved Metals:
  - Barium (KAFB-0506, -2622, -2625, -2626, -2630, and -2632)
  - Chromium (KAFB-2622, -2625, -2626, -2630, and -2632)
  - Iron (KAFB-2625, -2626, -2630, and -2632)
  - Lead (KAFB-2622, -2625, and -2626)
  - Manganese (KAFB-2626)
  - Selenium (KAFB-0506, -2622, -2625, -2626, -2630, and -2632)

- Inorganic Parameters:
  - Bromide (KAFB-0506, -2622, -2625, -2626, -2630, and -2632)
  - Chloride (KAFB-0506, -2622, -2625, -2626, -2630, and -2632)
  - Fluoride (KAFB-0506, -2622, -2625, -2626, -2630, and -2632)
  - Nitrate-nitrogen (KAFB-0506, -2622, -2625, -2626, -2630, and -2632)
  - Perchlorate (KAFB-0506, -2622, -2625, -2626, -2630, and -2632)
  - Sulfate (KAFB-0506, -2622, -2625, -2626, -2630, and -2632)
  - TDS (KAFB-0506, -2622, -2625, -2626, -2630, and -2632)

- Radiological Parameters:
  - Gross alpha (KAFB-2625 and KAFB-2632)
  - Gross beta (KAFB-2622 and KAFB-2625)
  - Radium-228 (KAFB-2625);
  - Radium-226 (KAFB-2625, -2630, and -2632)

The concentrations of all constituents detected in wells screened in the perched aquifer at the sewage lagoons in samples collected between November 25, 2013 and March 20, 2014 were below applicable New Mexico WQCC standards or SDWA MCLs (Table 2-4).

Results from the recent RFIs conducted at the sewage lagoons suggest the perched groundwater underlying the site is derived primarily from the infiltration of sewage effluent (USAF, 2007a). Therefore, elevated concentrations of VOCs, chloride, sulfate, and TDS indicate a release from the site.

Elevated concentrations of iron, manganese, selenium, gross alpha, gross beta, and radium-226, however, do not indicate a release from the site. These constituents have, in some cases, exceeded the groundwater standards. However, these exceedances likely represent fluctuations in groundwater quality or natural occurrence at elevated levels.

Regional Aquifer

The following metals, inorganics, and radiological parameters were detected in regional aquifer at the sewage lagoons:

- Dissolved Metals:
  - Barium (KAFB-2628 and KAFB-2629)
  - Chromium (KAFB-2628 and KAFB-2629)
  - Lead (KAFB-2628)
  - Manganese (KAFB-2629)
  - Selenium (KAFB-2628 and KAFB-2629)

- Inorganic Parameters:
  - Bromide (KAFB-2628, -2629, and -0505)
  - Chloride (KAFB-2628, -2629, and -0505)
  - Fluoride (KAFB-2628, -2629, and -0505)
  - Nitrate-nitrogen (KAFB-2628, -2629, and -0505)

- Sulfate (KAFB-2628, -2629, and -0505)
- TDS (KAFB-2628, -2629, and -0505)

- Radiological Parameters:
  - Gross alpha (KAFB-2628 and KAFB-2629)
  - Gross beta (KAFB-2628)
  - Radium-226 (KAFB-2628)

The concentrations of all constituents detected in wells screened in the regional aquifer at the sewage lagoons in samples collected between December 3, 2013 and March 19, 2014 were below applicable New Mexico WQCC standards or SDWA MCLs (Table 2-4).

2.4.4 Investigation-Derived Waste

The investigation-derived waste (IDW) generated during the LTM Program field activities was managed in accordance with Kirtland AFB procedures. The IDW generated during the field activities consisted of purge water from each well, decontamination water, and general waste (paper towels, sampling gloves, etc.).

Purge water and decontamination water was placed in 55-gallon polyethylene drums near the wells being sampled. Waste characterization was performed by reviewing the groundwater sample analytical results for all sites. All results were compared to the New Mexico WQCC regulations to determine appropriate disposal. All water was determined to be appropriate for disposal to the ground surface at the well sites. A request for disposal was prepared and submitted to Kirtland AFB for approval. Documentation for the IDW water disposal is included in Appendix C.

General waste was placed in plastic trash bags and disposed of in dumpsters at Kirtland AFB.

3. CONCLUSIONS AND RECOMMENDATIONS

The presence of VOCs and elevated concentrations of chloride, sulfate, and TDS in the perched groundwater indicate a release from the site. Nitrate-impacted groundwater is currently being investigated as part of the Stage 2 Abatement Plan (USAF, 2011). From 2004 through 2006 and in 2009 and 2011, Kirtland AFB conducted an RFI in several phases to determine the source and extent of TCE and other VOC contamination in soil gas and perched groundwater underlying the lagoons (USAF, 2007a; 2009, 2012). Results indicated that the perched groundwater at the sewage lagoons is primarily derived from infiltration of sewage effluent. Soil gas in and around the sewage lagoons is contaminated with VOCs, including TCE. Similarly, infiltration of sewage effluent may be contributing to elevated chloride, sulfate, and TDS in perched groundwater. Since the lagoons have been drained, there is now little potential that any residual contaminants in soil at the lagoons will leach to groundwater.

Annual sampling of eight perched groundwater monitoring wells and three regional wells under the LTM Program is recommended at the sewage lagoons. In addition, it is recommended that the two Golf Course extraction wells with pitless adaptors (KAFB-1062 and KAFB-10610) be re-equipped for sampling with either portable or nonportable Bennett pumps as part of the WP-26 monitoring program. The pitless adaptor construction is unstable and likely to result in bodily harm to workers accessing the well for both water-level measurements and groundwater sampling.

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FIGURES

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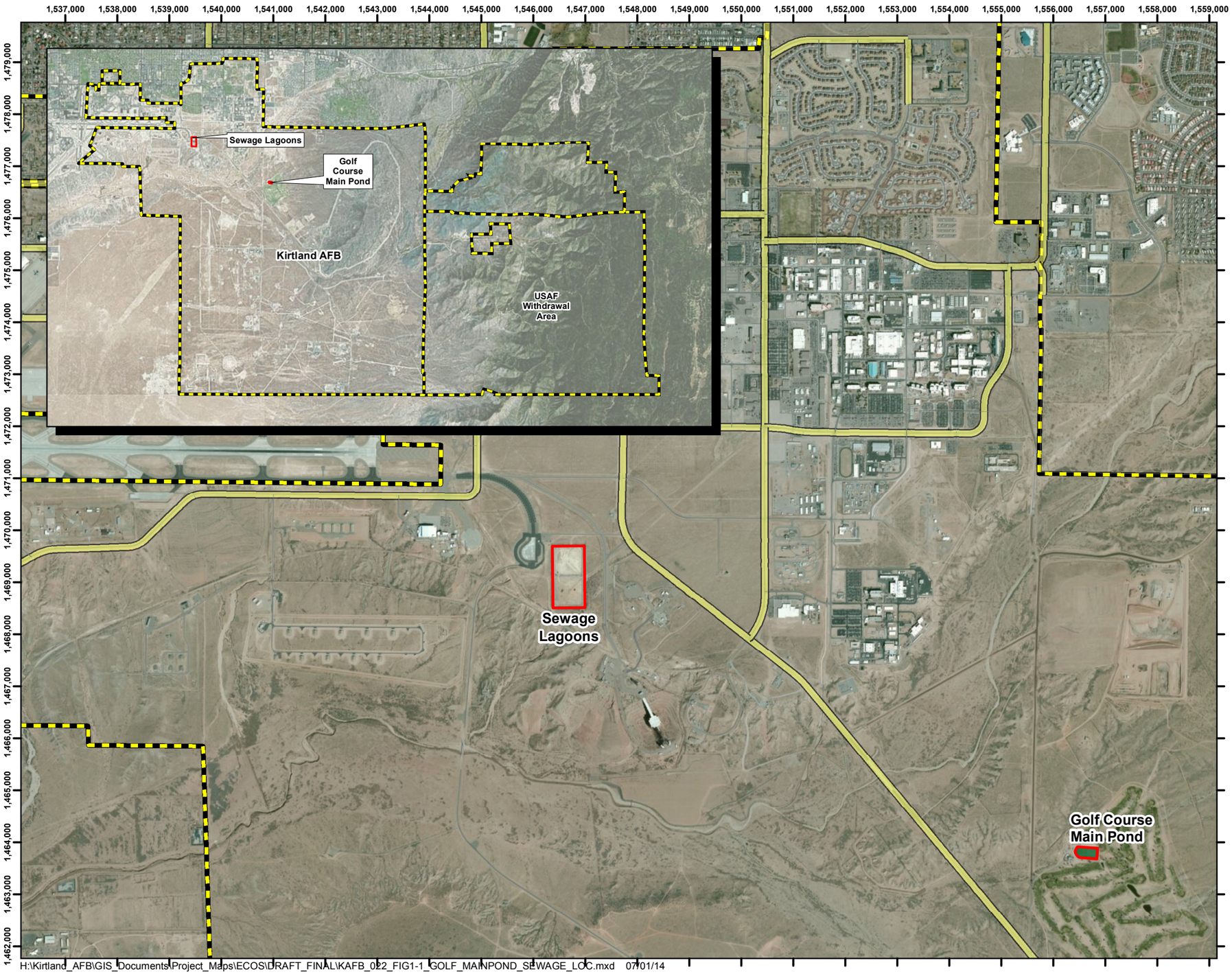

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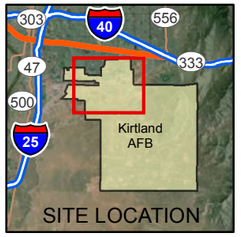
Legend

- Sewage Lagoons and Golf Course Pond
- Installation Boundary



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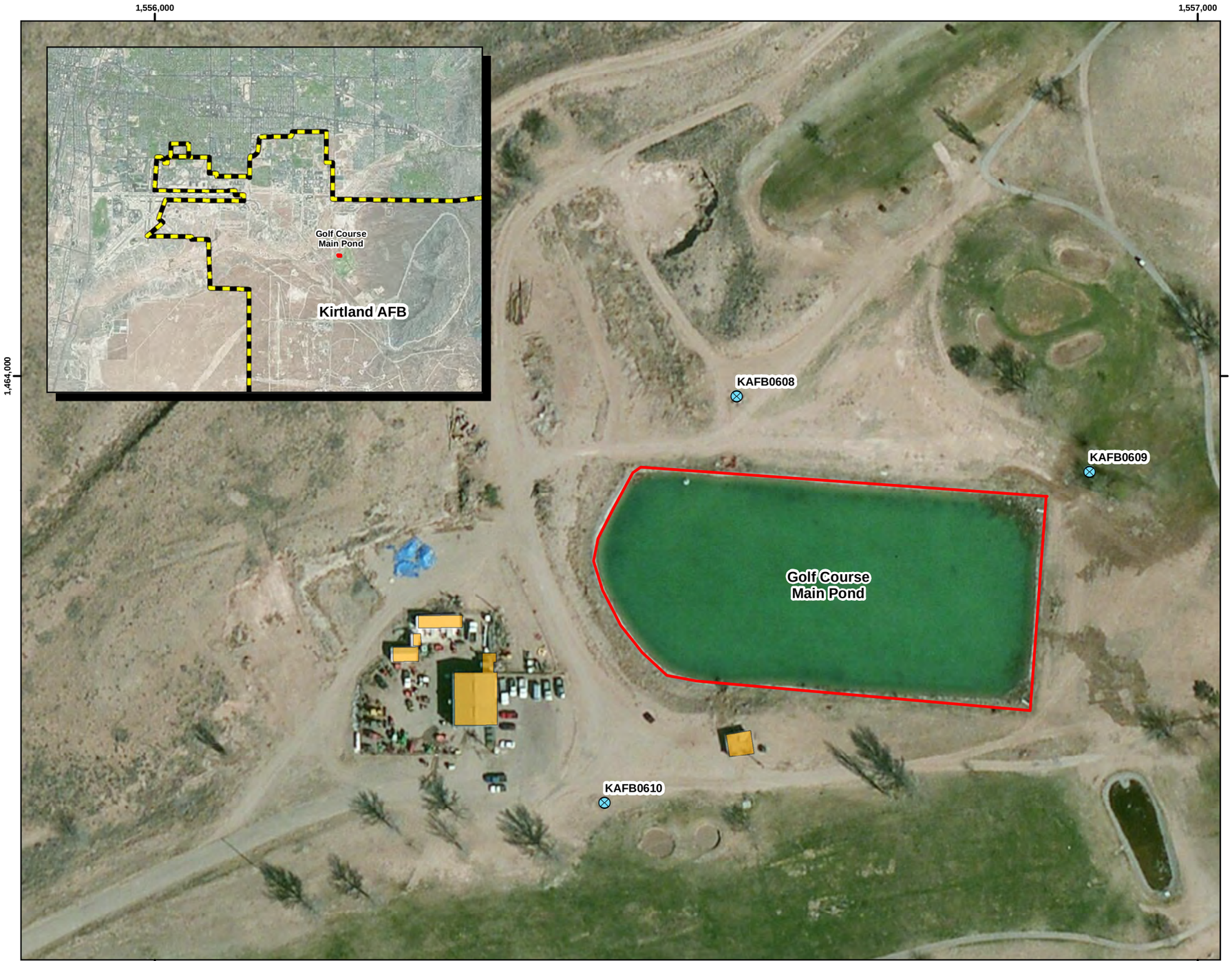
Feet
1 inch = 2,000 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

LONG TERM MONITORING
KIRTLAND AIR FORCE BASE, NEW MEXICO

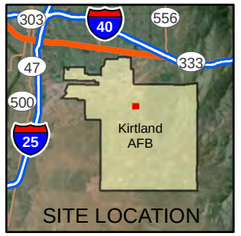
FIGURE 1-1

GENERAL LOCATION FOR
SOLID WASTE MANAGEMENT
UNIT WP-26, GOLF COURSE
MAIN POND AND SEWAGE LAGOONS



Legend

- Golf Course Pond Wells
- Golf Course Pond
- Installation Boundary
- Existing Structure



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Revision Date: 07/14/14

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Feet
1 inch = 100 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

LONG TERM MONITORING
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 1-2

GOLF COURSE MAIN POND
MONITORING WELL LOCATIONS

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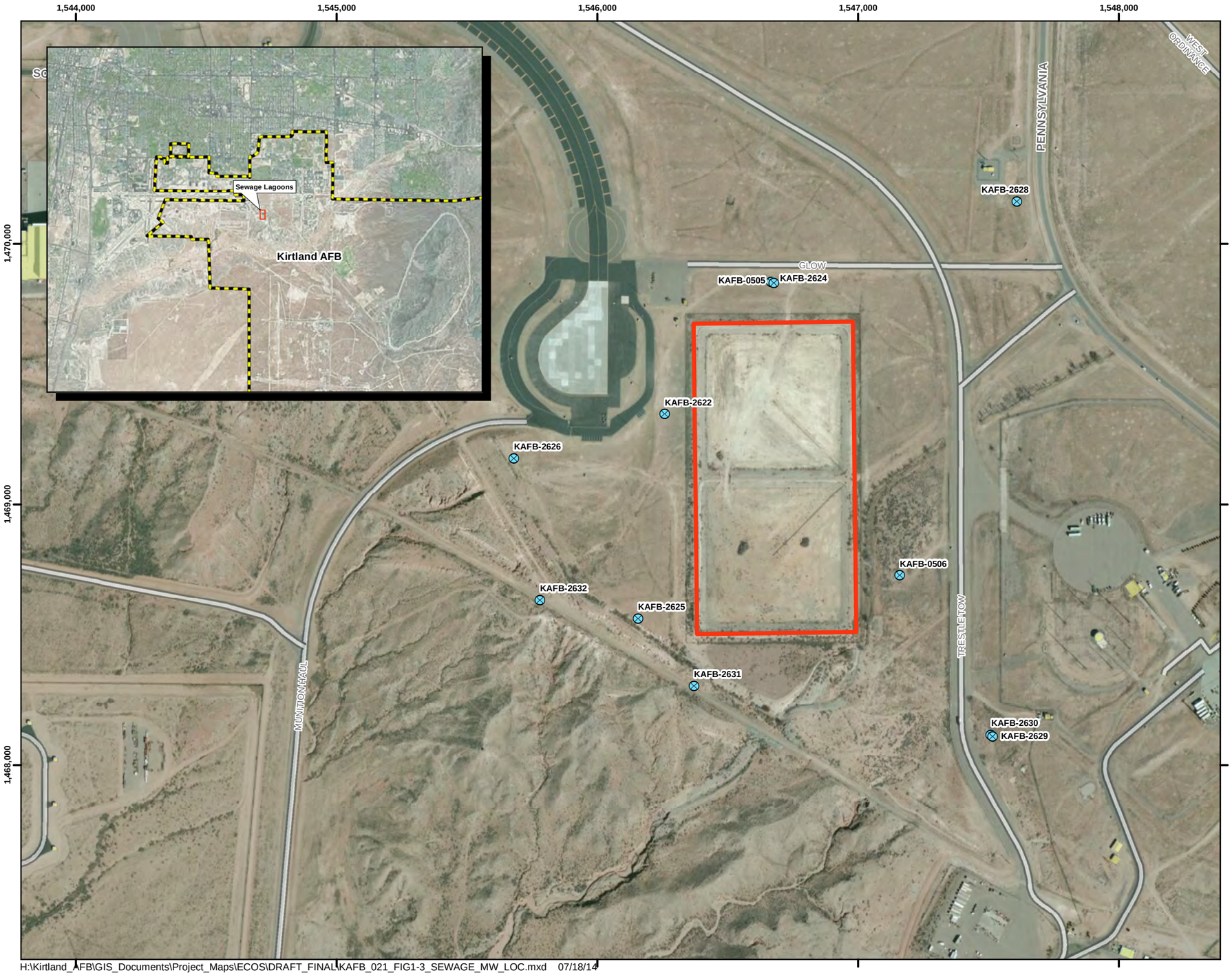
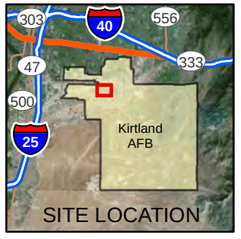


Legend

- Sewage Lagoons Monitoring Well Locations
- Sewage Lagoons
- Road
- Existing Structure
- Installation Boundary



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Revision Date: 07/18/14

0 200 400 800

Feet

1 inch = 400 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

LONG TERM MONITORING
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 1-3

SEWAGE LAGOONS
MONITORING WELL LOCATIONS

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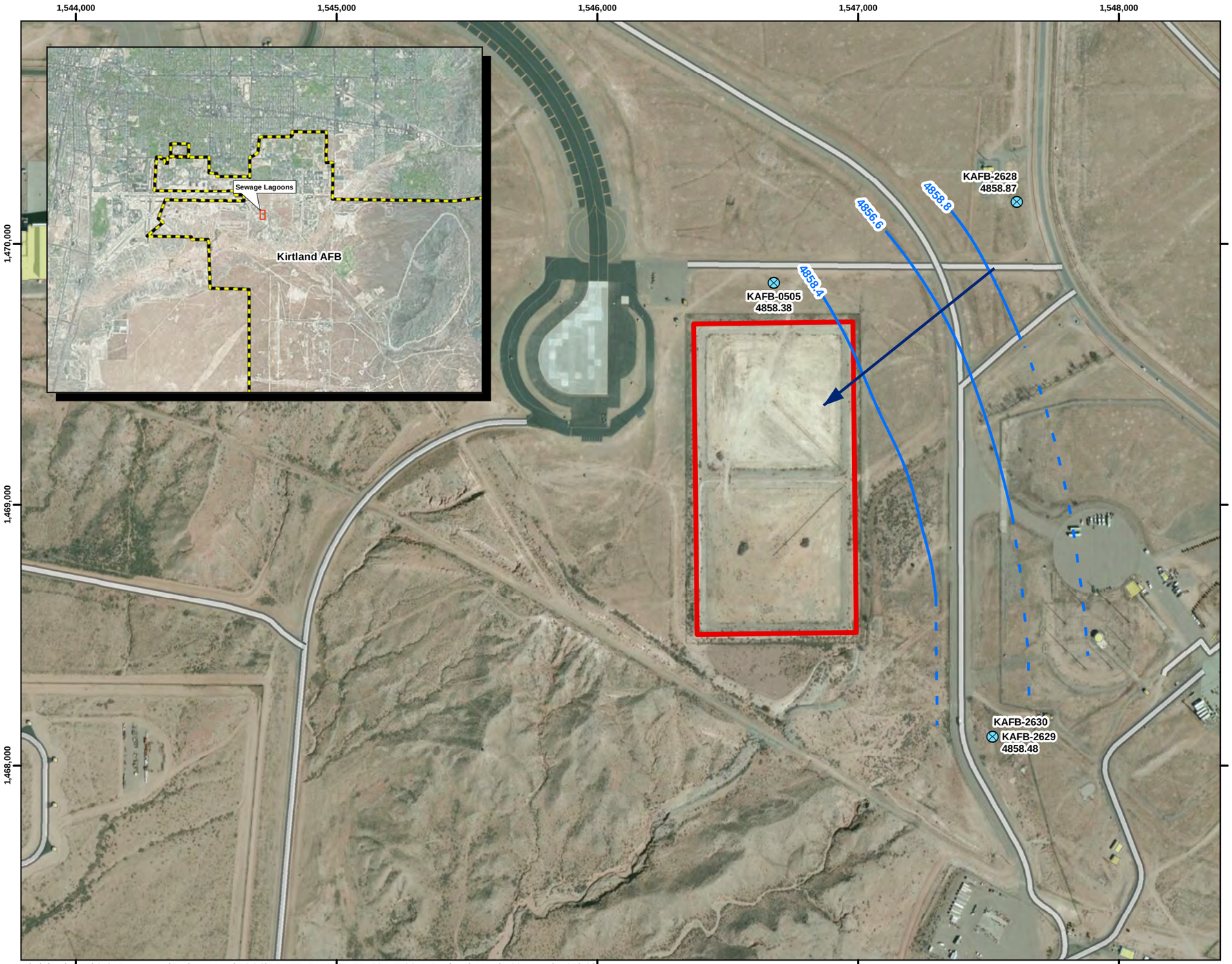
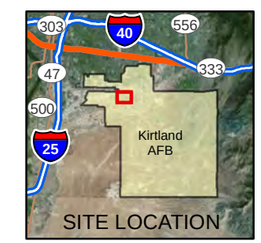


Legend

⊗	Monitor Well
KAFB-2628	Monitor Well ID
4858.87	Groundwater Elevation (ft amsl)
4858	Groundwater Elevation Contour (ft amsl, dashed where inferred)
←	Groundwater Flow Direction
▭	Sewage Lagoons

NOTES:

AFB = Air Force Base
ft amsl = Feet above mean sea level



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Revision Date: 07/18/14

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0 200 400 800

Feet
1 inch = 400 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

LONG TERM MONITORING
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 2-1

GROUNDWATER ELEVATION MAP
SEWAGE LAGOONS REGIONAL
AQUIFER MARCH 2014

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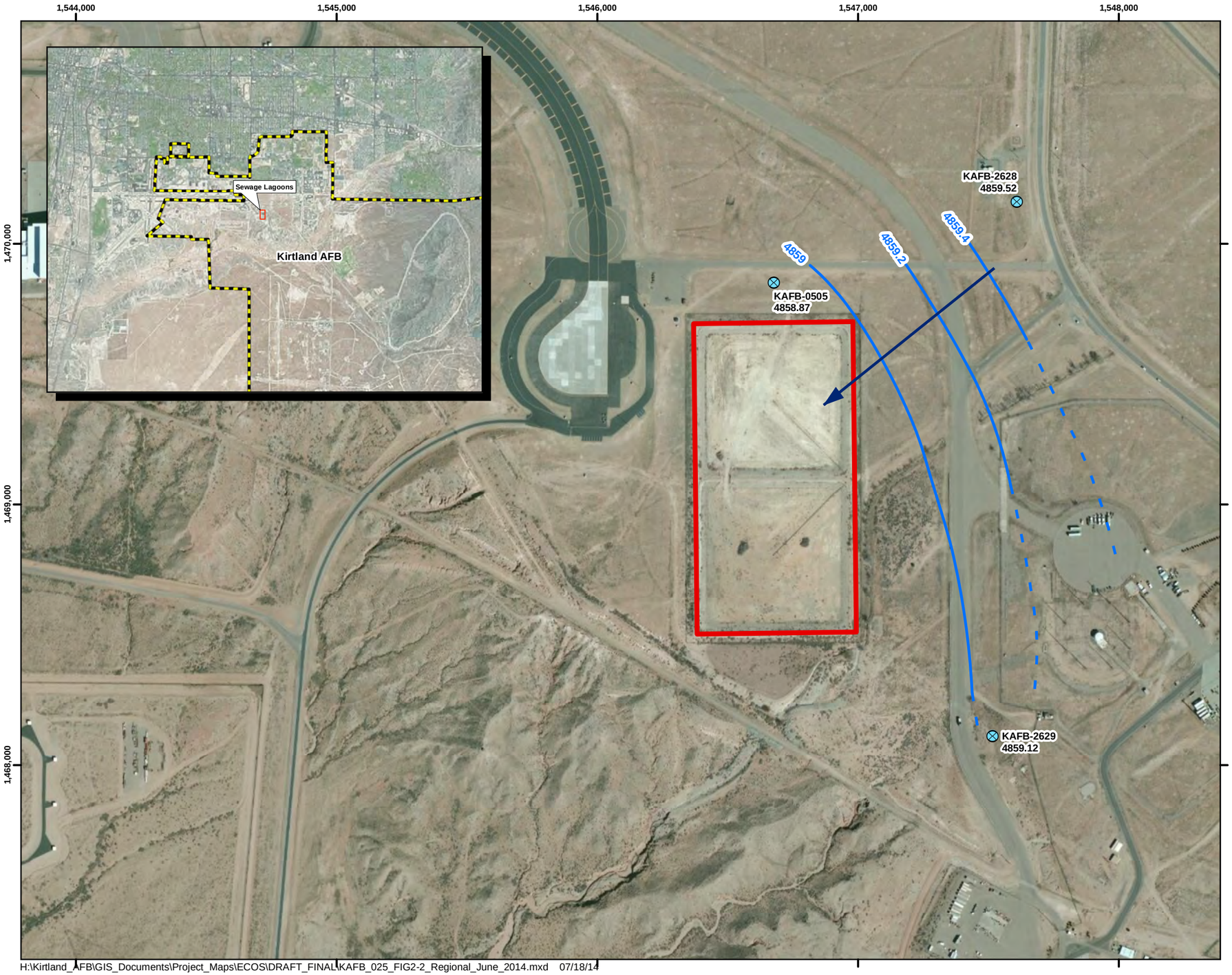
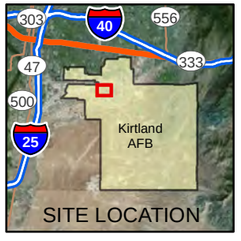


Legend

⊗	Monitor Well
KAFB-2628	Monitor Well ID
4858.87	Groundwater Elevation (ft amsl)
5030	Groundwater Elevation Contour (ft amsl, dashed where inferred)
←	Groundwater Flow Direction
▭	Sewage Lagoons

NOTES:

AFB = Air Force Base
ft amsl = Feet above mean sea level



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Revision Date: 07/18/14

N

0 200 400 800

Feet
1 inch = 400 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

LONG TERM MONITORING
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 2-2

GROUNDWATER ELEVATION MAP
SEWAGE LAGOONS REGIONAL
AQUIFER JUNE 2014

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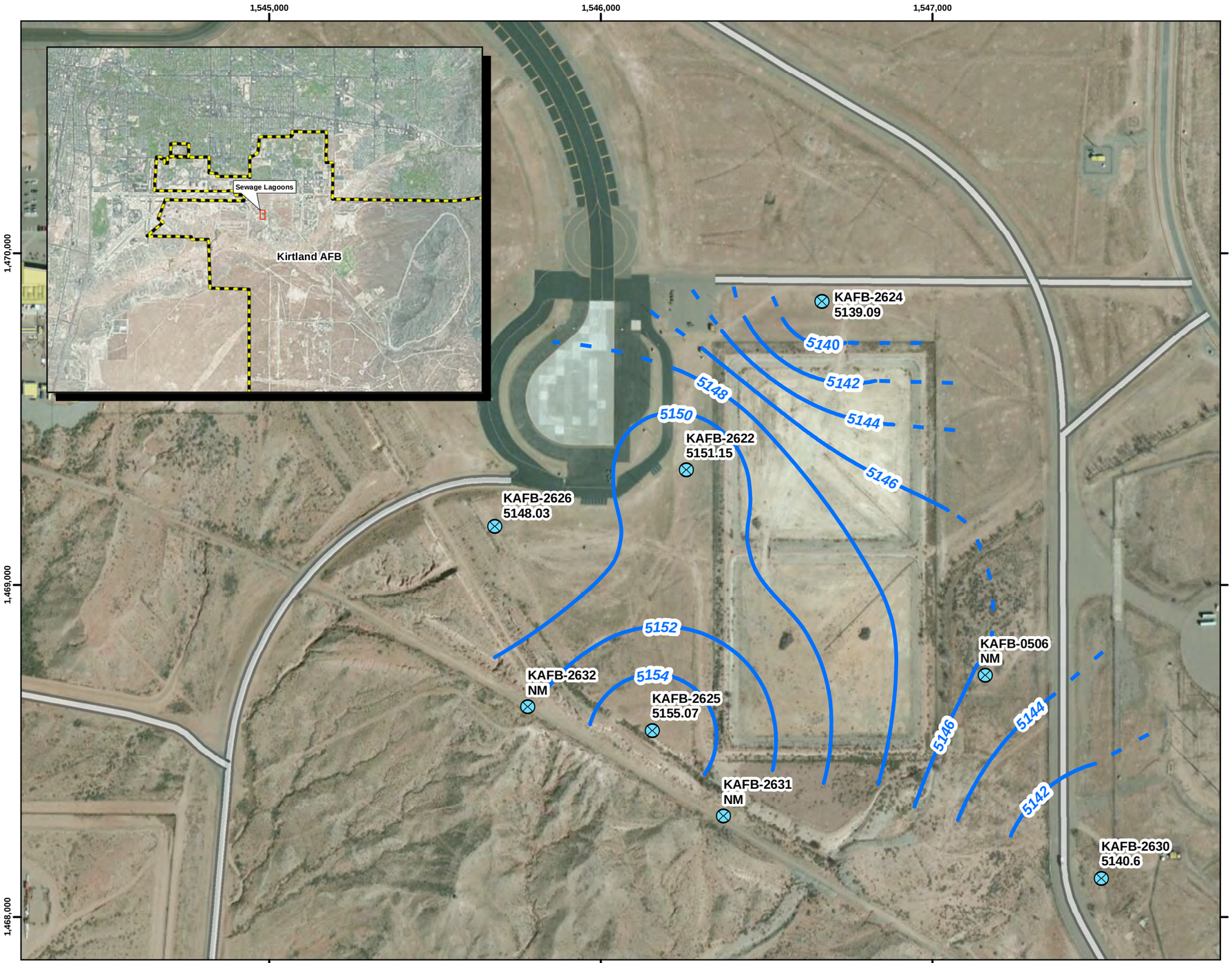

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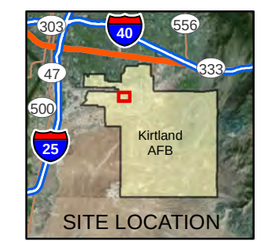
Legend

⊗	Monitor Well
KAFB-2628	Monitor Well ID
4858.87	Groundwater Elevation (ft amsl)
—5140—	Groundwater Elevation Contour (ft amsl, dashed where inferred)
←	Groundwater Flow Direction
▭	Sewage Lagoons

NOTES:

AFB = Air Force Base
ft amsl = Feet above mean sea level
NM = Not Measured



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Revision Date: 07/18/14

N

0 150 300 600

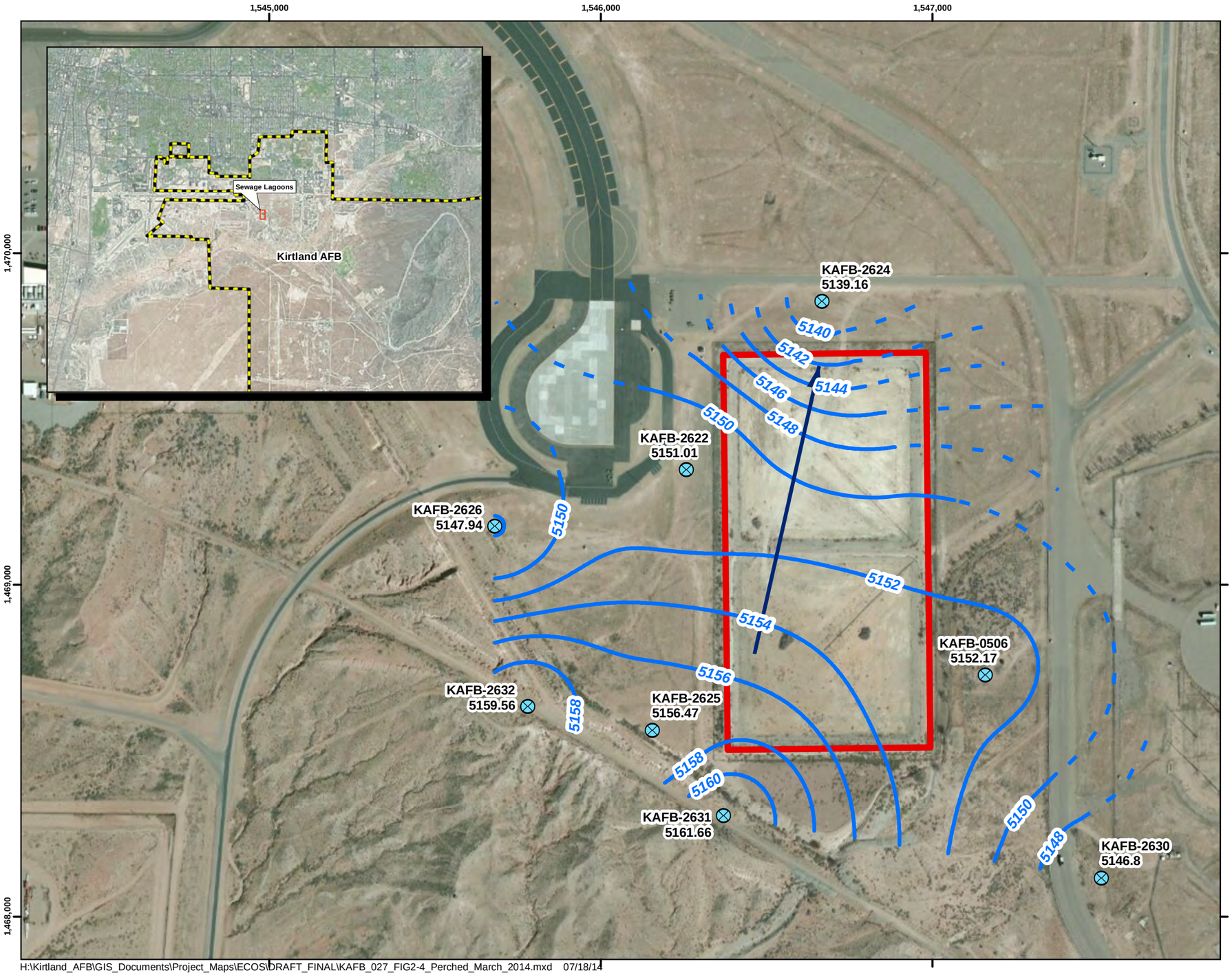
Feet
1 inch = 314 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

LONG TERM MONITORING
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 2-3

GROUNDWATER ELEVATION MAP
SEWAGE LAGOONS PERCHED
AQUIFER NOVEMBER 2013



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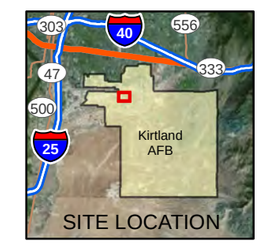
Legend

⊗	Monitor Well
KAFB-2628	Monitor Well ID
4858.87	Groundwater Elevation (ft amsl)
5140	Groundwater Elevation Contour (ft amsl, dashed where inferred)
←	Groundwater Flow Direction
▭	Sewage Lagoons

NOTES:

AFB = Air Force Base
ft amsl = Feet above mean sea level



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS

Revision Date: 07/18/14

N

0 150 300 600

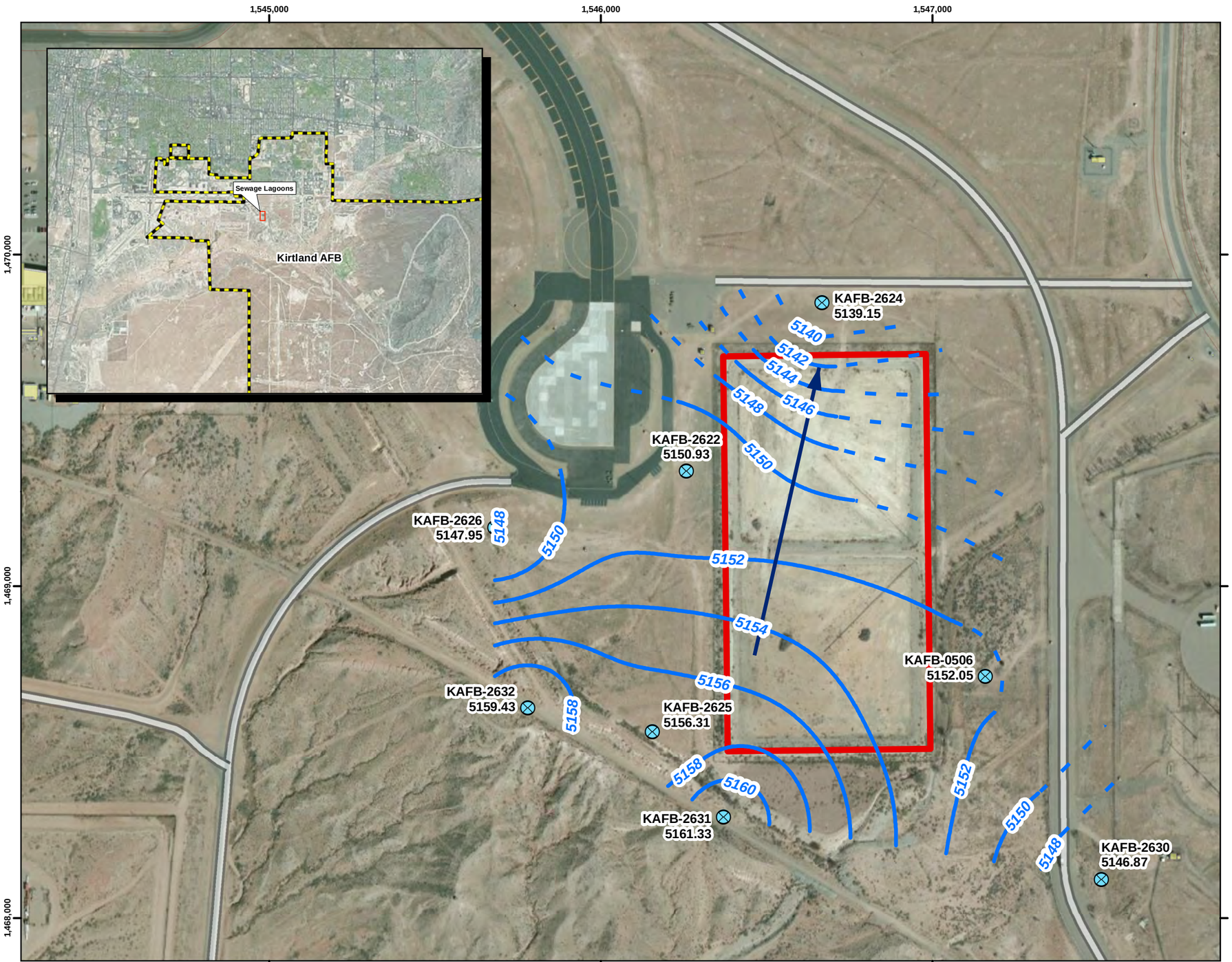
Feet
1 inch = 314 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

LONG TERM MONITORING
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 2-4

GROUNDWATER ELEVATION MAP
SEWAGE LAGOONS PERCHED
AQUIFER MARCH 2014



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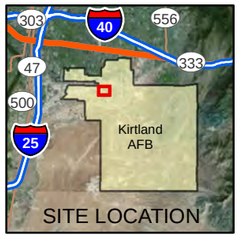
Legend

⊗	Monitor Well
KAFB-2628	Monitor Well ID
4858.87	Groundwater Elevation (ft amsl)
—5140—	Groundwater Elevation Contour (ft amsl, dashed where inferred)
←	Groundwater Flow Direction
▭	Sewage Lagoons

NOTES:

AFB = Air Force Base
ft amsl = Feet above mean sea level



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS

Revision Date: 07/18/14

N

0 150 300 600

Feet
1 inch = 314 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

LONG TERM MONITORING
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 2-5

GROUNDWATER ELEVATION MAP
SEWAGE LAGOONS PERCHED
AQUIFER JUNE 2014

TABLES

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Table 2-1. Groundwater Sample Analyses and Methods
SWMU WP-26

Analysis	Methods
Volatile organic compounds	SW8260B
Dissolved RCRA metals (Perched sewage lagoon wells only)	SW6010B/SW6020
Total Mercury (Perched sewage lagoon wells only)	SW7470A
Dissolved Iron and Manganese (Perched sewage lagoon wells only)	SW6010B
Radionuclides[1] (Perched sewage lagoon wells only)	SW9310/9315/9320MOD
Nitrate/nitrite as nitrogen	EPA 300.0A
Perchlorate (Perched sewage lagoon wells only)	SW6850
Total dissolved solids	EPA 160.1
Anions[2]	SW9056/EPA300.0
Ammonia (Sewage lagoon wells)	EPA350.1
Field parameters: pH, dissolved oxygen, oxidation reduction potential, specific conductance, turbidity, alkalinity, and temperature	Field measurements using portable meters

[1]Radionuclides include gross alpha, gross beta, and radium.

[2]Anions include chloride, fluoride, nitrate, nitrite, and sulfate.

Table 2-2. Gauging Data for November 2013, March 2014, and June 2014
Solid Waste Management Unit (SWMU) WP-26

Monitoring Well	Water Level Measurement Point Elevation (ft amsl)	November 2013		March 2014		June 2014	
		DTW (ft)	Groundwater Elevation (ft)	DTW (ft)	Groundwater Elevation (ft)	DTW (ft)	Groundwater Elevation (ft)
Sewage Lagoons Perched Aquifer							
KAFB-0506	5360.80	NM	--	208.63	5,152.17	208.75	5,152.05
KAFB-2622	5353.79	202.64	5,151.15	202.78	5,151.01	202.86	5,150.93
KAFB-2624	5356.88	217.79	5,139.09	217.72	5,139.16	217.73	5,139.15
KAFB-2625	5354.00	198.93	5,155.07	197.53	5,156.47	197.69	5,156.31
KAFB-2626	5355.50	207.47	5,148.03	207.56	5,147.94	207.55	5,147.95
KAFB-2630	5359.22	212.62	5,146.60	212.42	5,146.80	212.35	5,146.87
KAFB-2631	5335.45	NM	--	173.79	5,161.66	174.12	5,161.33
KAFB-2632	5328.81	NM	--	169.25	5,159.56	169.38	5,159.43
Sewage Lagoons Regional Aquifer							
KAFB-0505	5360.14	503.11	4,857.03	501.76	4,858.38	501.27	4,858.87
KAFB-2628	5366.90	509.65	4,857.25	508.03	4,858.87	507.38	4,859.52
KAFB-2629	5359.17	NM	--	500.69	4,858.48	500.05	4,859.12
Golf Course Main Pond Perched Aquifer							
KAFB-0609	5361.95	NM	--	NM	--	NM	--
KAFB-0610	5354.56	NM	--	NM	--	NM	--
KAFB-0608	5357.23	295.75	5,061.48	294.28	5,062.95	294.19	5,063.04

DTW = depth to water

ft = feet

amsl = above mean sea level

NM = not measured

Table 2-3. Summary of Analytical Results Golf Course Main Pond, December 2013

					SAMPLE LOCATION	**KAFB-0608**	
					SAMPLE NO	**WP026-30016**	
					SAMPLE DATE	**10-Dec-13**	
					SAMPLE PURPOSE	**REGULAR**	
Chemical Class Analytical Method	**Analyte**	**Units**	**NMAC 20.6.2 Human WQCC Standard[1]**	**Federal MCL[2]**	**Evaluation Criteria[3]**	**Result**	**Qual**
General Chemistry E350.1, SW9056, SM2540C	BROMIDE	mg/L	NS	NS	NS	0.321	
	CHLORIDE	mg/L	250	NS	250	24.3	
	FLUORIDE	mg/L	1.6	NS	1.6	0.356	
	NITROGEN, NITRATE-NITRITE	mg/L	10	10	10	**24.7**	
	SULFATE	mg/L	600	NS	600	94.3	
	TOTAL DISSOLVED SOLIDS	mg/L	1000	NS	1000	491	
VOCs 8260B	1,1,1,2-TETRACHLOROETHANE	µg/L	NS	NS	NS	ND	U
	1,1,1-TRICHLOROETHANE	µg/L	60	200	60	ND	U
	1,1,2,2-TETRACHLOROETHANE	µg/L	10	NS	10	ND	U
	1,1,2-TRICHLOROETHANE	µg/L	10	5	5	ND	U
	1,1-DICHLOROETHANE	µg/L	25	NS	25	ND	U
	1,1-DICHLOROETHENE	µg/L	5	7	5	ND	U
	1,1-DICHLOROPROPENE	µg/L	NS	NS	NS	ND	U
	1,2,3-TRICHLOROBENZENE	µg/L	NS	NS	NS	ND	U
	1,2,3-TRICHLOROPROPANE	µg/L	NS	NS	NS	ND	U
	1,2,4-TRICHLOROBENZENE	µg/L	NS	70	70	ND	U
	1,2,4-TRIMETHYLBENZENE	µg/L	NS	NS	NS	ND	U
	1,2-DIBROMO-3-CHLOROPROPANE	µg/L	NS	0.2	0.2	ND	U
	1,2-DIBROMOETHANE	µg/L	0.1	0.05	0.05	ND	U
	1,2-DICHLOROBENZENE	µg/L	NS	600	600	ND	U
	1,2-DICHLOROETHANE	µg/L	10	5	5	ND	U
	1,2-DICHLOROPROPANE	µg/L	NS	5	5	ND	U
	1,3,5-TRIMETHYLBENZENE	µg/L	NS	NS	NS	ND	U
	1,3-DICHLOROBENZENE	µg/L	NS	NS	NS	ND	U
	1,3-DICHLOROPROPANE	µg/L	NS	NS	NS	ND	U
	1,4-DICHLOROBENZENE	µg/L	NS	75	75	ND	U
	2,2-DICHLOROPROPANE	µg/L	NS	NS	NS	ND	U
	2-BUTANONE	µg/L	NS	NS	NS	ND	U

Table 2-3. Summary of Analytical Results Golf Course Main Pond, December 2013

					SAMPLE LOCATION	KAFB-0608	
					SAMPLE NO	WP026-30016	
					SAMPLE DATE	10-Dec-13	
					SAMPLE PURPOSE	REGULAR	
Chemical Class Analytical Method	**Analyte**	**Units**	**NMAC 20.6.2 Human WQCC Standard[1]**	**Federal MCL[2]**	**Evaluation Criteria[3]**	**Result**	**Qual**
VOCs 8260B (continued)	2-CHLOROTOLUENE	µg/L	NS	NS	NS	ND	U
	2-HEXANONE	µg/L	NS	NS	NS	ND	U
	4-CHLOROTOLUENE	µg/L	NS	NS	NS	ND	U
	4-METHYL-2-PENTANONE	µg/L	NS	NS	NS	ND	U
	ACETONE	µg/L	NS	NS	NS	ND	U
	BENZENE	µg/L	10	5	5	ND	U
	BROMOBENZENE	µg/L	NS	NS	NS	ND	U
	BROMODICHLOROMETHANE	µg/L	NS	80	80	ND	U
	BROMOFORM	µg/L	NS	80	80	ND	U
	BROMOMETHANE	µg/L	NS	NS	NS	ND	U
	CARBON DISULFIDE	µg/L	NS	NS	NS	ND	U
	CARBON TETRACHLORIDE	µg/L	10	5	5	ND	U
	CHLOROBENZENE	µg/L	NS	100	100	ND	U
	CHLOROETHANE	µg/L	NS	NS	NS	ND	U
	CHLOROFORM	µg/L	100	80	80	ND	U
	CHLOROMETHANE	µg/L	NS	NS	NS	ND	U
	CIS-1,2-DICHLOROETHENE	µg/L	NS	70	70	ND	U
	CIS-1,3-DICHLOROPROPENE	µg/L	NS	NS	NS	ND	U
	DIBROMOCHLOROMETHANE	µg/L	NS	80	80	ND	U
	DIBROMOMETHANE	µg/L	NS	NS	NS	ND	U
	DICHLORODIFLUOROMETHANE	µg/L	NS	NS	NS	ND	U
	ETHYLBENZENE	µg/L	750	700	700	ND	U
	HEXACHLOROBUTADIENE	µg/L	NS	NS	NS	ND	U
	ISOPROPYLBENZENE	µg/L	NS	NS	NS	ND	U
	METHYL TERT-BUTYL ETHER	µg/L	NS	NS	NS	ND	U
	METHYLENE CHLORIDE	µg/L	100	5	5	ND	U
	NAPHTHALENE	µg/L	30	NS	30	ND	U
	N-BUTYLBENZENE	µg/L	NS	NS	NS	ND	U

Table 2-3. Summary of Analytical Results Golf Course Main Pond, December 2013

					SAMPLE LOCATION	**KAFB-0608**	
					SAMPLE NO	**WP026-30016**	
					SAMPLE DATE	**10-Dec-13**	
					SAMPLE PURPOSE	**REGULAR**	
Chemical Class Analytical Method	**Analyte**	**Units**	**NMAC 20.6.2 Human WQCC Standard[1]**	**Federal MCL[2]**	**Evaluation Criteria[3]**	**Result**	**Qual**
VOCs 8260B (continued)	N-PROPYLBENZENE	µg/L	NS	NS	NS	ND	U
	P-ISOPROPYLTOLUENE	µg/L	NS	NS	NS	ND	U
	SEC-BUTYLBENZENE	µg/L	NS	NS	NS	ND	U
	STYRENE	µg/L	NS	100	100	ND	U
	TERT-BUTYLBENZENE	µg/L	NS	NS	NS	ND	U
	TETRACHLOROETHENE	µg/L	20	5	5	ND	U
	TOLUENE	µg/L	750	1000	750	ND	U
	TRANS-1,2-DICHLOROETHENE	µg/L	NS	100	100	ND	U
	TRANS-1,3-DICHLOROPROPENE	µg/L	NS	NS	NS	ND	U
	TRICHLOROETHENE	µg/L	100	5	5	ND	U
	TRICHLOROFLUOROMETHANE	µg/L	NS	NS	NS	ND	U
	VINYL CHLORIDE	µg/L	1	2	1	ND	U
	XYLENES	µg/L	620	10000	620	ND	U

[1] New Mexico Administrative Code (NMAC), Title 20, Chapter 6, Part 2.3103 Standards for Ground Water of 10,000 mg/L TDS concentration or lower.

[2] U.S. Environmental Protection Agency National Drinking Water Regulations, including primary and secondary standards (May 2009).

[3] The evaluation criteria is the lowest value between the New Mexico and federal regulatory levels.

Notes:

Shading indicates the analyte was detected

Bold = an exceedance of the evaluation criterion

MCL = maximum contaminant level

µg/L = microgram per liter

mg/L = milligram per liter

ND = analyte was not detected

NS = not specified

Qual = qualifier

U = the analyte was analyzed for but was not detected or the concentration was below the detection limit.

VOC = volatile organic compound

WQCC = Water Quality Control Commission

Table 2-4. Summary of Analytical Results Sewage Lagoons, November 2013 to March 2014

					SAMPLE LOCATION	KAFB0505		KAFB0506		KAFB2622		KAFB-2625	
					SAMPLE NO	WP026-30013		WP026-30001		WP026-30002		WP026-30004	
					SAMPLE DATE	19-Mar-14		20-Mar-14		25-Nov-13		2-Dec-13	
					SAMPLE PURPOSE	REGULAR		REGULAR		REGULAR		REGULAR	
					AQUIFER	REGIONAL		PERCHED		PERCHED		PERCHED	
Chemical Class Analytical Method	**Analyte**	**Units**	**NMAC 20.6.2 Human WQCC Standard[1]**	**Federal MCL[2]**	**Evaluation Criteria[3]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
General Chemistry	AMMONIA (AS N)	mg/L	NS	NS	NS	ND	U	ND	U	0.129	J	ND	U
E350.1, SW9056,	BROMIDE	mg/L	NS	NS	NS	0.115	MJ	0.549	MJ	1.89		1.22	
SM2540C, SW6850	CHLORIDE	mg/L	250	NS	250	13.9		63.9		192		135	
	FLUORIDE	mg/L	1.6	NS	1.6	0.375		0.307		0.33		0.335	
	NITROGEN, NITRATE-NITRITE	mg/L	10	10	10	4.22		2.18		3.83		1.94	
	PERCHLORATE	mg/L	NS	NS	NS	--		0.00139	J	0.00795		0.00118	J
	SULFATE	mg/L	600	NS	600	84.7		299		104		38.9	
	TOTAL DISSOLVED SOLIDS	mg/L	1000	NS	1000	401		611		709		448	
Dissolved Metals	ARSENIC, DISSOLVED	mg/L	0.1	0.01	0.01	--		ND	U	ND	U	ND	U
SW6010B, SW6020	BARIUM, DISSOLVED	mg/L	1	2	1	--		0.0318		0.0659		0.117	
	CADMIUM, DISSOLVED	mg/L	0.01	0.005	0.005	--		ND	U	ND	U	ND	U
	CHROMIUM, DISSOLVED	mg/L	0.05	0.1	0.05	--		ND		0.000656	J	0.000542	J
	IRON, DISSOLVED	mg/L	1	NS	1	--		ND	U	ND	U	0.0106	J
	LEAD, DISSOLVED	mg/L	0.05	0.015	0.015	--		ND	MU	0.000812		0.000803	
	MANGANESE, DISSOLVED	mg/L	0.2	NS	0.2	--		ND	U	ND	U	ND	U
	MERCURY, DISSOLVED	mg/L	0.002	0.002	0.002	--		ND	U	ND	U	ND	U
	SELENIUM, DISSOLVED	mg/L	0.05	0.05	0.05	--		0.0108		0.00588		0.0038	
	SILVER, DISSOLVED	mg/L	0.05	NS	0.05	--		ND	U	ND	U	ND	U
Radionuclides	GROSS ALPHA PARTICLE RADIOACTIVITY	pCi/L	NS	15	15	--		ND	U	ND	U	4.3	
SW9310/9315/	GROSS BETA PARTICLE RADIOACTIVITY	pCi/L	NS	NS	NS	--		ND	U	3.2	LT	13.4	
9320MOD	RA-228	pCi/L	NS	NS	NS	--		ND	U	ND	U	0.48	LT
	RADIUM-226	pCi/L	NS	NS	NS	--		ND	U	ND	U	0.34	LT
VOCs	1,1,1,2-TETRACHLOROETHANE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
SW8260B	1,1,1-TRICHLOROETHANE	µg/L	60	200	60	ND	U	ND	U	ND	U	ND	U
	1,1,2,2-TETRACHLOROETHANE	µg/L	10	NS	10	ND	U	ND	U	ND	U	ND	U
	1,1,2-TRICHLOROETHANE	µg/L	10	5	5	ND	U	ND	U	ND	U	ND	U
	1,1-DICHLOROETHANE	µg/L	25	NS	25	ND	U	2.72		4		3.71	
	1,1-DICHLOROETHENE	µg/L	5	7	5	ND	U	ND	U	0.29	J	ND	U
	1,1-DICHLOROPROPENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	1,2,3-TRICHLOROBENZENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	1,2,3-TRICHLOROPROPANE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	1,2,4-TRICHLOROBENZENE	µg/L	NS	70	70	ND	U	ND	U	ND	U	ND	U
	1,2,4-TRIMETHYLBENZENE	µg/L	NS	NS	NS	ND	U	ND	U	0.38	J	ND	U
	1,2-DIBROMO-3-CHLOROPROPANE	µg/L	NS	0.2	0.2	ND	U	ND	U	ND	U	ND	U
	1,2-DIBROMOETHANE	µg/L	0.1	0.05	0.05	ND	U	ND	U	ND	U	ND	U
	1,2-DICHLOROBENZENE	µg/L	NS	600	600	ND	U	ND	U	0.53	J	ND	U
	1,2-DICHLOROETHANE	µg/L	10	5	5	ND	U	ND	U	ND	U	ND	U
	1,2-DICHLOROPROPANE	µg/L	NS	5	5	ND	U	ND	U	ND	U	ND	U
	1,3,5-TRIMETHYLBENZENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	1,3-DICHLOROBENZENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	0.26	J
	1,3-DICHLOROPROPANE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	1,4-DICHLOROBENZENE	µg/L	NS	75	75	ND	U	ND	U	ND	U	0.43	J
	2,2-DICHLOROPROPANE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	2-BUTANONE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	2-CHLOROTOLUENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	2-HEXANONE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	4-CHLOROTOLUENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	4-METHYL-2-PENTANONE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	ACETONE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	BENZENE	µg/L	10	5	5	ND	U	ND	U	ND	U	ND	U
	BROMOBENZENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	BROMODICHLOROMETHANE	µg/L	NS	80	80	ND	U	ND	U	ND	U	ND	U
	BROMOFORM	µg/L	NS	80	80	ND	U	ND	U	ND	U	ND	U
	BROMOMETHANE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	CARBON DISULFIDE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	CARBON TETRACHLORIDE	µg/L	10	5	5	ND	U	ND	U	ND	U	ND	U
	CHLOROBENZENE	µg/L	NS	100	100	ND	U	ND	U	ND	U	ND	U
	CHLOROETHANE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	CHLOROFORM	µg/L	100	80	80	ND	U	ND	U	ND	U	ND	U

Table 2-4. Summary of Analytical Results Sewage Lagoons, November 2013 to March 2014

					SAMPLE LOCATION	KAFB0505		KAFB0506		KAFB2622		KAFB-2625	
					SAMPLE NO	WP026-30013		WP026-30001		WP026-30002		WP026-30004	
					SAMPLE DATE	19-Mar-14		20-Mar-14		25-Nov-13		2-Dec-13	
					SAMPLE PURPOSE	REGULAR		REGULAR		REGULAR		REGULAR	
					AQUIFER	REGIONAL		PERCHED		PERCHED		PERCHED	
Chemical Class Analytical Method	**Analyte**	**Units**	**NMAC 20.6.2 Human WQCC Standard[1]**	**Federal MCL[2]**	**Evaluation Criteria[3]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
VOCs	CHLOROMETHANE	µg/L	NS	NS	NS	ND	U	5.09		ND	U	ND	U
SW8260B	CIS-1,2-DICHLOROETHENE	µg/L	NS	70	70	ND	U	ND	U	3.93		0.42	J
(continued)	CIS-1,3-DICHLOROPROPENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	DIBROMOCHLOROMETHANE	µg/L	NS	80	80	ND	U	ND	U	ND	U	ND	U
	DIBROMOMETHANE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	DICHLORODIFLUOROMETHANE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	ETHYLBENZENE	µg/L	750	700	700	ND	U	ND	U	ND	U	ND	U
	HEXACHLOROBUTADIENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	ISOPROPYLBENZENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	METHYL TERT-BUTYL ETHER	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	METHYLENE CHLORIDE	µg/L	100	5	5	ND	U	ND	U	ND	U	ND	U
	NAPHTHALENE	µg/L	30	NS	30	ND	U	ND	U	1.52		ND	U
	N-BUTYLBENZENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	N-PROPYLBENZENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	P-ISOPROPYLTOLUENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	SEC-BUTYLBENZENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	STYRENE	µg/L	NS	100	100	ND	U	ND	U	ND	U	ND	U
	TERT-BUTYLBENZENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	TETRACHLOROETHENE	µg/L	20	5	5	ND	U	ND	U	0.36	J	ND	U
	TOLUENE	µg/L	750	1000	750	0.272	J	ND	U	0.33	J	ND	U
	TRANS-1,2-DICHLOROETHENE	µg/L	NS	100	100	ND	U	ND	U	ND	U	ND	U
	TRANS-1,3-DICHLOROPROPENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	TRICHLOROETHENE	µg/L	100	5	5	ND	U	2.64		21.6		6.97	
	TRICHLOROFLUOROMETHANE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	VINYL CHLORIDE	µg/L	1	2	1	ND	U	ND	U	ND	U	ND	U
	XYLENES	µg/L	620	10000	620	ND	U	ND	U	ND	U	ND	U

[1] New Mexico Administrative Code (NMAC), Title 20, Chapter 6, Part 2.3103 Standards for Ground Water of 10,000 mg/L TDS concentration or lower.
[2] U.S. Environmental Protection Agency National Drinking Water Regulations, including primary and secondary standards (May 2009).
[3] The evaluation criteria is the lowest value between the New Mexico and federal regulatory levels.

