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SUBMITTAL OF FINAL FISCAL YEAR 2015 LONG-TERM MONITORING REPORT FOR ST-105 NITRATE IMPACTED GROUNDWATER
EPA ID# NM9570024423

Dear Mr. Kieling

Attached please find the *Final Fiscal Year 2015 Long-Term Monitoring Report for ST-105 – Nitrate Impacted Groundwater*. This annual report summarizes the activities performed in support of long-term monitoring conducted at Site ST-105 to evaluate the nitrate impacts associated with the perched and regional aquifers underlying Kirtland Air Force Base.

If you have further questions, please contact Mr. L. Wayne Bitner at (505) 853-3484 or at ludie.bitner@us.af.mil, or Mr. Scott Clark at (505) 846-9017 or at scott.clark@us.af.mil.

Sincerely

ERIC H. FROEHLICH, Colonel, USAF
Commander

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Final LTM Report, ST-105 Nitrate Contaminated Groundwater

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KIRTLAND AIR FORCE BASE
ALBUQUERQUE, NEW MEXICO

FINAL FISCAL YEAR 2015 LONG-TERM MONITORING REPORT

ST-105 – NITRATE IMPACTED GROUNDWATER

April 2016

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KIRTLAND AIR FORCE BASE
ALBUQUERQUE, NEW MEXICO

FINAL FISCAL YEAR 2015
LONG-TERM MONITORING REPORT

ST-105 NITRATE IMPACTED GROUNDWATER

April 2016

Prepared for:

Air Force Civil Engineer Center
Department of the Air Force, 772nd ESS/PKB
3515 S. General McMullen Dr., Suite 155
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NOTICE

This Long-Term Monitoring Report for fiscal year 2015 groundwater sampling and analysis conducted at Site ST-105, Nitrate Impacted Groundwater, was prepared for the Air Force Civil Engineer Center by URS Group, Inc. in association with FPM Remediations, Inc. to aid in the implementation of a final remedial action plan under the Environmental Restoration Program. As the report relates to actual or possible releases of potentially hazardous substances, its release prior to an Air Force final decision on remedial action may be in the public's interest. The limited objectives of this report and the ongoing nature of the Environmental Restoration Program, along with the evolving knowledge of site conditions and chemical effects on the environment and health, must be considered when evaluating this report, since subsequent facts may become known which may make this report premature or inaccurate.

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14. ABSTRACT
This Long-Term Monitoring Report for fiscal year 2015 documents the results for the sampling and analysis activities performed for Site ST-105 Groundwater Impacted by Nitrates, Kirtland Air Force Base, New Mexico. Groundwater samples were collected from monitoring wells installed throughout the defined nitrate plume area. In addition, gauging of wells was performed both in the fall and in the spring to determine water level elevations to further refine the understanding of the groundwater flow that is affecting the migration of nitrate impacted groundwater in both the perched and regional aquifers underlying the Kirtland Air Force Base.

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ERIC H. FROEHLICH, 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 Natural Resource Injury program is a mechanism designed to restore natural resources injured by hazardous substance releases. The Natural Resource Injury program requires parties responsible for contamination and injuries to pay for losses. The Natural Resource Injury program measures natural resource injuries and determines liability. A Natural Resource Injury program demonstrates the nature of injury and any environmental pathways. It also measures the extent of injury and the necessary restoration measures and costs. In certain cases, restoration may include replacement or acquisition of equivalents for habitats; populations of wildlife; and human services, including hunting, fishing, and recreational activities.

The Natural Resource Injury program is carried out by various federal, state, and tribal trustees for fish, wildlife, other living resources, water, lands, and protected areas. Trusteeship is derived from treaties (federal and tribal), statutes (federal and state), and other regulations. Federal agencies responsible for land management include the U.S. National Park Service; U.S. Fish and Wildlife Service; U.S. Bureau of Land Management; U.S. Department of Agriculture, including the U.S. Forest Service; U.S. Department of Defense; and the U.S. Department of Energy.

The Natural Resource Injury Program has established a restoration fund to be used to restore resources lost or injured by the release of hazardous materials and oil spills. The Natural Resource Injury program has been traditionally associated with the Comprehensive Environmental Response, Compensation, and Liability Act which directed the Department of Interior to prepare rules for Natural Resource Injury at hazardous waste sites and for emergency incidents involving substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act.

The Comprehensive Environmental Response, Compensation, and Liability Act and the Resource Conservation and Recovery Act provide tools to clean up contaminants from the environment. These cleanup programs focus on risks to human health and the environment but do not provide efforts for the restoration or compensation for natural resources. The programs are primarily carried out by the United States Environmental Protection Agency working with the states. These programs do not concentrate on restoring natural resources, although cleanup may prevent further injuries to natural resources. With regard to injuries to natural resources, the Comprehensive Environmental Response, Compensation, and Liability Act states the following: (1) responsible parties are liable for compensatory damages for injuries to natural resources owned, managed, or controlled by government agencies or Indian tribes; (2) government agencies and Indian tribes may assess and collect the damages, acting on behalf of the public as trustees for the injured natural resources; and (3) recovered damages must be used to restore, rehabilitate, replace, or acquire the equivalent of the injured natural resources. Therefore, the Natural Resource Injury program was established to ensure restoration and compensation where needed and appropriate.

Conclusions and Recommendations:

This Long-Term Monitoring Report documents sampling and analysis data that are of adequate quality to evaluate whether constituents exist in the groundwater that pose an unacceptable risk to human health or the environment. The vegetation and wildlife found near the site are widely dispersed over Kirtland Air Force Base, so there would be no impact to biodiversity. Restricted access protocols and limited planned development at Kirtland Air Force Base have been strategically designed to limit environmental impacts.

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ENVIRONMENTAL JUSTICE CONSIDERATION

Presidential Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (59 Federal Register 7629), 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 was considered. Demographic and economic census information presented in Environmental Justice Guidance under the National Environmental Policy Act was used as a primary reference (Council on Environmental Quality, 1997).

Minority populations living within a 50-mile radius of Kirtland Air Force Base, which exceed 21.6 percent (%) of the general population according to U.S. Census Bureau (USCB) block census data, were evaluated with regard to health and environmental effects from activities at Kirtland Air Force Base. Similarly, low-income block groups (clusters of blocks) that exceeded New Mexico's state poverty percentage (15.7 %) were analyzed for effects from the corrective measure activities at Kirtland Air Force Base (USCB, 2010a).

Minority populations are considered to be all people of color except white people who are not Hispanic. In 2010, 31.6 % of New Mexico's population was minority. Neighborhoods having minority population percentages exceeding the minority population percentage of 31.6 % were identified on a block-by-block basis, using block census data (USCB, 2010b).

The USCB 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 2010 census threshold for two adults and two children (family of four) was based on a household income of $22,113 (USCB, 2010c). In 2010, 25 % of New Mexico's population was listed in poverty or designated as having low income (USCB, 2010a). In this analysis, low income block groups were identified where the low-income population percentage in the block group exceeds the poverty percentage for the State of New Mexico.

According to 2010 census data, approximately 248,069 minority individuals from an approximate total population of 831,681 reside in the 50-mile radius of impact. This represents 30 % of the total radius of impact population (USCB, 2010d). Approximately 106,345 persons were identified as being low income or living in poverty, which represents approximately 12.7 % of the radius of impact population (USCB, 2010e).

Block group populations within the radius of impact that contained a poverty percentage that was less than the state poverty average of 15.7 % were not considered low income areas for this analysis. It was determined that these block groups did not contain a large number of low-income neighborhoods because the poverty percentage of these block groups was below the state poverty average of 15.7 % (USCB, 2010a).

The distribution of low-income population has strong correlation to minority populations of Blacks, Native Americans, and Hispanics. For example, portions of the Pueblo of Isleta, south of Kirtland Air Force Base, have high percentages of Native Americans who are low-income individuals. To the southeast of Kirtland Air Force Base, the rural area of Estancia is also low income and contains large Black and Native American populations. To the north of Kirtland Air Force Base, high concentrations of low-income populations are located in the Pueblos of San Felipe, Santo Domingo, and Jemez, as well as in the rural area of Cochiti. These rural areas to the north contain large Hispanic and Native American populations. The Laguna Pueblo, located to the west of Kirtland Air Force Base, has a large low-income

Native American population. High concentrations of low-income Hispanic populations reside immediately west of Kirtland Air Force Base in the South Valley neighborhood of Albuquerque.

The environmental and human health effects considered for this investigation include potential impacts to both soil and groundwater from contamination, restricted access by Native Americans to traditional cultural sites, biological resources, air quality, and noise. Based on the findings of this report, there are no identified negative impacts from the area of concern that would 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 or low-income populations. Any impacts due to restrictions of access to cultural sites would be removed by coordination between Kirtland Air Force Base and the local tribes to develop processes to allow access during periods in which safety standards and practices would be maintained.

PREFACE

This Long-Term Monitoring Report documents the sampling and analysis activities conducted in support of the fiscal year 2015 groundwater monitoring conducted in support of the evaluation of the ST-105, Nitrate Impacted Groundwater, site at Kirtland Air Force Base, Albuquerque, New Mexico. Activities to be conducted include groundwater monitoring to assess nitrate impacts on groundwater underlying the site and evaluate potential sources of nitrates to support the determination of future actions that may be required to mitigate the impacts on the groundwater underlying the Kirtland Air Force Base.

This work is being performed under the authority of the Air Force Civil Engineer Center – Contract No. FA8903-13-C-0008. The work under this contract will be performed between 20 September 2014 and 20 September 2023. Brian Renaghan, Air Force Civil Engineer Center/Environmental Restoration Division, has been appointed as the Primary Contracting Officer's Representative for this contract. This program is conducted under the Kirtland Environmental Restoration Branch Chief, Ludie (Wayne) Bitner. Scott Clark is the Kirtland Air Force Base Environmental Restoration Branch Project Manager. URS Group, Inc., as a subcontractor to FPM Remediations, Inc., has prepared this report as defined in the Performance Based Remediation Contract for Cannon, Holloman, and Kirtland Air Force Bases located in New Mexico, and Luke Air Force Base located in Arizona. Mr. Richard Wells is the URS Group, Inc. Installation Manager for the Environmental Restoration Project Sites at Kirtland Air Force Base.

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CONTENTS

Page

EXECUTIVE SUMMARY vii

1.0 INTRODUCTION 1-1
1.1 Background 1-1

2.0 CONCEPTUAL SITE MODEL 2-1
2.1 Regional Geology 2-1
2.2 Hydrogeology 2-2
2.3 Perched Aquifer Hydrogeology 2-3
2.4 Fate and Transport and Potential Receptors 2-3

3.0 SCOPE OF WORK 3-1

4.0 REGIONAL AQUIFER 4-1
4.1 Groundwater Sampling Results 4-1
4.2 Nitrate Trends 4-5
4.3 Regional Aquifer Groundwater Elevations 4-38

5.0 PERCHED AQUIFER 5-1
5.1 Groundwater Analytical Results 5-1
5.2 Perched Aquifer Nitrate Trends 5-4
5.3 Perched Aquifer Groundwater Elevations 5-11

6.0 GOLF COURSE MAIN POND 6-1

7.0 FIELD QUALITY CONTROL SAMPLE SUMMARY 7-1
7.1 Field Duplicates 7-1
7.2 Equipment Blanks 7-5
7.3 Field Blanks 7-6
7.4 Representativeness 7-7
7.5 Comparability 7-7
7.6 Completeness 7-8
7.7 Sensitivity 7-8

8.0 DATA VALIDATION PROCEDURES 8-1

9.0 EVALUATION AND RECOMMENDATIONS 9-1
9.1 Nitrate Evaluation 9-1
9.2 Evaluation of Nitrate and Anionic Compounds 9-5
9.3 Recommendations 9-19

10.0 REFERENCES 10-1

TABLES

Table **Page**

Table 3-1. ST-105 Groundwater Monitoring Wells....3-1
Table 3-2. Groundwater Sample Analyses and Methods....3-3
Table 4-1. Regional Aquifer Groundwater Analytical Results....4-2
Table 4-2. Regional Aquifer Groundwater Elevations....4-38
Table 5-1. Perched Aquifer Groundwater Analytical Results....5-2
Table 5-2. Perched Aquifer Groundwater Elevations....5-12
Table 6-1. Golf Course Main Pond Analytical Summary....6-2
Table 7-1. KAFB-0621 Precision Evaluation....7-2
Table 7-2. KAFB-1007R Precision Evaluation....7-3
Table 7-3. ST105-MW09 Precision Evaluation....7-4
Table 7-4. KAFB-0623 Precision Evaluation....7-5
Table 7-5. Equipment Blank Analytical Summary....7-5
Table 7-6. Field Blank Analytical Summary....7-6
Table 8-1. Data Validation Summary....8-1
Table 9-1. ST-105 Analytical Summary....9-9

FIGURES

Figure **Page**

Figure 1-1. ST-105 Project Location....1-3
Figure 3-1. ST-105 Monitoring Well Locations....3-5
Figure 3-2. ST-105 Groundwater Level Wells....3-6
Figure 4-1. Production Well KAFB-7 Nitrate Trend....4-6
Figure 4-2. Production Well KAFB-16 Nitrate Trend....4-7
Figure 4-3. Well KAFB-0505 Nitrate and Groundwater Elevation Trends....4-7
Figure 4-4. Well KAFB-0507/-0507R Nitrate and Groundwater Elevation Trends....4-8
Figure 4-5. Well KAFB-0508 Nitrate and Groundwater Elevation Trends....4-9
Figure 4-6. Well KAFB-0510 Nitrate and Groundwater Elevation Trends....4-10
Figure 4-7. Well KAFB-0512/512R Nitrate and Groundwater Elevation Trends....4-10
Figure 4-8. Well KAFB-0514 Nitrate and Groundwater Elevation Trends....4-11
Figure 4-9. Well KAFB-0516 Nitrate and Groundwater Elevation Trends....4-12
Figure 4-10. Well KAFB-0517 Nitrate and Groundwater Elevation Trends....4-13
Figure 4-11. Well KAFB-0518 Nitrate and Groundwater Elevation Trends....4-13
Figure 4-12. Well KAFB-0519 Nitrate and Groundwater Elevation Trends....4-14
Figure 4-13. Well KAFB-0520 Nitrate and Groundwater Elevation Trends....4-15
Figure 4-14. Well KAFB-0521 Nitrate Trends....4-16
Figure 4-15. Well KAFB-0522 Nitrate and Groundwater Elevation Trends....4-16
Figure 4-16. Well KAFB-0523 Nitrate and Groundwater Elevation Trends....4-17
Figure 4-17. Well KAFB-0524 Nitrate and Groundwater Elevation Trends....4-18
Figure 4-18. Well KAFB-0525 Nitrate and Groundwater Elevation Trends....4-19
Figure 4-19. Well KAFB-2628 Nitrate and Groundwater Elevation Trends....4-19
Figure 4-20. Wells KAFB-2629 Nitrate and Groundwater Elevation Trends....4-20
Figure 4-21. Well KAFB-0307 Nitrate and Groundwater Elevation Trends....4-22
Figure 4-22. Well KAFB-0311 Nitrate and Groundwater Elevation Trends....4-22
Figure 4-23. Well KAFB-0312 Nitrate and Groundwater Elevation Trends....4-23
Figure 4-24. Well KAFB-0315 Nitrate and Groundwater Elevation Trends....4-24
Figure 4-25. Well KAFB-0611 Nitrate and Groundwater Elevation Trends....4-24

Figure 4-26. Well KAFB-0613 Nitrate and Groundwater Elevation Trends 4-25
Figure 4-27. Well KAFB-0615 Nitrate and Groundwater Elevation Trends 4-26
Figure 4-28. Well KAFB-0616 Nitrate and Groundwater Elevation Trends 4-27
Figure 4-29. Well KAFB-0617 Nitrate and Groundwater Elevation Trends 4-27
Figure 4-30. Well KAFB-0618 Nitrate and Groundwater Elevation Trends 4-28
Figure 4-31. Well KAFB-0620 Nitrate and Groundwater Elevation Trends 4-29
Figure 4-32. Well KAFB-0621 Nitrate and Groundwater Elevation Trends 4-30
Figure 4-33. Well KAFB-0622 Nitrate and Groundwater Elevation Trends 4-30
Figure 4-34. Well KAFB-0624 Nitrate and Groundwater Elevation Trends 4-31
Figure 4-35. Well KAFB-0625 Nitrate and Groundwater Elevation Trends 4-32
Figure 4-36. Well KAFB-0626 Nitrate Concentration Trends 4-33
Figure 4-37. Well KAFB-0904 Nitrate and Groundwater Elevation Trends 4-33
Figure 4-38. Well TJA-4 Nitrate and Groundwater Elevation Trends 4-34
Figure 4-39. Well KAFB-1006 Nitrate and Groundwater Elevation Trends 4-35
Figure 4-40. Well KAFB-1007/1007R Nitrate and Groundwater Elevation Trends 4-36
Figure 4-41. Well KAFB-1008 Nitrate and Groundwater Elevation Trends 4-37
Figure 4-42. Well KAFB-1009 Nitrate and Groundwater Elevation Trends 4-37
Figure 4-43. ST-105 Regional Aquifer Contour Map – Fall 2014 4-41
Figure 4-44. ST-105 Regional Aquifer Contour Map – Spring 2015 4-42
Figure 5-1. Well KAFB-0314 Nitrate and Groundwater Elevation Trends 5-4
Figure 5-2. Well KAFB-0506 Nitrate and Groundwater Elevation Trends 5-5
Figure 5-3. Well KAFB-0602 Nitrate and Groundwater Elevation Trends 5-6
Figure 5-4. Well KAFB-0608 Nitrate and Groundwater Elevation Trends 5-6
Figure 5-5. Well KAFB-0612 Nitrate and Groundwater Elevation Trends 5-7
Figure 5-6. Well KAFB-0614 Nitrate and Groundwater Elevation Trends 5-8
Figure 5-7. Well KAFB-0619 Nitrate and Groundwater Elevation Trends 5-9
Figure 5-8. Well KAFB-0623 Nitrate and Groundwater Elevation Trends 5-9
Figure 5-9. Well TJA-2 Nitrate and Groundwater Elevation Trends 5-10
Figure 5-10. Well TJA-5 Nitrate and Groundwater Elevation Trends 5-11
Figure 5-11. ST-105 Perched Aquifer Contour Map – Fall 2014 5-14
Figure 5-12. ST-105 Perched Aquifer Contour Map – Spring 2015 5-15
Figure 9-1. Regional Aquifer Nitrate Isoconcentration Contours – FY 2015 9-3
Figure 9-2. Perched Aquifer Nitrate Isoconcentration Contours – FY 2015 9-7
Figure 9-3. ST-105 Delta ^{15}N versus Nitrate Concentration 9-13
Figure 9-4. Dual-Isotope Plot for ST-105 Groundwater Samples 9-14
Figure 9-5. Total Dissolved Solids versus Nitrate Concentration 9-14
Figure 9-6. Chloride versus Nitrate Concentration with Known Relationships 9-15
Figure 9-7. Chloride/Bromide Ratios versus Chloride Concentration 9-16
Figure 9-8. Chloride/Bromide Ratios versus Chloride with Precipitation Mixing Lines 9-17
Figure 9-9. Range of Chloride/Bromide Ration 9-17

APPENDICES

A Analytical Data Summary
B Analytical Laboratory Reports
C Validation Reports

ACRONYMS AND ABBREVIATIONS

%	percent
‰	parts per thousand (or per mil)
AFB	Air Force Base
amsl	above mean sea level
ATSDR	Agency for Toxic Substances and Disease Registry
bgs	below ground surface
$CaCO_3$	calcium carbonate
CFR	Code of Federal Regulations
CSIA	Compound Specific Isotope Analysis
DoD	U.S. Department of Defense
DTW	depth to water
EPA	U.S. Environmental Protection Agency
ft	feet
ft/ft	foot per foot
FPM	FPM Remediations, Inc.
FY	fiscal year
GCMP	Golf Course Main Pond
LOD	limit of detection
LOQ	limit of quantitation
LTM	long-term monitoring
MCL	maximum contaminant level
mg/L	milligram per liter
µg/L	micrograms per liter
ND	non-detect
NE	none established
NM	not measured
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NMWQCC	New Mexico Water Quality Control Commission
NSDWR	National Secondary Drinking Water Regulation
PPCP	pharmaceuticals and personal care products
QC	Quality Control
RPD	relative percent difference
RSL	regional screening level
SM	standard method
SNL	Sandia National Laboratory
TDS	total dissolved solids
TKN	Total Kjeldahl Nitrogen
URS	URS Group, Inc.
USAF	U.S. Air Force
USF	Santa Fe Group
USCB	U.S. Census Bureau
UTL	upper tolerance limit

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EXECUTIVE SUMMARY

This annual report summarizes the activities performed in support of long-term monitoring conducted at Site ST-105 to evaluate the nitrate impacts associated with the perched and regional aquifers underlying the Kirtland Air Force Base, New Mexico. The objective of the long-term monitoring program is to monitor groundwater conditions at those sites that have potentially been impacted by past site activities. This report presents the results of the monitoring conducted during fiscal year 2015 in support of evaluation of the nitrate impacts associated with site ST-105 and provides conclusions and recommendations for future monitoring activities.

The Kirtland Air Force Base Long-Term Monitoring Program is conducted under the regulatory authority of the New Mexico Environment Department and the U.S. Environmental Protection Agency, Region 6. In October 1990, Kirtland Air Force Base was granted a Resource Conservation and Recovery Act Part B permit by the U.S. Environmental Protection Agency to operate a waste facility in accordance with the Hazardous and Solid Waste Amendments of 1984. The Kirtland Air Force Base Resource Conservation and Recovery Act permit was updated by the New Mexico Environment Department in July 2010.

The long-term monitoring activities conducted during fiscal year 2015 included the collection of groundwater level measurements at the wells associated with the nitrate plumes and collection of groundwater samples from the wells where sufficient water was available to provide a viable, representative sample. The groundwater samples were submitted to an approved off-site laboratory for analyses of required parameters including anions (bromide, chloride, fluoride, nitrate-nitrite, and sulfate), alkalinity, total Kjeldahl nitrogen, ammonia, total dissolved solids, dissolved and total organic carbon, and metals.

During the fiscal year 2015 groundwater monitoring effort, samples were collected and submitted for compound-specific isotope analysis. Compound-specific isotope analysis is an analytical method that measures the ratios of naturally occurring stable isotopes in environmental samples. Each element has a distinct isotopic ratio that can change in systematic ways depending on the processes which the element-containing compound has undergone. Nitrate is comprised of nitrogen and oxygen, each of which has different isotopes. For nitrogen, the prevalent isotopes are nitrogen-14/-15. Isotopic fractionation is the process resulting in relative enrichment of one isotope in a mixture. By measuring these isotopic ratios, the data may reveal information as to relative age of the nitrate and hence whether the source is aged or more recent in origin.

Regional Aquifer Plume 1

For the wells associated with Regional Aquifer Plume 1, the overall nitrate concentration trend appears to be decreasing with the exception of the notable spike associated with well KAFB-0517. The overall decline in nitrate concentrations is promising and may be indicative that any remaining source in the vadose zone contributing to the nitrate impacts on the regional aquifer may be decreasing. It appears Plume 1 may have migrated to the south.

It was noted in the conclusions provided in the *Stage 2 Abatement Program for Nitrate-Contaminated Groundwater (Site ST-105) Fifth Annual Groundwater Monitoring Report* (U.S. Air Force [USAF], 2012a) that increasing nitrate concentrations in well KAFB-0510 were a cause for concern with regard to potential impacts on production well KAFB-16. The nitrate concentration trend for this well appears to have reversed and has demonstrated a decreasing trend since 2010.

The groundwater elevations for the wells associated with Plume 1 have been increasing over time. For some wells, there may be a correlation between the groundwater elevation and the nitrate concentration,

but for many of the wells, a correlation is not apparent. Both the groundwater elevation and nitrate concentrations will continue to be monitored and potential trends and correlation between elevation and concentration evaluated as additional data are collected.

Regional Aquifer Plume 2

For the wells associated with Regional Aquifer Plume 2, there is not an apparent overall trend in nitrate concentrations. The nitrate concentrations for the wells are fairly consistent.

The groundwater elevations show a mix of increasing, decreasing, and consistent trends depending on location. Overall, there is no apparent correlation between groundwater elevation and nitrate concentration, although data from well KAFB-0621 perhaps shows a slight correlation between the two. As with Plume 1, monitoring will be continued and further evaluation of potential trends and correlation between elevation and concentration performed as additional data are collected.

McCormick Ranch

For the wells associated with McCormick Ranch located at the southwestern corner of Kirtland Air Force Base, the nitrate concentrations appear to be fairly consistent, with the nitrate concentration for the sample collected from well KAFB-1007 slightly exceeding the 10 mg/L regulatory level with those obtained from well KAFB-1008 being below 10mg/L. The groundwater elevation trend is decreasing, with no correlation between elevation and concentration.