Notes:
Shading indicates the analyte was detected.
-- = not analyzed
B = indicates that the compound was also detected in the method blank and data should be interpreted with caution
J = estimated value, concentration is less than the Level of Quantitation (LOQ) but greater than the detection limit (DL)
LT = result is less than the requested minimum detectable concentration (MDC), but greater than the sample specific MDC
M = indicates that the sample matrix interfered with the quantitation of the analyte
MCL = maximum concentration level
µg/L = micrograms per liter
mg/L = milligrams per liter
ND = analyte was not detected
NS = not specified
Qual = qualifier
U = the analyte was analyzed for but was not detected or the concentration was below the detection limit
VOC = volatile organic compound
WQCC = Water Quality Control Commission

Table 2-4. Summary of Analytical Results Sewage Lagoons, November 2013 to March 2014

					SAMPLE LOCATION	KAFB-2626		KAFB-2626		KAFB-2628		KAFB-2629	
					SAMPLE NO	WP026-30005		WP026-30006		WP026-30010		WP026-30011	
					SAMPLE DATE	4-Dec-13		4-Dec-13		3-Dec-13		17-Mar-14	
					SAMPLE PURPOSE	REGULAR		DUPLICATE		REGULAR		REGULAR	
					AQUIFER	PERCHED		PERCHED		REGIONAL		REGIONAL	
Chemical Class Analytical Method	**Analyte**	**Units**	**NMAC 20.6.2 Human WQCC Standard[1]**	**Federal MCL[2]**	**Evaluation Criteria[3]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
General Chemistry	AMMONIA (AS N)	mg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
E350.1, SW9056,	BROMIDE	mg/L	NS	NS	NS	0.414	MJ	0.425	MJ	0.128	J	0.125	J
SM2540C, SW6850	CHLORIDE	mg/L	250	NS	250	40.4		41.3		15.6		16.1	
	FLUORIDE	mg/L	1.6	NS	1.6	0.427		0.443		0.391		0.406	
	NITROGEN, NITRATE-NITRITE	mg/L	10	10	10	2.18		2.15		2.04		3.51	
	PERCHLORATE	mg/L	NS	NS	NS	0.00216		0.00213		ND	U	ND	U
	SULFATE	mg/L	600	NS	600	13.3		13.6		82.4		83.3	
	TOTAL DISSOLVED SOLIDS	mg/L	1000	NS	1000	270	B	277	B	375		325	
Dissolved Metals	ARSENIC, DISSOLVED	mg/L	0.1	0.01	0.01	ND	U	ND	U	ND	MU	ND	U
SW6010B, SW6020	BARIUM, DISSOLVED	mg/L	1	2	1	0.173		0.177		0.104		0.0567	
	CADMIUM, DISSOLVED	mg/L	0.01	0.005	0.005	ND	U	ND	U	ND	U	ND	U
	CHROMIUM, DISSOLVED	mg/L	0.05	0.1	0.05	0.00198	J	0.00202	J	0.000702	J	0.00101	J
	IRON, DISSOLVED	mg/L	1	NS	1	0.0182	J	0.0156	J	ND	U	ND	U
	LEAD, DISSOLVED	mg/L	0.05	0.015	0.015	0.000566	J	0.000636	J	0.000629	J	ND	U
	MANGANESE, DISSOLVED	mg/L	0.2	NS	0.2	0.00235	J	0.00267	J	ND	U	0.000793	J
	MERCURY, DISSOLVED	mg/L	0.002	0.002	0.002	ND	U	ND	U	ND	U	ND	U
	SELENIUM, DISSOLVED	mg/L	0.05	0.05	0.05	0.00261		0.00247	J	0.00227	J	0.00282	
	SILVER, DISSOLVED	mg/L	0.05	NS	0.05	ND	U	ND	U	ND	U	ND	U
Radionuclides	GROSS ALPHA PARTICLE RADIOACTIVITY	pCi/L	NS	15	15	ND	U	ND	U	3.45		3.8	
SW9310/9315/	GROSS BETA PARTICLE RADIOACTIVITY	pCi/L	NS	NS	NS	ND	U	ND	U	3.2	LT	ND	LT
9320MOD	RA-228	pCi/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	RADIUM-226	pCi/L	NS	NS	NS	ND	U	ND	U	0.26	LT	ND	U
VOCs	1,1,1,2-TETRACHLOROETHANE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
SW8260B	1,1,1-TRICHLOROETHANE	µg/L	60	200	60	ND	U	ND	U	ND	U	ND	U
	1,1,2,2-TETRACHLOROETHANE	µg/L	10	NS	10	ND	U	ND	U	ND	U	ND	U
	1,1,2-TRICHLOROETHANE	µg/L	10	5	5	ND	U	ND	U	ND	U	ND	U
	1,1-DICHLOROETHANE	µg/L	25	NS	25	ND	U	ND	U	ND	U	ND	U
	1,1-DICHLOROETHENE	µg/L	5	7	5	ND	U	ND	U	ND	U	ND	U
	1,1-DICHLOROPROPENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	1,2,3-TRICHLOROBENZENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	1,2,3-TRICHLOROPROPANE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	1,2,4-TRICHLOROBENZENE	µg/L	NS	70	70	ND	U	ND	U	ND	U	ND	U
	1,2,4-TRIMETHYLBENZENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	1,2-DIBROMO-3-CHLOROPROPANE	µg/L	NS	0.2	0.2	ND	U	ND	U	ND	U	ND	U
	1,2-DIBROMOETHANE	µg/L	0.1	0.05	0.05	ND	U	ND	U	ND	U	ND	U
	1,2-DICHLOROBENZENE	µg/L	NS	600	600	ND	U	ND	U	ND	U	ND	U
	1,2-DICHLOROETHANE	µg/L	10	5	5	ND	U	ND	U	ND	U	ND	U
	1,2-DICHLOROPROPANE	µg/L	NS	5	5	ND	U	ND	U	ND	U	ND	U
	1,3,5-TRIMETHYLBENZENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	1,3-DICHLOROBENZENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	1,3-DICHLOROPROPANE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	1,4-DICHLOROBENZENE	µg/L	NS	75	75	ND	U	ND	U	ND	U	ND	U
	2,2-DICHLOROPROPANE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	2-BUTANONE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	2-CHLOROTOLUENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	2-HEXANONE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	4-CHLOROTOLUENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	4-METHYL-2-PENTANONE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	ACETONE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	BENZENE	µg/L	10	5	5	0.42	J	0.42	J	ND	U	ND	U
	BROMOBENZENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	BROMODICHLOROMETHANE	µg/L	NS	80	80	ND	U	ND	U	ND	U	ND	U
	BROMOFORM	µg/L	NS	80	80	ND	U	ND	U	ND	U	ND	U
	BROMOMETHANE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	CARBON DISULFIDE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	CARBON TETRACHLORIDE	µg/L	10	5	5	ND	U	ND	U	ND	U	ND	U
	CHLOROBENZENE	µg/L	NS	100	100	ND	U	ND	U	ND	U	ND	U
	CHLOROETHANE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	CHLOROFORM	µg/L	100	80	80	ND	U	ND	U	ND	U	ND	U

Table 2-4. Summary of Analytical Results Sewage Lagoons, November 2013 to March 2014

					SAMPLE LOCATION	KAFB-2626		KAFB-2626		KAFB-2628		KAFB-2629	
					SAMPLE NO	WP026-30005		WP026-30006		WP026-30010		WP026-30011	
					SAMPLE DATE	4-Dec-13		4-Dec-13		3-Dec-13		17-Mar-14	
					SAMPLE PURPOSE	REGULAR		DUPLICATE		REGULAR		REGULAR	
					AQUIFER	PERCHED		PERCHED		REGIONAL		REGIONAL	
Chemical Class Analytical Method	**Analyte**	**Units**	**NMAC 20.6.2 Human WQCC Standard[1]**	**Federal MCL[2]**	**Evaluation Criteria[3]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
VOCs	CHLOROMETHANE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
SW8260B	CIS-1,2-DICHLOROETHENE	µg/L	NS	70	70	ND	U	ND	U	ND	U	ND	U
(continued)	CIS-1,3-DICHLOROPROPENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	DIBROMOCHLOROMETHANE	µg/L	NS	80	80	ND	U	ND	U	ND	U	ND	U
	DIBROMOMETHANE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	DICHLORODIFLUOROMETHANE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	ETHYLBENZENE	µg/L	750	700	700	ND	U	ND	U	ND	U	ND	U
	HEXACHLOROBUTADIENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	ISOPROPYLBENZENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	METHYL TERT-BUTYL ETHER	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	METHYLENE CHLORIDE	µg/L	100	5	5	ND	U	ND	U	ND	U	ND	U
	NAPHTHALENE	µg/L	30	NS	30	ND	U	ND	U	ND	U	ND	U
	N-BUTYLBENZENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	N-PROPYLBENZENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	P-ISOPROPYLTOLUENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	SEC-BUTYLBENZENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	STYRENE	µg/L	NS	100	100	ND	U	ND	U	ND	U	ND	U
	TERT-BUTYLBENZENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	TETRACHLOROETHENE	µg/L	20	5	5	ND	U	ND	U	ND	U	ND	U
	TOLUENE	µg/L	750	1000	750	0.68	J	0.65	J	ND	U	ND	U
	TRANS-1,2-DICHLOROETHENE	µg/L	NS	100	100	ND	U	ND	U	ND	U	ND	U
	TRANS-1,3-DICHLOROPROPENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	TRICHLOROETHENE	µg/L	100	5	5	0.37	J	0.45	J	ND	U	ND	U
	TRICHLOROFLUOROMETHANE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U	ND	U
	VINYL CHLORIDE	µg/L	1	2	1	ND	U	ND	U	ND	U	ND	U
	XYLENES	µg/L	620	10000	620	0.92	J	0.88	J	ND	U	ND	U

[1] New Mexico Administrative Code (NMAC), Title 20, Chapter 6, Part 2.3103 Standards for Ground Water of 10,000 mg/L TDS concentration or lower.
[2] U.S. Environmental Protection Agency National Drinking Water Regulations, including primary and secondary standards (May 2009).
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ND = analyte was not detected
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VOC = volatile organic compound
WQCC = Water Quality Control Commission

Table 2-4. Summary of Analytical Results Sewage Lagoons, November 2013 to March 2014

					SAMPLE LOCATION	KAFB-2629		KAFB-2630		WP26-KAFB2632	
					SAMPLE NO	WP026-30012		WP026-30007		WP026-30009	
					SAMPLE DATE	17-Mar-14		18-Mar-14		18-Mar-14	
					SAMPLE PURPOSE	DUPLICATE		REGULAR		REGULAR	
					AQUIFER	REGIONAL		PERCHED		PERCHED	
Chemical Class Analytical Method	**Analyte**	**Units**	**NMAC 20.6.2 Human WQCC Standard[1]**	**Federal MCL[2]**	**Evaluation Criteria[3]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
General Chemistry	AMMONIA (AS N)	mg/L	NS	NS	NS	ND	U	ND	U	ND	U
E350.1, SW9056,	BROMIDE	mg/L	NS	NS	NS	0.122	J	0.743		0.775	
SM2540C, SW6850	CHLORIDE	mg/L	250	NS	250	16.2		87.4		92.6	
	FLUORIDE	mg/L	1.6	NS	1.6	0.407		0.382		0.385	
	NITROGEN, NITRATE-NITRITE	mg/L	10	10	10	3.5		2.81		1.95	
	PERCHLORATE	mg/L	NS	NS	NS	ND	U	0.00179	J	0.00195	J
	SULFATE	mg/L	600	NS	600	83.8		31.2		19.4	
	TOTAL DISSOLVED SOLIDS	mg/L	1000	NS	1000	321		235		246	
Dissolved Metals	ARSENIC, DISSOLVED	mg/L	0.1	0.01	0.01	ND	U	ND	U	ND	U
SW6010B, SW6020	BARIUM, DISSOLVED	mg/L	1	2	1	0.0553		0.217		0.236	
	CADMIUM, DISSOLVED	mg/L	0.01	0.005	0.005	ND	U	ND	U	ND	U
	CHROMIUM, DISSOLVED	mg/L	0.05	0.1	0.05	0.000945	J	0.00105	J	0.000842	J
	IRON, DISSOLVED	mg/L	1	NS	1	ND	U	ND	U	0.0137	J
	LEAD, DISSOLVED	mg/L	0.05	0.015	0.015	ND	U	ND	MU	ND	U
	MANGANESE, DISSOLVED	mg/L	0.2	NS	0.2	0.00094	J	ND	U	ND	U
	MERCURY, DISSOLVED	mg/L	0.002	0.002	0.002	ND	U	ND	U	ND	U
	SELENIUM, DISSOLVED	mg/L	0.05	0.05	0.05	0.003		0.0039		0.004	
	SILVER, DISSOLVED	mg/L	0.05	NS	0.05	ND	U	ND	U	ND	U
Radionuclides	GROSS ALPHA PARTICLE RADIOACTIVITY	pCi/L	NS	15	15	3.6		ND	U	2.1	LT
SW9310/9315/	GROSS BETA PARTICLE RADIOACTIVITY	pCi/L	NS	NS	NS	ND	LT	ND	U	ND	LT
9320MOD	RA-228	pCi/L	NS	NS	NS	ND	U	ND	U	ND	U
	RADIUM-226	pCi/L	NS	NS	NS	ND	U	0.29	LT	0.28	LT
VOCs	1,1,1,2-TETRACHLOROETHANE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U
SW8260B	1,1,1-TRICHLOROETHANE	µg/L	60	200	60	ND	U	ND	U	ND	U
	1,1,2,2-TETRACHLOROETHANE	µg/L	10	NS	10	ND	U	ND	U	ND	U
	1,1,2-TRICHLOROETHANE	µg/L	10	5	5	ND	U	ND	U	ND	U
	1,1-DICHLOROETHANE	µg/L	25	NS	25	ND	U	1.44		0.348	J
	1,1-DICHLOROETHENE	µg/L	5	7	5	ND	U	ND	U	ND	U
	1,1-DICHLOROPROPENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U
	1,2,3-TRICHLOROBENZENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U
	1,2,3-TRICHLOROPROPANE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U
	1,2,4-TRICHLOROBENZENE	µg/L	NS	70	70	ND	U	ND	U	ND	U
	1,2,4-TRIMETHYLBENZENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U
	1,2-DIBROMO-3-CHLOROPROPANE	µg/L	NS	0.2	0.2	ND	U	ND	U	ND	U
	1,2-DIBROMOETHANE	µg/L	0.1	0.05	0.05	ND	U	ND	U	ND	U
	1,2-DICHLOROBENZENE	µg/L	NS	600	600	ND	U	ND	U	ND	U
	1,2-DICHLOROETHANE	µg/L	10	5	5	ND	U	ND	U	ND	U
	1,2-DICHLOROPROPANE	µg/L	NS	5	5	ND	U	ND	U	ND	U
	1,3,5-TRIMETHYLBENZENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U
	1,3-DICHLOROBENZENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U
	1,3-DICHLOROPROPANE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U
	1,4-DICHLOROBENZENE	µg/L	NS	75	75	ND	U	ND	U	ND	U
	2,2-DICHLOROPROPANE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U
	2-BUTANONE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U
	2-CHLOROTOLUENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U
	2-HEXANONE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U
	4-CHLOROTOLUENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U
	4-METHYL-2-PENTANONE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U
	ACETONE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U
	BENZENE	µg/L	10	5	5	ND	U	ND	U	ND	U
	BROMOBENZENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U
	BROMODICHLOROMETHANE	µg/L	NS	80	80	ND	U	ND	U	ND	U
	BROMOFORM	µg/L	NS	80	80	ND	U	ND	U	ND	U
	BROMOMETHANE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U
	CARBON DISULFIDE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U
	CARBON TETRACHLORIDE	µg/L	10	5	5	ND	U	ND	U	ND	U
	CHLOROBENZENE	µg/L	NS	100	100	ND	U	ND	U	ND	U
	CHLOROETHANE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U
	CHLOROFORM	µg/L	100	80	80	ND	U	ND	U	ND	U

Table 2-4. Summary of Analytical Results Sewage Lagoons, November 2013 to March 2014

					SAMPLE LOCATION	KAFB-2629		KAFB-2630		WP26-KAFB2632	
					SAMPLE NO	WP026-30012		WP026-30007		WP026-30009	
					SAMPLE DATE	17-Mar-14		18-Mar-14		18-Mar-14	
					SAMPLE PURPOSE	DUPLICATE		REGULAR		REGULAR	
					AQUIFER	REGIONAL		PERCHED		PERCHED	
Chemical Class Analytical Method	**Analyte**	**Units**	**NMAC 20.6.2 Human WQCC Standard[1]**	**Federal MCL[2]**	**Evaluation Criteria[3]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
VOCs	CHLOROMETHANE	µg/L	NS	NS	NS	ND	U	5.6		5.58	
SW8260B	CIS-1,2-DICHLOROETHENE	µg/L	NS	70	70	ND	U	ND	U	ND	U
(continued)	CIS-1,3-DICHLOROPROPENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U
	DIBROMOCHLOROMETHANE	µg/L	NS	80	80	ND	U	ND	U	ND	U
	DIBROMOMETHANE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U
	DICHLORODIFLUOROMETHANE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U
	ETHYLBENZENE	µg/L	750	700	700	ND	U	ND	U	ND	U
	HEXACHLOROBUTADIENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U
	ISOPROPYLBENZENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U
	METHYL TERT-BUTYL ETHER	µg/L	NS	NS	NS	ND	U	ND	U	ND	U
	METHYLENE CHLORIDE	µg/L	100	5	5	ND	U	ND	U	ND	U
	NAPHTHALENE	µg/L	30	NS	30	ND	U	ND	U	ND	U
	N-BUTYLBENZENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U
	N-PROPYLBENZENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U
	P-ISOPROPYLTOLUENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U
	SEC-BUTYLBENZENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U
	STYRENE	µg/L	NS	100	100	ND	U	ND	U	ND	U
	TERT-BUTYLBENZENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U
	TETRACHLOROETHENE	µg/L	20	5	5	ND	U	ND	U	ND	U
	TOLUENE	µg/L	750	1000	750	ND	U	ND	U	ND	U
	TRANS-1,2-DICHLOROETHENE	µg/L	NS	100	100	ND	U	ND	U	ND	U
	TRANS-1,3-DICHLOROPROPENE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U
	TRICHLOROETHENE	µg/L	100	5	5	ND	U	4.74		3.23	
	TRICHLOROFLUOROMETHANE	µg/L	NS	NS	NS	ND	U	ND	U	ND	U
	VINYL CHLORIDE	µg/L	1	2	1	ND	U	ND	U	ND	U
	XYLENES	µg/L	620	10000	620	ND	U	ND	U	ND	U

[1] New Mexico Administrative Code (NMAC), Title 20, Chapter 6, Part 2.3103 Standards for Ground Water of 10,000 mg/L TDS concentration or lower.
[2] U.S. Environmental Protection Agency National Drinking Water Regulations, including primary and secondary standards (May 2009).
[3] The evaluation criteria is the lowest value between the New Mexico and federal regulatory levels.

Notes:
Shading indicates the analyte was detected.
-- = not analyzed
B = indicates that the compound was also detected in the method blank and data should be interpreted with caution
J = estimated value, concentration is less than the Level of Quantitation (LOQ) but greater than the detection limit (DL)
LT = result is less than the requested minimum detectable concentration (MDC), but greater than the sample specific MDC
M = indicates that the sample matrix interfered with the quantitation of the analyte
MCL = maximum concentration level
µg/L = micrograms per liter
mg/L = milligrams per liter
ND = analyte was not detected
NS = not specified
Qual = qualifier
U = the analyte was analyzed for but was not detected or the concentration was below the detection limit
VOC = volatile organic compound
WQCC = Water Quality Control Commission

APPENDIX A

Well Plugging Plan of Operations

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DISTRICT I

SCOTT A. VERHINES, P.E.
STATE ENGINEER

5550 San Antonio NE
Albuquerque, NM 87109
(505) 383-4000

June 17, 2014

FILE: KAFB Well 0609

Kirtland Air Force Base – Chief Environmental Restoration
C/o Wayne Bitner - 377MSG/CEANR
2050 Wyoming Blvd., SE
Albuquerque NM 87117-5270

Greetings:

Enclosed is your copy of the Well Plugging Plan of Operations, referenced above, which has been approved subject to the Conditions of Approval, attached hereto.

Sincerely,

Jeffrey L. Peterson
Water Resource Specialist Senior

JLP:jlp
Enclosures as stated

Cc: Santa Fe

WELL PLUGGING PLAN OF OPERATIONS

NOTE: A Well Plugging Plan of Operations shall be filed with and accepted by the Office of the State Engineer prior to plugging.

I. FILING FEE: There is no filing fee for this form.

II. GENERAL / WELL OWNERSHIP:

Existing Office of the State Engineer POD Number (Well Number) for well to be plugged: Non Permitted MW KAFB-0609

Name of well owner: KAFB ERM (POC: CBI, Inc. Mr. David Aubrey/Mr. Mike Amdurer)

Mailing address: 2440 Louisiana Blvd. NE, Suite 300

City: Albuquerque State: NM Zip code: 87110

Phone number: 505-262-8800 E-mail: david.aubrey@cbifederalservices.com

III. WELL DRILLER INFORMATION:

Well Driller contracted to provide plugging services: JR Drilling, LLC

New Mexico Well Driller License No.: 1644 Expiration Date: 10/31/2014

IV. WELL INFORMATION:

Note: A copy of the existing Well Record for the well to be plugged should be attached to this plan.

1) GPS Well Location: Latitude: See deg, _____ min, _____ sec
Longitude: Attached deg, _____ min, _____ sec, NAD 83

2) Reason(s) for plugging well: Well ready for closure. Pitless adapter was damaged and pump fell to bottom. Everything was fished out except the pump.

3) Was well used for any type of monitoring program? Yes If yes, please use section VII of this form to detail what hydrogeologic parameters were monitored. If the well was used to monitor contaminated or poor quality water, authorization from the New Mexico Environment Department may be required prior to plugging.

4) Does the well tap brackish, saline, or otherwise poor quality water? Unknown If yes, provide additional detail, including analytical results and/or laboratory report(s): _____

5) Static water level: 303-304' feet below land surface / feet above land surface (circle one)

6) Depth of the well: 345 feet

7) Inside diameter of innermost casing: 4 inches.

8) Casing material: PVC

9) The well was constructed with:

_____ an open-hole production interval, state the open interval: _____

X a well screen or perforated pipe, state the screened interval(s): See Attached/Stainless

10) What annular interval surrounding the artesian casing of this well is cement-grouted? 0-260'

11) Was the well built with surface casing? No If yes, is the annulus surrounding the surface casing grouted or otherwise sealed? _____ If yes, please describe: _____

12) Has all pumping equipment and associated piping been removed from the well? All but pump If not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.

V. DESCRIPTION OF PLANNED WELL PLUGGING:

Note: If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie pipe, a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional technical information, such as geophysical logs, that are necessary to adequately describe the proposal.

1) Describe the method by which cement grout shall be placed in the well, or describe requested plugging methodology proposed for the well: Well was part of an accident investigation. The pitless adapter had failed and the pump along with drop pipe and wiring fell to the bottom. JR Drilling spent two week fishing everything but the pump out. The pump was on a fish but had imploded on it's landing and could not be removed.

2) Will well head be cut-off below land surface after plugging? Yes

VI. PLUGGING AND SEALING MATERIALS:

Note: The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealant

1) For plugging intervals that employ cement grout, complete and attach Table A.

2) For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.

3) Theoretical volume of grout required to plug the well to land surface: .228.0

4) Type of Cement proposed: Portland Cement Type I/II)

5) Proposed cement grout mix: 5.2 gallons of water per 94 pound sack of Portland cement.

6) Will the grout be: _____ batch-mixed and delivered to the site

X mixed on site

7) Grout additives requested, and percent by dry weight relative to cement: N/A

8) Additional notes and calculations:

VII. ADDITIONAL INFORMATION: List additional information below, or on separate sheet(s):

CBI, Inc. 505-262-8800

JR Drilling, LLC: Rob Helton 505-286-7772

Please contact Mr. David Aubrey or Mr. Mike Amduer for any additional information.

GPS coordinates will be provided with the WD-11. This is all the information given to me

VIII. SIGNATURE:

I, RobHelton, say that I have carefully read the foregoing Well Plugging Plan of Operations and any attachments, which are a part hereof; that I am familiar with the rules and regulations of the State Engineer pertaining to the plugging of wells and will comply with them, and that each and all of the statements in the Well Plugging Plan of Operations and attachments are true to the best of my knowledge and belief.

Signature of Applicant — Date: 5/30/2014

IX. ACTION OF THE STATE ENGINEER:

This Well Plugging Plan of Operations is:

✓ Approved subject to the attached conditions.

____ Not approved for the reasons provided on the attached letter.

Witness my hand and official seal this 17th day of June, 2014

Scott A. Verhines, State Engineer

By: _____

2014 JUN -4 AM 9:38

TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)			1'
Bottom of proposed interval of grout placement (ft bgl)			345'
Theoretical volume of grout required per interval (gallons)			228.0
Proposed cement grout mix gallons of water per 94-lb. sack of Portland cement			5.2
Mixed on-site or batch-mixed and delivered?			On site
Grout additive 1 requested			
Additive 1 percent by dry weight relative to cement			
Grout additive 2 requested			
Additive 2 percent by dry weight relative to cement			

TABLE B - For plugging intervals that will employ approved non-cement based sealant(s). Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgl)			
Bottom of proposed sealant of grout placement (ft bgl)			
Theoretical volume of sealant required per interval (gallons)			
Proposed abandonment sealant (manufacturer and trade name)			

DISTRICT 1

SCOTT A. VERHINES, P.E.

NEW MEXICO STATE ENGINEER

Materials submitted by Kirtland Air Force Base – ERM, c/o CBI, Inc. David Aubrey, 2440 Louisiana Blvd., NE, Suite 300, Albuquerque, NM 87110 identify one 4" cased well (KAFB-0609), 345 feet deep, formerly used as a groundwater monitoring well. JR Drilling, LLC (WD-1644) will perform the plugging. No NMOSE permit was found for this well.

The NMOSE recognizes that the dedicated sampling pump and a portion of the sampling pipe is not recoverable from well KAFB-0609, and will allow KAFB-0609 to be plugged with the materials and methods described in the Well Plugging Plan of Operations.

Permittee: Kirtland Air Force Base, Chief Environmental Restoration, 377 MSG/CEANR, 2050 Wyoming Blvd., SE, Albuquerque, NM 87110.
Well KAFB-0609 approximate coordinates: X=360,502.7 meters, and Y=3,876,700.3 meters, UTM 13N, NAD 83, on land owned by Kirtland Air Force Base.

Specific Plugging Conditions of Approval for groundwater monitoring well KAFB-0609, Kirtland Air Force Base

1. Water well drilling and well drilling activities, including well plugging, are regulated under 19.27.4 NMAC, which requires any person engaged in the business of well drilling within New Mexico to obtain a Well Driller License issued by the New Mexico Office of the State Engineer (NMOSE). Therefore, the firm of a New Mexico licensed Well Driller shall perform the well plugging.

2. Theoretical volume of sealant required for abandonment of 4"-diameter well is approximately 0.65 gallons/foot. Total minimum volume of necessary sealant shall be calculated upon sounding the actual pluggable depth of the well. Based upon the reported completion of 345 feet, 224.25 gallons of sealant will be required to plug the well.

3. The Well Plugging Plan of Operations submitted requests use of Portland cement a sealant. NMAC 19.27.4.30.C.1 specifies placement of sealant by use of a tremie pipe. Placement of the sealant within the wells shall be by pumping through a tremie pipe extended to near well bottom, and kept below top of the slurry column as the well is plugged from bottom-upwards in a manner that displaces the standing water column (where applicable).

4. Any open annulus encountered surrounding the casing shall also be sealed by the placement of an approved cement grout or concrete mix. Prior to, or upon completion of plugging, the well casing may be cut-off below grade as necessary to allow approved redevelopment onsite, provided a minimum 6-inch thickness of reinforced cement grout or concrete completely covers the top of the cut-off casing. More stringent local building codes may apply.

5. Should the NMED, or another regulatory agency sharing jurisdiction of the project authorize, or by regulation require a more stringent well plugging procedure than herein acknowledged, the more-stringent procedure should be followed. This, in part, includes provisions regarding pre-authorization to proceed, contaminant remediation, inspection, pulling/perforating of casing, or prohibition of free discharge of any fluid from the borehole during or related to the plugging process.

6. NMOSE witnessing of the plugging will not be required, but shall be facilitated if a NMOSE observer is onsite. NMOSE witnessing may be requested during normal work hours by calling the District 1 NMOSE Office at 505-383-4000, at least 48-hours in advance. NMOSE inspection will occur dependant on personnel availability.

7. A NMOSE Plugging Record (available at: http://www.ose.state.nm.us/PDF/WellDrillers/WD-11.pdf) itemizing actual abandonment process and materials used shall be filed with the State Engineer (NMOSE, 5550 San Antonio Drive NE, Albuquerque, NM 87109-4127), within 20 days after completion of well plugging. Please attach a copy of these plugging conditions.

The NMOSE Well Plugging Plan of Operations is hereby approved with the aforesaid conditions applied.

Witness my hand and seal this 17th day of June A.D. 2014.

Scott A. Verhines, P.E. State Engineer

By: _____
Jeffrey L. Peterson
Water Resource Specialist Senior

Borehole Log

Project name: Kirtland Air Force Base HRP, Phase II Stage 2 Sheet 1 of 1
Project number: 463936000 Site: Site 6 (Golf Course Pond), Well 9
Borehole number: KAFB0609 Location: 1463843.09N, 416650.89E Surface Elevation: 5361.18
Drilling Company: USGS Drilling crew: Don Sweeney, Jeff Eson, Dave Rohder
Date started drilling: 03-29-90 Date completed drilling: 03-29-90 Total Depth: 355ft
Drilling method: Mud Rotary Drilling Fluid: Bentonite
Borehole diameter: 7-7/8"
Drilling equipment: Gardner-Denver 17W
Logged by: Ralph Wilcox Sample type: cutting
Geophysical Logging Company: USGS Logger: Jim Hudson
Geophysical Tools Run: LSN Resistivity, SP, Natural Gamma, Density, Neutron, & Caliper

Date	Time	Depth(ft)	Lithology and Remarks
03-29-90		0-15	sand, vfg-cg, moderate brown 4/4; very pale orange 10YR8/2 (3-7ft)
		15-20	silty sand vfg-fg, w/ vcg sand %?
		20-30	sand, fg w/ sand cg.
		30-35	sandy clay to sand w/ clay vfg & pebbles & pebble frags < 2 cm.
		35-40	no sample
		40-45	sand, fg-w/ sand cg.
		45-55	very sandy clay, vfg w/ cg sand - pebbles <1.0 cm.
		55-75	silty sand, vfg, w/ cg-vcg sand.
		75-85	sand, vfg w/ sand mg-cg %.
		85-90	sand, vfg w/ cg sand - pebbles <0.5 cm.
		90-105	sand, vfg w/ cg-vcg sand.
		105-115	gravel, vcg sand - pebbles and pebble frags <2.0 cm.
		115-125	sand, vfg w/ cg sand very pale orange 8/2.
		125-160	sand & silty sand, vfg-fg, w/ cg sand, <5%.
		160-185	sand & sandy clay vfg.
	1439	185-195	sandy clay & sand vfg.
		195-220	sand & sand w/ clay cg sand.
		220-245	sand w/ clay vfg.
		245-248	gravel, cg sand-pebbles <0.5 cm.
		248-250	sand w/ clay vfg.
	1540	250-253	gravel, cg sand-pebbles <0.5 cm.
		253-265	sand w/ clay & sandy clay, vfg.
		265-305	silty sand, vfg.
	1713	305-315	gravel, cg sand-sm pebbles <0.4 cm w/ silty sand vfg.
		315-330	sand w/ clay & sandy clay, gravel stringers <1/2 ft thick.
		330-335	sand, vfg-fg w/ gravel stringers <1/2 ft thick.
	1750	335-355	sand, vfg-fg.

T.D. 355ft.