Perched Aquifer Plume

For the perched aquifer plume, nitrate concentrations in the central to northeastern portion of the plume demonstrate an increasing trend; whereas, the nitrate concentrations for wells elsewhere in the plume appear to be fairly consistent over time. The groundwater elevations in the northern portion of the plume appear to be decreasing with those in the southern portion of plume increasing. There does not appear to be a strong indication of any correlation between nitrate concentrations and groundwater elevation. The addition of new monitoring wells to the network have allowed for better refinement of the nitrate contours.

Recommendations

It is recommended that monitoring of the following regional aquifer wells should be discontinued because (1) nitrate levels have been and continue to remain below concentrations of regulatory concern, (2) other wells are located in proximity to the wells recommended for discontinuation of monitoring and provide adequate coverage for monitoring of the nitrate plume, or (3) the well will be monitored in support of another site at Kirtland AFB and data will be obtained from that monitoring effort.

<u>Regional Nitrate Plume 1</u>

- KAFB-7
- KAFB-16
- KAFB-0505
- KAFB-0510
- KAFB-0519
- KAFB-0524
- KAFB-2628
- KAFB-2629

Regional Nitrate Plume 2

- KAFB-0307
- KAFB-0311
- KAFB-0312
- KAFB-0315
- KAFB-0615

McCormick Ranch

- KAFB-1006
- KAFB-1008
- KAFB-1009

Monitoring of all other regional aquifer wells should be continued under the ST-105 nitrate abatement project along with all of the perched aquifer wells.

In addition, it is recommended to reduce the analyte list to those constituents that provide data intrinsic to the understanding of the nitrate impacted groundwater. Historically, groundwater samples have been collected and submitted for the analysis of anions (chloride, bromide, fluoride, and sulfate), nitrate-nitrite (by 353.2), alkalinity, total Kjeldahl nitrogen, ammonia, total dissolved solids, dissolved organic carbon, total organic carbon, and the full metals suite. The recommended list for future monitoring should include anions (chloride and sulfate), nitrate-nitrite (by 353.2), alkalinity, total dissolved solids, and only iron and manganese from the metals list.

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1.0 INTRODUCTION

Under the Air Force Civil Engineer Center Contract No. FA8903-13-C-0008, URS Group, Inc. (URS), as a subcontractor to FPM Remediations, Inc. (FPM) has prepared this Long-Term Monitoring (LTM) Report in accordance with the Performance-Based Remediation Contract for Cannon, Holloman, and Kirtland Air Force Bases (AFBs) located in New Mexico, and Luke AFB located in Arizona. This report documents the sampling and analysis results obtained in support of the fiscal year (FY) 2015 groundwater monitoring conducted in support of the evaluation of groundwater impacted by nitrates associated with site ST-105 located at Kirtland AFB, Albuquerque, New Mexico as shown in Figure 1-1.

1.1 BACKGROUND

Three private airfields predate the Kirtland AFB, formerly named Albuquerque Army Air Base, with military operations becoming the primary focus in 1941. The base was renamed in 1942 honoring Colonel Roy C. Kirtland, a pioneer in Army aviation. Flight crews were trained in the early 1940s at Kirtland's three schools: advanced flying, bombardier training, and multi-engine school. Later that decade, the focus of base operations shifted to developing aircraft modifications for weapons delivery, researching ballistic characteristics, and testing weapons. Manzano Base was named in 1952 and was located on the former Site Able, created under the Armed Forces Special Weapons Command. Sandia Base began operating as the Albuquerque Airport Training Station in 1942 and served historically as a nuclear weapons installation. In 1971, Kirtland, Manzano, and Sandia bases were merged and were managed under one command.

The nitrate component of ST-105 is being addressed in compliance with a New Mexico Environment Department (NMED)-mandated abatement plan (NMED, 1999) under purview of the Groundwater Quality Bureau. In response to a 1999 letter from NMED, Kirtland AFB completed a Stage 1 Abatement Plan to investigate nitrate-impacted groundwater. Suspected sources of nitrate include the closed sewage lagoons, the Golf Course Main Pond (GCMP), Albuquerque Bernalillo County Water Utility Authority sanitary sewer line breaks in 1994 and 2003, and the Sandia National Laboratory (SNL) acid waste outfall line. In addition, a collapse of the top portion of the sewer line that occurred in 2013. In April 2002, an Interim Stage 2 Abatement Plan was implemented providing for hydraulic containment and mass removal of nitrate-impacted groundwater near production well KAFB-7 and for the beneficial use of the nitrate-impacted groundwater produced from the well to water the golf course. Nine new wells were installed in 2003 and monitoring of 38 wells was performed as reported in the S*emiannual Groundwater Monitoring Report for the Stage 1 Abatement Plan for Nitrate-Impacted Groundwater at Kirtland Air Force Base, New Mexico* (U.S. Air Force [USAF], 2002). Results showed nitrate exceeding the 10 milligram per liter (mg/L) regulatory level in 12 regional aquifer wells and six perched aquifer wells with concentrations ranging from 12 to 42.5 mg/L.

Groundwater monitoring has been a key component of both of the nitrate abatement plans with annual groundwater sampling occurring at over 70 wells and well gauging being performed at over 100 wells. A total of 22 new wells and three replacement wells were incorporated into the monitoring network in 2015 to further refine the boundaries of the nitrate plumes and to support identification of the source(s).Historically, two plumes have been identified with the regional aquifer. Plume 1 is located beneath the site of two Albuquerque Bernalillo County Water Utility Authority sanitary sewer line breaks, which occurred in 1994 and 2003 (USAF, 2009). Plume 2 extends from the Kirtland AFB boundary in the northeast to the southwest, with the golf course in the center portion of the plume. Plume 4 is associated with the perched aquifer and extends in a northwest-southeast direction between the Solid Waste Management Unit 165 Septic System Leach Field and the Tijeras Arroyo Golf Course (USAF, 2009).

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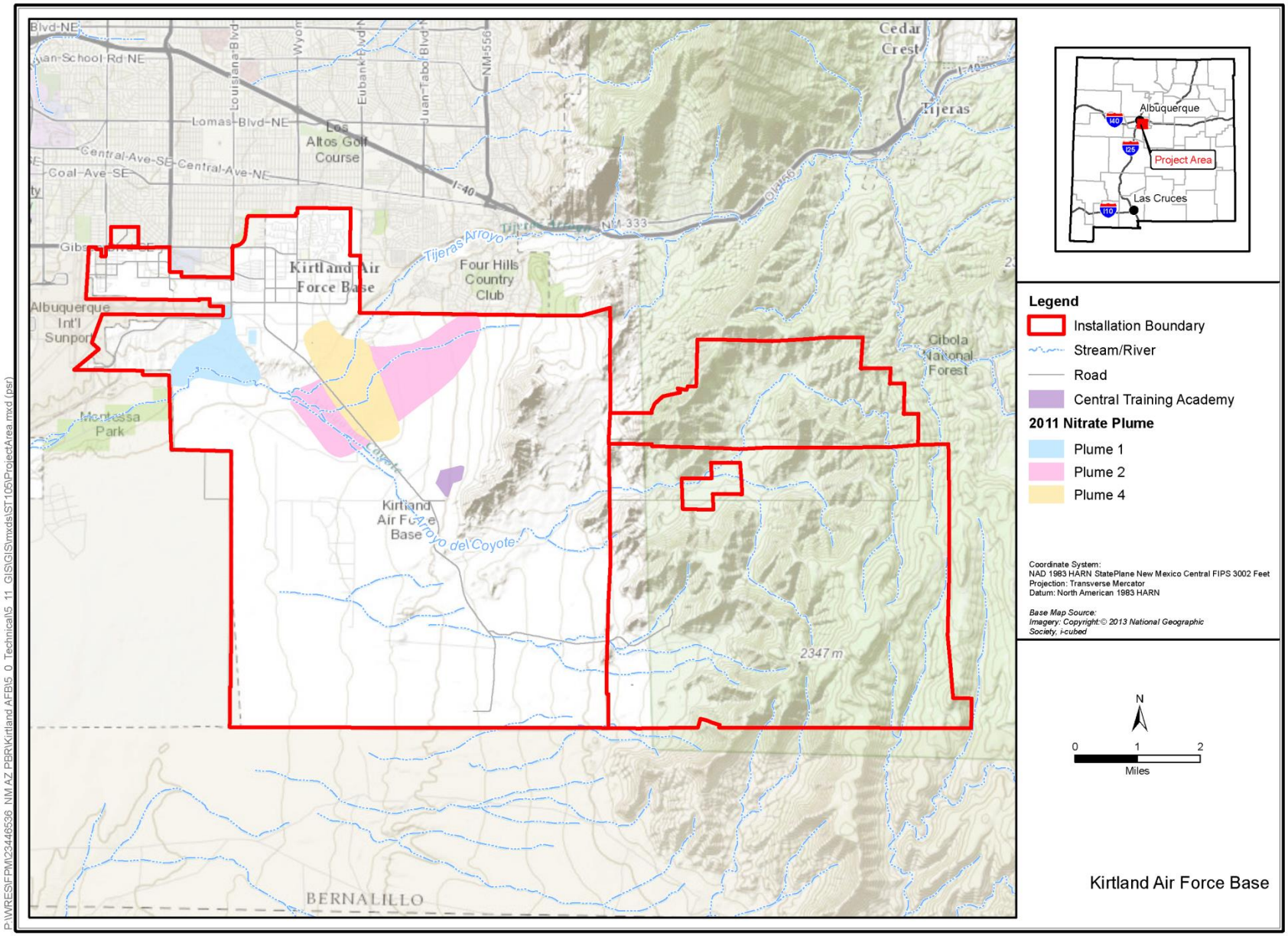

Figure 1-1. ST-105 Project Location

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2.0 CONCEPTUAL SITE MODEL

Kirtland AFB occupies approximately 51,558 acres in southeastern Albuquerque, New Mexico, nestled between the Sandia and Manzano mountain ranges. The base is located in Bernalillo County, in central New Mexico, southeast of and adjacent to the Albuquerque International Sunport (Figure 1-1). Kirtland AFB employs more than 23,000 people, including more than 4,200 active duty, 1,000 National Guard, and 3,200 part-time reservists. Kirtland AFB is home to the Air Force Nuclear Weapons Center and its subordinate wings, the 498th Armament Systems Wing and the 377th Air Base Wing. It is also home to the Defense Threat Reduction Agency Albuquerque office, Air Force Safety Center, the Air Force Inspection Agency, the Air Force Operational Test and Evaluation Center, the 58th Special Operations Wing, Space Development and Test Wing, the New Mexico Air National Guard 150th Fighter Wing, the Directed Energy and Space Vehicle Directorates of the Air Force Research Laboratory, the Department of Energy Albuquerque Office, the National Nuclear Security Administration, and SNL – New Mexico.

2.1 REGIONAL GEOLOGY

The geology of the Kirtland AFB area varies with the regional geology. The eastern portion of Kirtland AFB is mountainous, with elevations reaching 7,900 feet (ft) above mean sea level (amsl). These mountains are composed of Precambrian metamorphic and igneous (primarily granitic) and Paleozoic sedimentary rock (primarily marine carbonates). The western portion of the base lies within the Albuquerque Basin. Geologic features in this area of the basin include travertine and unconsolidated and semi-consolidated piedmont deposits, as well as eolian, lacustrine, and stream channel deposits.

In general, the near surface geology is characterized by recent deposits (i.e., mixtures of sandy silt and silty sand with minor amounts of clay and gravel); Ortiz gravel (i.e., alluvial piedmont sand and gravel deposits); and the Santa Fe Group (USF) (i.e., a mixture of sand, silt, clay, gravel, cobbles, and boulders). Generally, the northern and western portions of Kirtland AFB are dominated by unconsolidated geologic units; consolidated units predominate in the eastern half of the base.

Kirtland AFB lies within the eastern portion of the Albuquerque structural basin that contains the through-flowing Rio Grande. The basin is approximately 90 miles long and 30 miles wide. The deposits within the Albuquerque Basin consist of interbedded gravel, sand, silt, and clay. The thickness of basin-fill deposits within most of the basin exceeds 3,000 ft, though the thickness varies considerably because of the significant amount of faulting in the basin.

Geologic materials of primary importance within the basin are the USF and piedmont slope deposits. The USF consists of beds of unconsolidated to loosely consolidated sediments and interbedded volcanic rocks. The materials range from boulders to clay and from well sorted stream channel deposits to poorly sorted slope wash deposits. Coalescing alluvial fans of eroded materials from the surrounding mountains were deposited unconformably over the USF, extending westward from the base of the Sandia and Manzano mountains to the eastern edge of the Rio Grande floodplain. The fan sediments range from poorly sorted mud flow material to well sorted stream gravel. The beds consist of channel fill and interchannel deposits. The fan deposits range in thickness from 0 to 200 ft and thicken toward the mountains. The USF is further broken down into two depositional facies called the USF-1 and USF-2 (Hawley et al., 1995). USF-1 is present from ground surface to approximately 86 ft below ground surface (bgs), and then a transition occurs where USF-1 and USF-2 are interfingered to a depth of 144 ft bgs, underneath which USF-2 is present to a depth of greater than 500 ft bgs as described in the *Semi-Annual Summary and Performance Report, October 2007 through March 2008, Bulk Fuels Facility* (CH2M Hill, 2008).

2.2 HYDROGEOLOGY

Kirtland AFB spans a segment of the eastern flank of the Albuquerque basin and the uplifted basin margins (Van Hart, 2003). The basin is a segment of the Rio Grande rift, a linear extensional feature extending from southern Colorado to Mexico and West Texas. On Kirtland AFB, the structural scenario is quite complex, but can be simplified as consisting of four tectonic provinces including the following:

- The eastern part of the Calabacillas sub-basin of the Albuquerque basin, where bedrock is deeply buried below late Tertiary, Sante Fe Group Alluvium.
- The uplifted basin margins, where bedrock generally outcrops and forms rugged topography (e.g., elevated blocks of Manzano Base and Manzanita Mountains).
- The Hubble bench, which occupies an intermediate structural position between the Albuquerque basin and the uplifts. Bedrock in this province is generally buried by less than 200 ft of alluvium.
- The Travertine basin, which developed within a zone of Tertiary, Laramide-age shear on the western rim of the Hubble bench.

The stratigraphic section preserved on Kirtland AFB varies with province and is controlled by the amount of uplift and the attendant depth of erosion (Van Hart, 2003). Geology beneath the study area generally includes a relatively thin layer of Younger Piedmont alluvium overlying Madera Formation limestone, overlying the Sandia Formation, which overlies Manzanita Granite (New Mexico Bureau of Geology and Mineral Resources, 2002). The Younger Piedmont alluvium primarily consists of unconsolidated gravel and sand. The Madera Formation primarily consists of fossiliferous limestone. The Sandia Formation is comprised of shales and siltstones grading down into basal quartz pebble conglomerates and up into thin bedded limestones. The Manzanita Granite primarily consists of a homogeneous quartz monzonite (granite).

In general, on the eastern side of Kirtland AFB, near the mountain fronts, groundwater occurs in fractured bedrock aquifers. These aquifers may be water table aquifers, semi-confined, or fully confined. In some cases, shallow water table aquifers may exist in surficial alluvium or decomposed bedrock while deeper aquifer zones are present in more competent fractured bedrock. Local and regional faulting along the mountain fronts is known to have the potential to impede groundwater flow across the fault zones, in some cases resulting in dramatically differing depths to groundwater from one side of the inferred fault to the other.

From the *Stage 2 Abatement Program for Nitrate-Contaminated Groundwater (Site ST-105), Fifth Annual Groundwater Monitoring Report*, June 2012 (USAF, 2012a), the Albuquerque Basin regional aquifer is contained within the upper and, to some extent, the middle units of the USF. A regional system of faults along the eastern margin of the Albuquerque Basin divides the regional aquifer system into deeper zones west of the Sandia and Sandia West faults and shallower zones east of the Sandia and Sandia West faults. Depths to groundwater east of the faults vary from 50 to 200 ft bgs. Depths to groundwater west of the faults vary from about 270 to 770 ft bgs.

The apparent groundwater flow direction in the regional aquifer is generally westward, toward the Rio Grande. Groundwater flow direction beneath Kirtland AFB is toward the northwest and north due to drawdown created by water supply wells currently operated by Kirtland AFB and off-base wells operated by the city of Albuquerque (SNL, 2010). The regional aquifer hydraulic gradient in the eastern portions of the ST-105 monitoring network (near the Sandia fault system) ranges from 0.003 to 0.2 foot per foot (ft/ft) flowing toward the west according to the fall 2011 and spring 2012 groundwater elevation data. In

the western portion of the ST-105 monitoring well network, groundwater flow is predominantly northward towards extraction wells, with gradients ranging from 0.004 to 0.0003 ft/ft according to the fall 2011 and spring 2012 data. Perched groundwater zones are also present at Kirtland AFB. The best-documented perched zone is located in the north-central portion of Kirtland AFB, lying approximately 100 ft above the regional aquifer. Groundwater flow in the perched aquifer is toward the southeast with a hydraulic gradient ranging between 0.004 and 0.07 ft/ft according to the fall 2011 and spring 2012 groundwater elevation data.

2.3 PERCHED AQUIFER HYDROGEOLOGY

Perched groundwater zones are also present at Kirtland AFB. The shallow groundwater system is defined as a zone of saturation above the regional aquifer and separated from the regional aquifer by an unsaturated interval. Correlation of lithologic information obtained from boreholes drilled during monitoring well installation at SNL and Kirtland AFB and water chemistry data indicate that the shallow system consists of multiple zones of discontinuous saturation up to 125 ft thick that dip to the southeast. The depth to perched groundwater ranges from 200 to 415 ft bgs. The direction of groundwater flow in the main perched zone appears to be to the east-southeast with a hydraulic gradient of between 0.01 and 0.02 ft/ft.

A thin and isolated groundwater unit referred to as the perched zone groundwater is present beneath the Solid Waste Management Unit WP-26 sewage lagoons. This water-bearing unit is not suitable as a source of drinking water due to the lack of available water for pumping and the elevated salinity, as measured by total dissolved solids (TDS). This perched groundwater unit is distinct from the regional aquifer groundwater below and from other perched groundwater units located to the east of the site. The most likely source of this perched zone groundwater is infiltration of the former sewage lagoons effluent and accumulation above the silts and clays that form the perching layer. Since this supply of water has been discontinued for more than 20 years, perched zone groundwater in the vicinity of the former sewage lagoons has begun to desiccate. This conclusion is supported by water quality data, lithologic information, and well gauging data. The sewage lagoons are now dry, and there is evidence, including results of perched-zone saturation modeling provided in the *Annual Groundwater Monitoring Report, Fiscal Year 2001* (SNL, 2002), that the volume of perched groundwater is currently shrinking beneath the former sewage lagoons.

2.4 FATE AND TRANSPORT AND POTENTIAL RECEPTORS

As discussed in the *Site Investigation Work Plan – Nitrate Characterization* (USAF, 2012b), the most stable form of nitrogen in the Kirtland AFB groundwater is nitrate which percolates downward from sources near the surface along preferential pathways. Vertical groundwater migration is altered when it encounters areas of low permeability characterized by clayey deposits, commonly referred to as an aquitard, where vertical percolation will be slowed. Ponding will occur on top of the aquitard to form a perched aquifer. Lateral movement of the groundwater in the perched unit occurs if the aquifer surface is sloped, and vertical movement occurs through localized areas of higher permeability material, or around the edges of the aquitard.

The main route of exposure to nitrate for those exposed to impacted groundwater is through ingestion of food and/or water (Agency for Toxic Substances and Disease Registry [ATSDR], 2011). Drinking water at Kirtland AFB is supplied by wells such as groundwater production wells KAFB-15 and KAFB-16. Potential human and ecological receptors may be exposed to surface water from the GCMP, which receives nitrate-impacted groundwater extracted from well KAFB-7. Exposure to nitrate through inhalation and vapor intrusion is negligible because nitrate is not volatile.

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3.0 SCOPE OF WORK

Groundwater samples were collected in support of the FY 2015 ST-105 monitoring effort from 49 regional aquifer wells, 17 perched aquifer wells, and the GCMP at Kirtland AFB. Two of the regional wells (KAFB-0521 and KAFB-0626) are equipped with FLUTe® liners allowing for the collection of samples at multiple intervals (KAFB-0521 is sampled at 3 intervals and KAFB-0626 is sampled at four intervals). A list of the wells sampled in FY 2015 and related construction details is provided in Table 3-1. In addition to the monitoring wells, a surface water sample was collected from the GCMP. Samples were collected and analyzed for the list of analytes in Table 3-2. Water level measurements were obtained in October/November 2014 and April 2015. The locations of all of the monitoring wells in the current monitoring network from which samples and groundwater level measurements are obtained are shown in Figure 3-1. The wells shown in Figure 3-2 represent the additional wells within the current network from which just groundwater elevations are collected.

Groundwater samples were collected in accordance with the requirements delineated in the *ST-105 – Nitrate Contaminated Groundwater Long-Term Monitoring Plan* (USAF, 2014a) and the *ST-105 – Nitrate Contaminated Groundwater Quality Assurance Project Plan* (USAF, 2014b). Samples were collected using Bennett bladder pumps. The primary laboratory analyses were performed by ESC Lab Sciences in Mt. Joliet, Tennessee with the compound-specific isotope analyses performed by Pace Analytical Services, Inc. operating out of Allen, Texas.

Table 3-1. ST-105 Groundwater Monitoring Wells

Well	Diameter (inches)	Total Depth (feet)	Top of Screen (feet)	Bottom of Screen (feet)	Screen Slot Size (inches)	Measuring Point Elevation (feet)
Regional Aquifer Wells						
KAFB-7	Production Well					
KAFB-0307	4	461.33	406.33	451.33	0.01	5,361.86
KAFB-0311	4	469.4	434.54	459.60	0.01	5,350.62
KAFB-0312	5	538.60	504.60	529.60	0.01	5,429.50
KAFB-0315	5	479	449	474	0.01	5,463.44
KAFB-0505	5	522.75	496	521	0.02	5,360.14
KAFB-0507R	4	520	495	515	0.01	5,358.21
KAFB-0508	4	513.63	481	506	0.01	5,349.21
KAFB-0510	4	539.1	514	536	0.01	5,364.43
KAFB-512R	4	455	430	450	0.01	5,302.73
KAFB-0514	4	368.51	340	365	0.01	5,203.74
KAFB-0516	4	360.45	322	357	0.01	5,202.97
KAFB-0517	4	353.55	325	350	0.01	5,194.43
KAFB-0518	4	338.29	305	335	0.01	5,175.09
KAFB-0520	4	408.87	379.5	404	0.01	5,245.23
KAFB-0521A	5	657	550	555	0.01	5,349.78
KAFB-0521B	5	657	600	605	0.01	5,349.78
KAFB-0521C	5	657	650	655	0.01	5,349.78
KAFB-0522	4	434.22	404	430	0.01	5,264.81

Well	Diameter (inches)	Total Depth (feet)	Top of Screen (feet)	Bottom of Screen (feet)	Screen Slot Size (inches)	Measuring Point Elevation (feet)
KAFB-0523	4	630	600	625	0.01	5,347.84
KAFB-0524	4	514.8	484	509	0.01	5,342.94
KAFB-0525	4	401.7	371	396	0.01	5,227.08
KAFB-0611	4	513	498	508	0.01	5,383.42
KAFB-0613	4	452	420	450	0.01	5,388.11
KAFB-0615	4	327	300	325	0.01	5,635.76
KAFB-0616	4	499	472	497	0.01	5,478.40
KAFB-0617	4	592	575	590	0.01	5,503.11
KAFB-0618	4	562	535	560	0.01	5,407.38
KAFB-0620	4	474.5	447	472	0.01	5,331.97
KAFB-0621	4	650	624	649	0.01	5,567.22
KAFB-0624	4	792.5	765	790	0.01	5,673.78
KAFB-0625	4	497.5	470	495	0.01	5,390.23
KAFB-0626A	5	638	412.1	431.9	0.02	5,328.80
KAFB-0626B	5	638	466.2	476	0.02	5,328.80
KAFB-0626C	5	638	510.3	520	0.02	5,328.80
KAFB-0626D	5	638	623.7	633.4	0.02	5,328.80
KAFB-0904	4	369	343	368	0.01	5,289.23
KAFB-1007R	4	401.5	376.5	396.5	0.01	5,260.62
KAFB-1008	4	405	370.2	400.2	0.01	5,255.80
KAFB-1009	4	427.7	392.7	422.7	0.01	5,267.25
KAFB-2628	5	535	506	530	0.01	5,369.34
KAFB-2629	5	523.5	495.5	519.5	0.01	5,361.53
ST105-MW01	4	433.4	408	428	0.01	5,279.34
ST105-MW02	4	337.4	308.4	328.4	0.01	5,180.32
ST105-MW03	4	331	301	321	0.01	5,174.61
ST105-MW04	4	394.5	365	385	0.01	5,234.61
ST105-MW09	4	505	475	500	0.01	5,519.71
ST105-MW13	4	458.6	433.6	453.6	0.01	5,447.27
ST105-MW15	4	712	687	707	0.01	5,623.95
ST105-MW17	4	727	702	722	0.01	5,621.97
ST105-MW18	4	365	349.2	369.2	0.01	5,221.68
ST105-MW23	4	431	406	426	0.01	5,275.86
ST105-MW24	4	467	442	462	0.01	5,595.67
TJA-4	5	380	360	380	0.02	5,338.49
Perched Aquifer Wells						
KAFB-0314	5	455.17	430.17	450.17	0.01	5,453.08
KAFB-0506	5	224	200	220	0.01	5,360.80
KAFB-0602	4	495	437	457	0.02	5,361.49
KAFB-0608	4	330	307	327	0.02	5,357.23

Well	Diameter (inches)	Total Depth (feet)	Top of Screen (feet)	Bottom of Screen (feet)	Screen Slot Size (inches)	Measuring Point Elevation (feet)
KAFB-0612	4	317	305	315	0.01	5,382.78
KAFB-0614	4	372	360	370	0.01	5,388.22
KAFB-0619	4	406	389.25	404	0.01	5,408.11
KAFB-0623	4	292.5	265	290	0.01	5,326.27
ST105-MW06	4	253	228	248	0.01	5,313.26
ST105-MW10	4	461.5	436.5	456.5	0.01	5,334.70
ST105-MW12	4	401	375	395	0.01	5,419.90
ST105-MW19	4	370	345	365	0.01	5,217.94
ST105-MW20	4	306	281	301	0.01	5,383.72
ST105-MW21	4	315	290	310	0.01	5,390.90
ST105-MW22	4	502.3	472	492	0.01	5,386.66
TJA-2	4	307	277	297	0.02	5,349.81
TJA-5	5	287	267	287	0.02	5,333.79

In addition to the wells listed in Table 3-1, the following wells were scheduled to be sampled during the FY-2015 event, but samples could not be collected because of the noted reasons.

- KAFB-16 – The production well is undergoing renovation and was not operational.
- KAFB-0519 – The well was in disrepair.
- KAFB-1006 – The groundwater elevation was below the bottom of the well screen.
- ST105-MW05 – The groundwater elevation was below the bottom of the well screen.
- ST105-MW07 – The groundwater elevation was below the bottom of the well screen.
- ST105-MW08 – The groundwater elevation was below the bottom of the well screen.
- ST105-MW11 – The groundwater elevation was below the bottom of the well screen.
- KAFB-0622 – The groundwater elevation was below the bottom of the well screen.

Table 3-2. Groundwater Sample Analyses and Methods

Analysis	Method
Anions[a]	EPA Method 300.0
Nitrate-Nitrite (as Nitrogen)	EPA Method 353.2
Alkalinity	EPA SM 2320 B-2011
Total Kjeldahl Nitrogen	EPA Method 351.2
Ammonia (as Nitrogen)	EPA Method 350.1
Total Dissolved Solids	EPA SM 2540 C-2011
Dissolved Organic Carbon	EPA SM 5310 B-2011
Total Organic Carbon	SW-846 Method 9060A
Metals[b]	SW-846 Method 6010B/6020

Analysis	Method
[a] Anions included bromide, chloride, fluoride, and sulfate. [b.] Metals analyses included antimony, arsenic, barium, beryllium, cadmium, chromium, copper, cobalt, lead, manganese, nickel, selenium, silver, thallium, vanadium, and zinc by SW-846 Method 6020 and aluminum, boron, calcium, iron, lithium, magnesium, potassium, and sodium by SW-846 Method 6010B. EPA – U. S. Environmental Protection Agency SM – standard method	

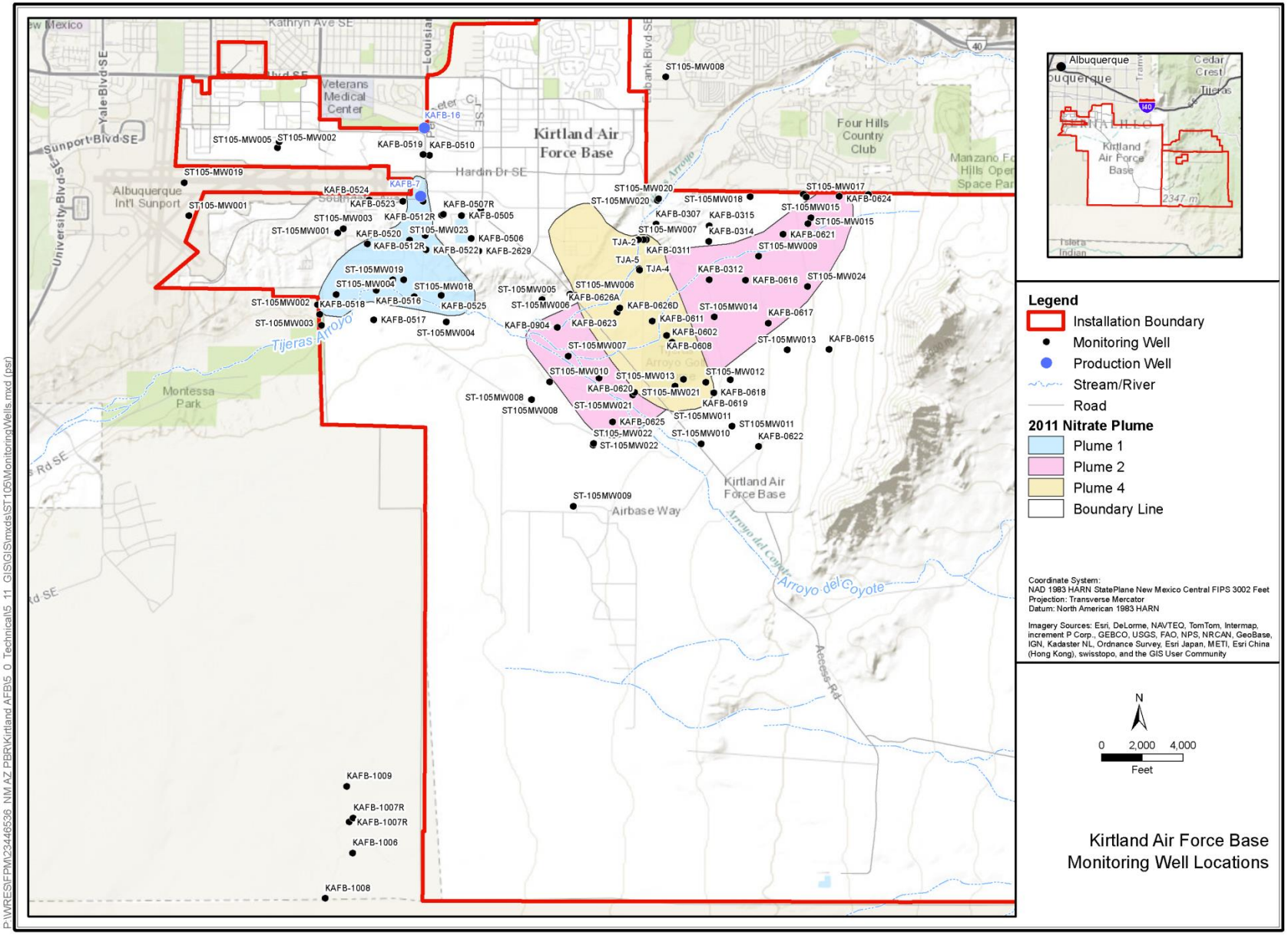

Figure 3-1. ST-105 Monitoring Well Locations

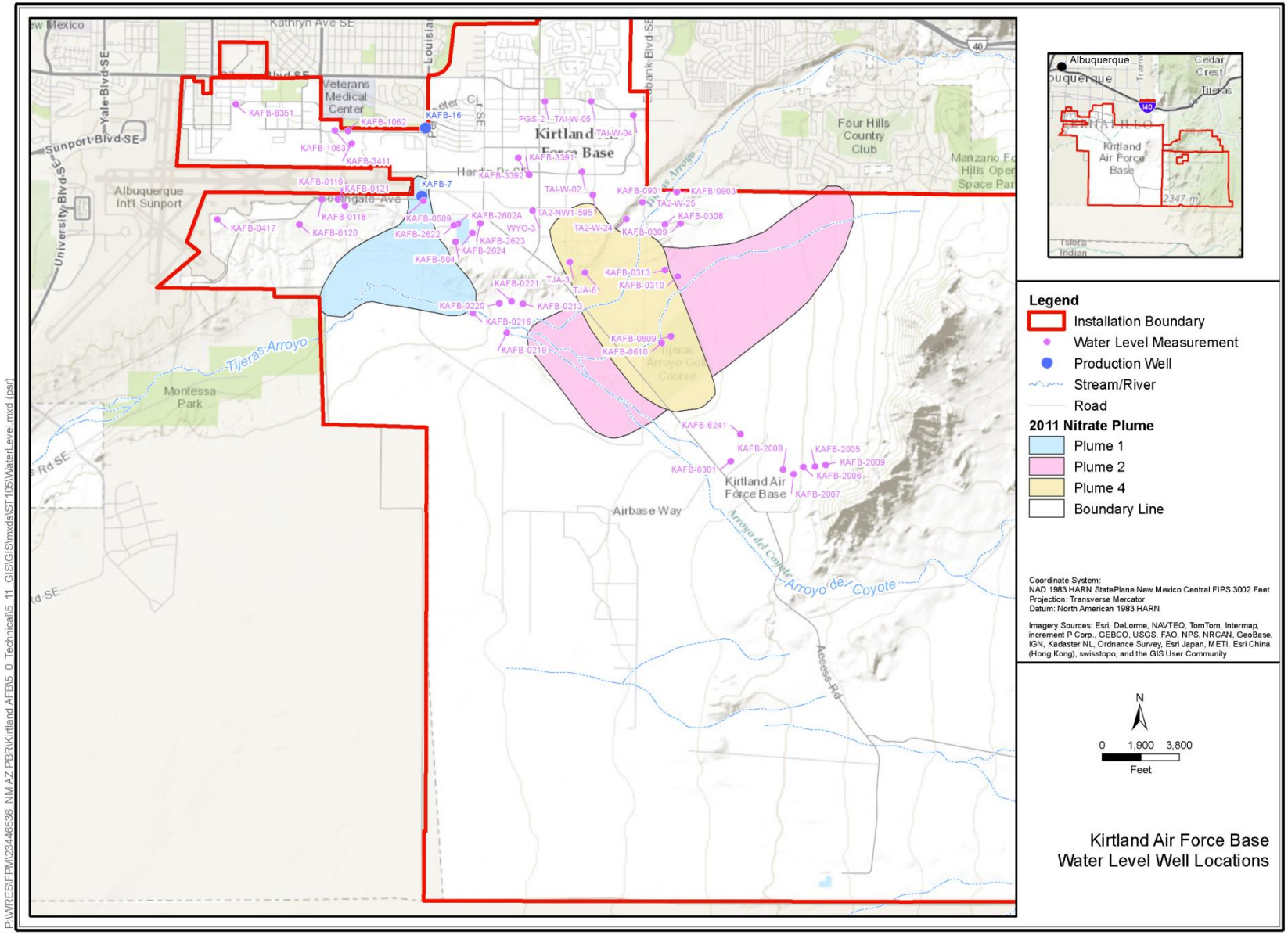

Figure 3-2. ST-105 Groundwater Level Wells

4.0 REGIONAL AQUIFER

As discussed in Section 3.0, groundwater samples were collected from the 49 regional aquifer wells listed in Table 3-1 with wells KAFB-0521 and KAFB-0626 sampled at multiple intervals using the installed FLUTe® liners resulting in the collection of 54 samples. Analytical results are compared to the lowest applicable screening level as obtained from the following sources:

- New Mexico Water Quality Commission Regulations (New Mexico Administrative Code [NMAC] 20.6.2)
- Applicable federal standards include U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) as found in 40 Code of Federal Regulations (CFR) 141 and 40 CFR 142 and National Secondary Drinking Water Regulations (NSDWR) found in 40 CFR 143
- EPA Regional Screening Levels (RSLs) for Tapwater available online at http://www.epa.gov/region6/6pd/rcra_c/pd-n/screen.htm.

4.1 GROUNDWATER SAMPLING RESULTS

The groundwater analytical results for the samples collected from the regional aquifer wells are summarized in Table 4-1 along with the applicable groundwater screening levels. The results for all analytes are tabulated in Table A-1 provided in Appendix A. The laboratory analytical reports are available in Appendix B.

4.1.1 Bromide

Samples from the 49 regional aquifer wells were analyzed for bromide in accordance with EPA Method 300.0. Bromide was detected in samples collected from 27 of the 49 well locations with concentrations ranging from 100 µg/L to 3,000 µg/L, with an average concentration of 723 µg/L. A regulatory screening level has not been established for bromide.

4.1.2 Chloride

Samples from the 49 regional aquifer wells were analyzed for chloride in accordance with EPA Method 300.0. Chloride was detected in samples collected from all 49 well locations ranging in concentration from 6,100 µg/L to 110,000 µg/L, with an average concentration of 20,600 µg/L. All chloride concentrations are below both the NMAC and the NSDWR regulatory level of 250,000 µg/L.

4.1.3 Fluoride

Samples from the 49 regional aquifer wells were analyzed for fluoride in accordance with EPA Method 300.0. Fluoride was detected in samples collected from all 49 well locations ranging in concentration from 230 µg/L to 2,100 µg/L, with an average concentration of 461 µg/L. The maximum concentration of 2,100 µg/L was detected in the samples collected from wells KAFB-0615 and ST105-MW24, which exceeded the NMAC regulatory screening level of 1,600 µg/L. Historic concentrations for samples collected from this well have varied from 1,600 µg/L to 3,500 µg/L; therefore, this result is within the range normally experienced. The concentrations for the samples collected from the other 48 well locations are all below the NMAC regulatory screening level.

Table 4-1. Regional Aquifer Groundwater Analytical Results

Analyte	Units	Minimum	Maximum	Number of Detects	Screening Level	Screening Level Source
Bromide	µg/L	100	3,000	27	NE	—
Chloride	µg/L	6,100	110,000	54	250,000	NMAC/NSDWR
Fluoride	µg/L	230	**2,100**	54	1,600	NMAC
Nitrate-Nitrite (as Nitrogen)	µg/L	940	**62,000**	54	10,000	NMAC/MCL
Sulfate	µg/L	17,000	**280,000**	54	250,000	NSDWR
Alkalinity	µg/L	89,000	180,000	54	NE	—
Ammonia (as Nitrogen)	µg/L	39	2,000	21	NE	—
Total Kjeldahl Nitrogen	µg/L	40	8,500	12	NE	—
TDS	µg/L	190,000	**1,200,000**	54	1,000,000	NMAC
Dissolved Organic Carbon	µg/L	110	9,400	50	NE	—
Total Organic Carbon	µg/L	100	13,000	38	NE	—
Antimony	µg/L	0.23	1.6	17	6	MCL
Arsenic	µg/L	0.28	**27**	53	10	MCL
Barium	µg/L	3.90	350	54	1,000	NMAC
Beryllium	µg/L	0.20	0.89	3	4	MCL
Cadmium	µg/L	ND	ND	0	5	MCL
Chromium	µg/L	0.59	38	53	50	NMAC
Copper	µg/L	0.53	10	23	1,000	NMAC
Cobalt	µg/L	0.42	1.0	2	50	NMAC
Lead	µg/L	0.42	5.0	16	15	EPA Action Level
Manganese	µg/L	0.25	**280**	47	200	NMAC
Nickel	µg/L	0.36	5.8	14	200	NMAC
Selenium	µg/L	0.44	14	52	50	NMAC/MCL
Silver	µg/L	0.31	0.41	4	50	NMAC
Thallium	µg/L	0.19	0.49	11	2	MCL
Vanadium	µg/L	0.85	10	54	63.1	EPA RSL for tapwater
Zinc	µg/L	2.7	30	19	10,000	NMAC
Aluminum	µg/L	35	290	18	5,000	NMAC
Boron	µg/L	43	130	49	750	NMAC
Calcium	µg/L	30,000	120,000	54	NE	—
Iron	µg/L	14	890	20	1,000	NMAC
Lithium	µg/L	13	54	46	NE	—
Magnesium	µg/L	3,800	31,000	54	NE	—
Potassium	µg/L	1,600	7,200	54	NE	—
Sodium	µg/L	19,000	54,000	54	NE	—

EPA – U.S. Environmental Protection Agency
MCL – maximum contaminant level
µg/L microgram per liter
NE – none established
ND – non-detect
NMAC – New Mexico Administrative Code
NSDWR – National Secondary Drinking Water Regulation
RSL – regional screening level
TDS – total dissolved solids
Bold text results indicate a concentration that exceeds the regulatory screening level.

4.1.4 Nitrate-Nitrite (as Nitrogen)

Samples from the 49 regional aquifer wells were analyzed for nitrate-nitrite (as nitrogen) in accordance with EPA Method 353.2. Nitrate-nitrite was detected in samples collected from all 49 wells at concentrations ranging from 940 µg/L to 62,000 µg/L, with an average concentration of 11,200 µg/L. Sample concentrations for 20 of the 49 regional aquifer well locations sampled exceeded both the NMAC and the MCL of 10,000 µg/L.

To note, in FY 2014, the analytical method for nitrate-nitrite was changed from EPA Method 300.0 to EPA Method 353.2. The EPA Method 353.2 provides comparable results to that of EPA Method 300.0 while mitigating some of the interference problems resulting from the presence of other anions when analyzing in accordance with Method 300.0.

For the FY 2014 monitoring effort, the sample collected for well KAFB-0505 in support of the ST-105 monitoring had a result of 350,000 µg/L, which was outside the range normally seen for this well. A sample was collected from the well concurrently in support of the WP-026 groundwater monitoring effort yielding a result of 4,220 µg/L, which fell within the historic range. The analytical result for the sample collected from KAFB-0505 during the FY 2015 monitoring effort was 3,700 µg/L, which is within the historic range for the well. This confirms that the 350,000 µg/L result was indeed an anomaly.

4.1.5 Sulfate

Samples from the 49 regional aquifer wells were analyzed for sulfate in accordance with EPA Method 300.0. Sulfate was detected in samples collected from all 49 wells at concentrations ranging from 17,000 µg/L to 280,000 µg/L, with an average concentration of 51,000 µg/L. Analytical results for samples collected from wells KAFB-0615 and ST105-MW24 were 280,000 µg/L and 260,000 µg/L, respectively, which exceed the NSDWR screening level of 250,000 µg/L. The FY 2014 sulfate concentration for the sample collected from well KAFB-0615 was 247,000 µg/L. Sulfate concentrations for this well will continue to be monitored to determine whether an increasing trend may exist for the well. All other sample results are below the NSDWR screening level of 250,000 µg/L.

4.1.6 Alkalinity

Samples from the 49 regional aquifer wells were analyzed for alkalinity (as calcium carbonate [$CaCO_3$]) in accordance with EPA Standard Method (SM) 2320 B-2011. Alkalinity results for the 49 wells ranged from 89,000 µg/L to 180,000 µg/L, with an average of 133,000 µg/L. A regulatory screening level has not been established for alkalinity.

4.1.7 Ammonia (as Nitrogen)

Samples from the 49 regional aquifer wells were analyzed for ammonia (as nitrogen) in accordance with EPA Method 350.1. Ammonia (as nitrogen) was detected in the samples collected from 21 of the 49 wells at concentrations ranging from 39 µg/L to 2,000 µg/L with an average concentration of 197 µg/L for the detected concentrations. A regulatory screening level has not been established for ammonia (as nitrogen). To note, the elevated ammonia concentrations were associated with a single well (KAFB-0521) which is equipped with a FLUTe® liner allowing groundwater samples to be collected from three different intervals (see Appendix A).

4.1.8 Total Kjeldahl Nitrogen

Samples from the 49 regional aquifer wells were analyzed for total Kjeldahl nitrogen in accordance with EPA Method 351.2. Total Kjeldahl nitrogen concentrations were detected in 12 of the 49 wells ranging from 40 µg/L to 8,500 µg/L with an average concentration of 1,200 µg/L for the detected concentrations. A regulatory screening level has not been established for total Kjeldahl nitrogen.

4.1.9 Total Dissolved Solids

Samples from the 49 regional aquifer wells were analyzed for TDS in accordance with EPA SM 2540 C-2011. The TDS results for all 49 wells ranged from 190,000 µg/L to 1,200,000 µg/L, with an average of 355,000 µg/L. The 1,200,000 µg/L result was for a sample collected from well KAFB-0618, which exceeds the NMAC screening level of 1,000,000 µg/L. It was noted during sampling of KAFB-0618 that the water table in the well was dropping at a high rate. A total of 75 gallons was purged from the well before purging was ceased because of the decrease in water in the well. Recharge was slow and the well was subsequently sampled the following day to allow for adequate recharge prior to sample collection. Results for all other wells were below the NMAC screening level.

4.1.10 Dissolved Organic Carbon and Total Organic Carbon

Samples from the 49 regional aquifer wells were analyzed for both dissolved organic carbon and total organic carbon in accordance with methods EPA SM 5310 B-2011 and SW-846 Method 9060A, respectively. Dissolved organic carbon was detected in 50 of the 49 wells at concentrations ranging from 110 µg/L to 9,400 µg/L with an average concentration of 1,470 µg/L for the detected results. The total organic carbon results ranged from 100 µg/L to 13,000 µg/L with detected concentrations for samples collected from 38 of the 49 wells. A regulatory screening level has not been established for either dissolved organic carbon or total organic carbon. To note, the highest dissolved organic carbon and total organic carbon were associated with wells KAFB-0521 and KAFB-0626 both of which are equipped with a FLUTe® liners allowing groundwater samples to be collected from three and four different intervals, respectively (see Appendix A). It is unclear as to whether the FLUTe® liners may be impacting the dissolved organic and total organic carbon results.

4.1.11 Metals

Samples from the 49 regional aquifer wells were analyzed for total metals in accordance with SW-846 Method 6010B (aluminum, boron, calcium, iron, lithium, magnesium, potassium, and sodium) and SW-846 Method 6020 (antimony, arsenic, barium, beryllium, cadmium, chromium, copper, cobalt, lead, manganese, nickel, selenium, silver, thallium, vanadium, and zinc). As shown in Table 4-1, concentrations for arsenic and manganese exceeded regulatory levels in one well each. The concentrations for all other metals were below established regulatory levels.

4.1.12 Arsenic

Arsenic was detected in 53 of the 54 samples collected from the regional aquifer wells at concentrations ranging from 0.28 µg/L to 27 µg/L with an average of 1.4 µg/L. The concentration for one sample collected from KAFB-0521A exceeded the MCL of 10 µg/L. The concentrations for all other samples were less than this regulatory level. As previously noted, KAFB-0521 has a FLUTe® liner installed that allows for collection of groundwater samples from three discrete intervals with interval A representing the uppermost interval which is screened between 550 and 555 ft below ground surface. The arsenic concentrations for the other two intervals, KAFB-0521B and KAFB-0521C, were 3.3 µg/L and 2.3 µg/L,

respectively. Arsenic concentrations for this well will continue to be monitored to further evaluate its presence.

4.1.13 Manganese

Manganese was detected in 47 of the 54 samples with concentrations ranging from 0.25 µg/L to 280 µg/L and having an average of 9.9 µg/L for the detected results. The NMAC screening level of 200 µg/L was exceeded by the sample collected from well ST105-MW15 with a concentration of 280 µg/L. This is one of the new wells added to the ST-105 groundwater monitoring network; therefore, historic data are not available. Manganese concentrations for this well will continue to be monitored to further evaluate its presence. The manganese concentrations for all other well samples were less than the NMAC screening level.

4.2 NITRATE TRENDS

4.2.1 Regional Aquifer Plume 1

4.2.1.1 KAFB-7

Nitrate concentrations for Production Well KAFB-7, located on the northern edge of Plume 1, originally exceeded the regulatory level of 10 mg/L, but have continually declined to concentrations less than the regulatory level since January 2006 and have remained there. The ST-105 nitrate abatement plan has prescribed that KAFB-7 be used as part of the plan to provide for beneficial use of the nitrate impacted groundwater by pumping groundwater from the well to the golf course main pond on Kirtland AFB where the water is subsequently used for maintaining the golf course grounds. As can be seen from Figure 4-1, the nitrate concentrations have declined to levels where the beneficial use as a source of nitrate for the golf course grounds is minimal. Furthermore, it has been requested that KAFB-7 be converted to an injection well for use on the Kirtland AFB Bulk Fuels Facility groundwater treatment project. Therefore, it has been recommended that KAFB-7 no longer be used as part of the ST-105 nitrate abatement plan.