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AR 2520

Table 2-7. Well Completion Specifications for Site WP-26, Golf Course Main Pond (WP-26)

Well Designation	Elevation Top of Casing[1]	Total Depth Borehole (ft)*	Total Depth Well (ft)*	Screened Interval (ft)*	Dia. (in)	Screen Const. inch slot[2]	Date Completed	Water Elevation Level[3]	Depth of submersible pump intake setting (ft)*
KAFB-0602	5362.80	495	467	437-457	4	0.020	3/20/90	5053.84	456
KAFB-0608	5358.50	375	338	307-327	4	0.020	3/28/90	5059.21	NA
KAFB-0609	5363.20	355	345	316-336	4	0.020	3/31/90	5059.46	335
KAFB-0610	5356.80	395	363	333-353	4	0.020	4/4/90	5059.49	352
RG-1589-S-4	NS	500	455	290-350 400-440	12	0.030	10/14/98	312.58[4]	approx. 424

* below ground surface (bgs)
(1) Elevation in ft above mean sea level (MSL) (Hall Engineering, January 1997)
(2) Stainless steel (304)
(3) December 1998 in ft above MSL
(4) bgs, measured on November 6, 1998.

ft feet
in inch
NA not applicable
NS not surveyed

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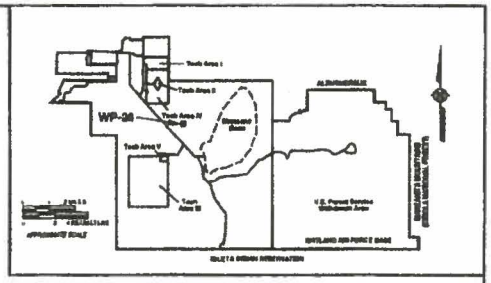
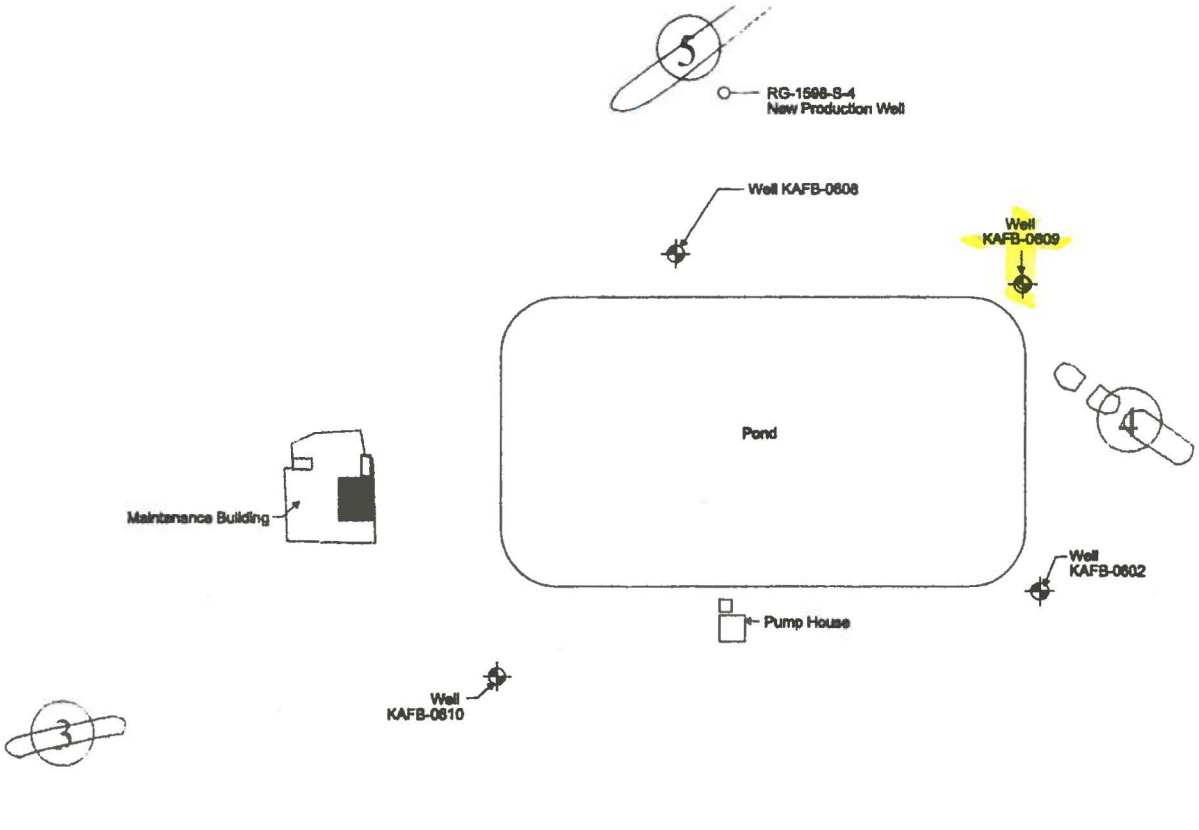




LEGEND

(3) GOLF COURSE FAIRWAY

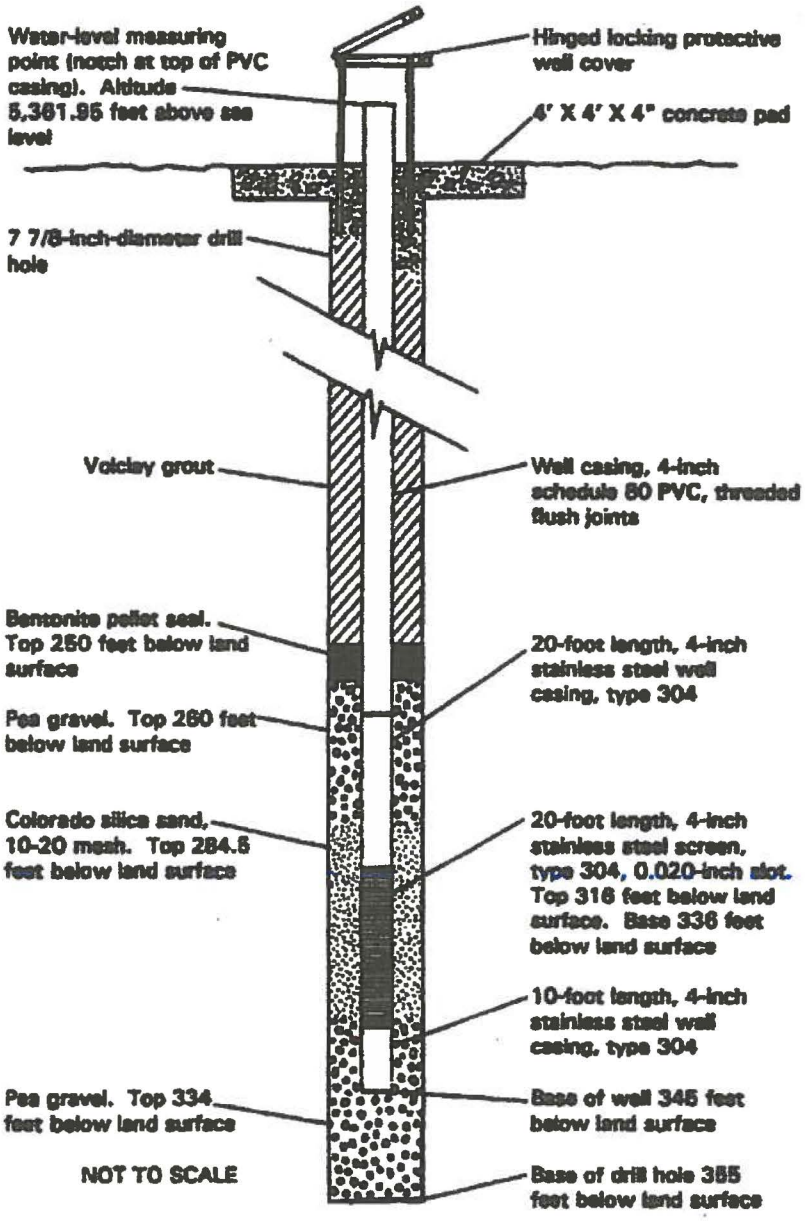
MONITORING WELL LOCATION

SCALE:	DRAWING DATE:	CAD FILE
NOT TO SCALE	08-26-99	67998001.02.72.00.00 03

SITE MAP
SITE WP-26, GOLF COURSE MAIN POND
(WP-26)

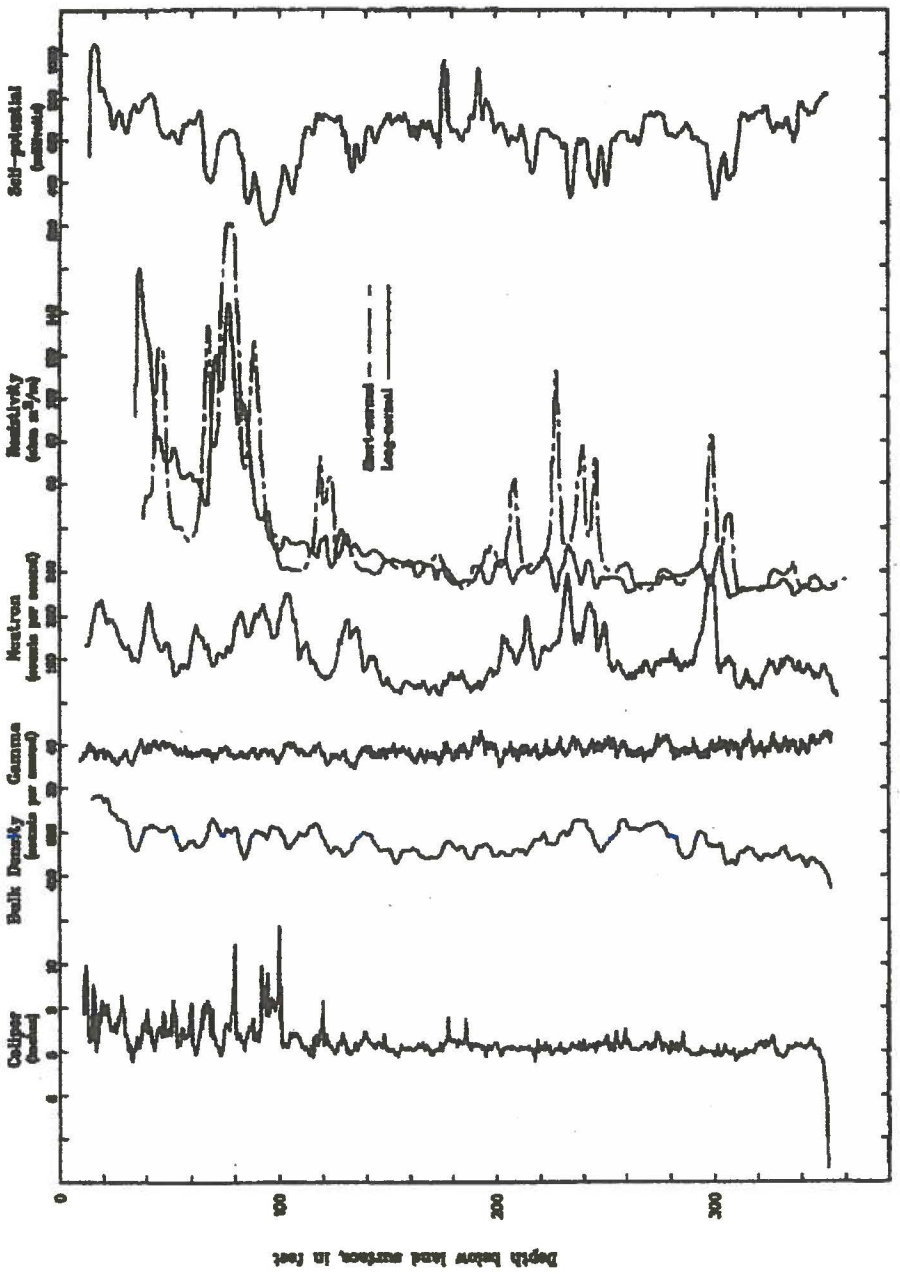
KIRTLAND AIR FORCE BASE

FIGURE 2-3



Well-completion diagram for monitoring well KAFB0609 drilled and completed by U.S. Geological Survey, Coal Branch, Denver, Colo. Started on 03-29-90. Completed on 03-31-90. Well drilled using mud-rotary method and Wyoming sodium bentonite drilling fluid.

AR 2520



Geophysical Well Logs (KAFB0600)

AR 2520

APPENDIX B

Well Gauging Data Forms for Gauging Events and Water Quality Field Data Sheets for Annual Sampling Event

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Kirtland Air Force Base, ECOS, Water Levels, Fall 2013

Field Personnel Names: TN

DATABASE ID	PUMP	MEASUREMENT DATE	MEASUREMENT TIME	DEPTH TO LNAPL (FT BELOW OUTER CASING OR VAULT RIM)	DEPTH TO WATER (FT BELOW OUTER CASING OR VAULT RIM)	Quality Check by Tim Noger	COMMENTS / NOTES
WP-26							
KAFB-0505	P	11/5/2013	1437	NA	503.11	TN	
KAFB-0506	P	--	--	--	NM	--	not measured
KAFB-0608	D	12/10/2013	935	NA	295.75	TN	
KAFB-0609	D	--	--	--	NM	--	not measured
KAFB-0610	D	--	--	--	NM	--	not measured
KAFB-2622	P	11/5/2013	1455	NA	202.64	TN	
KAFB-2624	P	11/5/2013	1433	NA	217.79	TN	
KAFB-2625	P	--	--	--	NM	--	not measured
KAFB-2626	P	11/25/2013	1600	NA	202.47	TN	
KAFB-2628	P	11/6/2013	809	NA	509.65	TN	
KAFB-2629	P	--	--	--	NM	--	not measured
KAFB-2630	P	--	--	--	NM	--	not measured
KAFB-2631	P	--	--	--	NM	--	not measured
KAFB-2632	P	--	--	--	NM	--	not measured

Kirtland Air Force Base, ECOS, Water Levels, March 2014

Field Personnel Names: TN, AS

DATABASE ID	PUMP	MEASUREMENT DATE	MEASUREMENT TIME	DEPTH TO LNAPL (FT BELOW OUTER CASING OR VAULT RIM)	DEPTH TO WATER (FT BELOW OUTER CASING OR VAULT RIM)	Quality Check by Tim Noger	COMMENTS / NOTES
WP-26							
KAFB-0505	P	3/10/2014	851	NA	501.76	TN	
KAFB-0506	P	3/10/2014	952	NA	208.63	TN	
KAFB-0608	D	3/11/2014	1458	NA	294.28	TN	
KAFB-2622	P	3/10/2014	903	NA	202.78	TN	
KAFB-2624	P	3/10/2014	857	NA	217.72	TN	
KAFB-2625	P	3/10/2014	1014	NA	197.53	TN	
KAFB-2626	P	3/10/2014	918	NA	207.56	TN	
KAFB-2628	P	3/10/2014	830	NA	508.03	TN	
KAFB-2629	P	3/10/2014	942	NA	500.69	TN	
KAFB-2630	P	3/10/2014	938	NA	212.42	TN	
KAFB-2631	P	3/10/2014	927	NA	173.79	TN	
KAFB-2632	P	3/10/2014	1031	NA	169.25	TN	

Kirtland Air Force Base, ECOS, Water Levels, June 2014

Field Personnel Names: TN, AC

DATABASE ID	PUMP	MEASUREMENT DATE	MEASUREMENT TIME	DEPTH TO LNAPL (FT BELOW OUTER CASING OR VAULT RIM)	DEPTH TO WATER (FT BELOW OUTER CASING OR VAULT RIM)	Quality Check by Tim Noger	COMMENTS / NOTES
WP-26							
KAFB-0505	P	6/12/2014	1125	NA	501.27	TN	
KAFB-0506	P	6/11/2014	1459	NA	208.75	TN	
KAFB-0608	D	6/11/2014	1130	NA	294.19	TN	
KAFB-2622	P	6/12/2014	1136	NA	202.86	TN	
KAFB-2624	P	6/12/2014	1129	NA	217.73	TN	
KAFB-2625	P	6/12/2014	1141	NA	197.69	TN	
KAFB-2626	P	6/12/2014	1145	NA	207.55	TN	
KAFB-2628	P	6/11/2014	1509	NA	507.38	TN	
KAFB-2629	P	6/11/2014	1447	NA	500.05	TN	
KAFB-2630	P	6/11/2014	1440	NA	212.35	TN	
KAFB-2631	P	6/12/2014	1113	NA	174.12	TN	
KAFB-2632	P	6/12/2014	1106	NA	169.38	TN	

Shaw Shaw Environmental, Inc.

GROUNDWATER PURGE LOG

Kirtland Air Force Base, Long-Term Monitoring

Project Name: ~~KAFB-BTT~~ TN ECOS **Well ID No.:** KAFB-2622

Site / SWMU No.: WP026 **Date:** 11/25/13

Weather: Sunny Cool **Time:** 1400

Field Crew: T. Noger S. Zachek A. Aubrey **Crew Signature:** T Noger

Review Signature: T Noger **Date Review:** 12/17/13

WELL OBSERVATIONS

Protective Casing / Vault: - (Intact) - Damaged - **Locked:** (Yes) - No **Well ID Mark:** (Yes) - No

Notes: BH VOC's Ø ppm BZ VOC's Ø ppm

CALCULATIONS

(A) Depth to Well Bottom	217.00	ft
(B) Pre-Purge Depth to Water	202.69	ft
(C) Water Column Height (A-B)	14.31	ft
(D) Casing Factor: 2"dia=0.17, 3"dia=0.37, (4"=0.65) 5"=1.02 (if the exact casing factor of the well is not listed, please round up to the closest one)	0.65	
(E) One Well Casing Volume (C x D):	9.30	gal
(F) Minimum Purge Volume (E x 3):	27.90	gal
(F) Screened Interval	20.00	ft

EQUIPMENT / MODEL	ID NUMBER
Parameter Meter MSitu 9500	R23757
Turbidity Meter Hach 2100P	
Pump portable Bennett	on file
Water Level Meter Geotech	

PURGING INFORMATION

Description first water purged: clear, no odor

Date and / or Time	Gallons Removed	Depth to Ground-water	Temp (°C)	pH	Spec Cond (mS/cm²)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Comment
1412	0	202.69	17.22	6.59	942.5	7.82	224	1.47	2.8 L/min
1421	7	203.60	16.93	7.60	949.1	7.79	138	2.33	
1429	13	204.48	16.98	7.62	940.3	7.73	120	2.79	
1448	18	203.13	16.81	7.69	967.3	7.66	125	4.75	
1507	23	203.10	16.85	7.65	964.6	7.71	116	1.22	
1526	28	203.10	16.76	7.66	961.9	7.67	110	0.37	
1526	28	203.10	16.76	7.66	961.9	7.67	110	0.37	

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Date and / or Time	Gallons Removed	Depth to Ground-water*	Temp (°C)	pH	Spec Cond (mS/cm²)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Comment
Values Prior to Sampling									
1526	28	203.10	16.76	7.66	961.9	7.67	110	0.37	

Field Alkalinity Result 84 mg/L @ $CaCO_3$

Note: For calculations, additional casing factors (D) and casing/borehole factors (I) can be found in the *Groundwater Investigation Work Plan, Part I: Field Investigation Activities.*

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GROUNDWATER PURGE LOG

Kirtland Air Force Base, Long-Term Monitoring

Project Name: KAFB FLDS 150577
Well ID No.: KAFB-2625
Site / SWMU No.: WP-26
Date: 12/2/2013
Weather: Sunny, clear, 40°
Time: 1045
Field Crew: A. Cochran,
Crew Signature: AC.
Review Signature: [illegible]
Date Review: 12/16/13

WELL OBSERVATIONS

Protective Casing / Vault: - Intact - Damaged -
Locked: Yes - No
Well ID Mark: Yes - No

Notes:

CALCULATIONS

(A) Depth to Well Bottom	207 ft
(B) Pre-Purge Depth to Water	197.35 ft
(C) Water Column Height (A-B)	9.65 ft
(D) Casing Factor: 2"dia=0.17, 3"dia=0.37, 4"=0.65 5"=1.02 (if the exact casing factor of the well is not listed, please round up to the closest one)	0.65
(E) One Well Casing Volume (C x D):	6.27 gal
(F) Minimum Purge Volume (E x 3):	18.81 gal
(F) Screened Interval	185-205 ft

EQUIPMENT / MODEL	ID NUMBER
Parameter Meter	In-Situ R24913
Turbidity Meter	HACH 2100Q #2100Q01
Pump	Portable bennett
Water Level Meter	#82050589

PURGING INFORMATION

Description first water purged: cloudy

Date and / or Time	Gallons Removed	Depth to Ground-water	Temp (°C)	pH	Spec Cond (mS/cm²)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Comment
1157	0	198.45	16.96	7.36	737.6	7.08	175	52.1	
~~1204~~			~~16.94~~	~~7.36~~	~~737.6~~	~~7.08~~	~~175~~		fixed leak in
1223	3	198.76	16.76	7.60	718.6	7.12	231	65.1	in-situ
1242	8	198.98	16.76	7.60	718.6	7.12	231	72.4	
~~1301~~ 1301	13	198.96	16.92	7.59	714.5	7.12	225	99.9	
1320	18	198.93	16.92	7.59	714.5	7.12	225	116	
field alkalinity			80	ppm					

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GROUNDWATER PURGE LOG

Kirtland Air Force Base, Long-Term Monitoring

Project Name: Ecos
Well ID No.: KAFB-2626
Site / SWMU No.: WP 26
Date: 12/4/13
Weather: Sunny Windy
Time: 1000
Field Crew: A.A. S.Z.
Crew Signature: [illegible]
Review Signature: [illegible]
Date Review: 12/16/13

WELL OBSERVATIONS

Protective Casing / Vault: - (Intact) - Damaged -
Locked: (Yes) - No
Well ID Mark: (Yes) - No

Notes:

CALCULATIONS

(A) Depth to Well Bottom	208	ft
(B) Pre-Purge Depth to Water	206.84	ft
(C) Water Column Height (A-B)	1.16	ft
(D) Casing Factor: 2"dia=0.17, 3"dia=0.37, (4")=0.65 5"=1.02 (if the exact casing factor of the well is not listed, please round up to the closest one)	0.65	
(E) One Well Casing Volume (C x D):	~~.075~~ .75	gal
(F) Minimum Purge Volume (E x 3):	~~.226~~ 2.25	gal
(F) Screened Interval	20	ft

EQUIPMENT / MODEL	ID NUMBER
Parameter Meter	In Situ
Turbidity Meter	Hach 2100Q
Pump	Portable bennett
Water Level Meter	

PURGING INFORMATION

Description first water purged: Clear no bubbles no Smell no VOC by P.I.D.

Date and / or Time	Gallons Removed	Depth to Ground-water	Temp (°C)	pH	Spec Cond (mS/cm²)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Comment
1051 ~~1040~~ 1047 ~~1045~~	0	206.65	15.83	7.13	404.2	6.40	245	1.58	
1103	3	209.95	16.53	7.6	389.5	6.49	214	1.58	

Field Alk 102 mg/L @ $CaCO_3$

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GROUNDWATER PURGE LOG

Kirtland Air Force Base, Long-Term Monitoring

Project Name: ECOS
Well ID No.: KAFB 2625
Site / SWMU No.: wp26
Date: 12/3/13
Weather: Sunny, mild
Time: 1020
Field Crew: AH SZ
Crew Signature: SZ
Review Signature: TN
Date Review: 12/16/13

WELL OBSERVATIONS

Protective Casing / Vault: - Intact - Damaged -
Locked: Yes - No
Well ID Mark: Yes - No

Notes:

CALCULATIONS

(A) Depth to Well Bottom	540	ft
(B) Pre-Purge Depth to Water	508.71	ft
(C) Water Column Height (A-B)	31.29	ft
(D) Casing Factor: 2"dia=0.17, 3"dia=0.37, 4"=0.65 5"=1.02 (if the exact casing factor of the well is not listed, please round up to the closest one)	1.02	
(E) One Well Casing Volume (C x D):	31.91	gal
(F) Minimum Purge Volume (E x 3):	96	gal
(F) Screened Interval	24	ft

EQUIPMENT / MODEL	ID NUMBER
Parameter Meter	In Situ R22460
Turbidity Meter Hach 2100Q	Hach 2100Q
Pump	Portable Bennett
Water Level Meter	KECK ETL 750

PURGING INFORMATION

Description first water purged: Clear no bubbles no VOC in BZ:WZ

Date and / or Time	Gallons Removed	Depth to Ground-water	Temp (°C)	pH	Spec Cond (mS/cm²)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Comment
1110	0	508.71	17.78	6.76	558.7	5.36	169	3.17	
1230	~~40~~ 41	508.67	17.78	6.76	558.7	5.35	169	1.09	
1350	80	508.63	19.28	7.32	559	4.70	190	0.95	
1409	85	508.59	19.06	7.33	556.2	4.77	187	1.36	
1428	90	508.59	19.12	7.32	553.7	4.68	183	2.02	
1449	~~96~~ 95	508.59	19.05	7.33	555.1	4.60	177	0.56	

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GROUNDWATER PURGE LOG

Kirtland Air Force Base, Bulk Fuels Facility Spill

Project Name: KAFB ~~BFF~~ ECOS
Well ID No.: KAFB-2629
Site / SWMU No.:
Date: 3/17/14
Weather: clear, ~58°
Time: 1218
Field Crew: GP, JM
Crew Signature: [signature]
Review Signature: [signature]
Date Review: 4/2/14

WELL OBSERVATIONS

Protective Casing / Vault: - (Intact) - Damaged - **Locked:** (Yes) - No **Well ID Mark:** (Yes) - No

Notes:

CALCULATIONS

(A) Depth to Well Bottom	526	ft
(B) Pre-Purge Depth to Water	500.35	ft
(C) Water Column Height (A-B)	25.65	ft
(D) Casing Factor: 4"=0.65 (5½"=1.02)	1.02	
(E) One Well Casing Volume (C x D):	26.163	gal
(F) Depth to Top of Screen	498.5	ft
(G) Depth to Bottom of Screen	522	ft
(H) Saturated Filter Pack Length (G -F, or B)	21.65	ft
(I) Casing/Borehole Factor 4/10 = 1.2, 5/10 = 1.07,	1.07	

(J) Filter Pack Volume (H x I)	23.16	gal
(K) Min Purge Volume (E + J)	49.3	gal
EQUIPMENT / MODEL	**ID NUMBER**	
Parameter Meter: In Situ	R25194	
Turbidity Meter: HACH 2100Q	3050	
Pump: ~~Dedic~~ Portable Bennett	On Site	
Field Alkalinity: La Motte	3467-01	

PURGING INFORMATION

Description first water purged:

Date and / or Time (3/17/14)	Gallons Removed	Depth to Ground-water (Ft)	Temp (°C) °F	pH	Spec Cond (µS/cm²)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Comment
1218	0	500.35	64.86	7.51	523.5	7.77	0.09	—	2.72 L/min
1242	17.15	500.28	66.8	7.50	537.2	7.64	0.06	3.05	
1306	34	500.25	66.68	7.49	537.2	7.53	0.06	1.03	
1325	39	500.17	66.00	7.50	532.7	7.61	0.05	.78	1.0 L/min
1344	44	500.15	66.08	7.50	533.5	7.68	0.05	.51	
1403	49	500.16	66.05	7.51	533.6	7.58	0.05	1.13	
Values Prior to Sampling									
1403	49	500.16	66.05	7.51	533.6	7.58	0.05	1.13	

Field Alkalinity Result 184 mg/L $CaCO_3$ Sample ID: WP026-30011 WP026-30012

BUBBLES: YES ____ NO X WHERE ____ AMOUNT ____ SIZE ____

Note: For calculations, additional casing factors (D) and casing/borehole factors (I) can be found in the *Groundwater Investigation Work Plan, Part I: Field Investigation Activities*

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GROUNDWATER PURGE LOG

Kirtland Air Force Base, Bulk Fuels Facility Spill

Project Name: KAFB ECOS
Well ID No.: KAFB-2630
Site / SWMU No.: WP026
Date: 3/18/14
Weather: Clear, ~50°
Time: 0920
Field Crew: GP, JM
Crew Signature: [signature]
Review Signature: [signature]
Date Review: 4/2/14

WELL OBSERVATIONS

Protective Casing / Vault: - Intact - Damaged -
Locked: Yes - No
Well ID Mark: Yes - No

Notes:

CALCULATIONS

(A) Depth to Well Bottom	231.50	ft
(B) Pre-Purge Depth to Water	212.07	ft
(C) Water Column Height (A-B)	19.43	ft
(D) Casing Factor: 4"=0.65 5"=1.02	0.65	
(E) One Well Casing Volume (C x D):	12.63	gal
(F) Depth to Top of Screen	unknown	ft
(G) Depth to Bottom of Screen	unknown	ft
(H) Saturated Filter Pack Length (G –F, or B)	estimated, used water column height 19.43	
(I) Casing/Borehole Factor 4/10 = 1.2 5/10 = 1.07, 1.2	~~23.3~~ 1.2 GP	

(J) Filter Pack Volume (H x I)	23.3	gal
(K) Min Purge Volume (E + J)	35.9	gal
EQUIPMENT / MODEL	**ID NUMBER**	
Parameter Meter: In Situ	R25194	
Turbidity Meter: 2100Q	LVE003050	
Pump: Portable Bennett	On-File	
Field Alkalinity: La Motte	3467-01	

PURGING INFORMATION

Description first water purged: cloudy, quickly cleared

Flow reduced to avoid purging well dry

Date and / or Time (3/18/14)	Gallons Removed	Depth to Ground-water (Ft)	Temp (°C)	pH	Spec Cond (µS/cm²)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Comment
0920	0	212.07	16.53	7.74	460.9	8.74	206	14.7	3.76 L/min
0932	12	219.20	16.80	7.67	461.8	8.57	80	16.2	1.92 L/min
0957 ~~0933~~ ~~0945~~	25	221.84	17.12	7.70	462.7	8.42	69	21.4	1.92 L/m
~~1004~~ 1016	30	222.07	16.97	7.72	460.4	8.36	66	17.1	1.00 L/m
~~1023~~ 1035	35	221.60	16.96	7.72	460.8	8.29	63	6.07	↓
~~1042~~ 1054	40	220.28	17.06	7.72	461.9	8.27	60	3.20	

Values Prior to Sampling

~~1042~~ 1054	40	220.28	17.06	7.72	461.9	8.27	60	3.20	1.0 L/min

Field Alkalinity Result mg/L CaCO3 Sample ID: WP026-30007

BUBBLES: YES ____ NO X WHERE ____ AMOUNT ____ SIZE ____

Note: For calculations, additional casing factors (D) and casing/borehole factors (I) can be found in the *Groundwater Investigation Work Plan, Part I: Field Investigation Activities*

140705

Kirtland Air Force Base, Bulk Fuels Facility Spill

Project Name: KAFB ECOS
Well ID No.: KAFB-2632
Site / SWMU No.: WP026
Date: 3/18/14
Weather: Clear, ~56°
Time: 1231
Field Crew: GH, JM
Crew Signature: Greg Pauck
Review Signature: TT Nagy
Date Review: 4/2/14

WELL OBSERVATIONS

Protective Casing / Vault: - Intact - Damaged -
Locked: Yes - No
Well ID Mark: Yes - No

Notes:

CALCULATIONS

(A) Depth to Well Bottom	180.05	ft
(B) Pre-Purge Depth to Water	168.99	ft
(C) Water Column Height (A-B)	11.06	ft
(D) Casing Factor: 4"=0.65 5"=1.02	0.65	
(E) One Well Casing Volume (C x D):	7.189	gal
(F) Depth to Top of Screen	157	ft
(G) Depth to Bottom of Screen	177	ft
(H) Saturated Filter Pack Length (G –F, or B)	8.01	ft
(I) Casing/Borehole Factor 4/10 = 1.2, 5/10 = 1.07,	1.2	

(J) Filter Pack Volume (H x I)	9.61	gal
(K) Min Purge Volume (E + J)	16.8	gal
EQUIPMENT / MODEL	**ID NUMBER**	
Parameter Meter: In Situ Troll	R25194	
Turbidity Meter: HACH 2100Q	LVE 003050	
Pump: Portable Pump Bennett	On-File	
Field Alkalinity: La Motte	~~30~~ 3467-01	

PURGING INFORMATION

Description first water purged: clear, no bubbles

Date and / or Time	Gallons Removed	Depth to Ground-water (Ft)	Temp (°C)	pH	Spec Cond (µS/cm²)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Comment
1231	0	168.99	16.36	7.72	462.6	8.18	196	12.1	1 L/min
1250	5	172.90	16.69	7.71	469.3	8.53	60	13.2	
1309	10	174.96	16.71	7.70	475.6	8.39	55	10.4	
1328	15	176.54	16.74	7.72	454.4	8.27	52	9.92	
1347	20	177.50	16.79	7.71	439.7	8.16	51	11.2	

Values Prior to Sampling

1347	20	177.50	16.79	7.71	439.7	8.16	51	11.2	1.0 L/min

Field Alkalinity Result 108 mg/L $CaCO_3$ Sample ID: WP026-30009

BUBBLES: YES ____ NO X WHERE ____ AMOUNT ____ SIZE ____

Note: For calculations, additional casing factors (D) and casing/borehole factors (I) can be found in the *Groundwater Investigation Work Plan, Part I: Field Investigation Activities*

140705

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GROUNDWATER PURGE LOG

Kirtland Air Force Base, Bulk Fuels Facility Spill

Project Name: KAFB ECOSS
Well ID No.: KAFB-0505
Site / SWMU No.: WP26 / ST105
Date: 3/19/14
Weather: clear, ~50°
Time: 1304
Field Crew: GP, JM
Crew Signature: [signature]
Review Signature: [signature]
Date Review: 4/2/14

WELL OBSERVATIONS

Protective Casing / Vault: - Intact - Damaged -
Locked: Yes - No
Well ID Mark: Yes No

Notes:

CALCULATIONS

(A) Depth to Well Bottom	522.75	ft
(B) Pre-Purge Depth to Water	501.62	ft
(C) Water Column Height (A-B)	21.13	ft
(D) Casing Factor: 4"=0.65 5"=1.02	1.02	
(E) One Well Casing Volume (C x D):	21.56	gal
(F) Depth to Top of Screen	496	ft
(G) Depth to Bottom of Screen	521	ft
(H) Saturated Filter Pack Length (G - F, or B)	19.38	ft
(I) Casing/Borehole Factor 4/10 = 1.2, 5/10 = 1.07	1.07	

(J) Filter Pack Volume (H x I)	20.7	gal
(K) Min Purge Volume (E + J)	42.3	gal
EQUIPMENT / MODEL	**ID NUMBER**	
Parameter Meter: In Situ Troll	R25794	
Turbidity Meter: HACH 2100Q	0157	
Pump: Portable Bennett	On File	
Field Alkalinity: La Motte	3467-01	

PURGING INFORMATION

Description first water purged: clear

Date and / or Time (3/19/14)	Gallons Removed	Depth to Ground-water (Ft)	Temp (°C)	pH	Spec Cond (µS/cm²)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Comment
1304	0	501.62	17.55	7.42	478.8	6.40	140	9.40	2.56 L/min
1324	14	501.28	19.23	7.50	500.4	6.23	47	6.96	↓
1345	28	501.21	19.16	7.52	498.6	7.07	48	2.55	↓
1404	33	501.49	18.79	7.56	493.8	7.39	44	1.42	1.0 L/min
1423	38	501.50	18.70	7.58	493.7	7.40	46	1.83	↓
1442	43	501.52	18.65	7.62	493.4	7.54	47	1.10	↓
Values Prior to Sampling									
1442	43	501.52	18.65	7.62	493.4	7.54	47	1.10	

Field Alkalinity Result 200 mg/L CaCO3 Sample ID: ST105-30001 WP026-30013

BUBBLES: YES ____ NO X WHERE ____ AMOUNT ____ SIZE ____

Note: For calculations, additional casing factors (D) and casing/borehole factors (I) can be found in the *Groundwater Investigation Work Plan, Part I: Field Investigation Activities*

Shaw Shaw Environmental, Inc.