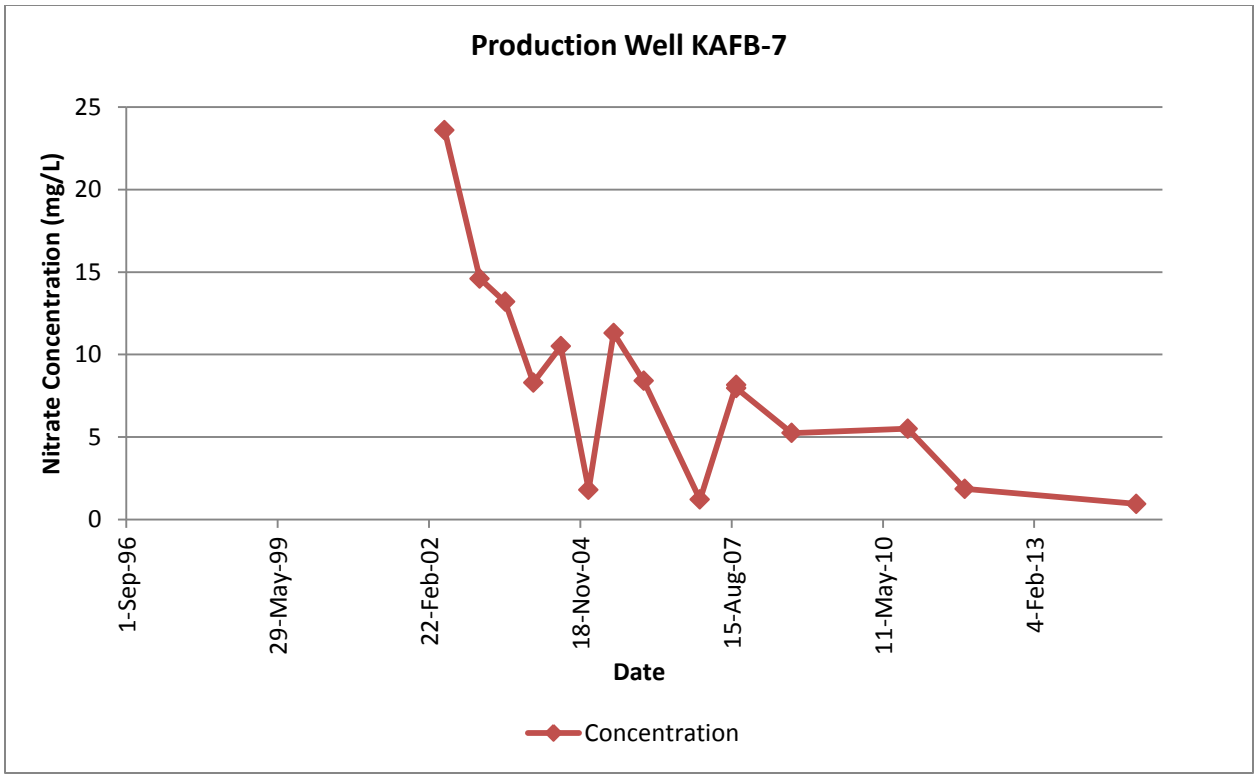

Figure 4-1. Production Well KAFB-7 Nitrate Trend

4.2.1.2 KAFB-16

Well KAFB-16 is a production well located far north of the nitrate plume. The well has been undergoing renovation and subsequently was unavailable for sampling. As shown in Figure 4-2, analytical data for the well is sparse and historically has been well below the regulatory level of 10 mg/L. Given the distance of the well in relation to the nitrate plume, as well as that the well will be sampled by the Kirtland AFB drinking water program once the well comes back on line, it is recommended that monitoring of well KAFB-16 under the ST-105 nitrate abatement plan be discontinued.

4.2.1.3 KAFB-0505

As shown in Figure 4-3, nitrate concentrations in samples collected from well KAFB-0505, located on the northeastern edge of Plume 1, continue to be below the regulatory level of 10 mg/L with a slight decreasing trend. The groundwater elevation continues to demonstrate an increasing trend since September 2009. A correlation between decreasing nitrate concentrations and increasing groundwater elevation trends is not apparent based on current and historical data. Given the consistent nitrate concentrations in this well and the fact that the concentrations have been below the regulatory level, it is recommended that monitoring of KAFB-0505 be discontinued under the ST-105 project. Monitoring of the well will be performed under the WP-026 Base Sewage Lagoons and Golf Course Pond site.

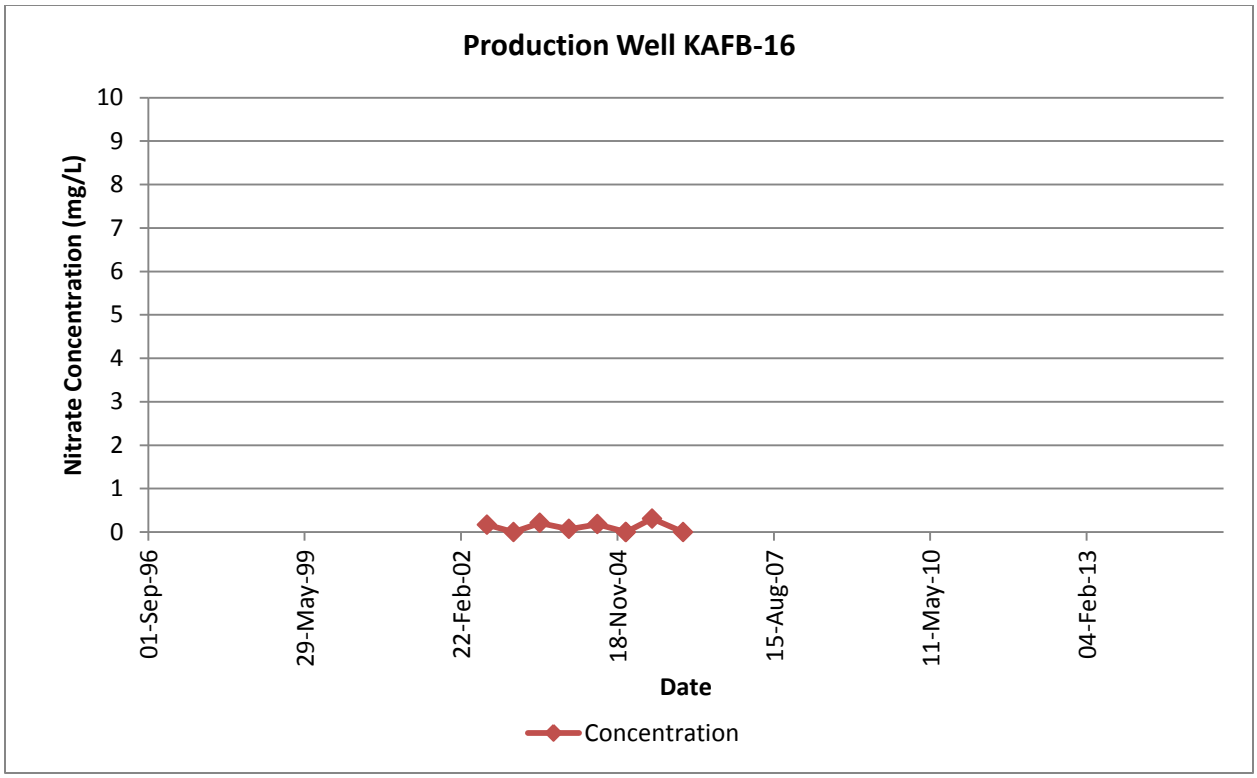

Figure 4-2. Production Well KAFB-16 Nitrate Trend

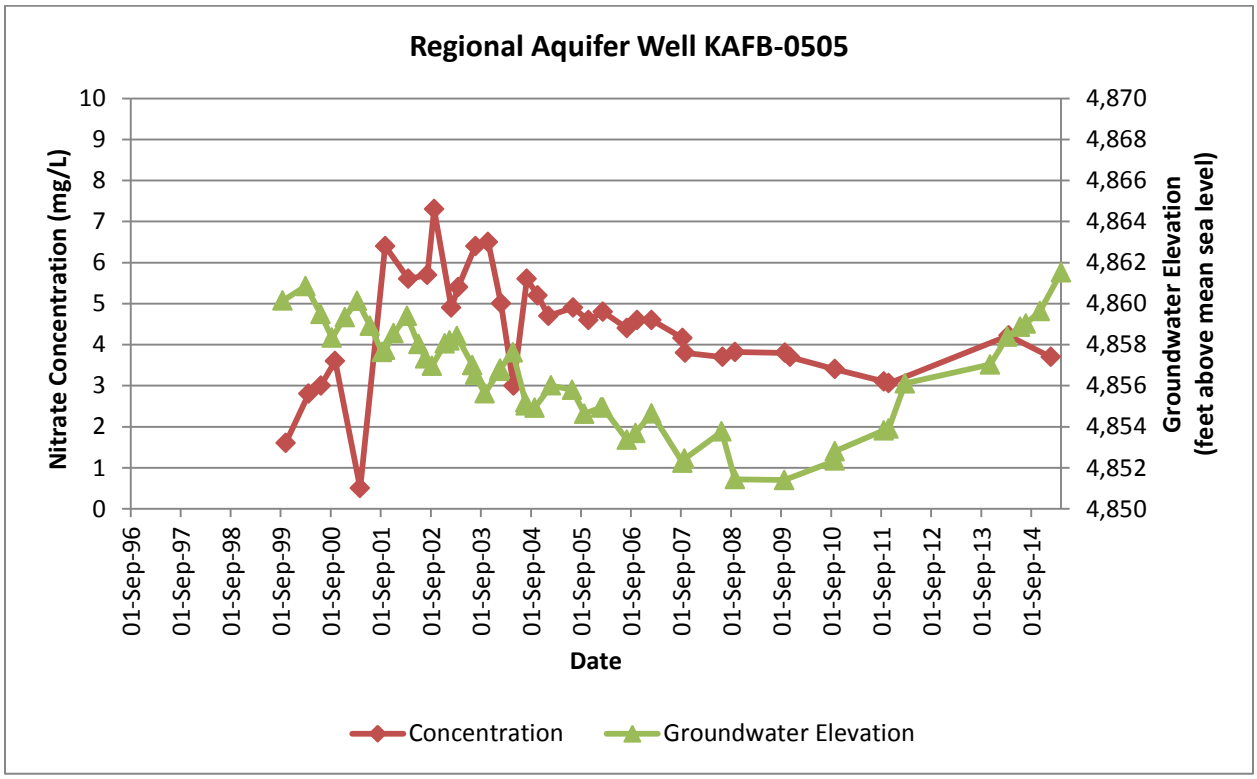

Figure 4-3. Well KAFB-0505 Nitrate and Groundwater Elevation Trends

4.2.1.4 KAFB-0507/-0507R

Wells KAFB-0507/-0507R, located just to the west of well KAFB-0505, have demonstrated a decreasing trend in nitrate concentration over time, declining below the regulatory level of 10 mg/L and remaining below that level since 2003. Well KAFB-0507 was abandoned in June 2013 because water levels had declined with KAFB-0507R installed in March 2013. Similar to well KAFB-0505, wells KAFB-0507/-0507R have shown an increasing trend in groundwater elevation since 2008. Figure 4-4 illustrates both the nitrate concentration trend and the groundwater elevation trend. It is not apparent from the trend charts that there is a correlation between the decreasing nitrate trend and the increasing groundwater elevation trend given that the most recent elevation data were collected from KAFB-0507R rather than KAFB-0507. Although nitrate concentrations have been below 10 mg/L for over 10 years, it is recommended that KAFB-0507R continue to be monitored on an annual basis for at least two more years to gather sufficient data upon which any discernable trends could be evaluated.

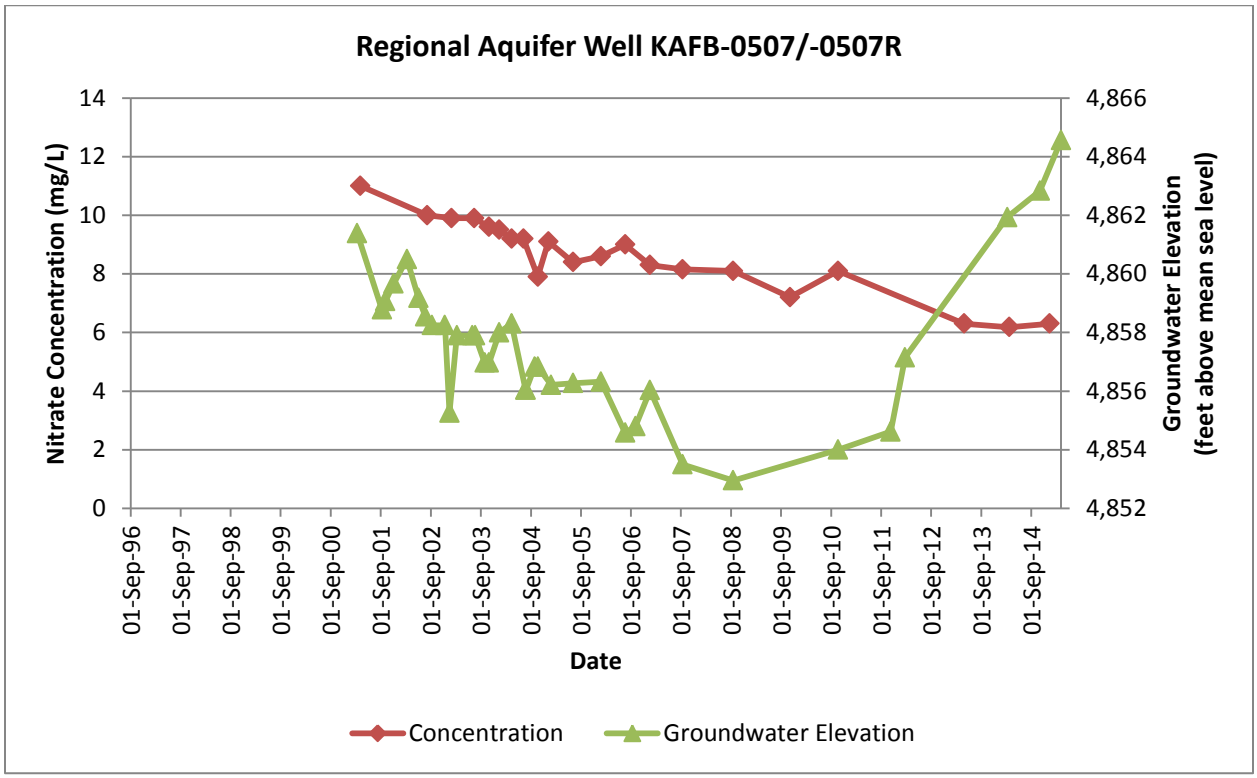

Figure 4-4. Well KAFB-0507/-0507R Nitrate and Groundwater Elevation Trends

4.2.1.5 KAFB-0508

Well KAFB-0508 is located on the northern edge of Plume 1. As shown in Figure 4-5, the nitrate concentrations have declined over time from a maximum of just under 30 mg/L 10 years ago to approximately 17 mg/L continuing to exceed the regulatory level of 10 mg/L. As with wells KAFB-0505 and KAFB-0507, the groundwater elevation demonstrates an increasing trend, which does not appear to have any correlation to the decreasing nitrate concentration trend. Given that the nitrate concentrations continue to exceed the regulatory level, it is recommended that annual monitoring of KAFB-0508 be continued.

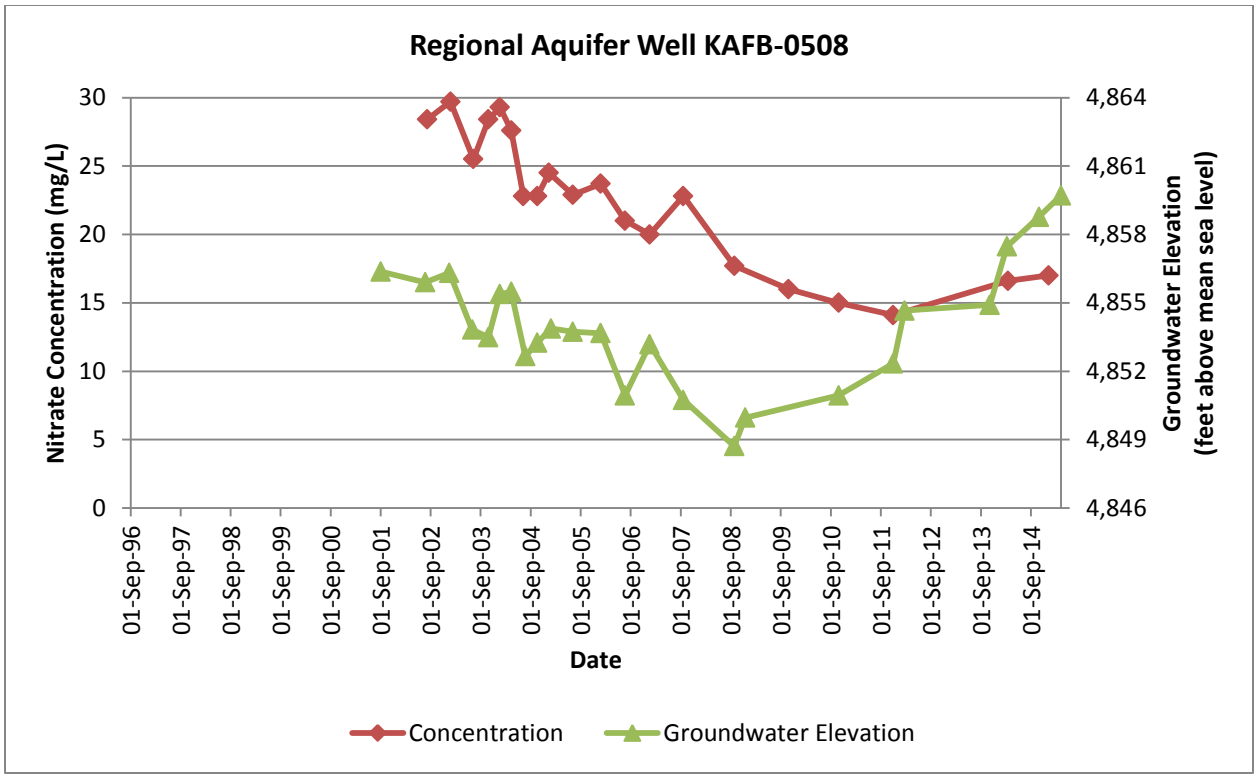

Figure 4-5. Well KAFB-0508 Nitrate and Groundwater Elevation Trends

4.2.1.6 KAFB-0510

Well KAFB-0510 is located to the north of Plume 1. As shown in Figure 4-6, the nitrate concentrations did demonstrate a discernable increasing trend between 2002 and 2010 peaking at 5.4 mg/L late that year, but appears to be decreasing during the past two sampling events. The nitrate concentrations have been consistently below the regulatory level of 10 mg/L. As with the previous three wells discussed above, the groundwater elevation demonstrates an increasing trend that does not appear to have any correlation to nitrate concentrations. Given that well KAFB-0510 is located well north of the extent of the nitrate plume and that nitrate concentrations have continually been less than the regulatory level of 10 mg/L, it is recommended that monitoring be discontinued.

4.2.1.7 KAFB-0512/512R

Wells KAFB-0512/512R, located along the western portion of Plume 1, have demonstrated a slightly decreasing trend in nitrate concentrations over time. Well KAFB-0512 was abandoned in June 2013 because water levels had declined with KAFB-512R installed in April 2013. Similar to other wells in the vicinity, wells KAFB-0512/512R have demonstrated in increasing trend in groundwater elevation since 2011. Figure 4-7 illustrates both the nitrate concentration trend and the groundwater elevation trend. There does not to be a correlation between the nitrate concentrations and the groundwater elevation. The most recent nitrate data collected from Well KAFB-512R provided a concentration of 4.4 mg/L. Previous nitrate concentrations obtained for Well KAFB-0512 were slightly above the 10 mg/L regulatory level. Given the limited data for KAFB-512R, it is recommended the monitoring continue on an annual basis.

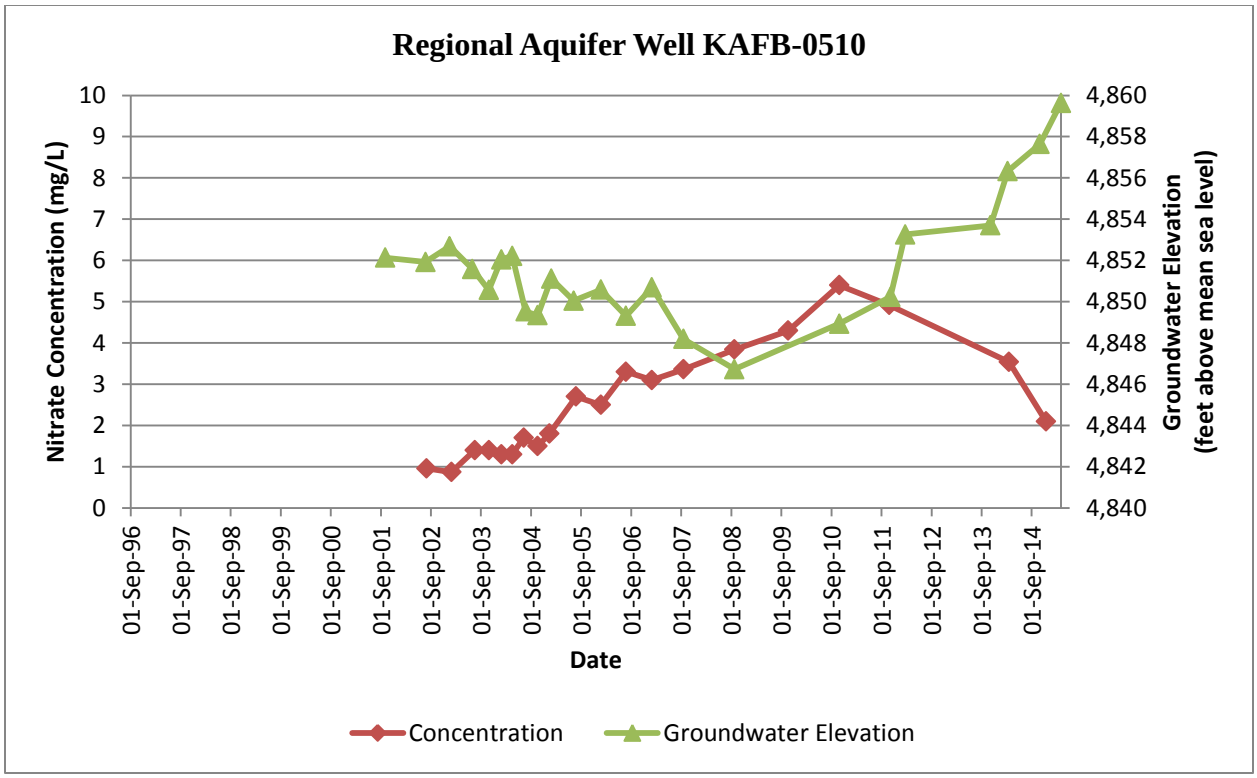

Figure 4-6. Well KAFB-0510 Nitrate and Groundwater Elevation Trends

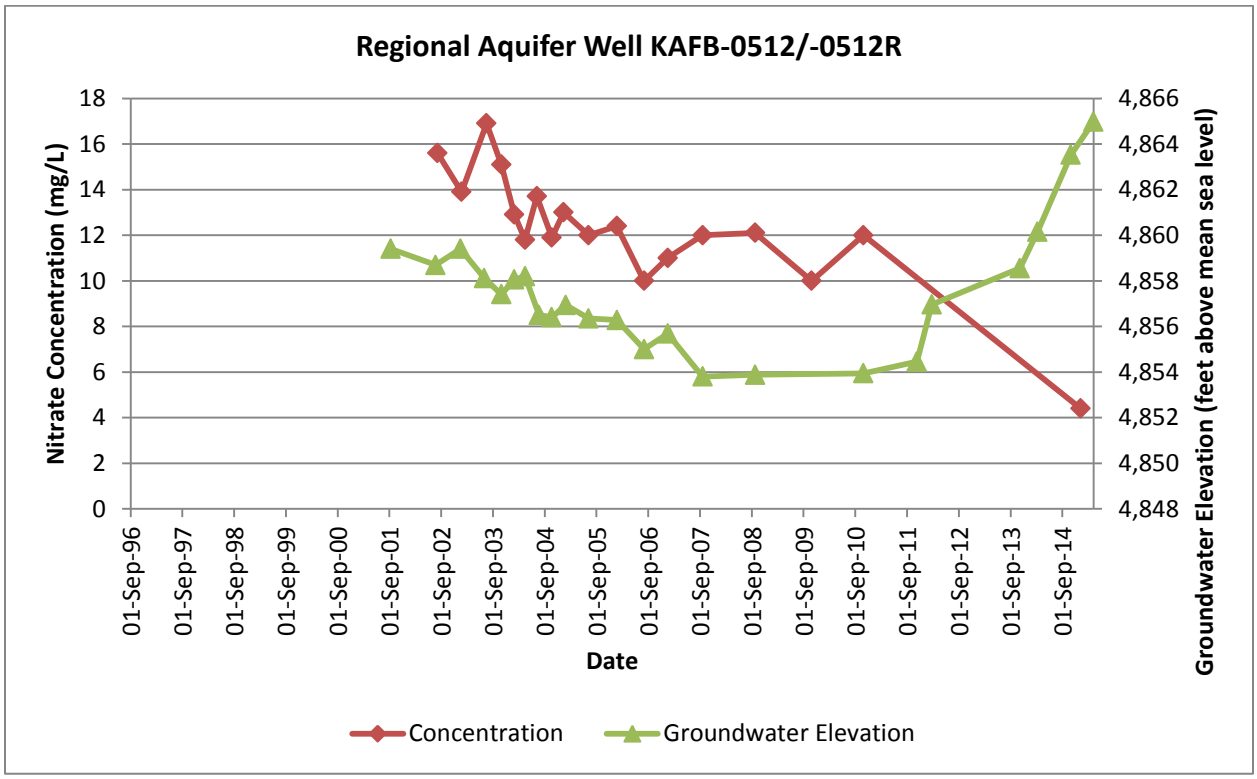

Figure 4-7. Well KAFB-0512/512R Nitrate and Groundwater Elevation Trends

4.2.1.8 KAFB-0514

Well KAFB-0514 is located near the center of Plume 1. The nitrate concentrations for samples collected from this well have consistently exceeded the regulatory level of 10 mg/L, ranging from the approximately 25 mg/L with a steady increase to a maximum of 110 mg/L in October 2010. The nitrate concentrations have decreased during the past two sampling events approaching the concentrations experienced for the well prior to the increase (see Figure 4-8). Interestingly, groundwater elevations reached their lowest level approximately the same time as the nitrate concentrations reached their maximum. Groundwater elevations are demonstrating an increasing trend similar to other wells in the vicinity of Plume 1. The nitrate concentrations and groundwater elevations will continue to be evaluated over the subsequent sampling events to determine whether a correlation between the two exists. Furthermore, the increase followed by decrease in nitrate concentrations may be indicative of an overall shift in the nitrate plume location. Given that nitrate concentrations remain above the regulatory level of 10mg/L, monitoring of KAFB-0514 will continue.

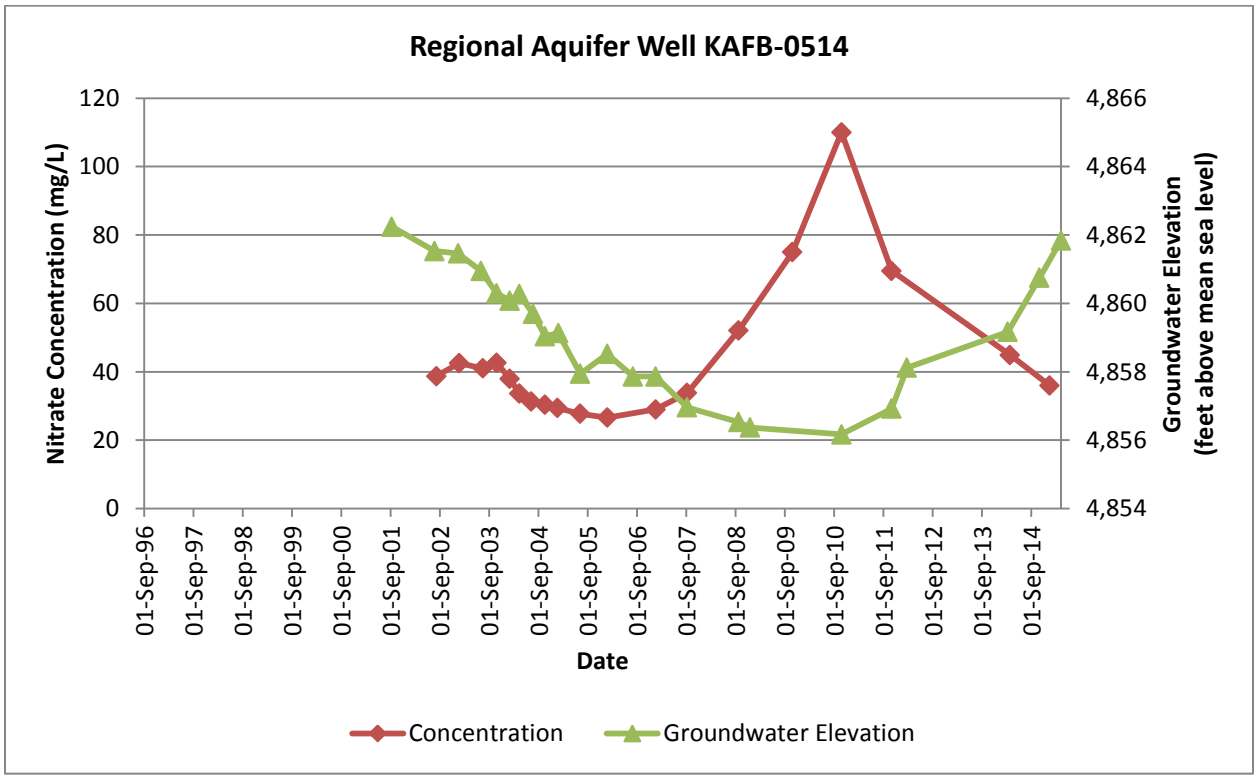

Figure 4-8. Well KAFB-0514 Nitrate and Groundwater Elevation Trends

4.2.1.9 KAFB-0516

Well KAFB-0516 is located in the south-central portion of Plume 1. As shown in Figure 4-9, the nitrate concentrations reached a maximum of 62.4 mg/L in September 2007 and have been declining since with a current concentration of 6.5 mg/L, which represents the lowest concentration seen for samples collected from this well. The groundwater level elevations declined over time until approximately 2008-2009 timeframe and have been steadily increasing since 2011. Given that historic nitrate concentrations have been above the 10 mg/L regulatory level, it is recommended that monitoring of Well KAFB-0516 be continued.

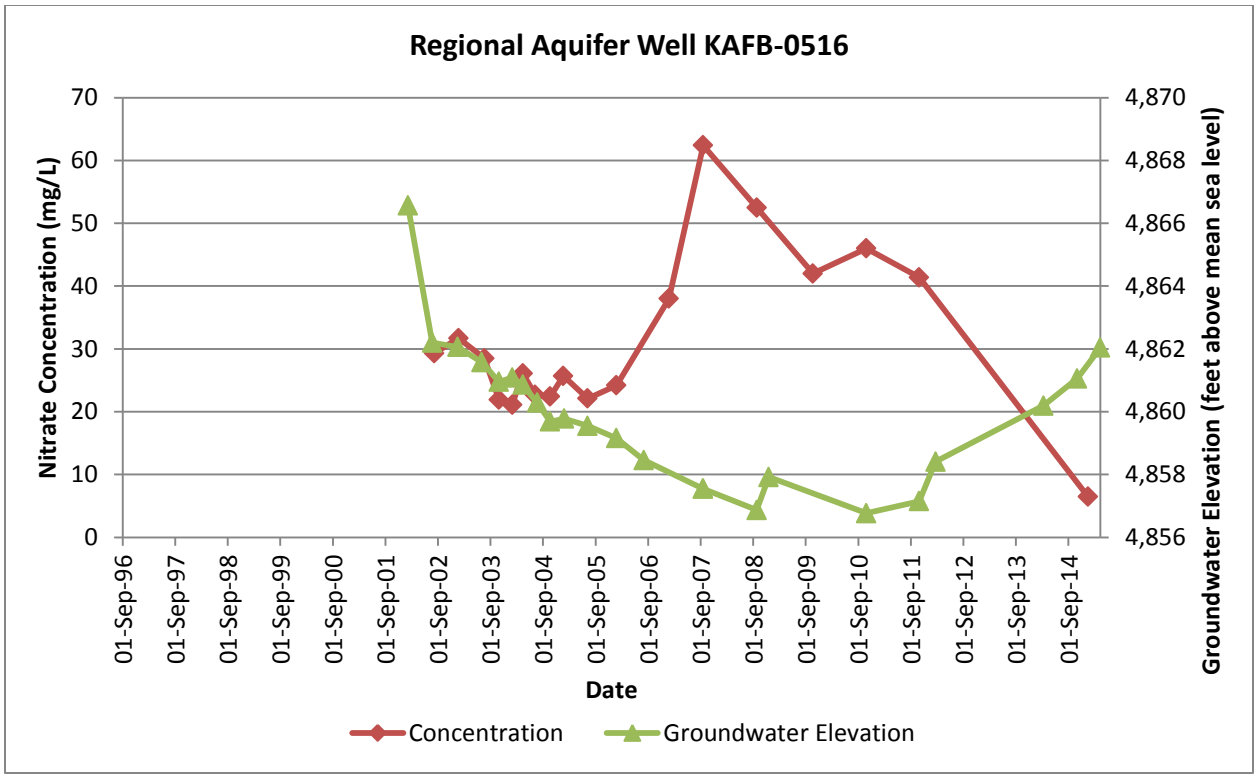

Figure 4-9. Well KAFB-0516 Nitrate and Groundwater Elevation Trends

4.2.1.10 KAFB-0517

Well KAFB-0517 is located south of the historically defined Plume 1. The nitrate concentrations have been below the regulatory level of 10 mg/L, but the results for the March 2014 sampling event showed a sudden spike of 40.5 mg/L with a continuing upward trend to 60 mg/L in December 2014 (see Figure 4-10). This may be indicative of a southward, cross-gradient migration of Plume 1, as the October 2011 analytical results did show an increase in concentration from those seen previously. The increasing trend may also be indicative of a new release from sewer lines that run through the area adjacent to the well. Continued monitoring is warranted to further evaluate the apparent increasing trend for nitrate in this well. Regarding groundwater elevations, this well is demonstrating an increasing trend as with other wells located in the vicinity of Plume 1. Given the increasing trend in nitrate concentrations above the regulatory level, monitoring of KAFB-0517 will continue.

4.2.1.11 KAFB-0518

Well KAFB-0518 is located on the southwestern corner of the ST-105 Plume 1. Historically, the nitrate concentrations for samples collected from this well have been below the regulatory level of 10 mg/L. As shown in Figure 4-11, the nitrate concentrations did demonstrate an increasing trend approaching the regulatory level, but the most recent sampling events indicate concentrations continue to remain below regulatory levels. As with other wells in the vicinity of Plume 1, the groundwater elevation for well KAFB-0518 does demonstrate an increasing trend over the past few years. It also appears that there may be an inverse correlation between nitrate concentration and groundwater elevations. Given the wells proximity to the nitrate plume, it is recommended that monitoring of KAFB-0518 be continued.

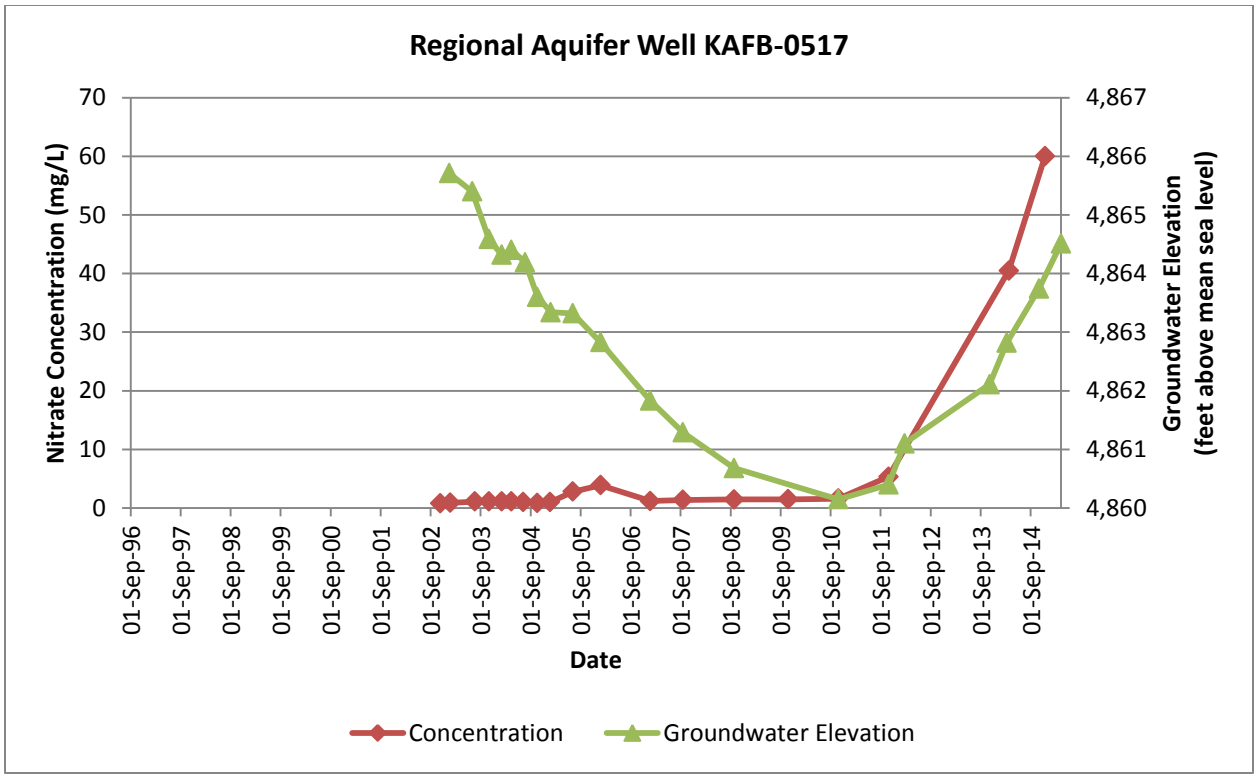

Figure 4-10. Well KAFB-0517 Nitrate and Groundwater Elevation Trends

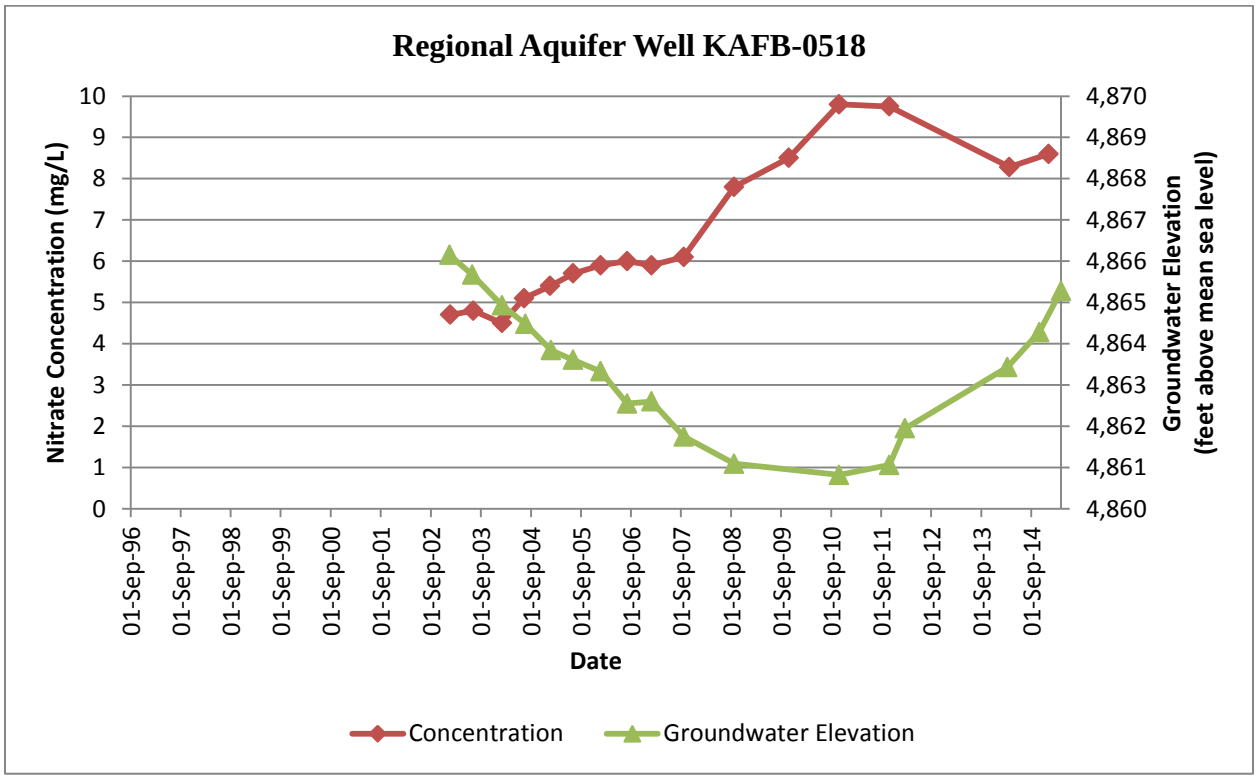

Figure 4-11. Well KAFB-0518 Nitrate and Groundwater Elevation Trends

4.2.1.12 KAFB-0519

Well KAFB-0519 is located north of the plume just to the west of Well KAFB-0510. The well has not sampled in recent years because it was in disrepair. As shown in Figure 4-12, the nitrate concentrations for the well are well below the regulatory level of 10 mg/L. As such and given that the well's proximity to KAFB-0510, which also shows nitrate concentrations to be below regulatory concern, it is recommended that monitoring of Well KAFB-0519 be discontinued and the well abandoned.

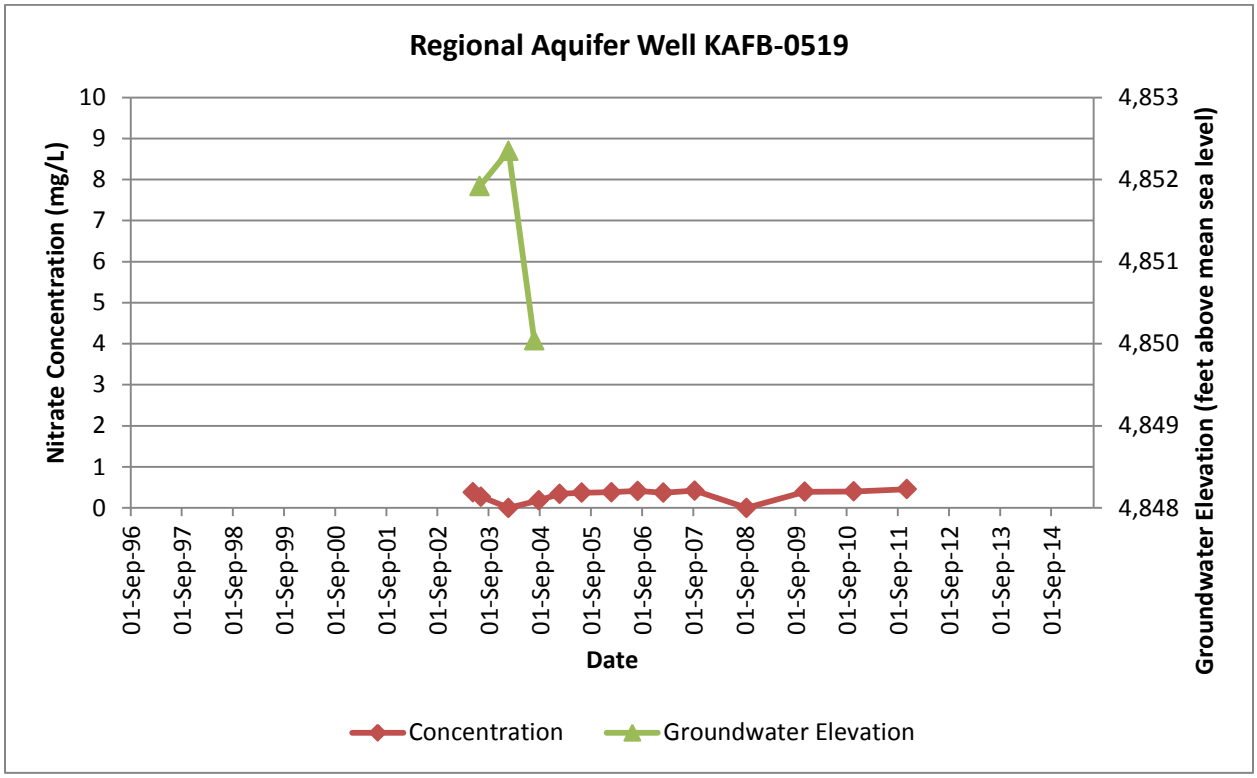

Figure 4-12. Well KAFB-0519 Nitrate and Groundwater Elevation Trends

4.2.1.13 KAFB-0520

Well KAFB-0520 is located on the northwestern edge of Plume 1. As shown in Figure 4-13, the nitrate concentrations for samples collected from this well demonstrated an increasing trend between 2004 through 2010 peaking at a maximum of 31 mg/L in October 2010. The nitrate concentrations have decreased during the most recent three sampling events with a concentration of 15.0 mg/L in January 2015. The groundwater elevations demonstrated an opposite trend over the same timeline declining from 2004 through 2009/2010 and currently increasing indicating a possible inverse correlation between nitrate concentrations and groundwater elevations. This will continue to be monitored and evaluated in subsequent reports to determine whether a statistical correlation does exist.

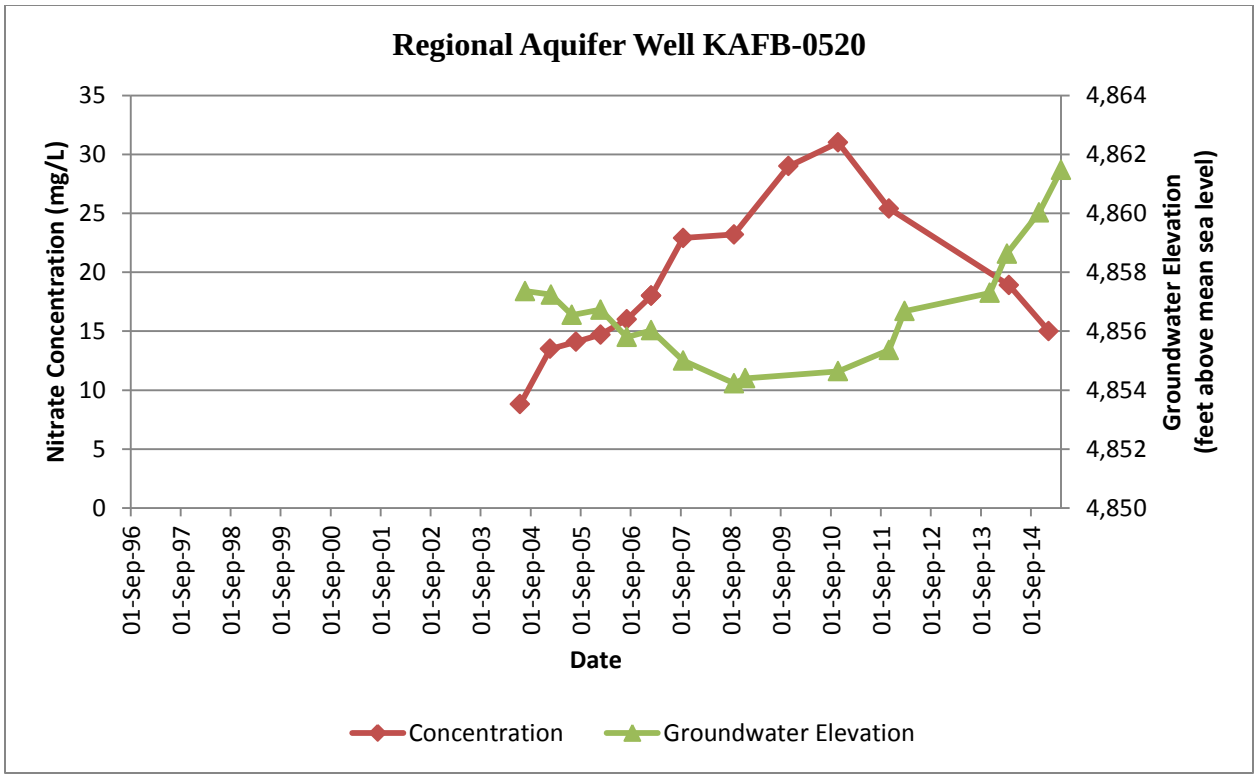

Figure 4-13. Well KAFB-0520 Nitrate and Groundwater Elevation Trends

4.2.1.14 KAFB-0521

Well KAFB-0521 is located to the north of Plume 1 adjacent to production well KAFB-7. As previously noted, KAFB-0521 is equipped with a FLUTe® liner which allows the well to be sampled at three discrete intervals. Figure 4-14 presents the nitrate concentrations for the three intervals. The depths associated with intervals KAFB-0521A, KAFB-0521B, and KAFB-0521C are 550 to 555 ft bgs, 600 to 605 ft bgs, and 650 to 655 ft bgs, respectively. As can be seen from the graphical presentation, nitrate concentrations in the uppermost interval were initially elevated, but have steadily declined to below the regulatory level of 10 mg/L. For the middle interval (KAFB-0521B), there was one anomalous result for the sample collected in July 2006, but overall concentrations have remained below regulatory concern as have the results for interval KAFB-0521C. Because of its proximity to the production well KAFB-7, as well as being on the northern edge of the primary nitrate plume, it is recommended to continue to monitor this well using the FLUTe® liner system for the near future.