GROUNDWATER PURGE LOG

Kirtland Air Force Base, Bulk Fuels Facility Spill

Project Name: KAFB ECOS
Well ID No.: KAFB-0506
Site / SWMU No.: WP26 / ST105
Date: 3/20/14
Weather: Clear, ~65°
Time: 1339
Field Crew: GP, JM
Crew Signature: [signature]
Review Signature: [signature]
Date Review: 4/2/14

WELL OBSERVATIONS

Protective Casing / Vault: - Intact - Damaged -
Locked: Yes - No
Well ID Mark: Yes - No

Notes:

CALCULATIONS

(A) Depth to Well Bottom	224	ft
(B) Pre-Purge Depth to Water	208.56	ft
(C) Water Column Height (A-B)	15.44	ft
(D) Casing Factor: 4"=0.65 6"=1.02	1.02	
(E) One Well Casing Volume (C x D):	15.74	gal
(F) Depth to Top of Screen	200	ft
(G) Depth to Bottom of Screen	220	ft
(H) Saturated Filter Pack Length (G – F or B)	11.44	ft
(I) Casing/~~Borehole Factor~~ 4/10 = 1.2, 5/10 = 1.07,	1.07	

(J) Filter Pack Volume (H x I)	12.24	gal
(K) Min Purge Volume (E + J)	27.98	gal
EQUIPMENT / MODEL	**ID NUMBER**	
Parameter Meter: In Situ Troll	R25194	
Turbidity Meter: HACH 2100 Q	0157	
Pump: Portable Bennett	On-File	
Field Alkalinity: La Motte	3467-01	

PURGING INFORMATION

Description first water purged: clear

Date and / or Time (3/20/14)	Gallons Removed	Depth to Ground-water (Ft)	Temp (°C)	pH	Spec Cond (µS/cm²)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Comment
1339	0	208.56	18.47	7.59	853.0	6.83	90	0.96	1.2 L/min
1358	6	211.93	16.89	7.54	864.5	7.70	37	1.27	↓
1417	13	214.22	16.88	7.56	836.5	7.53	36	1.39	↓
1436	18	216.30	16.92	7.56	833.0	7.48	35	1.93	1.0 L/min
1455	23	217.61	16.93	7.23	751.1	7.23	31	2.42	↓
1514	28	218.94	16.93	7.29	769.0	7.29	32	3.56	↓

Values Prior to Sampling

1514	28	218.94	16.93	7.29	769.0	7.29	32	3.56	1.0 L/min

Field Alkalinity Result 76 mg/L $CaCO_3$
Sample ID: WP026-30001, ST105-30002
BUBBLES: YES ____ NO X WHERE ____ AMOUNT ____ SIZE ____

Note: For calculations, additional casing factors (D) and casing/borehole factors (I) can be found in the *Groundwater Investigation Work Plan, Part I: Field Investigation Activities*

140705

Shaw Shaw Environmental, Inc.

GROUNDWATER PURGE LOG

Kirtland Air Force Base, Long-Term Monitoring

Project Name: ECOS
Well ID No.: KAFB-0608
Site / SWMU No.: WP026
Date: 12/10/13
Weather: Sunny Cold
Time: 0851
Field Crew: AA, SZ
Crew Signature:
Review Signature:
Date Review: 12/16/13

WELL OBSERVATIONS

Protective Casing / Vault: (Intact) - Damaged -
Locked: (Yes) No
Well ID Mark: (Yes) No

Notes: No VOC in BZ or WZ

CALCULATIONS

(A) Depth to Well Bottom	330	ft
(B) Pre-Purge Depth to Water	295.75	ft
(C) Water Column Height (A-B)	34.25	ft
(D) Casing Factor: 2"dia=0.17, 3"dia=0.37, 4"=0.65 5"=1.02 (if the exact casing factor of the well is not listed, please round up to the closest one)	.65	
(E) One Well Casing Volume (C x D):	22.3	gal
(F) Minimum Purge Volume (E x 3):	67	gal
(F) Screened Interval	20	ft

EQUIPMENT / MODEL	ID NUMBER
Parameter Meter	In Situ
Turbidity Meter	Hach 2100Q
Pump	Dedicated
Water Level Meter	geotech

PURGING INFORMATION

Description first water purged: Clear no Smell no bubbles

Date and / or Time	Gallons Removed	Depth to Ground-water	Temp (°C)	pH	Spec Cond (mS/cm²)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Comment
0935	0	295.75	18.04	7.17	748.9	8.16	205	18.7	
0951	26	306.62	18.22	7.25	744.8	8.57	230	7.94	
1007	52	307.2	18.20	7.28	705.5	8.89	229	11.7	
1026	57	296.89	17.18	7.3	700.7	7.84	236	4.38	
1045	62	296.89	17.34	7.31	704.7	7.75	239	3.12	
1104	67	296.80	17.27	7.30	700.3	7.58	243	3.88	

Field Alk 160 ppm mg/L @ $CaCO_3$

140705

Shaw Shaw Environmental, Inc.

GROUNDWATER PURGE LOG

Kirtland Air Force Base, Bulk Fuels Facility Spill

Project Name: ECOS
Well ID No.: GCMP
Site - SWMU No.: ST 105
Date: 5/1/14
Weather: Sunny
Time: 1300
Field Crew: TN, GP, AC
Crew Signature: TNagh
Review Signature: TNagh
Date Review: 5/5/14

WELL OBSERVATIONS

Protective Casing / Vault: - Intact - Damaged - Locked: Yes - No Well ID Mark: Yes - No

Notes

CALCULATIONS

(A) Depth to Well Bottom	n/a	ft
(B) Pre-Purge Depth to Water		ft
(C) Water Column Height (A-B)		ft
(D) Casing Factor: 4"=0.65 5"=1.02		
(E) One Well Casing Volume (C x D):		gal
(F) Depth to Top of Screen		ft
(G) Depth to Bottom of Screen		ft
(H) Saturated Filter Pack Length (G - F, or B)		ft
(I) Casing/Borehole Factor 4/10 = 1.2, 5/10 = 1.07,		

(J) Filter Pack Volume (H x I)	n/a	gal
(K) Min Purge Volume (E - J)		gal
EQUIPMENT / MODEL	**ID NUMBER**	
Parameter Meter: mS/m 9500	R25194	
Turbidity Meter: Hach 2100Q	0165	
Pump: n/a	n/a	
Field Alkalinity: LaMotte	3467-01	

PURGING INFORMATION

Description first water purged: clear, no odor

Date and / or Time	Gallons Removed	Depth to Ground-water (Ft)	Temp (°C)	pH	Spec Cond (µS/cm²)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Comment
1315	5	n/a	16.65	8.31	271.4	9.71	-107	2.65	
Values Prior to Sampling									
1315	5	n/a	16.65	8.31	271.4	9.71	-107	2.65	

Field Alkalinity Result 120 mg/L as $CaCO_3$ Sample ID: ST105-30029

BUBBLES: YES ____ NO ____ WHERE ____ AMOUNT ____ SIZE ____

Note: For calculations, additional casing factors (D) and casing/borehole factors (I) can be found in the *Groundwater Investigation Work Plan, Part I: Field Investigation Activities*

140705

APPENDIX C

Analytical Results for the Annual Groundwater Sampling Event

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Appendix C
Analytical Results

				Sample Location			KAFB0505						KAFB0506						KAFB-0608					
				Sample Number			WP026-30013						WP026-30001						WP026-30016					
				Sample Date			19-Mar-14						20-Mar-14						10-Dec-13					
				Sample Purpose			REG						REG						REG					
				Sample Depth			496-521 FT						200-220 FT						0-0 FT					
Test Group	Parameter	Units	EPA MCL[a]	NMED Background[b]	NMED GWQS[c]	EPA Tapwater[a]	Result	Qual	VALQUAL	LOQ	DL	LOD	Result	Qual	VALQUAL	LOQ	DL	LOD	Result	Qual	VALQUAL	LOQ	DL	LOD
GENERAL CHEMISTRY	AMMONIA (AS N)	mg/L					ND	U	U	0.3	0.1	0.15	ND	U	U	0.3	0.1	0.15						
	BROMIDE	mg/L					0.115	MJ	J	0.63	0.042	0.125	0.549	MJ	J	0.63	0.042	0.125	0.321			0.25	0.042	0.125
	CHLORIDE	mg/L			250		13.9			0.5	0.17	0.33	63.9			0.5	0.17	0.33	24.3			0.5	0.17	0.33
	FLUORIDE	mg/L			1.6	0.8	0.375			0.25	0.033	0.1	0.307			0.25	0.033	0.1	0.356			0.25	0.033	0.1
	NITROGEN, NITRATE-NITRITE	mg/L	10	4	10		4.22			1.5	0.25	0.75	2.18			1.5	0.25	0.75	24.7	D		15	2.5	7.5
	PERCHLORATE	mg/L											0.00139	J	J	0.002	0.0005	0.001						
	SULFATE	mg/L			600		84.7			2.5	0.33	1	299	D		5	0.66	2	94.3			2.5	0.33	1
	TOTAL DISSOLVED SOLIDS	mg/L			1000		401			20	20	20	611			20	20	20	491	Q		20	20	20
METALS (DISSOLVED)	ARSENIC, DISSOLVED	mg/L	0.01		0.1	0.000052							ND	U	U	0.0025	0.00075	0.0015						
	BARIUM, DISSOLVED	mg/L	2		1	3.8							0.0318			0.01	0.00125	0.0025						
	CADMIUM, DISSOLVED	mg/L	0.005		0.01	0.0092							ND	U	U	0.00125	0.00025	0.0005						
	CHROMIUM, DISSOLVED	mg/L	0.1		0.05								ND		U	0.0025	0.0005	0.001						
	IRON, DISSOLVED	mg/L			1	14							ND	U	U	0.025	0.0075	0.015						
	LEAD, DISSOLVED	mg/L	0.015	0.01	0.05								ND	MU	U	0.003	0.003	0.003						
	MANGANESE, DISSOLVED	mg/L			0.2	0.43							ND	U	U	0.00375	0.00075	0.0015						
	MERCURY, DISSOLVED	mg/L	0.002		0.002	0.00063							ND	U	U	0.0002	0.00008	0.00016						
	SELENIUM, DISSOLVED	mg/L	0.05		0.05	0.1							0.0108			0.0025	0.00075	0.00125						
	SILVER, DISSOLVED	mg/L			0.05	0.094							ND	U	U	0.0025	0.00025	0.0005						
RADIOACTIVE	GROSS ALPHA PARTICLE RADIOACTIVITY	pCi/L											ND	U	U	1.8	1.8	1.8						
	GROSS BETA PARTICLE RADIOACTIVITY	pCi/L											ND	U	U	3.2	3.2	3.2						
	RA-228	pCi/L											ND	U	U	0.68	0.68	0.68						
	RADIUM-226	pCi/L											ND	U	U	0.23	0.23	0.23						
VOCs	1,1,1,2-TETRACHLOROETHANE	ug/L				0.57	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,1,1-TRICHLOROETHANE	ug/L	200		60	8000	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,1,2,2-TETRACHLOROETHANE	ug/L			10	0.076	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,1,2-TRICHLOROETHANE	ug/L	5		10	0.28	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,1-DICHLOROETHANE	ug/L			25	2.7	ND	U	U	1	0.25	0.5	2.72			1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,1-DICHLOROETHENE	ug/L	7		5	280	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,1-DICHLOROPROPENE	ug/L					ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,2,3-TRICHLOROBENZENE	ug/L				7	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,2,3-TRICHLOROPROPANE	ug/L				0.00075	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1
	1,2,4-TRICHLOROBENZENE	ug/L	70			1.1	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,2,4-TRIMETHYLBENZENE	ug/L				15	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2			0.00033	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1
	1,2-DIBROMOETHANE	ug/L	0.05		0.1	0.0075	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,2-DICHLOROBENZENE	ug/L	600			300	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,2-DICHLOROETHANE	ug/L	5		10	0.17	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,2-DICHLOROPROPANE	ug/L	5			0.44	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,3,5-TRIMETHYLBENZENE	ug/L				120	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,3-DICHLOROBENZENE	ug/L					ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,3-DICHLOROPROPANE	ug/L				370	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,4-DICHLOROBENZENE	ug/L	75			0.48	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	2,2-DICHLOROPROPANE	ug/L					ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	2-BUTANONE	ug/L				5600	ND	U	U	10	2.5	5	ND	U	U	10	2.5	5	ND	U	U	10	2.5	5
	2-CHLOROTOLUENE	ug/L				240	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	2-HEXANONE	ug/L				38	ND	QU	U	5	1.25	2.5	ND	QU	U	5	1.25	2.5	ND	U	U	5	1.25	2.5
	4-CHLOROTOLUENE	ug/L				250	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	4-METHYL-2-PENTANONE	ug/L				1200	ND	U	U	5	1.25	2.5	ND	U	U	5	1.25	2.5	ND	U	U	5	1.25	2.5
	ACETONE	ug/L				14000	ND	QU	U	10	2.5	5	ND	QU	U	10	2.5	5	ND	U	U	10	2.5	5
	BENZENE	ug/L	5		10	0.45	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	BROMOBENZENE	ug/L				62	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	BROMODICHLOROMETHANE	ug/L	80			0.13	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	BROMOFORM	ug/L	80			9.2	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	BROMOMETHANE	ug/L				7.5	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1
	CARBON DISULFIDE	ug/L				810	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	CARBON TETRACHLORIDE	ug/L	5		10	0.45	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	CHLOROBENZENE	ug/L	100			78	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	CHLOROETHANE	ug/L				21000	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1
	CHLOROFORM	ug/L	80		100	0.22	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	CHLOROMETHANE	ug/L				190	ND	U	U	1	0.25	0.5	5.09	Z-01		1	0.25	0.5	ND	U	U	1	0.25	0.5
	CIS-1,2-DICHLOROETHENE	ug/L	70			36	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	CIS-1,3-DICHLOROPROPENE	ug/L					ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	DIBROMOCHLOROMETHANE	ug/L	80			0.17	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	DIBROMOMETHANE	ug/L				8	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	DICHLORODIFLUOROMETHANE	ug/L				200	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1
	ETHYLBENZENE	ug/L	700		750	1.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	HEXACHLOROBUTADIENE	ug/L				0.3	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	ISOPROPYLBENZENE	ug/L				450	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5

Appendix C
Analytical Results

				Sample Location			KAFB0505						KAFB0506						KAFB-0608					
				Sample Number			WP026-30013						WP026-30001						WP026-30016					
				Sample Date			19-Mar-14						20-Mar-14						10-Dec-13					
				Sample Purpose			REG						REG						REG					
				Sample Depth			496-521 FT						200-220 FT						0-0 FT					
Test Group	Parameter	Units	EPA MCL[a]	NMED Background[b]	NMED GWQS[c]	EPA Tapwater[a]	Result	Qual	VALQUAL	LOQ	DL	LOD	Result	Qual	VALQUAL	LOQ	DL	LOD	Result	Qual	VALQUAL	LOQ	DL	LOD
VOCs	METHYL TERT-BUTYL ETHER	ug/L				14	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	METHYLENE CHLORIDE	ug/L	5		100	11	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1
	NAPHTHALENE	ug/L			30	0.17	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	N-BUTYLBENZENE	ug/L				1000	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	N-PROPYLBENZENE	ug/L				660	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	P-ISOPROPYLTOLUENE	ug/L					ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	SEC-BUTYLBENZENE	ug/L				2000	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	STYRENE	ug/L	100			1200	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	TERT-BUTYLBENZENE	ug/L				690	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	TETRACHLOROETHENE	ug/L	5		20	11	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	TOLUENE	ug/L	1000		750	1100	0.272	J	J	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	TRANS-1,2-DICHLOROETHENE	ug/L	100			360	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	TRANS-1,3-DICHLOROPROPENE	ug/L					ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	TRICHLOROETHENE	ug/L	5		100	0.49	ND	U	U	1	0.25	0.5	2.64			1	0.25	0.5	ND	U	U	1	0.25	0.5
	TRICHLOROFLUOROMETHANE	ug/L				1100	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1
	VINYL CHLORIDE	ug/L	2		1	0.019	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	XYLENES	ug/L	10000		620	190	ND	U	U	3	0.75	1.5	ND	U	U	3	0.75	1.5	ND	U	U	3	0.75	1.5

Appendix C
Analytical Results

				Sample Location			KAFB0505						KAFB0506						KAFB-0608					
				Sample Number			WP026-30013						WP026-30001						WP026-30016					
				Sample Date			19-Mar-14						20-Mar-14						10-Dec-13					
				Sample Purpose			REG						REG						REG					
				Sample Depth			496-521 FT						200-220 FT						0-0 FT					
Test Group	Parameter	Units	EPA MCL[a]	NMED Background[b]	NMED GWQS[c]	EPA Tapwater[a]	Result	Qual	VALQUAL	LOQ	DL	LOD	Result	Qual	VALQUAL	LOQ	DL	LOD	Result	Qual	VALQUAL	LOQ	DL	LOD

Notes:
a. U.S. Environmental Protection Agency (EPA), 2010a, National Primary Drinking Water Regulations: List of Drinking Water Contaminants and Maximum Contaminant Levels.
b. NMED-HWB Approved Background Concentrations, SNL/Kirtland AFB, Chemical Constituents in Ground Water.
c. New Mexico Water Quality Control Commission, Water Quality Standards, New Mexico Administrative Code 20.6.2.3103
Shading indicates the analyte was detected.
Bold indicates analyte detected greater than regulatory standard.
ug/L = Microgram per liter.
DL = Detection limit.
EPA = Environmental Protection Agency.
FT = Feet.
GWQS = Groundwater Quality Standards.
J = Estimated value, concentration is less than LOQ but greater than laboratory method detection limit (DL).
KAFB = Kirtland Air Force Base.
LOD = Limit of Detection.
LOQ = Limit of Quantitation.
MCL = Maximum contaminant level.
mg/L = Milligram per liter.
ND = Not detected.
NMAC = New Mexico Administrative Code.
NMED = New Mexico Environment Department.
Qual = Laboratory qualifier.
REG = Regular sample.
U = Analyte was not detected. The reported numerical value is at or below the LOQ.
UJ = Analyte was tentatively not detected. The reported numerical value is at or below the LOQ.
VAL QUAL = Validation Qualifier.
VOC = Volatile organic compound.

Appendix C
Analytical Results

				Sample Location			KAFB2622						KAFB-2625						KAFB-2626						KAFB-2626					
				Sample Number			WP026-30002						WP026-30004						WP026-30005						WP026-30006					
				Sample Date			25-Nov-13						2-Dec-13						4-Dec-13						4-Dec-13					
				Sample Purpose			REG						REG						REG						FD					
				Sample Depth			195-215 FT						198.45-218.45 FT						185-205 FT						185-205 FT					
Test Group	Parameter	Units	EPA MCL[a]	NMED Background[b]	NMED GWQS[c]	EPA Tapwater[a]	Result	Qual	VALQUAL	LOQ	DL	LOD	Result	Qual	VALQUAL	LOQ	DL	LOD	Result	Qual	VALQUAL	LOQ	DL	LOD	Result	Qual	VALQUAL	LOQ	DL	LOD
GENERAL CHEMISTRY	AMMONIA (AS N)	mg/L					0.129	J	J	0.3	0.075	0.15	ND	U	U	0.3	0.075	0.15	ND	U	U	0.3	0.075	0.15	ND	U	U	0.3	0.075	0.15
	BROMIDE	mg/L					1.89			0.25	0.042	0.125	1.22			0.25	0.042	0.125	0.414	MJ	J	0.63	0.042	0.125	0.425	MJ	J	0.63	0.042	0.125
	CHLORIDE	mg/L			250		192			0.5	0.17	0.33	135			0.5	0.17	0.33	40.4			0.5	0.17	0.33	41.3			0.5	0.17	0.33
	FLUORIDE	mg/L			1.6	0.8	0.33			0.25	0.033	0.1	0.335			0.25	0.033	0.1	0.427			0.25	0.033	0.1	0.443			0.25	0.033	0.1
	NITROGEN, NITRATE-NITRITE	mg/L	10	4	10		3.83			1.5	0.25	0.75	1.94			1.5	0.25	0.75	2.18			1.5	0.25	0.75	2.15			1.5	0.25	0.75
	PERCHLORATE	mg/L					0.00795			0.002	0.0005	0.001	0.00118	J	J	0.002	0.0005	0.001	0.00216			0.002	0.0005	0.001	0.00213			0.002	0.0005	0.001
	SULFATE	mg/L			600		104			2.5	0.33	1	38.9			2.5	0.33	1	13.3			2.5	0.33	1	13.6			2.5	0.33	1
	TOTAL DISSOLVED SOLIDS	mg/L			1000		709	Q		20	20	20	448			20	20	20	270	QB	J+	20	20	20	277	QB		20	20	20
METALS (DISSOLVED)	ARSENIC, DISSOLVED	mg/L	0.01		0.1	0.000052	ND	U	U	0.0025	0.00075	0.0015	ND	U	U	0.0025	0.00075	0.0015	ND	U	U	0.0025	0.00075	0.0015	ND	U	U	0.0025	0.00075	0.0015
	BARIUM, DISSOLVED	mg/L	2		1	3.8	0.0659			0.01	0.00125	0.0025	0.117			0.01	0.00125	0.0025	0.173			0.01	0.00125	0.0025	0.177			0.01	0.00125	0.0025
	CADMIUM, DISSOLVED	mg/L	0.005		0.01	0.0092	ND	U	U	0.00125	0.00025	0.0005	ND	U	U	0.00125	0.00025	0.0005	ND	U	U	0.00125	0.00025	0.0005	ND	U	U	0.00125	0.00025	0.0005
	CHROMIUM, DISSOLVED	mg/L	0.1		0.05		0.000656	J	J	0.0025	0.0005	0.001	0.000542	J	J	0.0025	0.0005	0.001	0.00198	J	J	0.0025	0.0005	0.001	0.00202	J	J	0.0025	0.0005	0.001
	IRON, DISSOLVED	mg/L			1	14	ND	U	U	0.025	0.0075	0.015	0.0106	J	J	0.025	0.0075	0.015	0.0182	J	J	0.025	0.0075	0.015	0.0156	J	J	0.025	0.0075	0.015
	LEAD, DISSOLVED	mg/L	0.015	0.01	0.05		0.000812			0.00075	0.000375	0.00075	0.000803			0.00075	0.000375	0.00075	0.000566	J	J	0.00075	0.000375	0.00075	0.000636	J	J	0.00075	0.000375	0.00075
	MANGANESE, DISSOLVED	mg/L			0.2	0.43	ND	U	U	0.00375	0.00075	0.0015	ND	U	U	0.00375	0.00075	0.0015	0.00235	J	J	0.00375	0.00075	0.0015	0.00267	J	J	0.00375	0.00075	0.0015
	MERCURY, DISSOLVED	mg/L	0.002		0.002	0.00063	ND	U	U	0.0002	0.00008	0.00016	ND	U	U	0.0002	0.00008	0.00016	ND	U	U	0.0002	0.00008	0.00016	ND	U	U	0.0002	0.00008	0.00016
	SELENIUM, DISSOLVED	mg/L	0.05		0.05	0.1	0.00588			0.0025	0.00075	0.00125	0.0038			0.0025	0.00075	0.00125	0.00261			0.0025	0.00075	0.00125	0.00247	J	J	0.0025	0.00075	0.00125
	SILVER, DISSOLVED	mg/L			0.05	0.094	ND	U	U	0.0025	0.00025	0.0005	ND	U	U	0.0025	0.00025	0.0005	ND	U	U	0.0025	0.00025	0.0005	ND	U	U	0.0025	0.00025	0.0005
RADIOACTIVE	GROSS ALPHA PARTICLE RADIOACTIVITY	pCi/L					ND	U	U	1.46	1.46	1.46	4.3			1.8	1.8	1.8	ND	U	U	2.5	2.5	2.5	ND	U	U	2.4	2.4	2.4
	GROSS BETA PARTICLE RADIOACTIVITY	pCi/L					3.2	LT		1.9	1.9	1.9	13.4			2.5	2.5	2.5	ND	U	U	3.2	3.2	3.2	ND	U	U	3	3	3
	RA-228	pCi/L					ND	U	U	0.51	0.51	0.51	0.48	LT		0.48	0.48	0.48	ND	U	U	0.61	0.61	0.61	ND	U	U	0.47	0.47	0.47
	RADIUM-226	pCi/L					ND	U	U	0.22	0.22	0.22	0.34	LT		0.23	0.23	0.23	ND	U	U	0.36	0.36	0.36	ND	U	U	0.37	0.37	0.37
VOCs	1,1,1,2-TETRACHLOROETHANE	ug/L				0.57	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,1,1-TRICHLOROETHANE	ug/L	200		60	8000	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,1,2,2-TETRACHLOROETHANE	ug/L			10	0.076	ND	XU	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,1,2-TRICHLOROETHANE	ug/L	5		10	0.28	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,1-DICHLOROETHANE	ug/L			25	2.7	4			1	0.25	0.5	3.71			1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,1-DICHLOROETHENE	ug/L	7		5	280	0.29	J	J	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,1-DICHLOROPROPENE	ug/L					ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,2,3-TRICHLOROBENZENE	ug/L				7	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,2,3-TRICHLOROPROPANE	ug/L				0.00075	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1
	1,2,4-TRICHLOROBENZENE	ug/L	70			1.1	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,2,4-TRIMETHYLBENZENE	ug/L				15	0.38	XJ	J+	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2			0.00033	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1
	1,2-DIBROMOETHANE	ug/L	0.05		0.1	0.0075	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,2-DICHLOROBENZENE	ug/L	600			300	0.53	J	J	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,2-DICHLOROETHANE	ug/L	5		10	0.17	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,2-DICHLOROPROPANE	ug/L	5			0.44	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,3,5-TRIMETHYLBENZENE	ug/L				120	ND	XU	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,3-DICHLOROBENZENE	ug/L					ND	U	U	1	0.25	0.5	0.26	J	J	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,3-DICHLOROPROPANE	ug/L				370	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,4-DICHLOROBENZENE	ug/L	75			0.48	ND	U	U	1	0.25	0.5	0.43	J	J	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	2,2-DICHLOROPROPANE	ug/L					ND	XU	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	2-BUTANONE	ug/L				5600	ND	U	U	10	2.5	5	ND	U	U	10	2.5	5	ND	U	U	10	2.5	5	ND	U	U	10	2.5	5
	2-CHLOROTOLUENE	ug/L				240	ND	XU	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	2-HEXANONE	ug/L				38	ND	QU	U	5	1.25	2.5	ND	U	U	5	1.25	2.5	ND	U	U	5	1.25	2.5	ND	U	U	5	1.25	2.5
	4-CHLOROTOLUENE	ug/L				250	ND	XU	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	4-METHYL-2-PENTANONE	ug/L				1200	ND	U	U	5	1.25	2.5	ND	U	U	5	1.25	2.5	ND	U	U	5	1.25	2.5	ND	U	U	5	1.25	2.5
	ACETONE	ug/L				14000	ND	QU	U	10	2.5	5	ND	U	U	10	2.5	5	ND	U	U	10	2.5	5	ND	U	U	10	2.5	5
	BENZENE	ug/L	5		10	0.45	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	0.42	J	J	1	0.25	0.5	0.42	J	J	1	0.25	0.5
	BROMOBENZENE	ug/L				62	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	BROMODICHLOROMETHANE	ug/L	80			0.13	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	BROMOFORM	ug/L	80			9.2	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	BROMOMETHANE	ug/L				7.5	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1
	CARBON DISULFIDE	ug/L				810	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	CARBON TETRACHLORIDE	ug/L	5		10	0.45	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	CHLOROBENZENE	ug/L	100			78	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	CHLOROETHANE	ug/L				21000	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1
	CHLOROFORM	ug/L	80		100	0.22	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	CHLOROMETHANE	ug/L				190	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	CIS-1,2-DICHLOROETHENE	ug/L	70			36	3.93			1	0.25	0.5	0.42	J	J	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	CIS-1,3-DICHLOROPROPENE	ug/L					ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	DIBROMOCHLOROMETHANE	ug/L	80			0.17	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	DIBROMOMETHANE	ug/L				8	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	DICHLORODIFLUOROMETHANE	ug/L				200	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1
	ETHYLBENZENE	ug/L	700		750	1.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	HEXACHLOROBUTADIENE	ug/L				0.3	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	ISOPROPYLBENZENE	ug/L				450	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5

Appendix C
Analytical Results

				Sample Location			KAFB2622						KAFB-2625						KAFB-2626						KAFB-2626					
				Sample Number			WP026-30002						WP026-30004						WP026-30005						WP026-30006					
				Sample Date			25-Nov-13						2-Dec-13						4-Dec-13						4-Dec-13					
				Sample Purpose			REG						REG						REG						FD					
				Sample Depth			195-215 FT						198.45-218.45 FT						185-205 FT						185-205 FT					
Test Group	Parameter	Units	EPA MCL[a]	NMED Background[b]	NMED GWQS[c]	EPA Tapwater[a]	Result	Qual	VALQUAL	LOQ	DL	LOD	Result	Qual	VALQUAL	LOQ	DL	LOD	Result	Qual	VALQUAL	LOQ	DL	LOD	Result	Qual	VALQUAL	LOQ	DL	LOD
VOCs	METHYL TERT-BUTYL ETHER	ug/L				14	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	METHYLENE CHLORIDE	ug/L	5		100	11	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1
	NAPHTHALENE	ug/L			30	0.17	1.52			1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	N-BUTYLBENZENE	ug/L				1000	ND	XU	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	N-PROPYLBENZENE	ug/L				660	ND	XQU	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	P-ISOPROPYLTOLUENE	ug/L					ND	XU	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	SEC-BUTYLBENZENE	ug/L				2000	ND	XQU	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	STYRENE	ug/L	100			1200	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	TERT-BUTYLBENZENE	ug/L				690	ND	XU	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	TETRACHLOROETHENE	ug/L	5		20	11	0.36	J	J	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	TOLUENE	ug/L	1000		750	1100	0.33	J	J	1	0.25	0.5	ND	U	U	1	0.25	0.5	0.68	J	J	1	0.25	0.5	0.65	J	J	1	0.25	0.5
	TRANS-1,2-DICHLOROETHENE	ug/L	100			360	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	TRANS-1,3-DICHLOROPROPENE	ug/L					ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	TRICHLOROETHENE	ug/L	5		100	0.49	21.6			1	0.25	0.5	6.97			1	0.25	0.5	0.37	J	J	1	0.25	0.5	0.45	J	J	1	0.25	0.5
	TRICHLOROFLUOROMETHANE	ug/L				1100	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1
	VINYL CHLORIDE	ug/L	2		1	0.019	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	XYLENES	ug/L	10000		620	190	ND	U	U	3	0.75	1.5	ND	U	U	3	0.75	1.5	0.92	J	J	3	0.75	1.5	0.88	J	J	3	0.75	1.5

Appendix C
Analytical Results

				Sample Location			KAFB2622						KAFB-2625						KAFB-2626						KAFB-2626					
				Sample Number			WP026-30002						WP026-30004						WP026-30005						WP026-30006					
				Sample Date			25-Nov-13						2-Dec-13						4-Dec-13						4-Dec-13					
				Sample Purpose			REG						REG						REG						FD					
				Sample Depth			195-215 FT						198.45-218.45 FT						185-205 FT						185-205 FT					
Test Group	Parameter	Units	EPA MCL[a]	NMED Background[b]	NMED GWQS[c]	EPA Tapwater[a]	Result	Qual	VALQUAL	LOQ	DL	LOD	Result	Qual	VALQUAL	LOQ	DL	LOD	Result	Qual	VALQUAL	LOQ	DL	LOD	Result	Qual	VALQUAL	LOQ	DL	LOD

Notes:
a. U.S. Environmental Protection Agency (EPA), 2010a, National Primary Drinking Water Regulations: List of Drinking Water Contamina
b. NMED-HWB Approved Background Concentrations, SNL/Kirtland AFB, Chemical Constituents in Ground Water.
c. New Mexico Water Quality Control Commission, Water Quality Standards, New Mexico Administrative Code 20.6.2.3103
Shading indicates the analyte was detected.
Bold indicates analyte detected greater than regulatory standard.
ug/L = Microgram per liter.
DL = Detection limit.
EPA = Environmental Protection Agency.
FT = Feet.
GWQS = Groundwater Quality Standards.
J = Estimated value, concentration is less than LOQ but greater than laboratory method detection limit (DL).
KAFB = Kirtland Air Force Base.
LOD = Limit of Detection.
LOQ = Limit of Quantitation.
MCL = Maximum contaminant level.
mg/L = Milligram per liter.
ND = Not detected.
NMAC = New Mexico Administrative Code.
NMED = New Mexico Environment Department.
Qual = Laboratory qualifier.
REG = Regular sample.
U = Analyte was not detected. The reported numerical value is at or below the LOQ.
UJ = Analyte was tentatively not detected. The reported numerical value is at or below the LOQ.
VAL QUAL = Validation Qualifier.
VOC = Volatile organic compound.

Appendix C
Analytical Results

				Sample Location			KAFB-2628						KAFB-2629						KAFB-2629						KAFB-2630					
				Sample Number			WP026-30010						WP026-30011						WP026-30012						WP026-30007					
				Sample Date			3-Dec-13						17-Mar-14						17-Mar-14						18-Mar-14					
				Sample Purpose			REG						REG						FD						REG					
				Sample Depth			508.59-532.59 FT						498.5-522 FT						498.5-522 FT						208.4-228.2 FT					
Test Group	Parameter	Units	EPA MCL[a]	NMED Background[b]	NMED GWQS[c]	EPA Tapwater[a]	Result	Qual	VALQUAL	LOQ	DL	LOD	Result	Qual	VALQUAL	LOQ	DL	LOD	Result	Qual	VALQUAL	LOQ	DL	LOD	Result	Qual	VALQUAL	LOQ	DL	LOD
GENERAL CHEMISTRY	AMMONIA (AS N)	mg/L					ND	U	U	0.3	0.075	0.15	ND	U	U	0.3	0.1	0.15	ND	U	U	0.3	0.1	0.15	ND	U	U	0.3	0.1	0.15
	BROMIDE	mg/L					0.128	J	J	0.25	0.042	0.125	0.125	J	J	0.25	0.042	0.125	0.122	J	J	0.25	0.042	0.125	0.743			0.25	0.042	0.125
	CHLORIDE	mg/L			250		15.6			0.5	0.17	0.33	16.1			0.5	0.17	0.33	16.2			0.5	0.17	0.33	87.4			0.5	0.17	0.33
	FLUORIDE	mg/L			1.6	0.8	0.391			0.25	0.033	0.1	0.406			0.25	0.033	0.1	0.407			0.25	0.033	0.1	0.382			0.25	0.033	0.1
	NITROGEN, NITRATE-NITRITE	mg/L	10	4	10		2.04			1.5	0.25	0.75	3.51			1.5	0.25	0.75	3.5			1.5	0.25	0.75	2.81			1.5	0.25	0.75
	PERCHLORATE	mg/L					ND	U	U	0.002	0.0005	0.001	ND	U	U	0.002	0.0005	0.001	ND	U	U	0.002	0.0005	0.001	0.00179	J	J	0.002	0.0005	0.001
	SULFATE	mg/L			600		82.4			2.5	0.33	1	83.3			2.5	0.33	1	83.8			2.5	0.33	1	31.2			2.5	0.33	1
	TOTAL DISSOLVED SOLIDS	mg/L			1000		375			20	20	20	325			20	20	20	321			20	20	20	235			20	20	20
METALS (DISSOLVED)	ARSENIC, DISSOLVED	mg/L	0.01		0.1	0.000052	ND	MU	U	0.0025	0.001	0.0015	ND	U	U	0.0025	0.00075	0.0015	ND	U	U	0.0025	0.00075	0.0015	ND	U	U	0.0025	0.00075	0.0015
	BARIUM, DISSOLVED	mg/L	2		1	3.8	0.104			0.01	0.00125	0.0025	0.0567	X		0.01	0.00125	0.0025	0.0553			0.01	0.00125	0.0025	0.217	X		0.01	0.00125	0.0025
	CADMIUM, DISSOLVED	mg/L	0.005		0.01	0.0092	ND	U	U	0.00125	0.00025	0.0005	ND	U	U	0.00125	0.00025	0.0005	ND	U	U	0.00125	0.00025	0.0005	ND	U	U	0.00125	0.00025	0.0005
	CHROMIUM, DISSOLVED	mg/L	0.1		0.05		0.000702	J	J	0.0025	0.0005	0.001	0.00101	J	J	0.0025	0.0005	0.001	0.000945	J	J	0.0025	0.0005	0.001	0.00105	J	J	0.0025	0.0005	0.001
	IRON, DISSOLVED	mg/L			1	14	ND	U	U	0.025	0.0075	0.015	ND	U	U	0.025	0.0075	0.015	ND	U	U	0.025	0.0075	0.015	ND	U	U	0.025	0.0075	0.015
	LEAD, DISSOLVED	mg/L	0.015	0.01	0.05		0.000629	J	J	0.00075	0.000375	0.00075	ND	U	U	0.00075	0.000375	0.00075	ND	U	U	0.00075	0.000375	0.00075	ND	MU	U	0.00075	0.000425	0.00075
	MANGANESE, DISSOLVED	mg/L			0.2	0.43	ND	U	U	0.00375	0.00075	0.0015	0.000793	J	J	0.00375	0.00075	0.0015	0.00094	J	J	0.00375	0.00075	0.0015	ND	U	U	0.00375	0.00075	0.0015
	MERCURY, DISSOLVED	mg/L	0.002		0.002	0.00063	ND	U	U	0.0002	0.00008	0.00016	ND	U	U	0.0002	0.00008	0.00016	ND	U	U	0.0002	0.00008	0.00016	ND	U	U	0.0002	0.00008	0.00016
	SELENIUM, DISSOLVED	mg/L	0.05		0.05	0.1	0.00227	J	J	0.0025	0.00075	0.00125	0.00282			0.0025	0.00075	0.00125	0.003			0.0025	0.00075	0.00125	0.0039			0.0025	0.00075	0.00125
	SILVER, DISSOLVED	mg/L			0.05	0.094	ND	U	U	0.0025	0.00025	0.0005	ND	U	U	0.0025	0.00025	0.0005	ND	U	U	0.0025	0.00025	0.0005	ND	U	U	0.0025	0.00025	0.0005
RADIOACTIVE	GROSS ALPHA PARTICLE RADIOACTIVITY	pCi/L					3.45			0.86	0.86	0.86	3.8			1.1	1.1	1.1	3.6			1.2	1.2	1.2	ND	U	U	2.2	2.2	2.2
	GROSS BETA PARTICLE RADIOACTIVITY	pCi/L					3.2	LT		1.3	1.3	1.3	ND	LT	U	1.6	1.6	1.6	ND	LT	U	1.5	1.5	1.5	ND	U	U	2.9	2.9	2.9
	RA-228	pCi/L					ND	U	U	0.48	0.48	0.48	ND	U	U	0.51	0.51	0.51	ND	U	U	0.52	0.52	0.52	ND	U	U	0.55	0.55	0.55
	RADIUM-226	pCi/L					0.26	LT		0.22	0.22	0.22	ND	U	U	0.197	0.197	0.197	ND	U	U	0.2	0.2	0.2	0.29	LT		0.2	0.2	0.2
VOCs	1,1,1,2-TETRACHLOROETHANE	ug/L				0.57	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,1,1-TRICHLOROETHANE	ug/L	200		60	8000	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,1,2,2-TETRACHLOROETHANE	ug/L			10	0.076	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,1,2-TRICHLOROETHANE	ug/L	5		10	0.28	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,1-DICHLOROETHANE	ug/L			25	2.7	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	1.44			1	0.25	0.5
	1,1-DICHLOROETHENE	ug/L	7		5	280	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,1-DICHLOROPROPENE	ug/L					ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,2,3-TRICHLOROBENZENE	ug/L				7	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,2,3-TRICHLOROPROPANE	ug/L				0.00075	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1
	1,2,4-TRICHLOROBENZENE	ug/L	70			1.1	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,2,4-TRIMETHYLBENZENE	ug/L				15	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2			0.00033	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1
	1,2-DIBROMOETHANE	ug/L	0.05		0.1	0.0075	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,2-DICHLOROBENZENE	ug/L	600			300	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,2-DICHLOROETHANE	ug/L	5		10	0.17	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,2-DICHLOROPROPANE	ug/L	5			0.44	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,3,5-TRIMETHYLBENZENE	ug/L				120	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,3-DICHLOROBENZENE	ug/L					ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,3-DICHLOROPROPANE	ug/L				370	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	1,4-DICHLOROBENZENE	ug/L	75			0.48	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	2,2-DICHLOROPROPANE	ug/L					ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	2-BUTANONE	ug/L				5600	ND	U	U	10	2.5	5	ND	U	U	10	2.5	5	ND	U	U	10	2.5	5	ND	U	U	10	2.5	5
	2-CHLOROTOLUENE	ug/L				240	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	2-HEXANONE	ug/L				38	ND	U	U	5	1.25	2.5	ND	U	U	5	1.25	2.5	ND	U	U	5	1.25	2.5	ND	U	U	5	1.25	2.5
	4-CHLOROTOLUENE	ug/L				250	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	4-METHYL-2-PENTANONE	ug/L				1200	ND	U	U	5	1.25	2.5	ND	U	U	5	1.25	2.5	ND	U	U	5	1.25	2.5	ND	U	U	5	1.25	2.5
	ACETONE	ug/L				14000	ND	U	U	10	2.5	5	ND	U	U	10	2.5	5	ND	U	U	10	2.5	5	ND	XU	U	10	2.5	5
	BENZENE	ug/L	5		10	0.45	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	BROMOBENZENE	ug/L				62	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	BROMODICHLOROMETHANE	ug/L	80			0.13	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	BROMOFORM	ug/L	80			9.2	ND	U	U	1	0.25	0.5	ND	XU	U	1	0.25	0.5	ND	XU	U	1	0.25	0.5	ND	XU	U	1	0.25	0.5
	BROMOMETHANE	ug/L				7.5	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1
	CARBON DISULFIDE	ug/L				810	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	CARBON TETRACHLORIDE	ug/L	5		10	0.45	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	CHLOROBENZENE	ug/L	100			78	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	CHLOROETHANE	ug/L				21000	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1
	CHLOROFORM	ug/L	80		100	0.22	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	CHLOROMETHANE	ug/L				190	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	5.6	Z-01		1	0.25	0.5
	CIS-1,2-DICHLOROETHENE	ug/L	70			36	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	CIS-1,3-DICHLOROPROPENE	ug/L					ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	DIBROMOCHLOROMETHANE	ug/L	80			0.17	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	DIBROMOMETHANE	ug/L				8	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	DICHLORODIFLUOROMETHANE	ug/L				200	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1
	ETHYLBENZENE	ug/L	700		750	1.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	HEXACHLOROBUTADIENE	ug/L				0.3	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	ISOPROPYLBENZENE	ug/L				450	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5

Appendix C
Analytical Results

				Sample Location			KAFB-2628						KAFB-2629						KAFB-2629						KAFB-2630					
				Sample Number			WP026-30010						WP026-30011						WP026-30012						WP026-30007					
				Sample Date			3-Dec-13						17-Mar-14						17-Mar-14						18-Mar-14					
				Sample Purpose			REG						REG						FD						REG					
				Sample Depth			508.59-532.59 FT						498.5-522 FT						498.5-522 FT						208.4-228.2 FT					
Test Group	Parameter	Units	EPA MCL[a]	NMED Background[b]	NMED GWQS[c]	EPA Tapwater[a]	Result	Qual	VALQUAL	LOQ	DL	LOD	Result	Qual	VALQUAL	LOQ	DL	LOD	Result	Qual	VALQUAL	LOQ	DL	LOD	Result	Qual	VALQUAL	LOQ	DL	LOD
VOCs	METHYL TERT-BUTYL ETHER	ug/L				14	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	METHYLENE CHLORIDE	ug/L	5		100	11	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1
	NAPHTHALENE	ug/L			30	0.17	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	N-BUTYLBENZENE	ug/L				1000	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	N-PROPYLBENZENE	ug/L				660	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	P-ISOPROPYLTOLUENE	ug/L					ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	SEC-BUTYLBENZENE	ug/L				2000	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	STYRENE	ug/L	100			1200	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	TERT-BUTYLBENZENE	ug/L				690	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	TETRACHLOROETHENE	ug/L	5		20	11	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	TOLUENE	ug/L	1000		750	1100	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	TRANS-1,2-DICHLOROETHENE	ug/L	100			360	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	TRANS-1,3-DICHLOROPROPENE	ug/L					ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	TRICHLOROETHENE	ug/L	5		100	0.49	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	4.74			1	0.25	0.5
	TRICHLOROFLUOROMETHANE	ug/L				1100	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1	ND	U	U	2	0.5	1
	VINYL CHLORIDE	ug/L	2		1	0.019	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5	ND	U	U	1	0.25	0.5
	XYLENES	ug/L	10000		620	190	ND	U	U	3	0.75	1.5	ND	U	U	3	0.75	1.5	ND	U	U	3	0.75	1.5	ND	U	U	3	0.75	1.5

Appendix C
Analytical Results

				Sample Location			KAFB-2628						KAFB-2629						KAFB-2629						KAFB-2630					
				Sample Number			WP026-30010						WP026-30011						WP026-30012						WP026-30007					
				Sample Date			3-Dec-13						17-Mar-14						17-Mar-14						18-Mar-14					
				Sample Purpose			REG						REG						FD						REG					
				Sample Depth			508.59-532.59 FT						498.5-522 FT						498.5-522 FT						208.4-228.2 FT					
Test Group	Parameter	Units	EPA MCL[a]	NMED Background[b]	NMED GWQS[c]	EPA Tapwater[a]	Result	Qual	VALQUAL	LOQ	DL	LOD	Result	Qual	VALQUAL	LOQ	DL	LOD	Result	Qual	VALQUAL	LOQ	DL	LOD	Result	Qual	VALQUAL	LOQ	DL	LOD

Notes:
a. U.S. Environmental Protection Agency (EPA), 2010a, National Primary Drinking Water Regulations: List of Drinking Water Contamina
b. NMED-HWB Approved Background Concentrations, SNL/Kirtland AFB, Chemical Constituents in Ground Water.
c. New Mexico Water Quality Control Commission, Water Quality Standards, New Mexico Administrative Code 20.6.2.3103
Shading indicates the analyte was detected.
Bold indicates analyte detected greater than regulatory standard.
ug/L = Microgram per liter.
DL = Detection limit.
EPA = Environmental Protection Agency.
FT = Feet.
GWQS = Groundwater Quality Standards.
J = Estimated value, concentration is less than LOQ but greater than laboratory method detection limit (DL).
KAFB = Kirtland Air Force Base.
LOD = Limit of Detection.
LOQ = Limit of Quantitation.
MCL = Maximum contaminant level.
mg/L = Milligram per liter.
ND = Not detected.
NMAC = New Mexico Administrative Code.
NMED = New Mexico Environment Department.
Qual = Laboratory qualifier.
REG = Regular sample.
U = Analyte was not detected. The reported numerical value is at or below the LOQ.
UJ = Analyte was tentatively not detected. The reported numerical value is at or below the LOQ.
VAL QUAL = Validation Qualifier.
VOC = Volatile organic compound.

				Sample Location			WP26-KAFB2632					
				Sample Number			WP026-30009					
				Sample Date			18-Mar-14					
				Sample Purpose			REG					
				Sample Depth			157.4-177.2 FT					
Test Group	Parameter	Units	EPA MCL[a]	NMED Background[b]	NMED GWQS[c]	EPA Tapwater[a]	Result	Qual	VALQUAL	LOQ	DL	LOD
GENERAL CHEMISTRY	AMMONIA (AS N)	mg/L					ND	U	U	0.3	0.1	0.15
	BROMIDE	mg/L					0.775			0.25	0.042	0.125
	CHLORIDE	mg/L			250		92.6			0.5	0.17	0.33
	FLUORIDE	mg/L			1.6	0.8	0.385			0.25	0.033	0.1
	NITROGEN, NITRATE-NITRITE	mg/L	10	4	10		1.95			1.5	0.25	0.75
	PERCHLORATE	mg/L					0.00195	J	J	0.002	0.0005	0.001
	SULFATE	mg/L			600		19.4			2.5	0.33	1
	TOTAL DISSOLVED SOLIDS	mg/L			1000		246			20	20	20
METALS (DISSOLVED)	ARSENIC, DISSOLVED	mg/L	0.01		0.1	0.000052	ND	U	U	0.0025	0.00075	0.0015
	BARIUM, DISSOLVED	mg/L	2		1	3.8	0.236	X		0.01	0.00125	0.0025
	CADMIUM, DISSOLVED	mg/L	0.005		0.01	0.0092	ND	U	U	0.00125	0.00025	0.0005
	CHROMIUM, DISSOLVED	mg/L	0.1		0.05		0.000842	J	J	0.0025	0.0005	0.001
	IRON, DISSOLVED	mg/L			1	14	0.0137	J	J	0.025	0.0075	0.015
	LEAD, DISSOLVED	mg/L	0.015	0.01	0.05		ND	U	U	0.00075	0.000375	0.00075
	MANGANESE, DISSOLVED	mg/L			0.2	0.43	ND	U	U	0.00375	0.00075	0.0015
	MERCURY, DISSOLVED	mg/L	0.002		0.002	0.00063	ND	U	U	0.0002	0.00008	0.00016
	SELENIUM, DISSOLVED	mg/L	0.05		0.05	0.1	0.004			0.0025	0.00075	0.00125
	SILVER, DISSOLVED	mg/L			0.05	0.094	ND	U	U	0.0025	0.00025	0.0005
RADIOACTIVE	GROSS ALPHA PARTICLE RADIOACTIVITY	pCi/L					2.1	LT		1.06	1.06	1.06
	GROSS BETA PARTICLE RADIOACTIVITY	pCi/L					ND	LT	U	1.3	1.3	1.3
	RA-228	pCi/L					ND	U	U	0.72	0.72	0.72
	RADIUM-226	pCi/L					0.28	LT		0.21	0.21	0.21
VOCs	1,1,1,2-TETRACHLOROETHANE	ug/L				0.57	ND	U	U	1	0.25	0.5
	1,1,1-TRICHLOROETHANE	ug/L	200		60	8000	ND	U	U	1	0.25	0.5
	1,1,2,2-TETRACHLOROETHANE	ug/L			10	0.076	ND	U	U	1	0.25	0.5
	1,1,2-TRICHLOROETHANE	ug/L	5		10	0.28	ND	U	U	1	0.25	0.5
	1,1-DICHLOROETHANE	ug/L			25	2.7	0.348	J	J	1	0.25	0.5
	1,1-DICHLOROETHENE	ug/L	7		5	280	ND	U	U	1	0.25	0.5
	1,1-DICHLOROPROPENE	ug/L					ND	U	U	1	0.25	0.5
	1,2,3-TRICHLOROBENZENE	ug/L				7	ND	U	U	1	0.25	0.5
	1,2,3-TRICHLOROPROPANE	ug/L				0.00075	ND	U	U	2	0.5	1
	1,2,4-TRICHLOROBENZENE	ug/L	70			1.1	ND	U	U	1	0.25	0.5
	1,2,4-TRIMETHYLBENZENE	ug/L				15	ND	U	U	1	0.25	0.5
	1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2			0.00033	ND	U	U	2	0.5	1
	1,2-DIBROMOETHANE	ug/L	0.05		0.1	0.0075	ND	U	U	1	0.25	0.5
	1,2-DICHLOROBENZENE	ug/L	600			300	ND	U	U	1	0.25	0.5
	1,2-DICHLOROETHANE	ug/L	5		10	0.17	ND	U	U	1	0.25	0.5
	1,2-DICHLOROPROPANE	ug/L	5			0.44	ND	U	U	1	0.25	0.5
	1,3,5-TRIMETHYLBENZENE	ug/L				120	ND	U	U	1	0.25	0.5
	1,3-DICHLOROBENZENE	ug/L					ND	U	U	1	0.25	0.5
	1,3-DICHLOROPROPANE	ug/L				370	ND	U	U	1	0.25	0.5
	1,4-DICHLOROBENZENE	ug/L	75			0.48	ND	U	U	1	0.25	0.5
	2,2-DICHLOROPROPANE	ug/L					ND	U	U	1	0.25	0.5
	2-BUTANONE	ug/L				5600	ND	U	U	10	2.5	5
	2-CHLOROTOLUENE	ug/L				240	ND	U	U	1	0.25	0.5
	2-HEXANONE	ug/L				38	ND	U	U	5	1.25	2.5
	4-CHLOROTOLUENE	ug/L				250	ND	U	U	1	0.25	0.5
	4-METHYL-2-PENTANONE	ug/L				1200	ND	U	U	5	1.25	2.5
	ACETONE	ug/L				14000	ND	XU	U	10	2.5	5
	BENZENE	ug/L	5		10	0.45	ND	U	U	1	0.25	0.5
	BROMOBENZENE	ug/L				62	ND	U	U	1	0.25	0.5
	BROMODICHLOROMETHANE	ug/L	80			0.13	ND	U	U	1	0.25	0.5
	BROMOFORM	ug/L	80			9.2	ND	XU	U	1	0.25	0.5
	BROMOMETHANE	ug/L				7.5	ND	U	U	2	0.5	1
	CARBON DISULFIDE	ug/L				810	ND	U	U	1	0.25	0.5
	CARBON TETRACHLORIDE	ug/L	5		10	0.45	ND	U	U	1	0.25	0.5
	CHLOROBENZENE	ug/L	100			78	ND	U	U	1	0.25	0.5
	CHLOROETHANE	ug/L				21000	ND	U	U	2	0.5	1
	CHLOROFORM	ug/L	80		100	0.22	ND	U	U	1	0.25	0.5
	CHLOROMETHANE	ug/L				190	5.58	Z-01		1	0.25	0.5
	CIS-1,2-DICHLOROETHENE	ug/L	70			36	ND	U	U	1	0.25	0.5
	CIS-1,3-DICHLOROPROPENE	ug/L					ND	U	U	1	0.25	0.5
	DIBROMOCHLOROMETHANE	ug/L	80			0.17	ND	U	U	1	0.25	0.5
	DIBROMOMETHANE	ug/L				8	ND	U	U	1	0.25	0.5
	DICHLORODIFLUOROMETHANE	ug/L				200	ND	U	U	2	0.5	1
	ETHYLBENZENE	ug/L	700		750	1.5	ND	U	U	1	0.25	0.5
	HEXACHLOROBUTADIENE	ug/L				0.3	ND	U	U	1	0.25	0.5
	ISOPROPYLBENZENE	ug/L				450	ND	U	U	1	0.25	0.5

				Sample Location			WP26-KAFB2632					
				Sample Number			WP026-30009					
				Sample Date			18-Mar-14					
				Sample Purpose			REG					
				Sample Depth			157.4-177.2 FT					
Test Group	Parameter	Units	EPA MCL[a]	NMED Background[b]	NMED GWQS[c]	EPA Tapwater[a]	Result	Qual	VALQUAL	LOQ	DL	LOD
VOCs	METHYL TERT-BUTYL ETHER	ug/L				14	ND	U	U	1	0.25	0.5
	METHYLENE CHLORIDE	ug/L	5		100	11	ND	U	U	2	0.5	1
	NAPHTHALENE	ug/L			30	0.17	ND	U	U	1	0.25	0.5
	N-BUTYLBENZENE	ug/L				1000	ND	U	U	1	0.25	0.5
	N-PROPYLBENZENE	ug/L				660	ND	U	U	1	0.25	0.5
	P-ISOPROPYLTOLUENE	ug/L					ND	U	U	1	0.25	0.5
	SEC-BUTYLBENZENE	ug/L				2000	ND	U	U	1	0.25	0.5
	STYRENE	ug/L	100			1200	ND	U	U	1	0.25	0.5
	TERT-BUTYLBENZENE	ug/L				690	ND	U	U	1	0.25	0.5
	TETRACHLOROETHENE	ug/L	5		20	11	ND	U	U	1	0.25	0.5
	TOLUENE	ug/L	1000		750	1100	ND	U	U	1	0.25	0.5
	TRANS-1,2-DICHLOROETHENE	ug/L	100			360	ND	U	U	1	0.25	0.5
	TRANS-1,3-DICHLOROPROPENE	ug/L					ND	U	U	1	0.25	0.5
	TRICHLOROETHENE	ug/L	5		100	0.49	3.23			1	0.25	0.5
	TRICHLOROFLUOROMETHANE	ug/L				1100	ND	U	U	2	0.5	1
	VINYL CHLORIDE	ug/L	2		1	0.019	ND	U	U	1	0.25	0.5
	XYLENES	ug/L	10000		620	190	ND	U	U	3	0.75	1.5

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Test Group	Parameter	Units	EPA MCL[a]	NMED Background[b]	NMED GWQS[c]	EPA Tapwater[a]	Result	Qual	VALQUAL	LOQ	DL	LOD

Notes:
a. U.S. Environmental Protection Agency (EPA), 2010a, National Primary Drinking Water Regulations: List of Drinking Water Contamina
b. NMED-HWB Approved Background Concentrations, SNL/Kirtland AFB, Chemical Constituents in Ground Water.
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Shading indicates the analyte was detected.
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KAFB = Kirtland Air Force Base.
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Qual = Laboratory qualifier.
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UJ = Analyte was tentatively not detected. The reported numerical value is at or below the LOQ.
VAL QUAL = Validation Qualifier.
VOC = Volatile organic compound.

APPENDIX D

Data Quality Assessment Report

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ACRONYMS AND ABBREVIATIONS

%	percent
%D	percent difference
µg/L	microgram per liter
CCV	continuing calibration verification
DoD	U.S. Department of Defense
EPA	U.S. Environmental Protection Agency
ICP	inductively coupled plasma
ICS	interference check sample
KAFB	Kirtland Air Force Base
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LOQ	limit of quantitation
MDC	minimum detectable concentration
mg/L	milligram per liter
MS	matrix spike
MSD	matrix spike duplicate
QAPP	Quality Assurance Project Plan
QC	quality control
QSM	Quality Systems Manual
RPD	relative percent difference
RRF	relative response factor
SDG	sample delivery group
SOP	Standard Operating Procedure
TPH	total petroleum hydrocarbon
USACE	U.S. Army Corps of Engineers
VOC	volatile organic compound

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LABORATORY DATA QUALITY ASSESSMENT – GROUNDWATER NOVEMBER 2013 – MARCH 2014

1. LABORATORY DATA QUALITY SUMMARY

This Laboratory Data Quality Assessment describes the findings of the review of data for the November 2013 through March 2014 groundwater monitoring event at site WP026, and is provided to document the quality of the analytical data used in the Long-Term Groundwater Monitoring Summary Report for Solid Waste Management Unit WP-26 Sewage Lagoons and Golf Course Main Pond. Sampling procedures and overall quality control (QC) and quality assurance protocols for the November 2013 through March 2014 groundwater monitoring event are presented in the *Quality Assurance Project Plan for Long-Term Groundwater Monitoring at Multiple Sites: Solid Waste Management Unit (SWMU) 6-1, Landfill 1; SWMU 6-2, Landfill 2; SWMU 6-4, Landfills 4,5 and 6; ST-105 (CG-C564); UST-58 (PL567); WP026; and ST070, Kirtland Air Force Base, New Mexico* (QAPP, U.S. Army Corps of Engineers [USACE], 2013).

During the period from November 25, 2013 to March 24, 2014, ten groundwater samples, two field duplicates, one equipment rinse blank, and six trip blanks were collected and submitted to Empirical Laboratories LLC (Empirical) in Nashville, Tennessee, for analyses.

The groundwater samples and duplicates were analyzed for the following list of parameters:

- Volatile organic compounds (VOCs) – U.S. Environmental Protection Agency (EPA) Method SW8260B
- Dissolved metals – EPA Methods SW6010C and SW7470A
- Dissolved perchlorate – EPA Method SW6850
- Anions – EPA Method SW9056A
- Nitrate and nitrite as nitrogen – EPA Method 353.2
- Ammonia as nitrogen – Standard Method (SM) 4500NH3BG
- Total dissolved Solids (TDS) – SM 2540C

Empirical subcontracted the groundwater samples to ALS Environmental in Fort Collins, Colorado for the following analyses:

- Gross alpha and beta – EPA Method SW9310
- Radium -226 – EPA Method SW9315
- Radium -228 – EPA Method SW9320

At wells KAFB-0505 and KAFB-0608, groundwater samples were analyzed for the following parameters only in accordance with the project QAPP (USACE, 2013) requirements:

- VOCs – EPA Method SW8260B
- Anions – EPA Method SW9056A
- Nitrate and nitrite as nitrogen – EPA Method 353.2
- Ammonia as nitrogen – SM 4500NH3BG
- TDS – SM 2540C

Both laboratories hold a current U.S. Department of Defense (DoD) Environmental Laboratory Accreditation Program certification to perform the listed analyses.

All analytical results reported were received in three sample delivery groups (SDG) Kirtland-01, 02, and 05. Table 1 (provided at the end of this report) summarizes sample collection dates, sample numbers, sample locations, laboratory, sample types, extraction and analysis methods, extraction and analysis dates, and SDG numbers. An EPA Level III data review was performed for all analytical results for the SDG. The review was performed in accordance with the guidelines and control criteria specified in the following documents:

- The project QAPP (USACE, 2013)
- *DoD Quality Systems Manual for Environmental Laboratories, Version 4.2* (2010)
- *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (2006), SW-846* (EPA, 1996 and updates)
- *Standard Methods for the Examination of Water and Wastewater (21st Edition)* (American Public Health Association et al., 2005)
- *Environmental Quality – Guidance for Evaluating Performance-Based Chemical Data*, EM 200-1-10 (USACE, 2005)
- *USEPA Contract Laboratory Program, National Functional Guidelines for Superfund Organic Methods Data Review, Final* (EPA, 2008)
- *USEPA Contract Laboratory Program, National Functional Guidelines for Inorganic Superfund Data Review, Final* (EPA, 2010)

The following QC elements were included in the EPA Level III data review:

- Sample preservation and sample extraction and analysis holding times
- Laboratory method blanks
- Initial and continuing calibration blanks (metals, ammonia as nitrogen, anions, and nitrate and nitrite as nitrogen analyses only)
- Surrogate recoveries (organic analyses)

- Laboratory control sample (LCS)/laboratory control sample duplicate (LCSD) recoveries
- Matrix spike (MS)/matrix spike duplicate (MSD) recoveries
- Relative percent differences (RPDs)
- Initial calibration and verifications
- Continuing calibration verifications (CCVs)
- Inductively coupled plasma (ICP) interference check samples (ICS) (metal analysis only)
- Field blanks
- Field duplicates

Analytical data were reviewed in terms of precision, bias, representativeness, comparability, and completeness as follows:

- *Bias* is demonstrated by recovery of target analytes from fortified blank and sample matrices LCS/LCSD, and MS/MSD, respectively. For organic methods, bias is also demonstrated through recovery of surrogates from each field and QC sample. The recovery of target analytes from fortified samples is compared with the acceptance criteria defined in the QAPP (USACE, 2013) and DoD 2010 Quality Systems Manual (QSM). When the acceptance criteria are not available in the QAPP or DoD QSM, results are compared with the laboratory in-house control limits. When these criteria are not met, the data are qualified accordingly.
- *Precision* is expressed as the RPD between the results of replicate sample analyses: sample duplicates, LCSDs, and MSDs. When analyte RPDs exceed the acceptance criteria, the data are qualified accordingly.
- *Representativeness* of the samples submitted for analysis is ensured by adherence to standard sampling techniques and protocols.
- *Comparability* of sample results is ensured through the use of approved sampling and analysis methods.
- *Completeness* is expressed as a ratio of the number of usable data points to the total number of analytical data results.

The following sections present the EPA Level III data review findings. The discussion summarizes data quality exceedances and their potential impact on the quality and usability of analytical results. Table 2 presents definitions of data qualification and reason codes applied to the analytical results. Table 3 summarizes the qualified data. For informational purposes, qualified field QC data are also presented in this table.

1.1 Data Quality Outliers

1.1.1 Sample Preservation and Sample Extraction and Analysis Holding Times (Reason Code H)

The sample coolers and samples contained within were received intact at the laboratory and were held within the required 0 to 6 degrees Celsius and when required were chemically preserved in accordance with EPA and SM preservation requirements.

Sample holding times were evaluated by comparing the sample collection dates to the sample extraction and analysis dates. Extraction and analysis holding times were reviewed for all samples to determine the validity of the sample results. The analysis holding time requirements were achieved for all samples analyzed for VOCs, dissolved metals, dissolved perchlorate, anions, ammonia as nitrogen, nitrate and nitrite as nitrogen, TDS, and radiological parameters.