4.2.1.15 KAFB-0522

Well KAFB-0522 is located in the northeast central portion of Plume 1. Historically, nitrate concentrations for samples collected from this well demonstrated an increasing trend between 2004 and 2007, remained steady from 2007 through 2010 and appear to be decreasing over the most recent three sampling events with the most recent result being below the 10mg/L regulatory level (see Figure 4-15). As with other wells located in the vicinity of Plume 1, groundwater elevations at Well KAFB-0522 have demonstrated an increasing trend over the past five years. A correlation between nitrate concentrations and groundwater elevation may exist, but continued monitoring of the well is warranted to supplement the existing data and provide for a statistical evaluation.

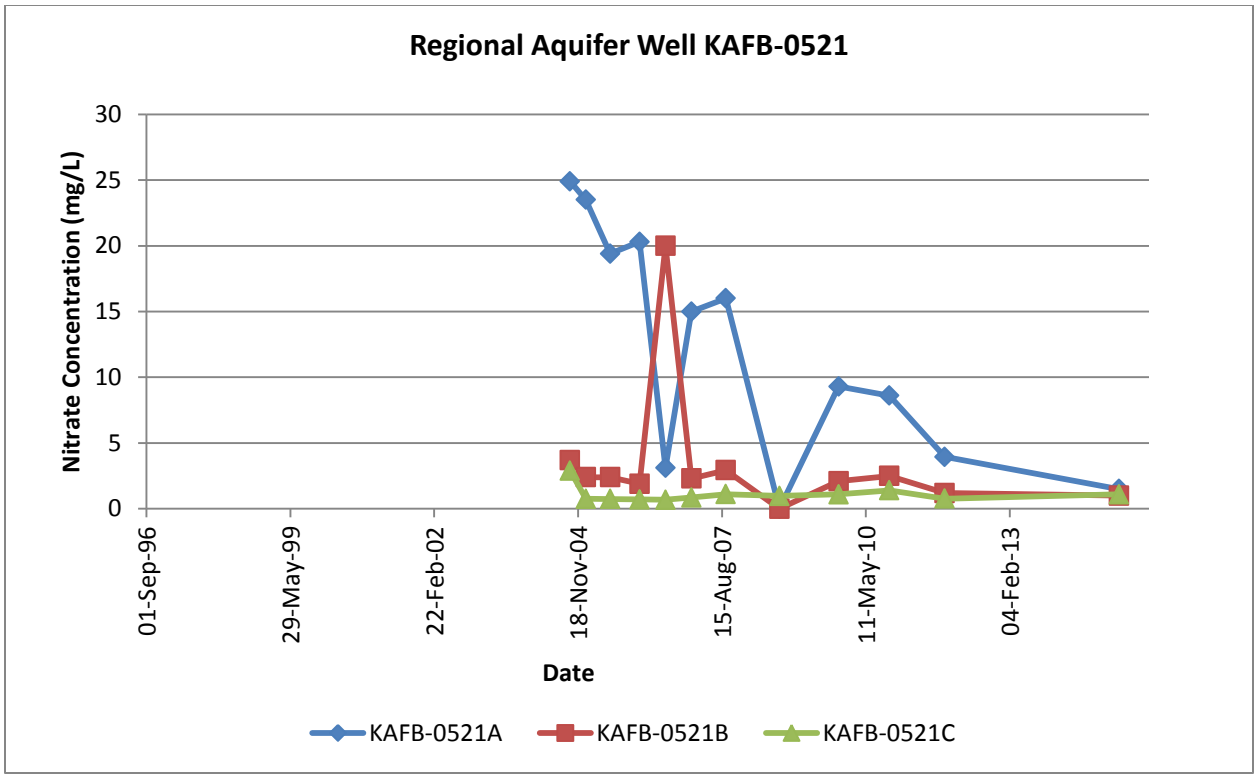

Figure 4-14. Well KAFB-0521 Nitrate Trends

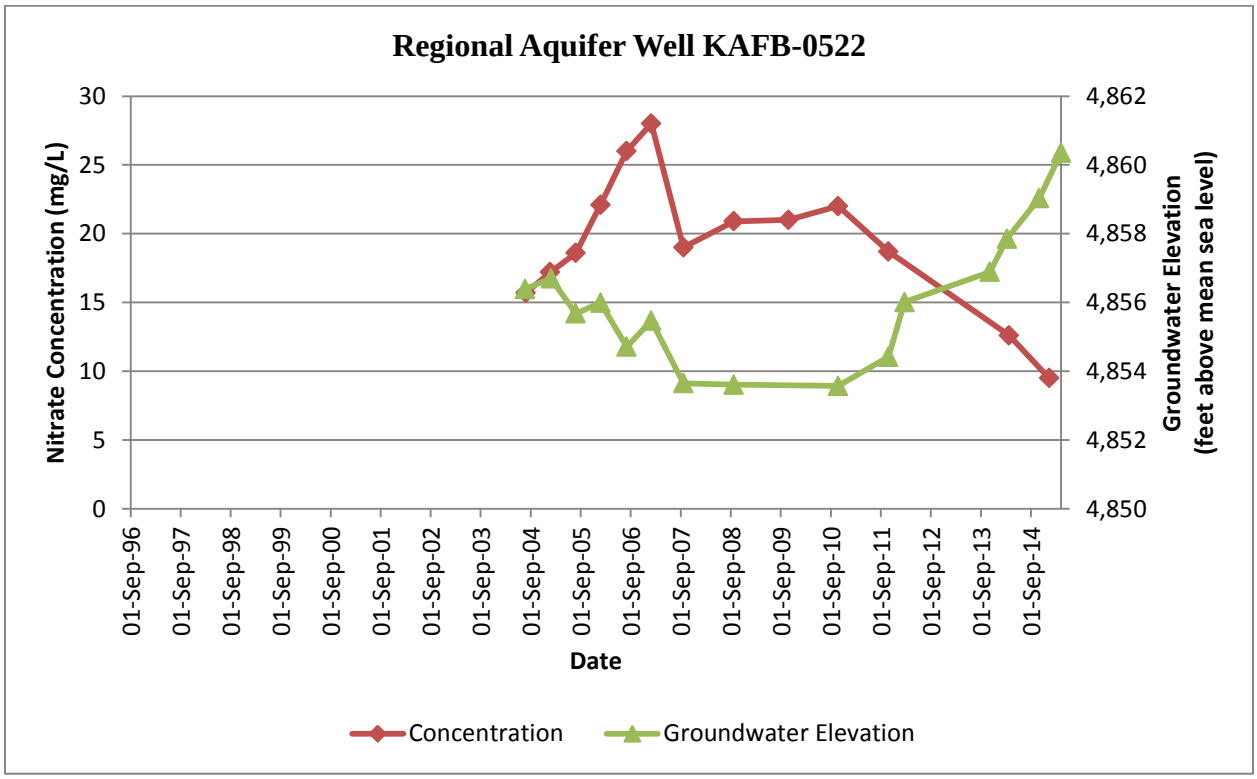

Figure 4-15. Well KAFB-0522 Nitrate and Groundwater Elevation Trends

4.2.1.16 KAFB-0523

Well KAFB-0523 is located on the north/northwestern edge of Plume 1. The nitrate concentrations for samples collected from well KAFB-0523 initially exceeded the regulatory level of 10 mg/L, but have demonstrated a steady to decreasing trend since September 2007 with a most recent concentration of 2.80 mg/L (see Figure 4-16). Again, the groundwater elevation for well KAFB-0523 demonstrates an increasing trend as have the groundwater elevations for other wells in the area. A correlation between nitrate concentrations and groundwater elevation may exist. Because of its proximity along the northern edge of the nitrate plume and the potential for a correlation between nitrate concentration and groundwater elevation, it is recommended that monitoring of KAFB-0523 be continued.

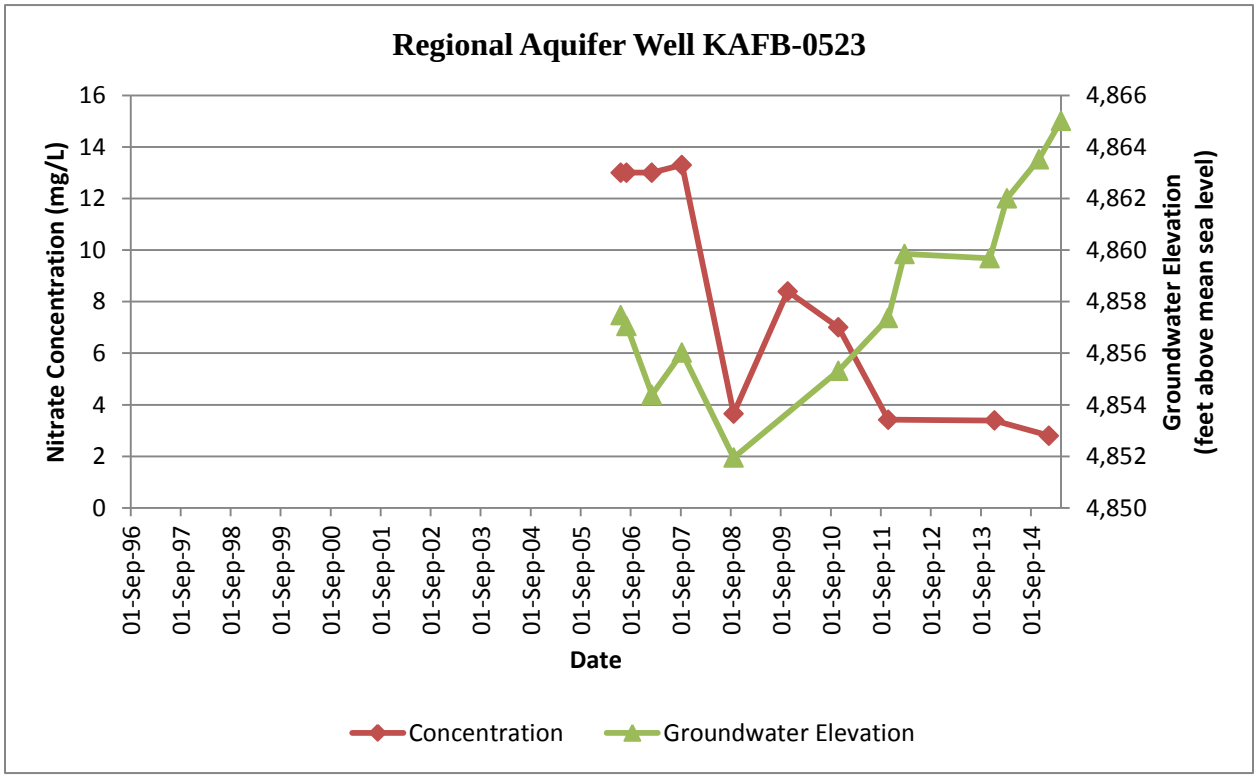

Figure 4-16. Well KAFB-0523 Nitrate and Groundwater Elevation Trends

4.2.1.17 KAFB-0524

Well KAFB-0524 is located to the northwest of Plume 1. The nitrate concentrations for samples collected from this well have generally been less than the regulatory level of 10 mg/L with a peak in September 2008 of 13.9 mg/L, which exceeded the regulatory level (see Figure 4-17). With the exception of that peak, the nitrate concentrations have averaged less than 4 mg/L and have been fairly consistent. As with the other wells in and around Plume 1, the groundwater elevation for well KAFB-0524 has demonstrated an increasing trend since late 2010; however, there is no apparent correlation between the nitrate concentrations that have consistently averaged less than 4 mg/L since 2009 and the groundwater elevations which have shown an increasing trend since 2010. Wells KAFB-0523 and KAFB-0521 provide adequate monitoring coverage in the vicinity of KAFB-0524. Therefore, it is recommended that monitoring of well KAFB-0524 be discontinued.

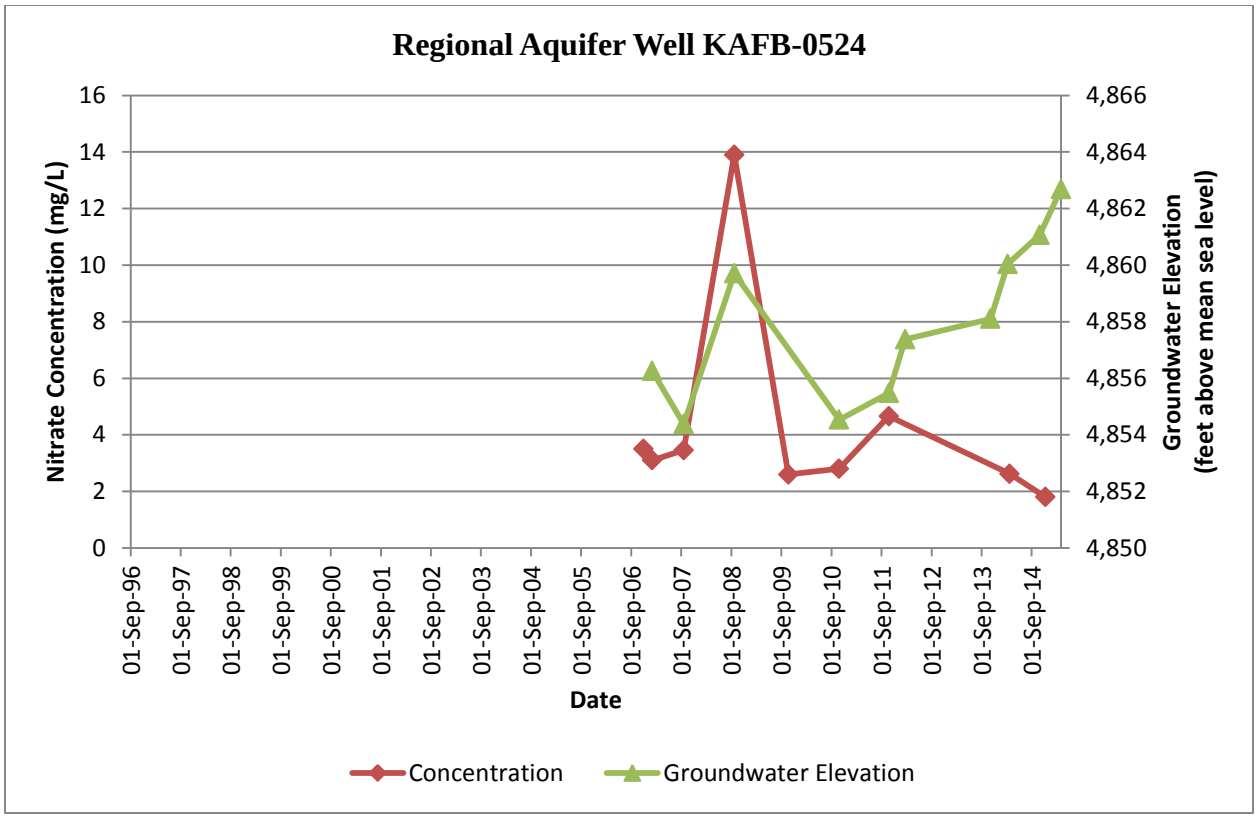

Figure 4-17. Well KAFB-0524 Nitrate and Groundwater Elevation Trends

4.2.1.18 KAFB-0525

Well KAFB-0525 is located in the southwestern quadrant of the ST-105 Plume 1. The nitrate concentrations demonstrated an increasing trend through November 2011. The March 2014 sampling event provided a demonstrably lower concentration of 4.66 mg/L which is over an order of magnitude less than the maximum concentration of 69.5 mg/L obtained in November 2011 (see Figure 4-18). This result was thought to have possible been an anomaly. However, the January 2015 sampling event provided a nitrate concentration of 14 mg/L which remains significantly less than the maximum observed in 2011, but is above the regulatory level. As with other wells in the vicinity of Plume 1, the groundwater elevation shows an increasing trend. This well will continue to be monitored.

4.2.1.19 KAFB-2628

Well KAFB-2628 is located to the northeast of the historic location of Plume 1 adjacent to the former sewage lagoons. As shown in Figure 4-19, the nitrate concentrations for the well are below the regulatory level of 10 mg/L. Groundwater elevations have steadily been increasing as has been the case for other wells in the vicinity of KAFB-2628. Given that the nitrate concentrations are well below the regulatory level of concern and that the well is sampled in support of the investigation of the WP-026 Base Sewage Lagoons and Golf Course Pond site, it is recommended that sampling of the well in support of the ST-105 project be discontinued.

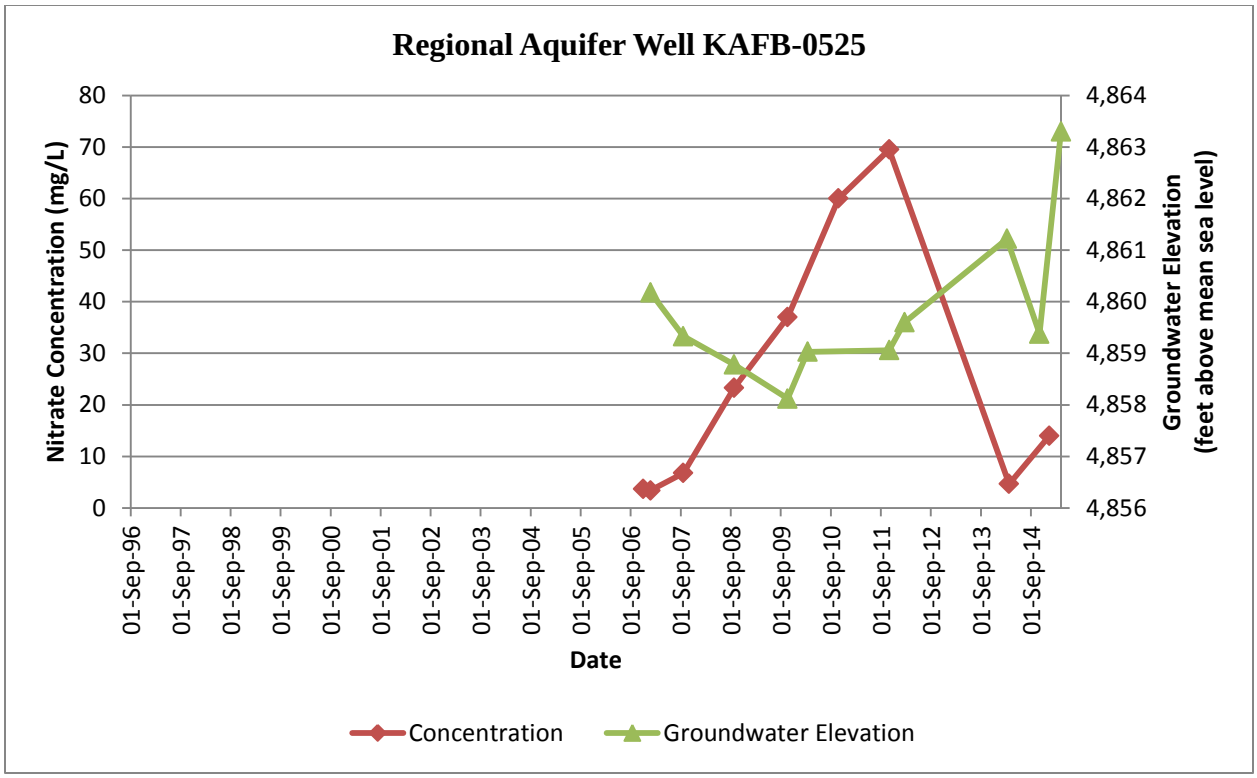

Figure 4-18. Well KAFB-0525 Nitrate and Groundwater Elevation Trends

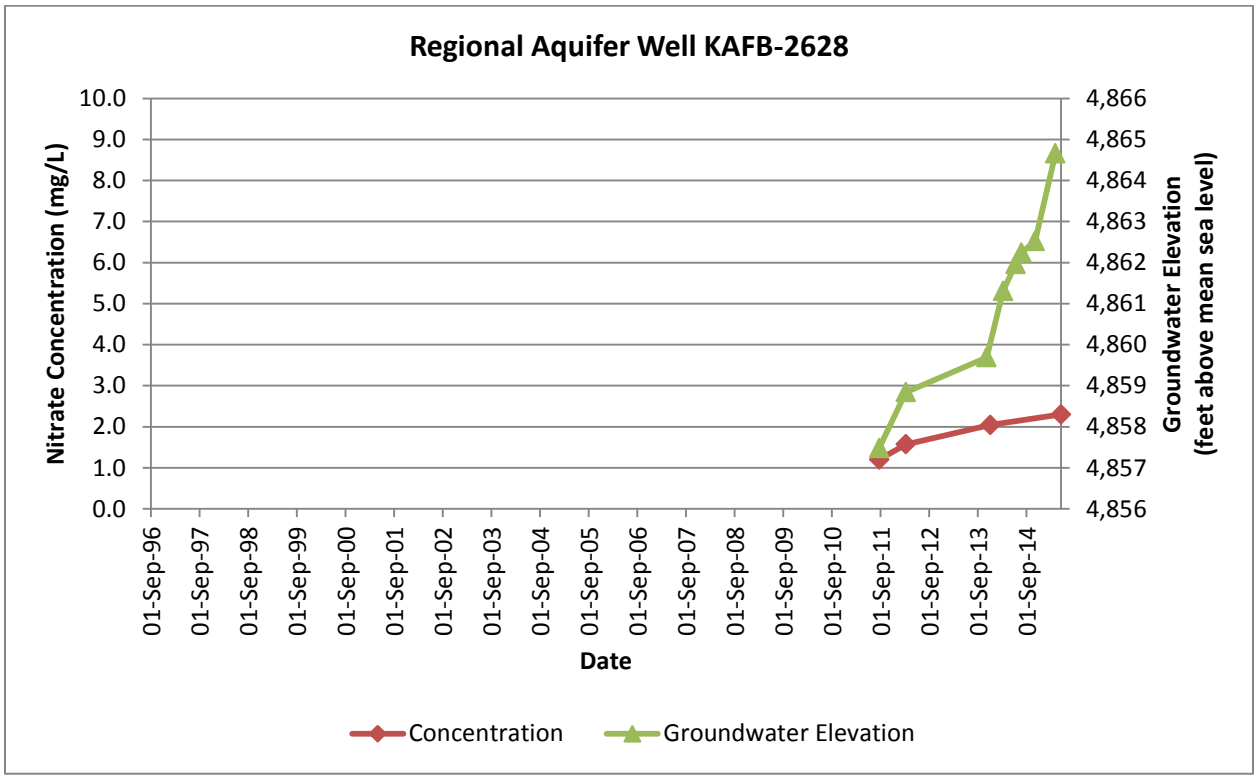

Figure 4-19. Well KAFB-2628 Nitrate and Groundwater Elevation Trends

4.2.1.20 KAFB-2629

Similar to KAFB-2628, Well KAFB-2629 is located to the northeast of the historic location of Plume 1 adjacent to the former sewage lagoons. As shown in Figure 4-20, the nitrate concentrations for the well are below the regulatory level of 10 mg/L. Groundwater elevations have steadily been increasing as has been the case for other wells in the vicinity of KAFB-2629. Given that the nitrate concentrations are well below the regulatory level of concern and that the well is sampled in support of the investigation of the WP-026 Base Sewage Lagoons and Golf Course Pond site, it is recommended that sampling of the well in support of the ST-105 project be discontinued.