1.1.2 Laboratory Method Blanks (Reason Code B1)

The field sample results were evaluated with respect to the laboratory method blank prepared and analyzed for each analytical batch and for each analytical method. Positive detections of VOCs and radiological parameters were observed in a few laboratory method blanks. Specific contaminants, detected levels, and their limit of quantitation (LOQ) are summarized below:

Analytical Method	Laboratory QC Batch #	Contaminant	Contaminant Level (µg/L)	LOQ (µg/L)
EPA SW8260B	4C25012	Hexachlorobutadiene	0.47	2
		Chloroform	0.258	2
	4C02011	Chloroform	0.256	2
	4C03015	Hexachlorobutadiene	0.316	2
EPA SW9310	ABI40325-5MB	Gross beta	1.26 (pCi/L)	1.03 (PCi/L)

Note: Value listed under the LOQ column for gross beta is minimum detectable concentration (MDC).
µg/L micrograms per liter
pCi/L picocuries per Liter

Based on the DoD QSM requirements (2010), laboratory method blank concentrations are considered acceptable when contaminant levels in the blank are less than one-half the LOQ for target analytes and less than the LOQ for common laboratory contaminants, such as acetone and methylene chloride. As indicated in the preceding table, the laboratory method blank levels for hexachlorobutadiene and chloroform were below one-half the LOQ and thus met the blank acceptance criteria; while the blank level for gross beta exceeded its minimum detectable concentration (MDC).

As a result of the laboratory method blank detection, the detected results of gross beta in samples were qualified as non-detected (U) at the reported value when concentrations of the analyte in samples were less than or equal to five times the level observed in the blank. This blank qualification has no impact on the data usability.

The analytes hexachlorobutadiene and chloroform were not detected in any groundwater sample processed with the laboratory method blanks, and thus, the sample results were not affected by the laboratory method blank detections, and no data qualification was warranted because of the trace laboratory method blank detections.

All laboratory method blanks were free of dissolved metals, dissolved perchlorate, anions, ammonia as nitrogen, nitrate and nitrite as nitrogen, TDS, and radium 226 and 228.

1.1.3 Initial and Continuing Calibration Blanks (Reason Code B2)

In addition to the laboratory method blanks for dissolved metals, anions, ammonia as nitrogen, and nitrate and nitrite as nitrogen analyses, initial and continuing calibration blank results were reviewed to ensure that the instrument was free of contamination prior to the analyses. All initial and continuing calibration blanks were free of all target analytes.

1.1.4 Surrogate Recoveries (Reason Code S)

Surrogate standards are organic compounds added to field and laboratory QC samples for organic analysis to evaluate the matrix effect and method performance on an individual sample basis. The surrogates bromofluorobenzene, dibromofluoromethane, 1,2-dichloroethane-d4, and toluene-d8 in all VOC samples were recovered within the established control criteria. The surrogate recovery results indicated acceptable sample procedures for the VOC analyses.

1.1.5 Laboratory Control Sample/Laboratory Control Sample Duplicate Recoveries and Precisions (Reason Codes L and D3)

The LCS is an aliquot of analyte-free matrix spiked with target analytes that is prepared with each analytical batch for each analytical method. The recovery of target analytes from the LCS analysis is a measurement of method performance in an interference-free sample matrix. Non-compliant LCS recoveries were reported for EPA Method SW8260B and SM2540C. The non-compliant LCS results that led to data qualification is presented as follows:

Analytical Method	Laboratory QC Batch #	LCS Recovery Outlier (%)	Control Limit (%)
EPA SW8260B	4C02011	Acetone: 153/131%	40-140%
SM2540C	3L11033	TDS: 121%	80-120%

As shown in the table, the reported LCS bias results for acetone and TDS exceeded their respective upper control criteria, however the precision between the LCS and LCSD recoveries for the analytes met the precision control limit. As a result of the LCS recovery bias, the detected results for acetone and TDS were qualified as estimated (J+) . This data qualification was applied to the results of acetone and TDS in all detected samples in the non-compliant batch. The high-biased LCS recoveries did not affect the data quality of the non-detected results. It should be noted that surrogates in all VOC samples qualified for the LCS recovery outliers were recovered within the accuracy specifications, thus indicating effective sample preparation procedures for the VOC analysis.

In addition, high-biased LCS recoveries were observed for other VOCs in another batch. Because these analytes were not detected in any associated samples, the sample results are not affected by the LCS recovery outliers, and no data qualification was warranted.

The LCS results meet the acceptance criteria for dissolved metals, dissolved perchlorate, anions, ammonia as nitrogen, nitrate and nitrite as nitrogen, and radiological parameters.

1.1.6 Matrix Spike/Matrix Spike Duplicate Recoveries and Precisions (Reason Codes M and D2)

The MS and MSD samples are a portion of a field sample spiked with target analytes that are prepared with each analytical batch and with each method. The MS/MSD results are used to evaluate any bias introduced to the method due to matrix interference, and to measure bias and precision for each analytical batch.

In accordance with the project QAPP requirements (USACE, 2013), the MS/MSD samples are to be collected at a rate of 1 per 20 groundwater samples or 5 percent. The following groundwater samples from site WP026 were spiked to achieve the 5 percent MS/MSD sample frequency requirements for dissolved metals, ammonia as nitrogen, nitrate and nitrite as nitrogen and dissolved perchlorate analyses.

Well Location	Sample Number	MS/MSD Analysis
KAFB-2625	WP026-30004	dissolved metals, ammonia as nitrogen, and nitrate and nitrite as nitrogen
KAFB-2628	WP026-30010	dissolved metals, ammonia as nitrogen, and nitrate and nitrite as nitrogen
KAFB-2626	WP026-30006	dissolved perchlorate
KAFB-2630	WP026-30007	nitrate and nitrite as nitrogen

The MS results meet the established bias and precision requirements for all the listed analyses. At well KAFB-2631, MS/MSD samples were planned, which included VOCs, dissolved metals, dissolved perchlorate, nitrate and nitrite, anions, ammonia as nitrogen, TDS, and radiological parameters. The planned MS/MSD samples were not collected due to insufficient groundwater in the well. The bias and precision results of these analyses from well KAFB-2631 were evaluated through recoveries of surrogates and LCS, and LCSD RPD discussed in the previous sections.

1.1.7 Initial Calibration (Reason Code G)

Instrument calibration is performed for VOC, dissolved metals, dissolved perchlorate, anions, ammonia as nitrogen, and nitrate and nitrite as nitrogen analyses according to the EPA method requirements (EPA, 1996). The linear analytical range is established for each method by analysis of calibration standards prepared at increasing concentrations that cover the expected sample concentrations. The acceptability of the initial calibration is determined by calculation of a percent relative standard deviation or coefficient. The initial calibration results are acceptable for all the listed methods.

Immediately after the initial calibration for each analysis, initial calibration verification was conducted at the mid-point of instrument calibration range by using a second-source calibration standard to verify the accuracy of the initial calibration. The review indicated acceptable initial calibration verification results for all target analytes.

1.1.8 Continuing Calibration Verification (Reason Code C)

Routinely during sample analysis, the stability of the analytical system is monitored by analysis of continuing calibration standards at concentrations near the mid-point of the instrument calibration range. The percent difference (%D) values between the relative response factor (RRF) in the initial calibration and the RRF in the continuing calibration exceeded the acceptance criteria for VOC. The CCV outliers that resulted in data qualification are summarized as follows:

Analytical Method	Calibration ID	CCV Outlier, D (%)	Control Limit (%)
EPA SW8260B	3L34302-CCB1	1,2,4-Trimethylbenzene: +30.9%	<20%

ID identification

As a result of the high-biased %D value, the detected results for the analyte 1,2,4-trimethylbenzene were qualified as estimated J+. This data qualification was applied to the detected results of the 1,2,4-trimethylbenzene in all samples associated with the non-compliant CCV. There is no impact on the data usability because of the minor CCV outlier. The high biased CCV results did not affect the non-detected results and therefore no data qualification was applied to the non-detected results of the 1,2,4-trimethylbenzene in any groundwater samples.

Except as noted, the CCV results are acceptable for all other analyses.

1.1.9 Interference Check Samples (Reason Code O)

The ICS verifies the inter-element and background correction factors. An ICS was analyzed at the required frequencies, and all ICS results are within the established control limit for EPA Method SW6010C for the groundwater monitoring event.

1.1.10 Trip Blanks (Reason Code K3)

Trip blanks were prepared by the laboratory and stored with the groundwater samples collected for VOCs analysis. In accordance with the project QAPP requirements (USACE, 2013), one trip blank is to be collected at a rate of one per cooler when collecting groundwater samples for VOC analysis. One trip blank was submitted with VOC samples per cooler during the sampling event, which resulted in a total of 6 trip blanks for the entire sampling event. The trip blank collection frequency requirement was met. The trip blanks were analyzed for VOC only. Table 4 summarizes the detected trip blank results and associated sample results. Positive results in the trip blanks are presented as follows:

- Common laboratory contaminant acetone was detected at trace levels below the LOQ in 6 trip blanks
- Common laboratory contaminant methylene chloride was reported at trace levels below the LOQ in 3 trip blanks

The above trip blank detections have no impact on the data quality of the sample results as the analytes acetone and methylene chloride were not detected in any groundwater samples shipped with the blanks. Except as noted, the trip blanks were free of other VOCs. The trip blank results are acceptable and demonstrate that valid sample storage and shipping procedures are being implemented.

1.1.11 Equipment Rinse Blanks (Reason Code K1)

Equipment rinse blanks are designed to check for contamination from sampling equipment, and the results for the equipment rinse blanks are used to evaluate the efficiency of equipment decontamination procedures.

In accordance with the project QAPP requirements (USACE, 2013), no equipment rinse blanks will be collected when dedicated or disposable sampling equipment is used to collect groundwater samples. When non-dedicated or non-disposable sampling equipment is used, one equipment rinse blank will be collected at a rate of one per day.

During the November 2013 through March 2014 groundwater monitoring event at site WP026, non-dedicated sampling equipment was used to collect groundwater samples. Following sample collection, the sampling equipment was decontaminated in accordance with equipment decontamination procedures. One equipment rinse blank sample was prepared for the entire sampling event by rinsing the decontaminated pump with the distilled water, and then collecting the final rinse into appropriate sample containers. The equipment rinse blank sample was analyzed for VOC and metals. Table 5 summarizes the detected equipment rinse blank results and associated sample results. Positive results in the equipment rinse blank are summarized below:

- Concentration of iron was reported above the LOQ while concentrations of chromium, lead, and manganese were detected at trace levels below their respective LOQ;
- Common laboratory contaminant acetone was detected at a trace level below the LOQ; and chloroform was also detected below the LOQ.

As a result of the equipment rinse blank detection, one detected result of chromium in an associated groundwater sample was qualified as non-detected (U) at the reported concentration when the sample concentration was less than or equal to five times the level reported in the blank. This blank qualification has no impact on the data usability. As shown on Table 5, analytes iron, lead, manganese, acetone, and chloroform were not detected in the associated groundwater sample, and thus the sample results were not affected by the equipment rinse blank detections. Except where noted, the equipment rinse blank was free of all other target analytes.

1.1.12 Field Duplicates

In accordance with the project QAPP requirements (USACE, 2013), field duplicate samples are to be collected at a minimum rate of 10 percent of the total number of groundwater samples. Field duplicate samples are evaluated by calculating the RPD between the parent sample and its duplicate. The RPD is calculated using the following equation:

$$RPD = /(S-D)/[(S+D)/2]/ \times 100$$

where:

S = sample result
D = duplicate result

Acceptable precision control criteria are established at less than or equal to 35 percent for water samples. The RPD is calculated between pairs of field duplicate samples when both results are reported above the LOQ.

Two field duplicate pair was collected for the November 2013 through March 2014 groundwater monitoring event and met the 10 percent field duplicate frequency objective. The duplicate pair was collected from locations KAFB-2626 and KAFB-2629. The duplicate pairs were analyzed for VOC, dissolved metals, dissolved perchlorate, nitrate and nitrite as nitrogen, anions, ammonia as nitrogen, TDS, and radiological parameters. Table 6 presents the field duplicate results.

As indicated on Table 6, nitrate and nitrite as nitrogen by EPA Method 353.2, TDS by SM2540C, dissolved barium by EPA Method 6010C, dissolved perchlorate by EPA Method SW6850, and anions by

EPA Method SW9056A were detected above their respective LOQ in the pair from location KAFB-2626; and nitrate and nitrite as nitrogen by EPA Method 353.2, TDS by SM2540C, dissolved barium and selenium by EPA Method 6010C, anions by EPA Method SW9056A; and gross alpha by EPA Method SW9310 were reported above the LOQ in the second pair from location KAFB-2629. The RPDs for the listed analytes ranged from 0.2 to 6.2 percent, which is well within the 35 percent field precision requirement. Except as noted, no other target analytes were detected above the LOQ in the pairs. The field duplicate demonstrating acceptable overall field sampling and analytical precision for all methods.

1.2 Completeness

The following sections present a discussion of technical completeness for the November 2013 through March 2014 groundwater monitoring event. Completeness calculations were performed only for the groundwater samples that are used for project decisions. For informational purposes, completeness calculations were also calculated for the field QC samples. Completeness results are presented in Table 7.

1.2.1 Technical Completeness

Technical completeness is a quantitative measure of the data usability based on the number of rejected data compared to the total number of sample results. The technical completeness goal for each method is equal to or greater than 95 percent. The technical completeness calculation considers all data that are not rejected to be usable. The technical completeness is calculated as follows:

$$\%\ \text{Technical Completeness} = \frac{\text{Number of Usable Results}}{\text{Total Number of Results}} \times 100$$

As discussed in the previous sections, minor LCS recovery bias, CCV outliers, and low level laboratory and field blank detections were observed for the VOC, dissolved metals, TDS, and radiological analyses. While the affected results were qualified as estimated or non-detected, the data usability is not affected. Despite the exceedances noted, the technical completeness was 100 percent for all methods exceeding the 95 percent technical completeness objective. Therefore, the project data quality objectives were achieved for all methods for the November through March 2014 groundwater monitoring event.

1.3 Analysis Completeness

As a part of the data review process, CB&I reviewed chain-of-custody forms against Groundwater Monitoring Planner for site WP026 to ensure that analytical results were reported for all planned methods and samples. The review indicated the following:

- No groundwater samples were collected from locations KAFB-2624 and KAFB-2631 due to insufficient water in the two wells.
- No groundwater samples were collected from locations KAFB-0609 and KAFB-0610. These two wells were deemed unsafe and therefore were not sampled.
- Due to an error on the chain of custody form, no ammonia as nitrogen analysis was requested for one sample from well KAFB-0608. When the error was identified, the analysis holding time for the ammonia sample was already expired.

Except where noted above, analytical results were reported for all methods and for all samples as planned.

1.4 Summary

The analytical data reported for the November 2013 through March 2014 groundwater monitoring event at site WP026 have been reviewed for precision, accuracy/bias, and completeness. During sampling, samplers followed the approved project QAPP requirements and established sampling standard operating procedures (SOP) to collect, preserve, document, and ship samples to an off-site laboratories, ensuring the representativeness of the groundwater samples collected for the event. The selected laboratories are DoD ELAP certified and adhered to the most current EPA method requirements, project QAPP and DoD QSM requirements to prepare, analyze, and report the data. This ensures the comparability of the analytical results between different samples and different sites. An EPA data review was performed to evaluate the laboratory data and to verify that the laboratory complied with the DoD QSM and project QAPP requirements, and to apply qualifiers to the affected analytical data that was outside the established control criteria. Based on a review of the completed sample collection logs, chain of custody forms, sample receipt forms, and laboratory data packages, the analytical data reported for this event has met the representativeness and comparability requirements.

Data quality exceedances consist of minor LCS recovery bias and continuing calibration outliers and low level laboratory and field blank detections. The affected data were qualified as estimated or nondetected. In all cases, the degree of these data quality exceedances was minor, and the data usability was not affected. The 95 percent technical completeness goal was exceeded for all methods for the November 2013 through March 2014 groundwater monitoring event. All data are usable for their intended purposes.

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TABLES

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List of Appendix D Tables

Table 1: Summary of Samples Collected, Sample Date, Sample Location, Preparation Method, Analysis Method, and Data Review Level

Table 2: Data Qualification Flags and Reason Codes

Table 3: Qualified Data Summary

Table 4: Detected Trip Blank Results and Associated Sample Results

Table 5: Detected Equipment Blank Results and Associated Sample Results

Table 6: Field Duplicate Summary

Table 7: Technical Completeness

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Table 1: Summary of Samples Collected, Sample Date, Sample Location, Preparation Method, Analysis Method, and Data Review Level WP026, November 2013 - March 2014 Kirtland Air Force Base

Date Collected	Field Sample ID	Sample Location	Lab	Sample Type	Date Prepared	Prep Method	Date Analyzed	Analytical Method	Review Level
Environmental Samples									
SDG ECOS_001									
11/25/2013	WP026-30002	KAFB2622	EPLN	REG	12/9/2013	NONE	12/9/2013	E353.2	III
11/25/2013	WP026-30002	KAFB2622	EPLN	REG	11/27/2013	NONE	11/27/2013	SM2540C	III
11/25/2013	WP026-30002	KAFB2622	EPLN	REG	12/16/2013	NONE	12/17/2013	SM4500NH3BG	III
11/25/2013	WP026-30002	KAFB2622	EPLN	REG	12/5/2013	SW3005	12/10/2013	SW6010C-DISS	III
11/25/2013	WP026-30002	KAFB2622	EPLN	REG	12/9/2013	METHOD	12/13/2013	SW6850-DISS	III
11/25/2013	WP026-30002	KAFB2622	EPLN	REG	12/11/2013	METHOD	12/12/2013	SW7470A-DISS	III
11/25/2013	WP026-30002	KAFB2622	EPLN	REG	12/6/2013	SW5030	12/6/2013	SW8260B	III
11/25/2013	WP026-30002	KAFB2622	EPLN	REG	12/13/2013	METHOD	12/13/2013	SW9056A	III
11/25/2013	WP026-30002	KAFB2622	ALS	REG	12/9/2013	METHOD	12/17/2013	SW9310	III
11/25/2013	WP026-30002	KAFB2622	ALS	REG	12/4/2013	METHOD	12/19/2013	SW9315	III
11/25/2013	WP026-30002	KAFB2622	ALS	REG	12/13/2013	METHOD	12/13/2013	SW9320	III
12/2/2013	WP026-30004	KAFB-2625	EPLN	REG	12/9/2013	NONE	12/9/2013	E353.2	III
12/2/2013	WP026-30004	KAFB-2625	EPLN	REG	12/5/2013	NONE	12/5/2013	SM2540C	III
12/2/2013	WP026-30004	KAFB-2625	EPLN	REG	12/10/2013	NONE	12/12/2013	SM4500NH3BG	III
12/2/2013	WP026-30004	KAFB-2625	EPLN	REG	12/5/2013	SW3005	12/10/2013	SW6010C-DISS	III
12/2/2013	WP026-30004	KAFB-2625	EPLN	REG	12/9/2013	METHOD	12/13/2013	SW6850-DISS	III
12/2/2013	WP026-30004	KAFB-2625	EPLN	REG	12/11/2013	METHOD	12/12/2013	SW7470A-DISS	III
12/2/2013	WP026-30004	KAFB-2625	EPLN	REG	12/11/2013	SW5030	12/11/2013	SW8260B	III
12/2/2013	WP026-30004	KAFB-2625	EPLN	REG	12/13/2013	METHOD	12/13/2013	SW9056A	III
12/2/2013	WP026-30004	KAFB-2625	ALS	REG	12/9/2013	METHOD	12/18/2013	SW9310	III
12/2/2013	WP026-30004	KAFB-2625	ALS	REG	12/4/2013	METHOD	12/19/2013	SW9315	III
12/2/2013	WP026-30004	KAFB-2625	ALS	REG	12/13/2013	METHOD	12/13/2013	SW9320	III
12/3/2013	WP026-30010	KAFB-2628	EPLN	REG	12/9/2013	NONE	12/9/2013	E353.2	III
12/3/2013	WP026-30010	KAFB-2628	EPLN	REG	12/5/2013	NONE	12/5/2013	SM2540C	III
12/3/2013	WP026-30010	KAFB-2628	EPLN	REG	12/16/2013	NONE	12/17/2013	SM4500NH3BG	III
12/3/2013	WP026-30010	KAFB-2628	EPLN	REG	12/5/2013	SW3005	12/10/2013	SW6010C-DISS	III
12/3/2013	WP026-30010	KAFB-2628	EPLN	REG	12/9/2013	METHOD	12/13/2013	SW6850-DISS	III
12/3/2013	WP026-30010	KAFB-2628	EPLN	REG	12/11/2013	METHOD	12/12/2013	SW7470A-DISS	III
12/3/2013	WP026-30010	KAFB-2628	EPLN	REG	12/11/2013	SW5030	12/11/2013	SW8260B	III
12/3/2013	WP026-30010	KAFB-2628	EPLN	REG	12/13/2013	METHOD	12/13/2013	SW9056A	III

Table 1: Summary of Samples Collected, Sample Date, Sample Location, Preparation Method, Analysis Method, and Data Review Level WP026, November 2013 - March 2014 Kirtland Air Force Base

Date Collected	Field Sample ID	Sample Location	Lab	Sample Type	Date Prepared	Prep Method	Date Analyzed	Analytical Method	Review Level
Environmental Samples									
SDG ECOS_001									
12/3/2013	WP026-30010	KAFB-2628	ALS	REG	12/9/2013	METHOD	12/18/2013	SW9310	III
12/3/2013	WP026-30010	KAFB-2628	ALS	REG	12/4/2013	METHOD	12/19/2013	SW9315	III
12/3/2013	WP026-30010	KAFB-2628	ALS	REG	12/13/2013	METHOD	12/13/2013	SW9320	III
SDG ECOS_002									
12/4/2013	WP026-30005	KAFB-2626	EPLN	REG	12/9/2013	NONE	12/9/2013	E353.2	III
12/4/2013	WP026-30005	KAFB-2626	EPLN	REG	12/11/2013	NONE	12/11/2013	SM2540C	III
12/4/2013	WP026-30005	KAFB-2626	EPLN	REG	12/16/2013	NONE	12/17/2013	SM4500NH3BG	III
12/4/2013	WP026-30005	KAFB-2626	EPLN	REG	12/12/2013	SW3005	12/13/2013	SW6010C-DISS	III
12/4/2013	WP026-30005	KAFB-2626	EPLN	REG	12/9/2013	METHOD	12/17/2013	SW6850-DISS	III
12/4/2013	WP026-30005	KAFB-2626	EPLN	REG	12/11/2013	METHOD	12/12/2013	SW7470A-DISS	III
12/4/2013	WP026-30005	KAFB-2626	EPLN	REG	12/11/2013	SW5030	12/11/2013	SW8260B	III
12/4/2013	WP026-30005	KAFB-2626	EPLN	REG	12/18/2013	METHOD	12/18/2013	SW9056A	III
12/4/2013	WP026-30005	KAFB-2626	ALS	REG	12/10/2013	METHOD	12/13/2013	SW9310	III
12/4/2013	WP026-30005	KAFB-2626	ALS	REG	12/10/2013	METHOD	12/17/2013	SW9315	III
12/4/2013	WP026-30005	KAFB-2626	ALS	REG	12/13/2013	METHOD	12/13/2013	SW9320	III
12/4/2013	WP026-30006	KAFB-2626	EPLN	FD	12/9/2013	NONE	12/9/2013	E353.2	III
12/4/2013	WP026-30006	KAFB-2626	EPLN	FD	12/11/2013	NONE	12/11/2013	SM2540C	III
12/4/2013	WP026-30006	KAFB-2626	EPLN	FD	12/16/2013	NONE	12/17/2013	SM4500NH3BG	III
12/4/2013	WP026-30006	KAFB-2626	EPLN	FD	12/12/2013	SW3005	12/13/2013	SW6010C-DISS	III
12/4/2013	WP026-30006	KAFB-2626	EPLN	FD	12/9/2013	METHOD	12/17/2013	SW6850-DISS	III
12/4/2013	WP026-30006	KAFB-2626	EPLN	FD	12/11/2013	METHOD	12/12/2013	SW7470A-DISS	III
12/4/2013	WP026-30006	KAFB-2626	EPLN	FD	12/11/2013	SW5030	12/11/2013	SW8260B	III
12/4/2013	WP026-30006	KAFB-2626	EPLN	FD	12/18/2013	METHOD	12/18/2013	SW9056A	III
12/4/2013	WP026-30006	KAFB-2626	ALS	FD	12/10/2013	METHOD	12/20/2013	SW9310	III
12/4/2013	WP026-30006	KAFB-2626	ALS	FD	12/10/2013	METHOD	12/17/2013	SW9315	III
12/4/2013	WP026-30006	KAFB-2626	ALS	FD	12/13/2013	METHOD	12/13/2013	SW9320	III
12/10/2013	WP026-30016	KAFB-0608	EPLN	REG	12/23/2013	NONE	12/23/2013	E353.2	III
12/10/2013	WP026-30016	KAFB-0608	EPLN	REG	12/11/2013	NONE	12/11/2013	SM2540C	III
12/10/2013	WP026-30016	KAFB-0608	EPLN	REG	12/16/2013	SW5030	12/16/2013	SW8260B	III
12/10/2013	WP026-30016	KAFB-0608	EPLN	REG	12/20/2013	METHOD	12/21/2013	SW9056A	III

Table 1: Summary of Samples Collected, Sample Date, Sample Location, Preparation Method, Analysis Method, and Data Review Level WP026, November 2013 - March 2014 Kirtland Air Force Base

Date Collected	Field Sample ID	Sample Location	Lab	Sample Type	Date Prepared	Prep Method	Date Analyzed	Analytical Method	Review Level
Environmental Samples									
SDG ECOS_005									
3/17/2014	WP026-30011	KAFB-2629	EPLN	REG	3/19/2014	NONE	3/19/2014	E353.2	III
3/17/2014	WP026-30011	KAFB-2629	EPLN	REG	3/21/2014	NONE	3/21/2014	SM2540C	III
3/17/2014	WP026-30011	KAFB-2629	EPLN	REG	3/24/2014	NONE	3/25/2014	SM4500NH3BG	III
3/17/2014	WP026-30011	KAFB-2629	EPLN	REG	3/24/2014	SW3005	3/25/2014	SW6010C-DISS	III
3/17/2014	WP026-30011	KAFB-2629	EPLN	REG	4/1/2014	METHOD	4/1/2014	SW6850-DISS	III
3/17/2014	WP026-30011	KAFB-2629	EPLN	REG	3/28/2014	METHOD	3/31/2014	SW7470A-DISS	III
3/17/2014	WP026-30011	KAFB-2629	EPLN	REG	3/25/2014	SW5030	3/25/2014	SW8260B	III
3/17/2014	WP026-30011	KAFB-2629	EPLN	REG	3/20/2014	METHOD	3/20/2014	SW9056A	III
3/17/2014	WP026-30011	KAFB-2629	ALS	REG	3/25/2014	METHOD	3/30/2014	SW9310	III
3/17/2014	WP026-30011	KAFB-2629	ALS	REG	3/19/2014	METHOD	4/4/2014	SW9315	III
3/17/2014	WP026-30011	KAFB-2629	ALS	REG	3/28/2014	METHOD	4/2/2014	SW9320	III
3/17/2014	WP026-30012	KAFB-2629	EPLN	FD	3/19/2014	NONE	3/19/2014	E353.2	III
3/17/2014	WP026-30012	KAFB-2629	EPLN	FD	3/21/2014	NONE	3/21/2014	SM2540C	III
3/17/2014	WP026-30012	KAFB-2629	EPLN	FD	3/24/2014	NONE	3/25/2014	SM4500NH3BG	III
3/17/2014	WP026-30012	KAFB-2629	EPLN	FD	3/24/2014	SW3005	3/25/2014	SW6010C-DISS	III
3/17/2014	WP026-30012	KAFB-2629	EPLN	FD	4/1/2014	METHOD	4/1/2014	SW6850-DISS	III
3/17/2014	WP026-30012	KAFB-2629	EPLN	FD	3/28/2014	METHOD	3/31/2014	SW7470A-DISS	III
3/17/2014	WP026-30012	KAFB-2629	EPLN	FD	3/25/2014	SW5030	3/25/2014	SW8260B	III
3/17/2014	WP026-30012	KAFB-2629	EPLN	FD	3/20/2014	METHOD	3/20/2014	SW9056A	III
3/17/2014	WP026-30012	KAFB-2629	ALS	FD	3/25/2014	METHOD	3/30/2014	SW9310	III
3/17/2014	WP026-30012	KAFB-2629	ALS	FD	3/19/2014	METHOD	4/4/2014	SW9315	III
3/17/2014	WP026-30012	KAFB-2629	ALS	FD	3/28/2014	METHOD	4/2/2014	SW9320	III
3/18/2014	WP026-30007	KAFB-2630	EPLN	REG	3/19/2014	NONE	3/19/2014	E353.2	III
3/18/2014	WP026-30007	KAFB-2630	EPLN	REG	3/21/2014	NONE	3/21/2014	SM2540C	III
3/18/2014	WP026-30007	KAFB-2630	EPLN	REG	3/24/2014	NONE	3/25/2014	SM4500NH3BG	III
3/18/2014	WP026-30007	KAFB-2630	EPLN	REG	3/24/2014	SW3005	3/25/2014	SW6010C-DISS	III
3/18/2014	WP026-30007	KAFB-2630	EPLN	REG	4/1/2014	METHOD	4/1/2014	SW6850-DISS	III
3/18/2014	WP026-30007	KAFB-2630	EPLN	REG	3/28/2014	METHOD	3/31/2014	SW7470A-DISS	III
3/18/2014	WP026-30007	KAFB-2630	EPLN	REG	3/26/2014	SW5030	3/26/2014	SW8260B	III
3/18/2014	WP026-30007	KAFB-2630	EPLN	REG	3/20/2014	METHOD	3/20/2014	SW9056A	III

Table 1: Summary of Samples Collected, Sample Date, Sample Location, Preparation Method, Analysis Method, and Data Review Level WP026, November 2013 - March 2014 Kirtland Air Force Base

Date Collected	Field Sample ID	Sample Location	Lab	Sample Type	Date Prepared	Prep Method	Date Analyzed	Analytical Method	Review Level
Environmental Samples									
SDG ECOS_005									
3/18/2014	WP026-30007	KAFB-2630	ALS	REG	3/25/2014	METHOD	3/30/2014	SW9310	III
3/18/2014	WP026-30007	KAFB-2630	ALS	REG	3/19/2014	METHOD	4/4/2014	SW9315	III
3/18/2014	WP026-30007	KAFB-2630	ALS	REG	3/28/2014	METHOD	4/2/2014	SW9320	III
3/18/2014	WP026-30009	WP26-KAFB2632	EPLN	REG	3/19/2014	NONE	3/19/2014	E353.2	III
3/18/2014	WP026-30009	WP26-KAFB2632	EPLN	REG	3/21/2014	NONE	3/21/2014	SM2540C	III
3/18/2014	WP026-30009	WP26-KAFB2632	EPLN	REG	3/24/2014	NONE	3/25/2014	SM4500NH3BG	III
3/18/2014	WP026-30009	WP26-KAFB2632	EPLN	REG	3/24/2014	SW3005	3/25/2014	SW6010C-DISS	III
3/18/2014	WP026-30009	WP26-KAFB2632	EPLN	REG	4/1/2014	METHOD	4/1/2014	SW6850-DISS	III
3/18/2014	WP026-30009	WP26-KAFB2632	EPLN	REG	3/28/2014	METHOD	3/31/2014	SW7470A-DISS	III
3/18/2014	WP026-30009	WP26-KAFB2632	EPLN	REG	3/26/2014	SW5030	3/26/2014	SW8260B	III
3/18/2014	WP026-30009	WP26-KAFB2632	EPLN	REG	3/20/2014	METHOD	3/20/2014	SW9056A	III
3/18/2014	WP026-30009	WP26-KAFB2632	ALS	REG	3/25/2014	METHOD	3/30/2014	SW9310	III
3/18/2014	WP026-30009	WP26-KAFB2632	ALS	REG	3/19/2014	METHOD	4/4/2014	SW9315	III
3/18/2014	WP026-30009	WP26-KAFB2632	ALS	REG	3/28/2014	METHOD	4/2/2014	SW9320	III
3/19/2014	WP026-30013	KAFB0505	EPLN	REG	3/24/2014	NONE	3/24/2014	E353.2	III
3/19/2014	WP026-30013	KAFB0505	EPLN	REG	3/27/2014	NONE	3/27/2014	SM2540C	III
3/19/2014	WP026-30013	KAFB0505	EPLN	REG	4/3/2014	NONE	4/4/2014	SM4500NH3BG	III
3/19/2014	WP026-30013	KAFB0505	EPLN	REG	4/2/2014	SW5030	4/2/2014	SW8260B	III
3/19/2014	WP026-30013	KAFB0505	EPLN	REG	3/21/2014	METHOD	3/21/2014	SW9056A	III
3/20/2014	WP026-30001	KAFB0506	EPLN	REG	3/24/2014	NONE	3/24/2014	E353.2	III
3/20/2014	WP026-30001	KAFB0506	EPLN	REG	3/21/2014	NONE	3/21/2014	SM2540C	III
3/20/2014	WP026-30001	KAFB0506	EPLN	REG	4/3/2014	NONE	4/4/2014	SM4500NH3BG	III
3/20/2014	WP026-30001	KAFB0506	EPLN	REG	3/27/2014	SW3005	3/31/2014	SW6010C-DISS	III
3/20/2014	WP026-30001	KAFB0506	EPLN	REG	3/27/2014	SW3005	4/1/2014	SW6010C-DISS	III
3/20/2014	WP026-30001	KAFB0506	EPLN	REG	4/7/2014	METHOD	4/7/2014	SW6850-DISS	III
3/20/2014	WP026-30001	KAFB0506	EPLN	REG	3/28/2014	METHOD	3/31/2014	SW7470A-DISS	III
3/20/2014	WP026-30001	KAFB0506	EPLN	REG	4/2/2014	SW5030	4/2/2014	SW8260B	III
3/20/2014	WP026-30001	KAFB0506	EPLN	REG	3/21/2014	METHOD	3/21/2014	SW9056A	III
3/20/2014	WP026-30001	KAFB0506	EPLN	REG	4/8/2014	METHOD	4/8/2014	SW9056A	III
3/20/2014	WP026-30001	KAFB0506	ALS	REG	3/27/2014	METHOD	3/31/2014	SW9310	III

Table 1: Summary of Samples Collected, Sample Date, Sample Location, Preparation Method, Analysis Method, and Data Review Level WP026, November 2013 - March 2014 Kirtland Air Force Base

Date Collected	Field Sample ID	Sample Location	Lab	Sample Type	Date Prepared	Prep Method	Date Analyzed	Analytical Method	Review Level
Environmental Samples									
SDG ECOS_005									
3/20/2014	WP026-30001	KAFB0506	ALS	REG	3/25/2014	METHOD	4/9/2014	SW9315	III
3/20/2014	WP026-30001	KAFB0506	ALS	REG	3/28/2014	METHOD	4/2/2014	SW9320	III
Field QC Samples									
SDG ECOS_001									
11/25/2013	WP026-80004	FIELDQC	EPLN	TB	12/6/2013	SW5030	12/6/2013	SW8260B	III
12/2/2013	WP026-80005	FIELDQC	EPLN	TB	12/11/2013	SW5030	12/11/2013	SW8260B	III
SDG ECOS_002									
12/4/2013	WP026-80006	FIELDQC	EPLN	TB	12/11/2013	SW5030	12/11/2013	SW8260B	III
12/9/2013	WP026-80007	FIELDQC	EPLN	TB	12/16/2013	SW5030	12/16/2013	SW8260B	III
SDG ECOS_005									
3/18/2014	WP026-80008	FIELDQC	EPLN	TB	3/26/2014	SW5030	3/26/2014	SW8260B	III
3/20/2014	WP026-80009	FIELDQC	EPLN	TB	4/2/2014	SW5030	4/2/2014	SW8260B	III
3/24/2014	WP026-80001	FIELDQC	EPLN	ER	4/7/2014	SW3005	4/17/2014	SW6010C-DISS	III
3/24/2014	WP026-80001	FIELDQC	EPLN	ER	4/3/2014	METHOD	4/4/2014	SW7470A-DISS	III
3/24/2014	WP026-80001	FIELDQC	EPLN	ER	4/3/2014	SW5030	4/3/2014	SW8260B	III

Notes:

SDG	Sample Delivery Group
ALS	ALS Environmental
EPLN	Empirical Laboratories
REG	Normal sample sent to the lab
ER	Equipment rinse blank
FD	Field Duplicate
TB	Trip Blank
III	Samples received Level III data review

Table 2. Data Qualification Flags and Reason Codes

Data Qualifier Definitions for Organic Data Review

Qualifier	Definition
	No Qualifier indicates that the data are acceptable both qualitatively and quantitatively.
U	The analyte was analyzed for but was not detected above the reported limit of quantitation.
J	The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample. Results are estimated, although the data are considered usable and may be used as appropriate to meet project objectives. Results are qualitatively acceptable and quantitatively uncertain.
J-	The analyte was positively identified; the associated numerical value is its approximate concentration with a low bias in the sample.
J+	The analyte was positively identified; the associated numerical value is its approximate concentration with a high bias in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a “tentative identification.”
NJ	The analysis indicates the presence of an analyte that has been ”tentatively identified,” and the associated value represents its approximate concentration.
UJ	The analyte was not detected above the reported limit of quantitation. However, the reported limit of quantitation is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
R	The analyte was analyzed for, but the presence or absence of the analyte has not been verified. Re-sampling and re-analysis may be necessary to confirm or deny the presence of the analyte. Results are rejected, and data are unusable for any purposes.

Data Qualifier Definitions For Inorganic Data Review

Qualifier	Definition
	No Qualifier indicates that the data are acceptable both qualitatively and quantitatively.
U	The analyte was analyzed for but was not detected above the level of the reported value. The reported value is the limit of quantitation for water and soil for all the analytes except cyanide and mercury. For cyanide and mercury, the reported value is the contract-required detection limit.
J	The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample. Results are estimated, although the data are considered usable and may be used as appropriate to meet project objectives. Results are qualitatively acceptable and quantitatively uncertain.
J-	The analyte was positively identified; the associated numerical value is its approximate concentration with a low bias in the sample.
J+	The analyte was positively identified; the associated numerical value is its approximate concentration with a high bias in the sample.
UJ	The analyte was analyzed for but was not detected above the reported value. The reported value may not accurately or precisely represent the sample limit of quantitation.
R	The analyte was analyzed for, but the presence or absence of the analyte has not been verified. Re-sampling and re-analysis may be necessary to confirm or deny the presence of the analyte. Results are rejected, and data are unusable for any purposes.

Table 2. Data Qualification Flags and Reason Codes (concluded)

Reason Codes for Data Review and Validation

Reason Code	Description
A	Serial dilution outside criteria (Level IV).
B1	Method blank contaminants above reporting limit.
B2	Calibration blank contaminants above reporting limit.
B2, Bias Flag "-"	Calibration blank indicates negative interference; false negatives may be present.
C	Calibration outside control limits.
D	Sample results precision between primary and secondary columns outside control limit.
D1	Sample duplicate RPD outside control limit.
D2	Matrix duplicate RPD outside control limit.
D3	Laboratory control sample duplicate RPD outside control limit.
E	The sample results exceed the linear calibration range of the instrument.
F	Hydrocarbon pattern does not match hydrocarbon pattern in the standard.
G1	Initial calibration relative standard deviation outside control limit.
G2	Initial continuing calibration RRF outside control limit.
G3	Continuing calibration RRF outside control limit.
H	Holding time exceeded.
I	Internal standard recovery outside control limit.
K1	Equipment rinsate contamination.
K2	Ambient blank contamination.
K3	Trip blank contamination.
L	LCS outside control limits.
M	MS outside control limits.
O	Interference check sample outside acceptance criteria.
P	Analyte qualified based on the professional judgment of the reviewer.
S	Surrogate recovery outside control limit.
T	Temperature outside acceptance criteria.
Tr	Value reported detected between the detection limit and LOQ.
W	Pesticide breakdown outside criteria (Level IV).
X	Raised reporting limit due to matrix interference or high analyte concentration.
Y	Analyte was not confirmed by a second column.

Table 3
Qualified Data Summary
WP026, November 2013 - March 2014
Kirtland Air Force Base

Sample ID	Sample Type	Sample Date	Analyte	SDG	Result	DL	LOQ	Dilution	Units	Qualifier
Environmental Samples										
Reason Code B1		**Method SW9310**								
WP026-30009	REG	3/18/2014	Gross Beta	1403325	3.7	1.3	1.3	1	pCi/L	U
WP026-30011	REG	3/17/2014	Gross Beta	1403325	2.8	1.6	1.6	1	pCi/L	U
WP026-30012	FD	3/17/2014	Gross Beta	1403325	3	1.5	1.5	1	pCi/L	U
Reason Code CTr		**Method SW8260B**								
WP026-30002	REG	11/25/2013	1,2,4-Trimethylbenzene	ECOS_001	0.38	0.25	1	1	ug/L	J+
Reason Code K1		**Method SW6010C-DISS**								
WP026-30001	REG	3/20/2014	Chromium, Dissolved	ECOS_005	2.52	0.5	2.5	1	ug/L	U
Reason Code L		**Method SM2540C**								
WP026-30005	REG	12/4/2013	Total Dissolved Solids	ECOS_002	270	20	20	1	mg/L	J+
Field QC Samples										
Reason Code LTr		**Method SW8260B**								
WP026-80009	TB	3/20/2014	Acetone	ECOS_005	4.27	2.5	10	1	ug/L	J+

Notes: See Table 2 for definitions of Qualifiers and Reason Codes.

SDG	Sample delivery group
DL	Detection limit
LOQ	Limit of quantitation
MDC	Minimum detectable concentration for radiological parameters. Values listed under the DL and LOQ columns for Gross Beta are MDC.
REG	Normal sample sent to the lab
FD	Field duplicate
TB	Trip blank
mg/L	Milligrams per liter
µg/L	Micrograms per liter
pCi/L	Picocuries per liter

Table 4
Detected Trip Blank Results and Associated Sample Results
WP026, November 2013 - March 2014
Kirtland Air Force Base

Field Sample ID	Sample Type	Sample Date	Method	Analyte	Result	DL	LOQ	Units	Qualifier	Reason Code
WP026-80004	**TB**	**11/25/2013**	**SW8260B**	**Acetone**	**3.38**	**2.5**	**10**	**ug/L**	**J**	**Tr**
WP026-30002	REG	11/25/2013	SW8260B	Acetone	ND	2.5	10	ug/L		
WP026-80005	**TB**	**12/2/2013**	**SW8260B**	**Acetone**	**6.95**	**2.5**	**10**	**ug/L**	**J**	**Tr**
WP026-30004	REG	12/2/2013	SW8260B	Acetone	ND	2.5	10	ug/L		
WP026-30010	REG	12/3/2013	SW8260B	Acetone	ND	2.5	10	ug/L		
WP026-80005	**TB**	**12/2/2013**	**SW8260B**	**Methylene chloride**	**1.02**	**0.5**	**2**	**ug/L**	**J**	**Tr**
WP026-30004	REG	12/2/2013	SW8260B	Methylene chloride	ND	0.5	2	ug/L		
WP026-30010	REG	12/3/2013	SW8260B	Methylene chloride	ND	0.5	2	ug/L		
WP026-80006	**TB**	**12/4/2013**	**SW8260B**	**Acetone**	**4.92**	**2.5**	**10**	**ug/L**	**J**	**Tr**
WP026-30005	REG	12/4/2013	SW8260B	Acetone	ND	2.5	10	ug/L		
WP026-30006	FD	12/4/2013	SW8260B	Acetone	ND	2.5	10	ug/L		
WP026-80006	**TB**	**12/4/2013**	**SW8260B**	**Methylene chloride**	**1.84**	**0.5**	**2**	**ug/L**	**J**	**Tr**
WP026-30005	REG	12/4/2013	SW8260B	Methylene chloride	ND	0.5	2	ug/L		
WP026-30006	FD	12/4/2013	SW8260B	Methylene chloride	ND	0.5	2	ug/L		
WP026-80007	**TB**	**12/9/2013**	**SW8260B**	**Acetone**	**4.08**	**2.5**	**10**	**ug/L**	**J**	**Tr**
WP026-30016	REG	12/10/2013	SW8260B	Acetone	ND	2.5	10	ug/L		
WP026-80007	**TB**	**12/9/2013**	**SW8260B**	**Methylene chloride**	**1.2**	**0.5**	**2**	**ug/L**	**J**	**Tr**
WP026-30016	REG	12/10/2013	SW8260B	Methylene chloride	ND	0.5	2	ug/L		
WP026-80008	**TB**	**3/18/2014**	**SW8260B**	**Acetone**	**8.72**	**2.5**	**10**	**ug/L**	**J**	**Tr**
WP026-30011	REG	3/17/2014	SW8260B	Acetone	ND	2.5	10	ug/L		
WP026-30012	FD	3/17/2014	SW8260B	Acetone	ND	2.5	10	ug/L		
WP026-30007	REG	3/18/2014	SW8260B	Acetone	ND	2.5	10	ug/L		
WP026-30009	REG	3/18/2014	SW8260B	Acetone	ND	2.5	10	ug/L		
WP026-80009	**TB**	**3/20/2014**	**SW8260B**	**Acetone**	**4.27**	**2.5**	**10**	**ug/L**	**J+**	**LTr**
WP026-30013	REG	3/19/2014	SW8260B	Acetone	ND	2.5	10	ug/L		
WP026-30001	REG	3/20/2014	SW8260B	Acetone	ND	2.5	10	ug/L		

Notes: See Table 2 for definitions of Qualifiers and Reason Codes.

DL Detection limit
LOQ Limit of quantitation
ND Not detected at the LOQ
REG Normal sample sent to the lab
FD Field duplicate
TB Trip blank
µg/L Micrograms per liter

Table 5
Detected Equipment Blank Results and Associated Sample Results
WP026, November 2013 - March 2014
Kirtland Air Force Base

Field Sample ID	Sample Type	Sample Date	Method	Analyte	Result	DL	LOQ	Units	Qualifier	Reason Code
WP026-80001	**ER**	**3/24/2014**	**SW6010C-DISS**	**Chromium, Dissolved**	**0.853**	**0.5**	**2.5**	**ug/L**	**J**	**Tr**
WP026-30001	REG	3/20/2014	SW6010C-DISS	Chromium, Dissolved	2.52	0.5	2.5	ug/L	U	K1
WP026-80001	**ER**	**3/24/2014**	**SW6010C-DISS**	**Iron, Dissolved**	**29.4**	**7.5**	**25**	**ug/L**		
WP026-30001	REG	3/20/2014	SW6010C-DISS	Iron, Dissolved	ND	7.5	25	ug/L		
WP026-80001	**ER**	**3/24/2014**	**SW6010C-DISS**	**Lead, Dissolved**	**0.604**	**0.375**	**0.75**	**ug/L**	**J**	**Tr**
WP026-30001	REG	3/20/2014	SW6010C-DISS	Lead, Dissolved	ND	3	3	ug/L		
WP026-80001	**ER**	**3/24/2014**	**SW6010C-DISS**	**Manganese, Dissolved**	**3.71**	**0.75**	**3.75**	**ug/L**	**J**	**Tr**
WP026-30001	REG	3/20/2014	SW6010C-DISS	Manganese, Dissolved	ND	0.75	3.75	ug/L		
WP026-80001	**ER**	**3/24/2014**	**SW8260B**	**Acetone**	**6.08**	**5**	**20**	**ug/L**	**J**	**Tr**
WP026-30001	REG	3/20/2014	SW8260B	Acetone	ND	2.5	10	ug/L		
WP026-80001	**ER**	**3/24/2014**	**SW8260B**	**Chloroform**	**0.811**	**0.5**	**2**	**ug/L**	**J**	**Tr**
WP026-30001	REG	3/20/2014	SW8260B	Chloroform	ND	0.25	1	ug/L		

Notes: See Table 2 for definitions of Qualifiers and Reason Codes.

DL Detection limit
LOQ Limit of quantitation
ND Not detected at the LOQ
REG Normal sample sent to the lab
ER Equipment rinse blank
µg/L Micrograms per liter

Table 6
Field Duplicate Summary
WP026, November 2013 - March 2014
Kirtland Air Force Base

Well ID/Method	Analyte	Sample Date	Normal Sample Result	Normal Sample LOQ	Duplicate Sample Result	Duplicate Sample LOQ	Units	RPD %	RPD Goal of 35% Met
KAFB-2626									
E353.2	Nitrate/Nitrite as N	12/4/2013	2.18	1.5	2.15	1.5	mg/L	1.4	Yes
SM2540C	Total Dissolved Solids		270 J+	20	277	20	mg/L	2.6	Yes
SM4500NH3BG	Ammonia as N		ND	0.3	ND	0.3	mg/L	--	--
SW6010C-DISS	Arsenic, Dissolved		ND	2.5	ND	2.5	ug/L	--	--
	Barium, Dissolved		173	10	177	10	ug/L	2.3	Yes
	Cadmium, Dissolved		ND	1.25	ND	1.25	ug/L	--	--
	Chromium, Dissolved		1.98 J	2.5	2.02 J	2.5	ug/L	--	--
	Iron, Dissolved		18.2 J	25	15.6 J	25	ug/L	--	--
	Lead, Dissolved		0.566 J	0.75	0.636 J	0.75	ug/L	--	--
	Manganese, Dissolved		2.35 J	3.75	2.67 J	3.75	ug/L	--	--
	Selenium, Dissolved		2.61	2.5	2.47 J	2.5	ug/L	--	--
	Silver, Dissolved		ND	2.5	ND	2.5	ug/L	--	--
SW6850-DISS	Perchlorate		2.16	2	2.13	2	ug/L	1.4	Yes
SW7470A-DISS	Mercury, Dissolved		ND	0.2	ND	0.2	ug/L	--	--
SW8260B	1,1,1,2-Tetrachloroethane		ND	1	ND	1	ug/L	--	--
	1,1,1-Trichloroethane		ND	1	ND	1	ug/L	--	--
	1,1,2,2-Tetrachloroethane		ND	1	ND	1	ug/L	--	--
	1,1,2-Trichloroethane		ND	1	ND	1	ug/L	--	--
	1,1-Dichloroethane		ND	1	ND	1	ug/L	--	--
	1,1-Dichloroethene		ND	1	ND	1	ug/L	--	--
	1,1-Dichloropropene		ND	1	ND	1	ug/L	--	--
	1,2,3-Trichlorobenzene		ND	1	ND	1	ug/L	--	--
	1,2,3-Trichloropropane		ND	2	ND	2	ug/L	--	--
	1,2,4-Trichlorobenzene		ND	1	ND	1	ug/L	--	--
	1,2,4-Trimethylbenzene		ND	1	ND	1	ug/L	--	--
	1,2-Dibromo-3-chloropropane		ND	2	ND	2	ug/L	--	--
	1,2-Dibromoethane (EDB)		ND	1	ND	1	ug/L	--	--
	1,2-Dichlorobenzene		ND	1	ND	1	ug/L	--	--
	1,2-Dichloroethane		ND	1	ND	1	ug/L	--	--
	1,2-Dichloropropane		ND	1	ND	1	ug/L	--	--
	1,3,5-Trimethylbenzene		ND	1	ND	1	ug/L	--	--
	1,3-Dichlorobenzene		ND	1	ND	1	ug/L	--	--
	1,3-Dichloropropane		ND	1	ND	1	ug/L	--	--
	1,4-Dichlorobenzene		ND	1	ND	1	ug/L	--	--
	2,2-Dichloropropane		ND	1	ND	1	ug/L	--	--
	2-Butanone		ND	10	ND	10	ug/L	--	--
	2-Chlorotoluene		ND	1	ND	1	ug/L	--	--
	2-Hexanone		ND	5	ND	5	ug/L	--	--
	4-Chlorotoluene		ND	1	ND	1	ug/L	--	--
	4-Methyl-2-pentanone		ND	5	ND	5	ug/L	--	--
	Acetone		ND	10	ND	10	ug/L	--	--
	Benzene		0.42 J	1	0.42 J	1	ug/L	--	--

Table 6
Field Duplicate Summary
WP026, November 2013 - March 2014
Kirtland Air Force Base

Well ID/Method	Analyte	Sample Date	Normal Sample Result	Normal Sample LOQ	Duplicate Sample Result	Duplicate Sample LOQ	Units	RPD %	RPD Goal of 35% Met
KAFB-2626									
SW8260B	Bromobenzene	12/4/2013	ND	1	ND	1	ug/L	--	--
	Bromodichloromethane		ND	1	ND	1	ug/L	--	--
	Bromoform		ND	1	ND	1	ug/L	--	--
	Bromomethane		ND	2	ND	2	ug/L	--	--
	Carbon disulfide		ND	1	ND	1	ug/L	--	--
	Carbon tetrachloride		ND	1	ND	1	ug/L	--	--
	Chlorobenzene		ND	1	ND	1	ug/L	--	--
	Chloroethane		ND	2	ND	2	ug/L	--	--
	Chloroform		ND	1	ND	1	ug/L	--	--
	Chloromethane		ND	1	ND	1	ug/L	--	--
	cis-1,2-Dichloroethene		ND	1	ND	1	ug/L	--	--
	cis-1,3-Dichloropropene		ND	1	ND	1	ug/L	--	--
	Dibromochloromethane		ND	1	ND	1	ug/L	--	--
	Dibromomethane		ND	1	ND	1	ug/L	--	--
	Dichlorodifluoromethane		ND	2	ND	2	ug/L	--	--
	Ethylbenzene		ND	1	ND	1	ug/L	--	--
	Hexachlorobutadiene		ND	1	ND	1	ug/L	--	--
	Isopropylbenzene		ND	1	ND	1	ug/L	--	--
	Methyl t-Butyl Ether		ND	1	ND	1	ug/L	--	--
	Methylene chloride		ND	2	ND	2	ug/L	--	--
	Naphthalene		ND	1	ND	1	ug/L	--	--
	n-Butylbenzene		ND	1	ND	1	ug/L	--	--
	n-Propylbenzene		ND	1	ND	1	ug/L	--	--
	p-Isopropyltoluene		ND	1	ND	1	ug/L	--	--
	sec-Butylbenzene		ND	1	ND	1	ug/L	--	--
	Styrene		ND	1	ND	1	ug/L	--	--
	tert-Butylbenzene		ND	1	ND	1	ug/L	--	--
	Tetrachloroethene		ND	1	ND	1	ug/L	--	--
	Toluene		0.68 J	1	0.65 J	1	ug/L	--	--
	trans-1,2-Dichloroethene		ND	1	ND	1	ug/L	--	--
	trans-1,3-Dichloropropene		ND	1	ND	1	ug/L	--	--
	Trichloroethene		0.37 J	1	0.45 J	1	ug/L	--	--
	Trichlorofluoromethane		ND	2	ND	2	ug/L	--	--
	Vinyl chloride		ND	1	ND	1	ug/L	--	--
	Xylenes (total)		0.92 J	3	0.88 J	3	ug/L	--	--
SW9056A	Bromide		0.414 J	0.63	0.425 J	0.63	mg/L	--	--
	Chloride		40.4	0.5	41.3	0.5	mg/L	2.2	Yes
	Fluoride		0.427	0.25	0.443	0.25	mg/L	3.7	Yes
	Sulfate		13.3	2.5	13.6	2.5	mg/L	2.2	Yes
SW9310	Gross Alpha		ND	2.5	ND	2.4	pCi/L	--	--
	Gross Beta		ND	3.2	ND	3	pCi/L	--	--
SW9315	Radium-226		ND	0.36	ND	0.37	pCi/L	--	--

Table 6
Field Duplicate Summary
WP026, November 2013 - March 2014
Kirtland Air Force Base

Well ID/Method	Analyte	Sample Date	Normal Sample Result	Normal Sample LOQ	Duplicate Sample Result	Duplicate Sample LOQ	Units	RPD %	RPD Goal of 35% Met
KAFB-2626									
SW9320	Radium-228	12/4/2013	ND	0.61	ND	0.47	pCi/L	--	--
KAFB-2629									
E353.2	Nitrate/Nitrite as N	3/17/2014	3.51	1.5	3.5	1.5	mg/L	0.3	Yes
SM2540C	Total Dissolved Solids		325	20	321	20	mg/L	1.2	Yes
SM4500NH3BG	Ammonia as N		ND	0.3	ND	0.3	mg/L	--	--
SW6010C-DISS	Arsenic, Dissolved		ND	2.5	ND	2.5	ug/L	--	--
	Barium, Dissolved		56.7	10	55.3	10	ug/L	2.5	Yes
	Cadmium, Dissolved		ND	1.25	ND	1.25	ug/L	--	--
	Chromium, Dissolved		1.01 J	2.5	0.945 J	2.5	ug/L	--	--
	Iron, Dissolved		ND	25	ND	25	ug/L	--	--
	Lead, Dissolved		ND	0.75	ND	0.75	ug/L	--	--
	Manganese, Dissolved		0.793 J	3.75	0.94 J	3.75	ug/L	--	--
	Selenium, Dissolved		2.82	2.5	3	2.5	ug/L	6.2	Yes
	Silver, Dissolved		ND	2.5	ND	2.5	ug/L	--	--
SW6850-DISS	Perchlorate		ND	2	ND	2	ug/L	--	--
SW7470A-DISS	Mercury, Dissolved		ND	0.2	ND	0.2	ug/L	--	--
SW8260B	1,1,1,2-Tetrachloroethane		ND	1	ND	1	ug/L	--	--
	1,1,1-Trichloroethane		ND	1	ND	1	ug/L	--	--
	1,1,2,2-Tetrachloroethane		ND	1	ND	1	ug/L	--	--
	1,1,2-Trichloroethane		ND	1	ND	1	ug/L	--	--
	1,1-Dichloroethane		ND	1	ND	1	ug/L	--	--
	1,1-Dichloroethene		ND	1	ND	1	ug/L	--	--
	1,1-Dichloropropene		ND	1	ND	1	ug/L	--	--
	1,2,3-Trichlorobenzene		ND	1	ND	1	ug/L	--	--
	1,2,3-Trichloropropane		ND	2	ND	2	ug/L	--	--
	1,2,4-Trichlorobenzene		ND	1	ND	1	ug/L	--	--
	1,2,4-Trimethylbenzene		ND	1	ND	1	ug/L	--	--
	1,2-Dibromo-3-chloropropane		ND	2	ND	2	ug/L	--	--
	1,2-Dibromoethane (EDB)		ND	1	ND	1	ug/L	--	--
	1,2-Dichlorobenzene		ND	1	ND	1	ug/L	--	--
	1,2-Dichloroethane		ND	1	ND	1	ug/L	--	--
	1,2-Dichloropropane		ND	1	ND	1	ug/L	--	--
	1,3,5-Trimethylbenzene		ND	1	ND	1	ug/L	--	--
	1,3-Dichlorobenzene		ND	1	ND	1	ug/L	--	--
	1,3-Dichloropropane		ND	1	ND	1	ug/L	--	--
	1,4-Dichlorobenzene		ND	1	ND	1	ug/L	--	--
	2,2-Dichloropropane		ND	1	ND	1	ug/L	--	--
	2-Butanone		ND	10	ND	10	ug/L	--	--
	2-Chlorotoluene		ND	1	ND	1	ug/L	--	--
	2-Hexanone		ND	5	ND	5	ug/L	--	--
	4-Chlorotoluene		ND	1	ND	1	ug/L	--	--
	4-Methyl-2-pentanone		ND	5	ND	5	ug/L	--	--

Table 6
Field Duplicate Summary
WP026, November 2013 - March 2014
Kirtland Air Force Base

Well ID/Method	Analyte	Sample Date	Normal Sample Result	Normal Sample LOQ	Duplicate Sample Result	Duplicate Sample LOQ	Units	RPD %	RPD Goal of 35% Met
KAFB-2629									
SW8260B	Acetone	3/17/2014	ND	10	ND	10	ug/L	--	--
	Benzene		ND	1	ND	1	ug/L	--	--
	Bromobenzene		ND	1	ND	1	ug/L	--	--
	Bromodichloromethane		ND	1	ND	1	ug/L	--	--
	Bromoform		ND	1	ND	1	ug/L	--	--
	Bromomethane		ND	2	ND	2	ug/L	--	--
	Carbon disulfide		ND	1	ND	1	ug/L	--	--
	Carbon tetrachloride		ND	1	ND	1	ug/L	--	--
	Chlorobenzene		ND	1	ND	1	ug/L	--	--
	Chloroethane		ND	2	ND	2	ug/L	--	--
	Chloroform		ND	1	ND	1	ug/L	--	--
	Chloromethane		ND	1	ND	1	ug/L	--	--
	cis-1,2-Dichloroethene		ND	1	ND	1	ug/L	--	--
	cis-1,3-Dichloropropene		ND	1	ND	1	ug/L	--	--
	Dibromochloromethane		ND	1	ND	1	ug/L	--	--
	Dibromomethane		ND	1	ND	1	ug/L	--	--
	Dichlorodifluoromethane		ND	2	ND	2	ug/L	--	--
	Ethylbenzene		ND	1	ND	1	ug/L	--	--
	Hexachlorobutadiene		ND	1	ND	1	ug/L	--	--
	Isopropylbenzene		ND	1	ND	1	ug/L	--	--
	Methyl t-Butyl Ether		ND	1	ND	1	ug/L	--	--
	Methylene chloride		ND	2	ND	2	ug/L	--	--
	Naphthalene		ND	1	ND	1	ug/L	--	--
	n-Butylbenzene		ND	1	ND	1	ug/L	--	--
	n-Propylbenzene		ND	1	ND	1	ug/L	--	--
	p-Isopropyltoluene		ND	1	ND	1	ug/L	--	--
	sec-Butylbenzene		ND	1	ND	1	ug/L	--	--
	Styrene		ND	1	ND	1	ug/L	--	--
	tert-Butylbenzene		ND	1	ND	1	ug/L	--	--
	Tetrachloroethene		ND	1	ND	1	ug/L	--	--
	Toluene		ND	1	ND	1	ug/L	--	--
	trans-1,2-Dichloroethene		ND	1	ND	1	ug/L	--	--
	trans-1,3-Dichloropropene		ND	1	ND	1	ug/L	--	--
	Trichloroethene		ND	1	ND	1	ug/L	--	--
	Trichlorofluoromethane		ND	2	ND	2	ug/L	--	--
	Vinyl chloride		ND	1	ND	1	ug/L	--	--
	Xylenes (total)		ND	3	ND	3	ug/L	--	--
SW9056A	Bromide		0.125 J	0.25	0.122 J	0.25	mg/L	--	--
	Chloride		16.1	0.5	16.2	0.5	mg/L	0.6	Yes
	Fluoride		0.406	0.25	0.407	0.25	mg/L	0.2	Yes
	Sulfate		83.3	2.5	83.8	2.5	mg/L	0.6	Yes
SW9310	Gross Alpha		3.8	1.1	3.6	1.2	pCi/L	5.4	Yes

Table 6
Field Duplicate Summary
WP026, November 2013 - March 2014
Kirtland Air Force Base

Well ID/Method	Analyte	Sample Date	Normal Sample Result	Normal Sample LOQ	Duplicate Sample Result	Duplicate Sample LOQ	Units	RPD %	RPD Goal of 35% Met
KAFB-2629									
SW9310	Gross Beta	3/17/2014	2.8 U	1.6	3 U	1.5	pCi/L	--	--
SW9315	Radium-226		ND	0.197	ND	0.2	pCi/L	--	--
SW9320	Radium-228		ND	0.51	ND	0.52	pCi/L	--	--

Notes:

LOQ	Limit of quantitation
RPD	Relative percent difference
ND	Not detected at the LOQ for chemistry data or not detected at the minimum detectable concentration (MDC) for radiological data
mg/L	Milligrams per liter
µg/L	Micrograms per liter
pCi/L	Picocuries per liter

RPD formula = 100 x |Primary Result - Duplicate Result| / ((Primary Result + Duplicate Result) / 2)

-- Not applicable since RPD not calculated. RPD is only calculated when the analyte is detected at or above the LOQ in both the normal sample and the duplicate sample.

Table 7
Technical Completeness
WP026, November 2013 - March 2014
Kirtland Air Force Base

Analytical Method	Number of Analytes	Number of Samples	Number of Results	Number of Useable Results	Technical Completeness [Goal = 95 percent] (percent)
Environmental Samples					
E353.2	1	12	12	12	100.0
SM2540C	1	12	12	12	100.0
SM4500NH3BG	1	11	11	11	100.0
SW6010C-DISS	9	10	90	90	100.0
SW6850-DISS	1	10	10	10	100.0
SW7470A-DISS	1	10	10	10	100.0
SW8260B	63	12	756	756	100.0
SW9056A	4	12	48	48	100.0
SW9310	2	10	20	20	100.0
SW9315	1	10	10	10	100.0
SW9320	1	10	10	10	100.0
Field QC Samples					
SW6010C-DISS	9	1	9	9	100.0
SW7470A-DISS	1	1	1	1	100.0
SW8260B	63	7	441	441	100.0