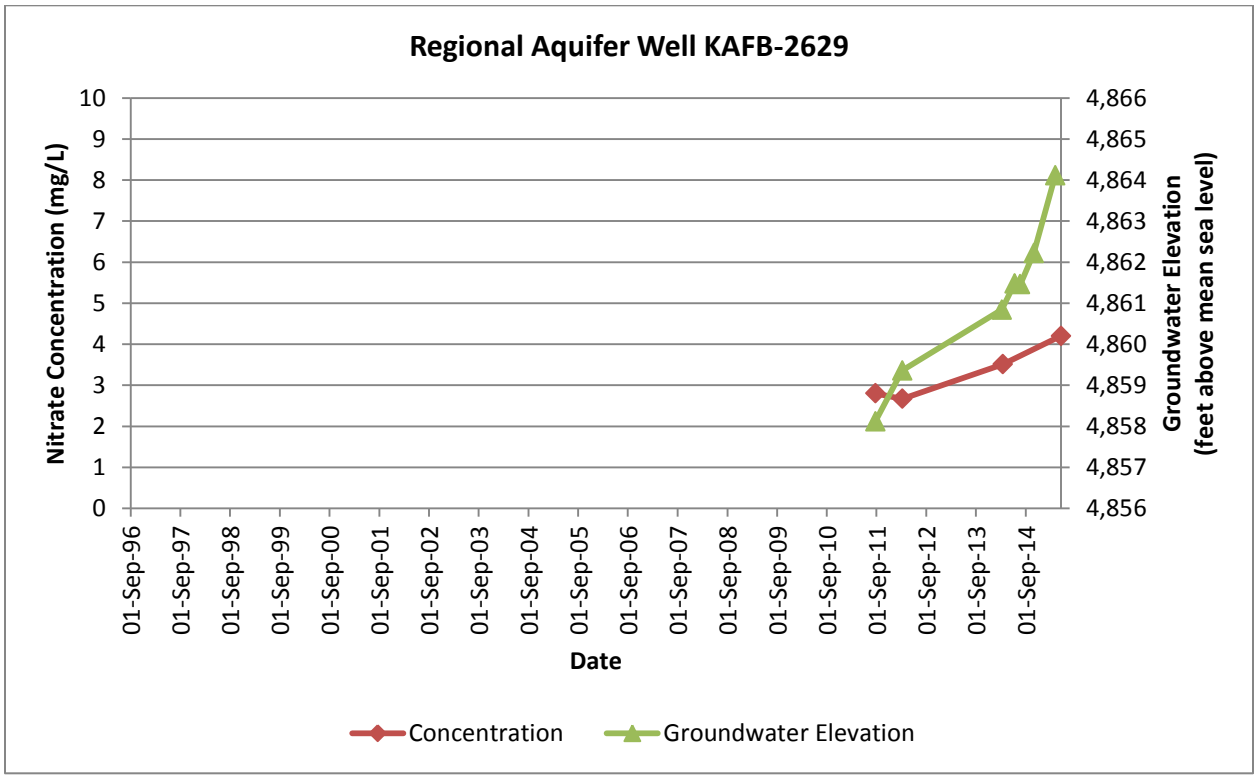

Figure 4-20. Wells KAFB-2629 Nitrate and Groundwater Elevation Trends

4.2.1.21 New Wells in the Vicinity of Plume 1

Wells ST105-MW01, ST105-MW02, ST105-MW03, ST105-MW04, ST105-MW18, and ST105-MW23 were installed in the vicinity of Plume 1 in the February-March timeframe of 2013. The FY 2015 sampling event represents the first time that these wells were included in the ST-105 monitoring network.

Well ST105-MW01 is located to the northwest of Plume 1 with a nitrate concentration of 2.7 mg/L. Wells ST105-MW02 and ST105-MW03 are located to the southwest of Plume 1 with nitrate concentrations of 2.6 mg/L and 3.2 mg/L, respectively. Well ST105-MW04 is located along the south-central edge of the plume with a nitrate concentration of 2.9 mg/L. The nitrate concentrations for these four wells are below the regulatory level of 10 mg/L. The wells provide additional data to refine the plume extents and will continue to be monitored.

Well ST105-MW23 is located in the northern portion of Plume 1 and has a nitrate concentration of 20.0 mg/L, which exceeds the regulatory level of 10 mg/L. Well ST105-MW18 is located in the southern

portion of the plume having a nitrate concentration of 62.0 mg/L. These wells will aid in refining the definition of these portions of the plume.

4.2.2 Regional Aquifer Plume 2

Wells sampled and historically identified with Regional Aquifer Plume 2 have included KAFB-0307, KAFB-0311, KAFB-0312, KAFB-0315, KAFB-0611, KAFB-0613, KAFB-0615, KAFB-0616, KAFB-0617, KAFB-0618, KAFB-0620, KAFB-0621, KAFB-0622, KAFB-0624, KAFB-0625, KAFB-0626, KAFB-0904, and TJA-4 as listed in Table 3-1. In addition, new wells ST105-MW09, ST105-MW13, ST105-MW15, ST105-MW17, ST105-MW18, and ST105-MW24 have been added to the ST-105 monitoring network.

4.2.2.1 KAFB-0307

Well KAFB-0307 is located to the north of the central portion of Plume 2. The nitrate concentrations have ranged from 7.10 mg/L to 10.0 mg/L with all historic results being at or below the regulatory level of 10 mg/L (see Figure 4-21). The groundwater elevation for this well has been steadily increasing for the past 16 years with no apparent correlation with the nitrate concentrations. Although the nitrate concentrations have continually been at or below the regulatory level of concern, the location of this well is critical to monitoring the northern extent of the nitrate plume. The well is sampled annually in support of the Landfill 8 monitoring effort; therefore, it is recommended to discontinue monitoring of the well under the ST-105 monitoring plan and continue to monitor in support of the landfill monitoring requirements which will provide the necessary supporting data for ST-105.

4.2.2.2 KAFB-0311

Well KAFB-0311 is located to the north of the central portion of Plume 2 to the southwest of Well KAFB-0307 discussed in Section 4.2.1.1. The nitrate concentrations have ranged from 5.20 mg/L to 10.0 mg/L with all historic results being at or below the regulatory level of 10 mg/L (see Figure 4-22). As with Well KAFB-0307, the groundwater elevation for this well has been steadily increasing for the past 16 years with no apparent correlation with the nitrate concentrations. Although the nitrate concentrations have continually been at or below the regulatory level of concern, the location of this well is critical to monitoring the northern extent of the nitrate plume. The well is sampled annually in support of the Landfill 8 monitoring effort; therefore, it is recommended to discontinue monitoring of the well under the ST-105 monitoring plan and continue to monitor in support of the landfill monitoring requirements which will provide the necessary supporting data for ST-105.

4.2.2.3 KAFB-0312

Well KAFB-0312 is located in the north central portion of Plume 2. The nitrate concentrations have ranged from 14.2 mg/L to 21.0 mg/L averaging slightly less than 18 mg/L (see Figure 4-23). The groundwater elevations have steadily been increasing for the past 16 years with no apparent correlation with the nitrate concentrations. This well continues to be critical to the ST-105 monitoring effort. The well is sampled annually in support of the Landfill 8 monitoring effort; therefore, it is recommended to discontinue monitoring of the well under the ST-105 monitoring plan and continue to monitor in support of the landfill monitoring requirements which will provide the necessary supporting data for ST-105.

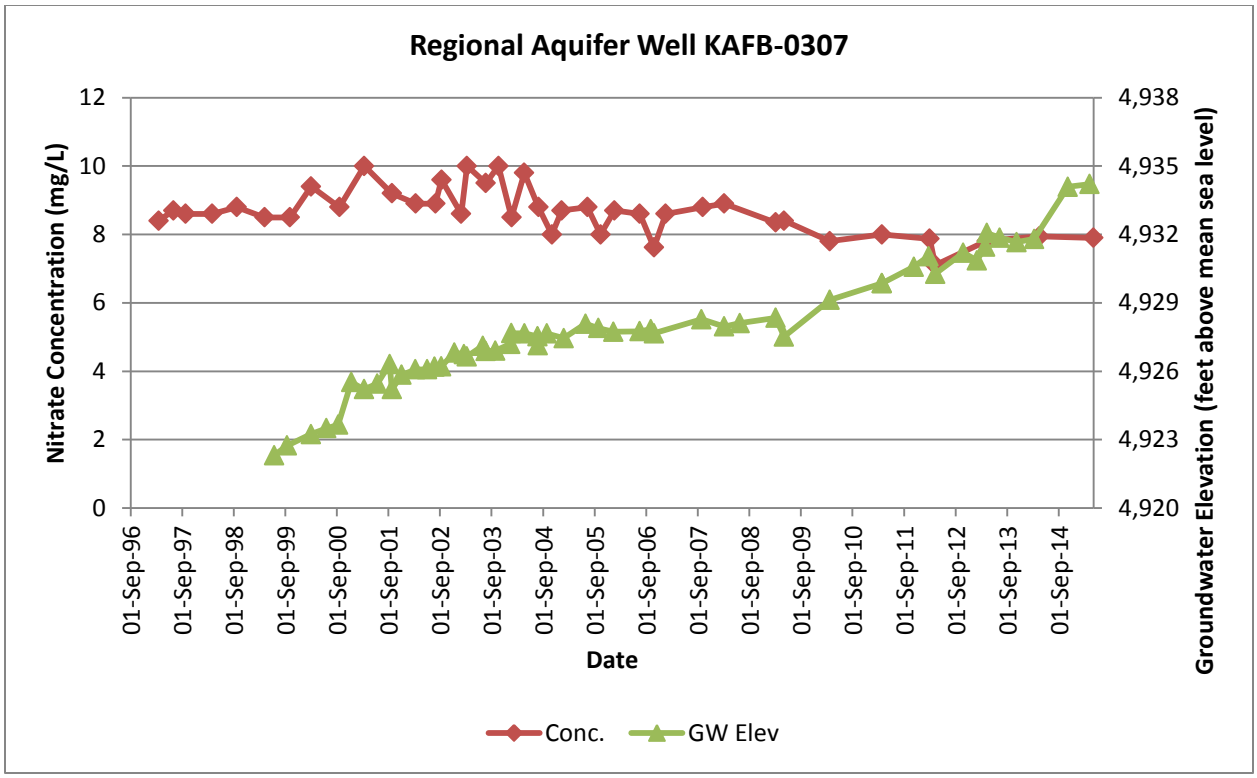

Figure 4-21. Well KAFB-0307 Nitrate and Groundwater Elevation Trends

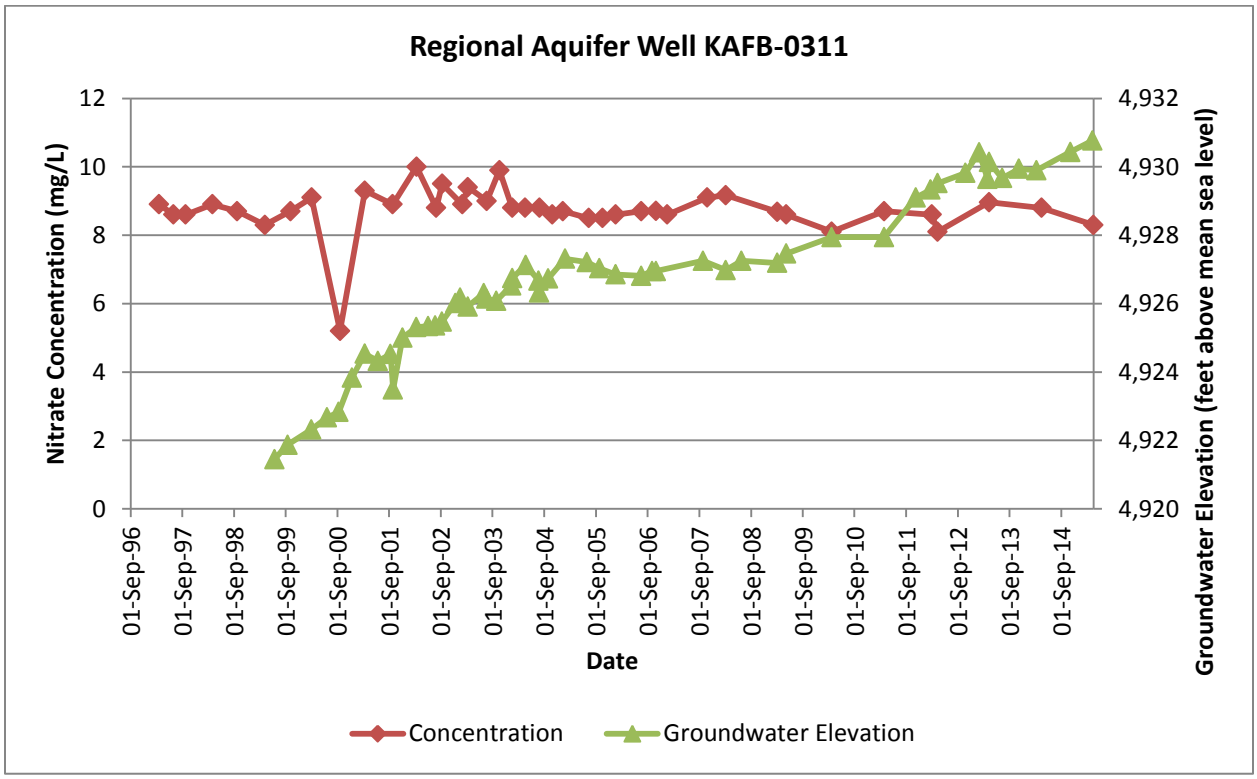

Figure 4-22. Well KAFB-0311 Nitrate and Groundwater Elevation Trends

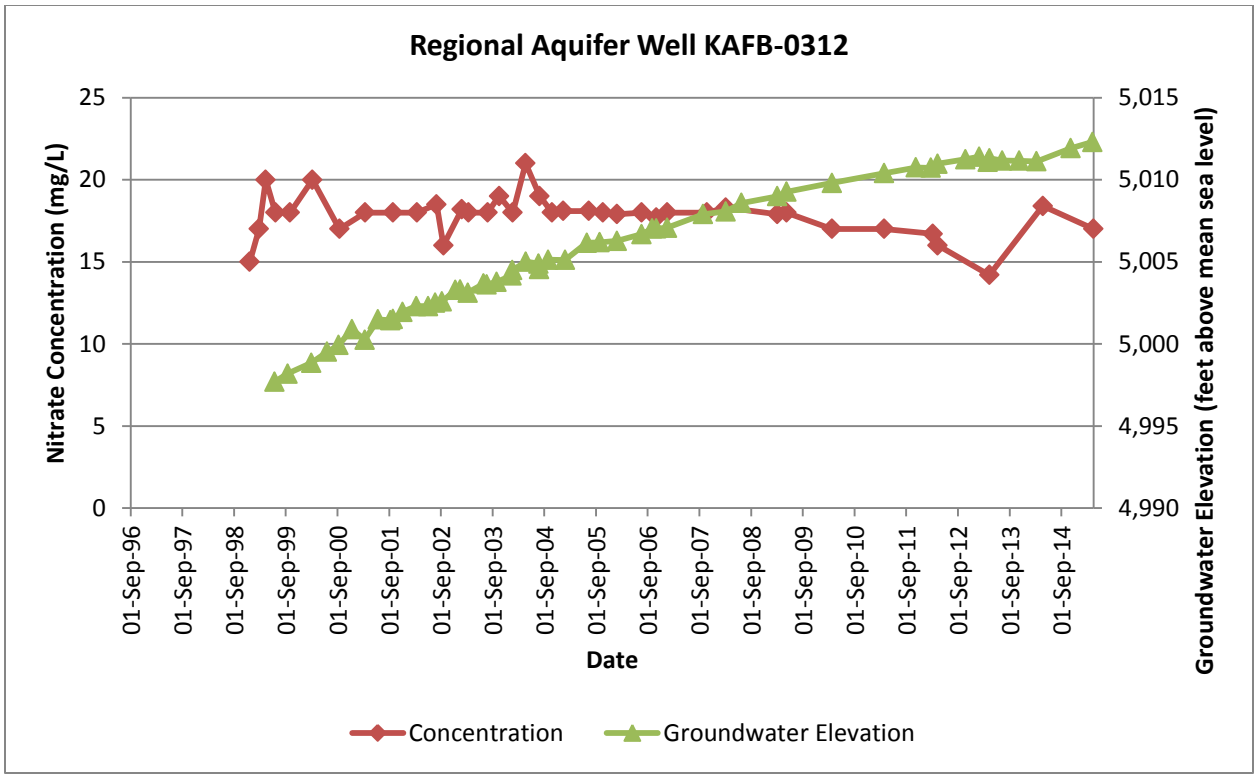

Figure 4-23. Well KAFB-0312 Nitrate and Groundwater Elevation Trends

4.2.2.4 KAFB-0315

Well KAFB-0315 is located to the north of the central portion of Plume 2 due east of Well KAFB-0307. As shown in Figure 4-24, the nitrate concentrations for this well were originally as high as 23 mg/L in October 2000, but have steadily declined and have remained less than 10 mg/L since July 2006 and have averaged less than 7 mg/L since March 2010. Groundwater elevations have steadily been increasing since September 2000 and a possible inverse correlation may exist with nitrate concentrations. The well is sampled annually in support of the Landfill 8 monitoring effort; therefore, it is recommended to discontinue monitoring of the well under the ST-105 monitoring plan and continue to monitor in support of the landfill monitoring requirements which will provide the necessary supporting data for ST-105.

4.2.2.5 KAFB-0611

As shown in Figure 4-25, nitrate concentrations for samples collected from well KAFB-0611, which is located near the center of Plume 2, have been consistent ranging between 11 mg/L and 13.6 mg/L exceeding the regulatory level of 10 mg/L. The groundwater elevation for this well has steadily been decreasing over the past 11 years indicating that no correlation exists between nitrate concentrations and groundwater elevation for well KAFB-0611. This well will continue to be monitored.

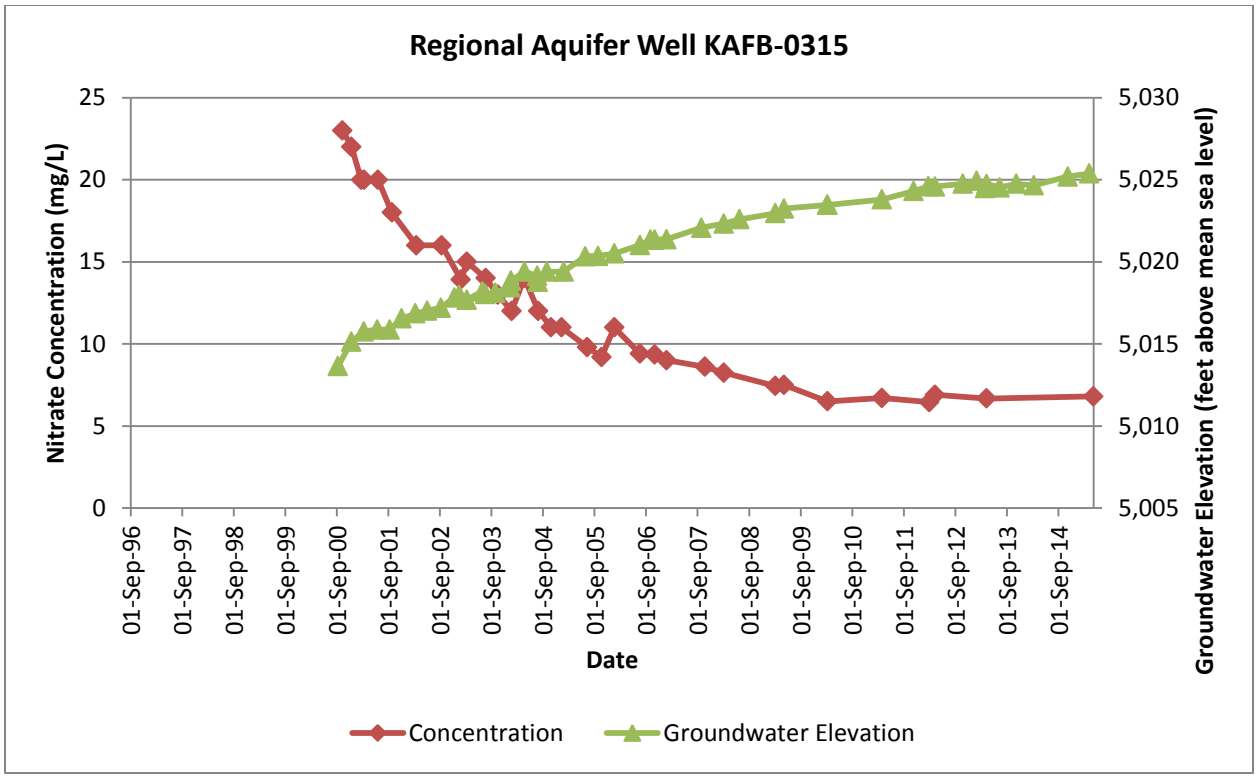

Figure 4-24. Well KAFB-0315 Nitrate and Groundwater Elevation Trends

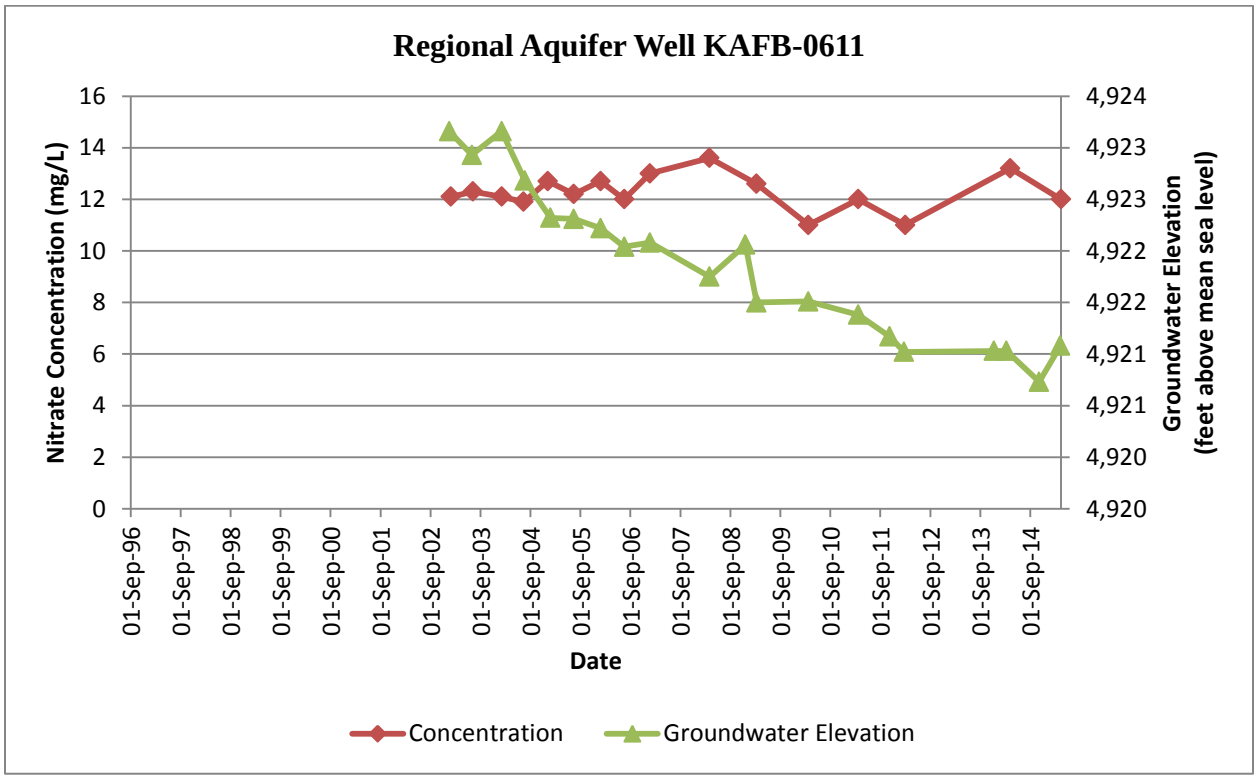

Figure 4-25. Well KAFB-0611 Nitrate and Groundwater Elevation Trends

4.2.2.6 KAFB-0613

Well KAFB-0613 is located along the south-southeastern edge of Plume 2. As shown in Figure 4-26, the nitrate concentrations for samples collected from well KAFB-0613 have remained fairly consistent averaging approximately 15 mg/L over the past 11 years, which exceeds the regulatory level of 10 mg/L. In April 2008, there was a single result of 8.05 mg/L, which is about half of the rest of the historic concentrations, but appears to be an anomaly given that concentrations obtained during subsequent sampling events have returned to the levels obtained prior to that event. The groundwater elevation for the well increased from January 2003 through March 2009, but appears to have leveled off since that time. This well will continue to be monitored.

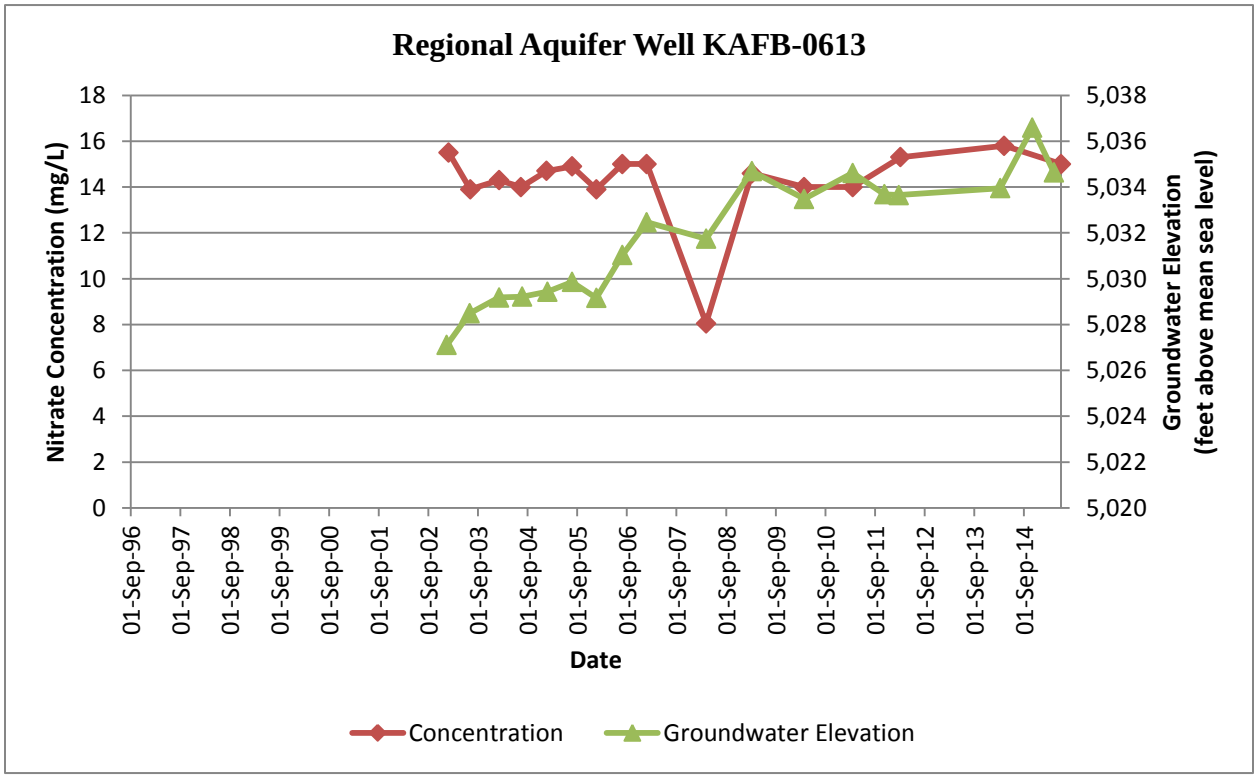

Figure 4-26. Well KAFB-0613 Nitrate and Groundwater Elevation Trends

4.2.2.7 KAFB-0615

Well KAFB-0615 is located to the east of the southeastern edge of Plume 2 on the western slope of the Manzanita Mountains. The nitrate concentrations for samples collected from this well demonstrated an increasing trend from January 2003 through April 2008, but have stabilized averaging approximately 7 mg/L and remaining below the regulatory level of 10 mg/L (see Figure 4-27). The groundwater elevation has shown a decreasing trend with a noticeable upward shift from January 2006 to April 2008 then resuming the decreasing trend. This well is located some distance from the historic location of the plume and its usefulness is questionable. Two new wells that have been installed along the southeastern edge of the plume (ST105-MW13 and ST105-MW24) better serve as sentinel wells to monitor the southeastern extent of the regional nitrate plume in that vicinity. Concentrations for both of these newer wells are below 10 mg/L. It is recommended that monitoring of Well KAFB-0615 be discontinued. Monitoring of the well can resume should nitrate concentrations in either ST105-MW13 or ST105-MW24

increase above the regulatory level of concern indicating the need for using Well KAFB-0615 as a sentinel well in that area of the plume.

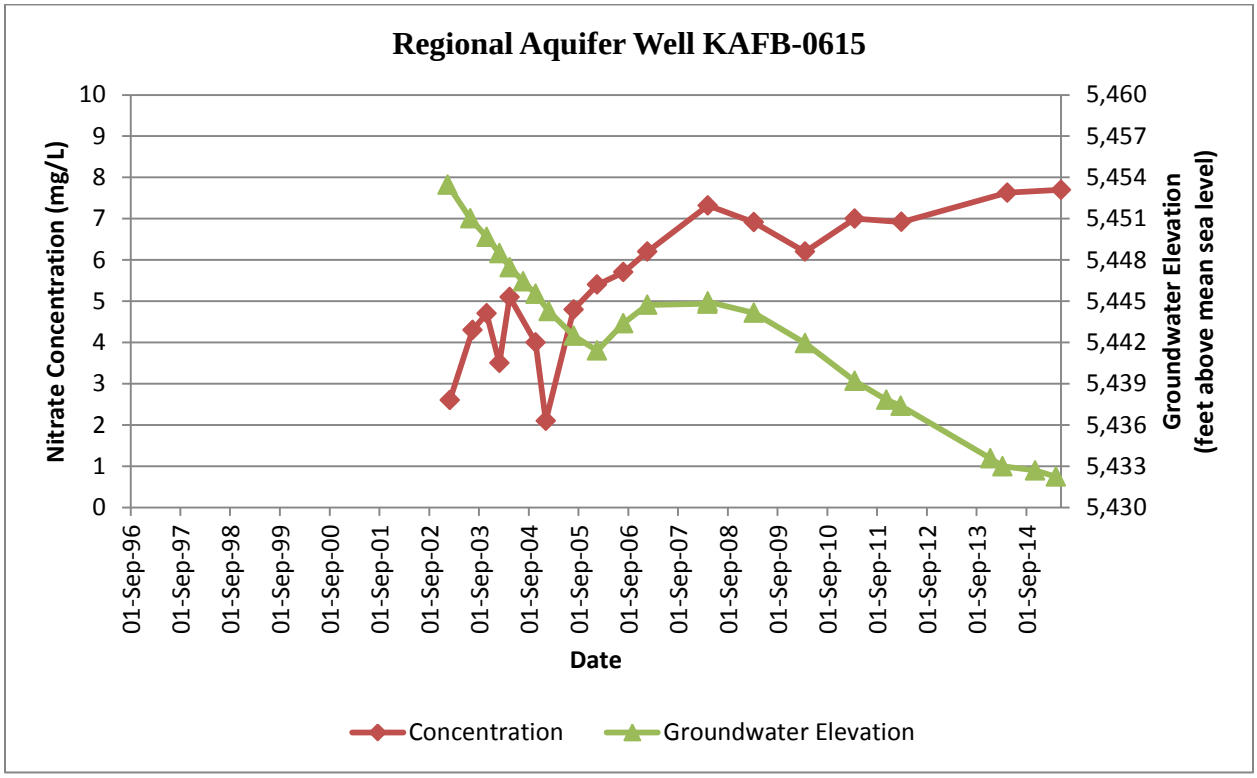

Figure 4-27. Well KAFB-0615 Nitrate and Groundwater Elevation Trends

4.2.2.8 KAFB-0616

Well KAFB-0616 is located in the eastern section of the ST-105 Plume 2. The nitrate concentrations for the samples collected from the well appeared to be demonstrating a decreasing trend, having declined from a maximum of 20.8 mg/L in July 2003 to a minimum of 14.7 mg/L in March 2012, although the most recent results increased to and remain at 17 mg/L (see Figure 4-28). The concentrations have consistently been above the 10 mg/L regulatory level. As with well KAFB-0613, the groundwater elevation for well KAFB-0616 increased from January 2003 through March 2009, but appears to have leveled off since that time. Monitoring of this well will continue.

4.2.2.9 KAFB-0617

Well KAFB-0617 is located in the southeastern section of the ST-105 Plume 2. The nitrate concentrations for the samples collected from the well have consistently been above the 10 mg/L regulatory level averaging approximately 14 mg/L from July 2004 to the present (see Figure 4-29). Historically, the concentrations have ranged from 11 mg/L to a maximum of 14.9 mg/L, which was obtained during the sampling event in May 2014. The groundwater elevation has steadily been increasing. The new wells installed in the vicinity of Plume 2 will aid in the evaluation of groundwater flow and elevations. Monitoring of this well will continue.

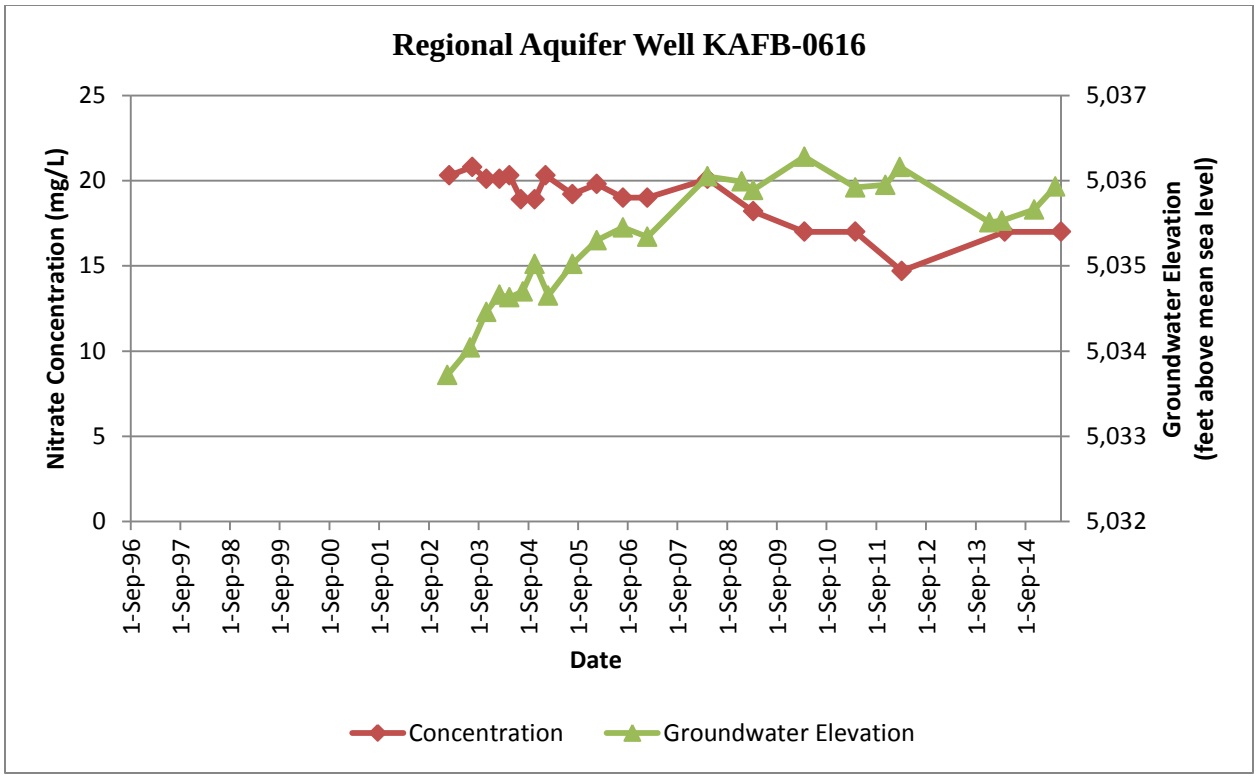

Figure 4-28. Well KAFB-0616 Nitrate and Groundwater Elevation Trends

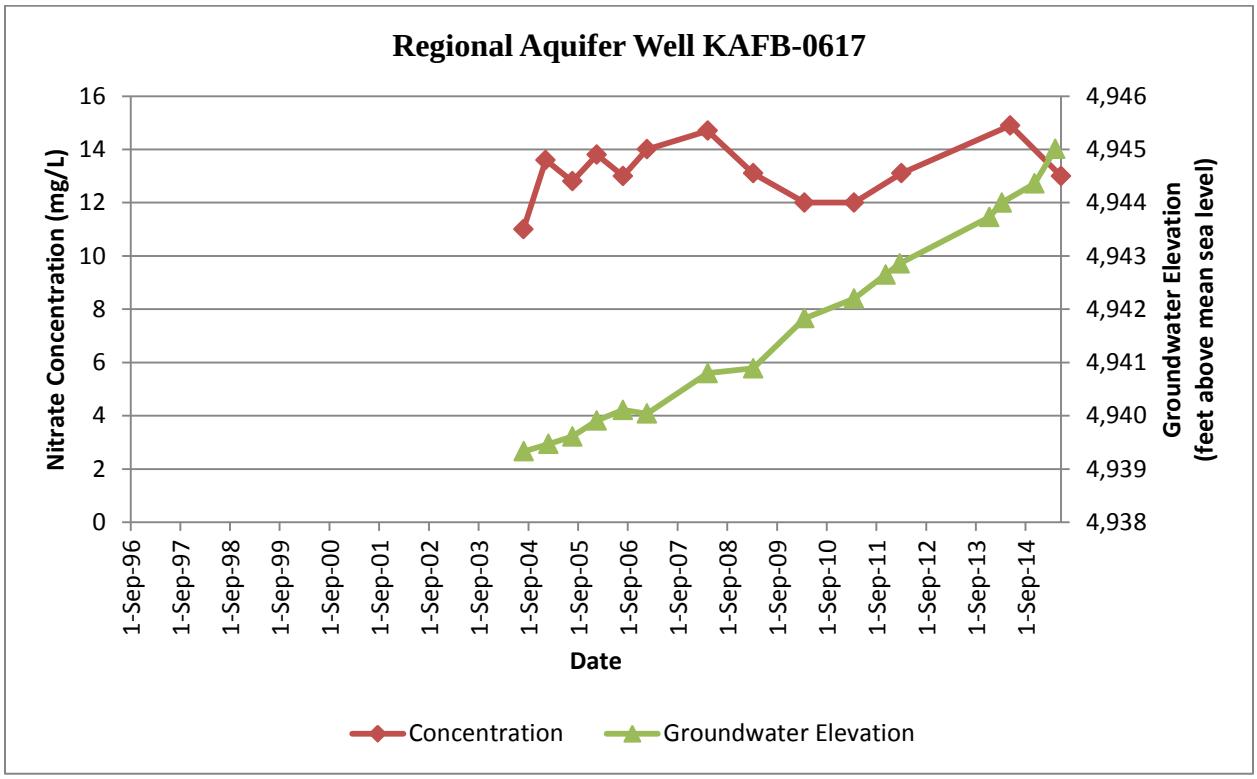

Figure 4-29. Well KAFB-0617 Nitrate and Groundwater Elevation Trends

4.2.2.10 KAFB-0618

Well KAFB-0618 is located just off the southeastern edge of Plume 2. As shown in Figure 4-30, the nitrate concentrations for the samples collected from this well have consistently remained below the regulatory level of 10 mg/L with an average concentration of approximately 5.5 mg/L. The groundwater elevation has been decreasing slightly, having decreased approximately 3 ft since July 2005. As stated previously, new wells installed in the vicinity of Plume 2 will aid in the evaluation of groundwater elevations and gradient. Given its proximity to the southern border of the historic extent of Plume 2, it is recommended that monitoring of KAFB-0618 be continued.

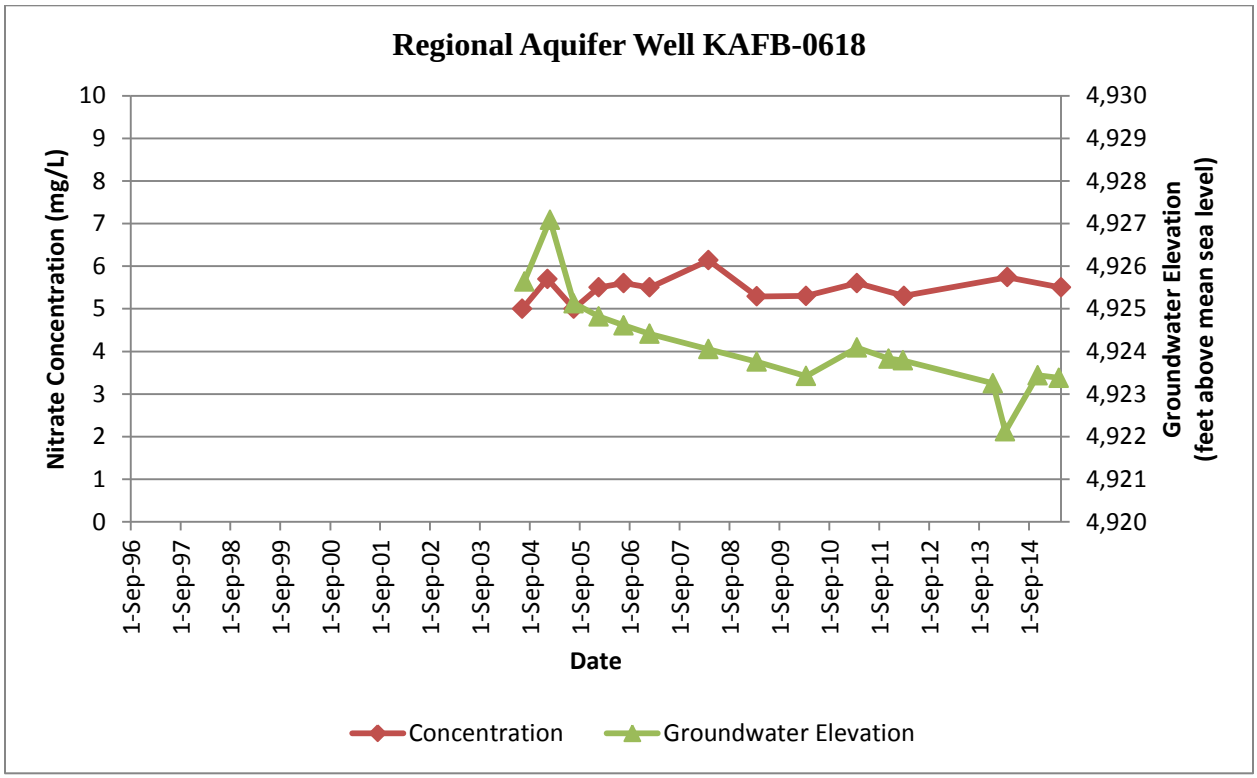

Figure 4-30. Well KAFB-0618 Nitrate and Groundwater Elevation Trends

4.2.2.11 KAFB-0620

Well KAFB-0620 is located in the southwest-central portion of the ST-105 Plume 2. As shown in Figure 4-31, the nitrate concentrations have consistently been above the regulatory level of 10 mg/L averaging between 11 and 12 mg/L. The concentration has not shown much variability over time ranging from a minimum of 9.82 mg/L in March 2012 to a maximum of 12.7 mg/L in April 2008. As with well KAFB-0618, well KAFB-0620 has shown a slight decrease in groundwater elevation over the past 10 years, but is within a foot of the earlier elevations shown on the figure. Monitoring of KAFB-0620 will be continued.

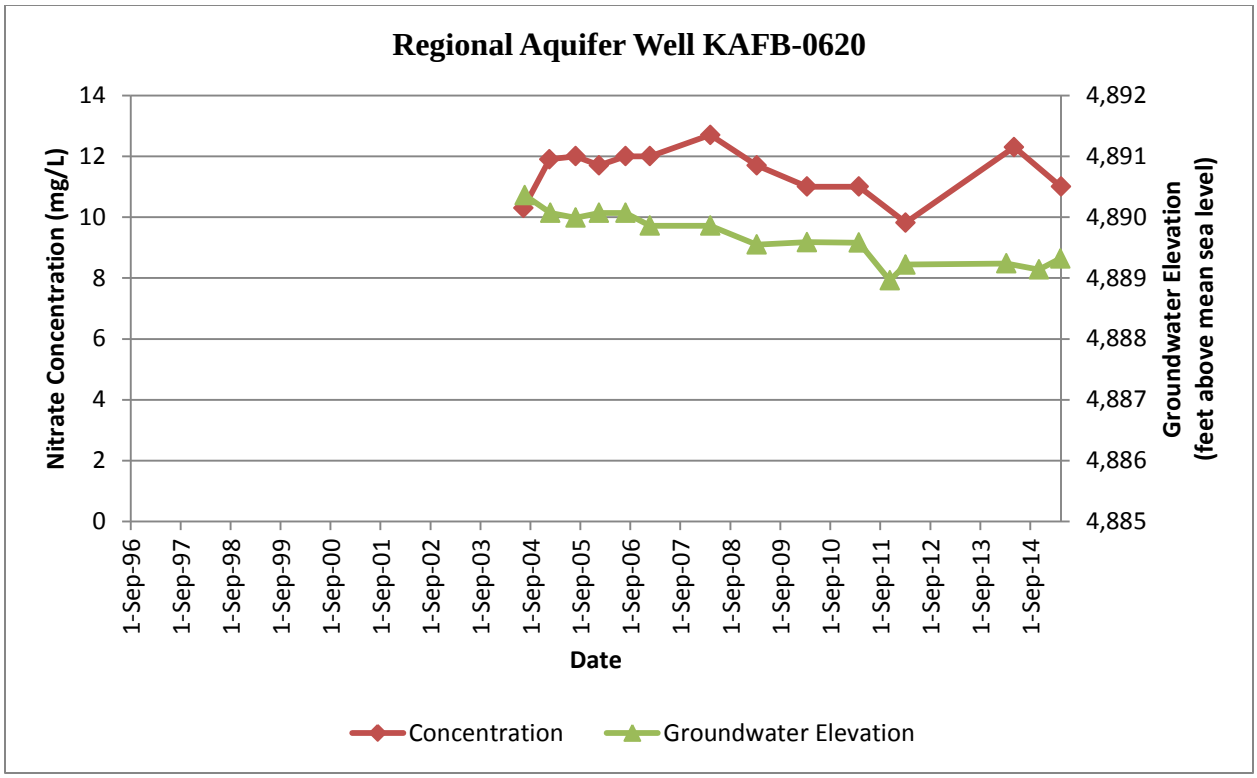

Figure 4-31. Well KAFB-0620 Nitrate and Groundwater Elevation Trends

4.2.2.12 KAFB-0621

Well KAFB-0621 is located in the northeastern part of Plume 2 along the slope of the Manzanita Mountains. The nitrate concentrations for samples collected from the well continue to exceed the regulatory level of 10 mg/L ranging from 11.7 mg/L to a maximum of 13.6 mg/L in January 2005 (see Figure 4-32). There appears to be a slight decreasing trend in concentrations which may correlate to increases in the groundwater elevation. Similar to well KAFB-0616 in the vicinity, the groundwater elevation demonstrated an increasing trend. Monitoring of this well will be continued.

4.2.2.13 KAFB-0622

Well KAFB-0622 is located south of the southeastern edge of Plume 2. The nitrate concentrations for samples collected from the well have consistently been less than the regulatory level of 10 mg/L, averaging approximately 7.5 mg/L (see Figure 4-33). Groundwater elevations have steadily been decreasing with an overall decline of approximately 15 ft since January 2005. Unfortunately, the decrease in groundwater elevation for this well has made it such that viable groundwater samples can no longer be collected. The groundwater elevation will continue to be monitored and sampling will resume should the groundwater elevation increase allowing for the collection of viable groundwater samples. Well KAFB-0618 is located closer to the plume than KAFB-0622 providing for adequate coverage in that vicinity of the nitrate impacted groundwater.

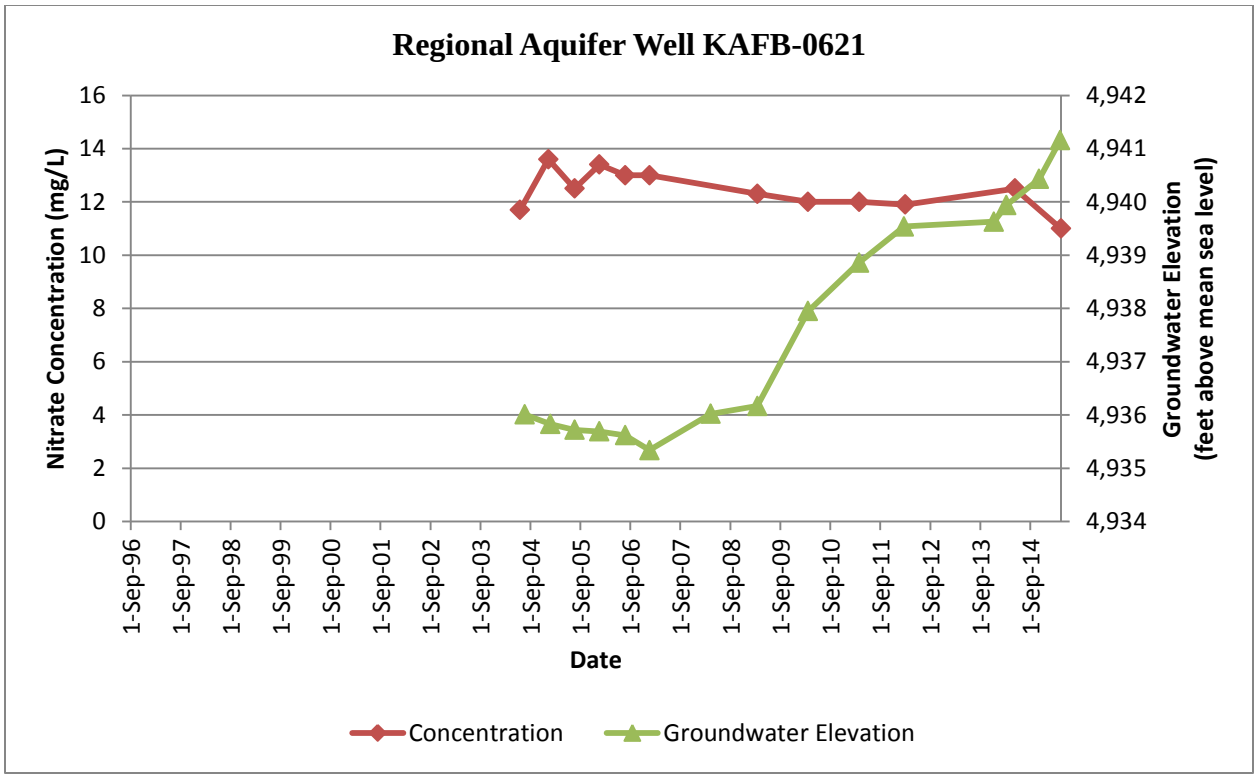

Figure 4-32. Well KAFB-0621 Nitrate and Groundwater Elevation Trends

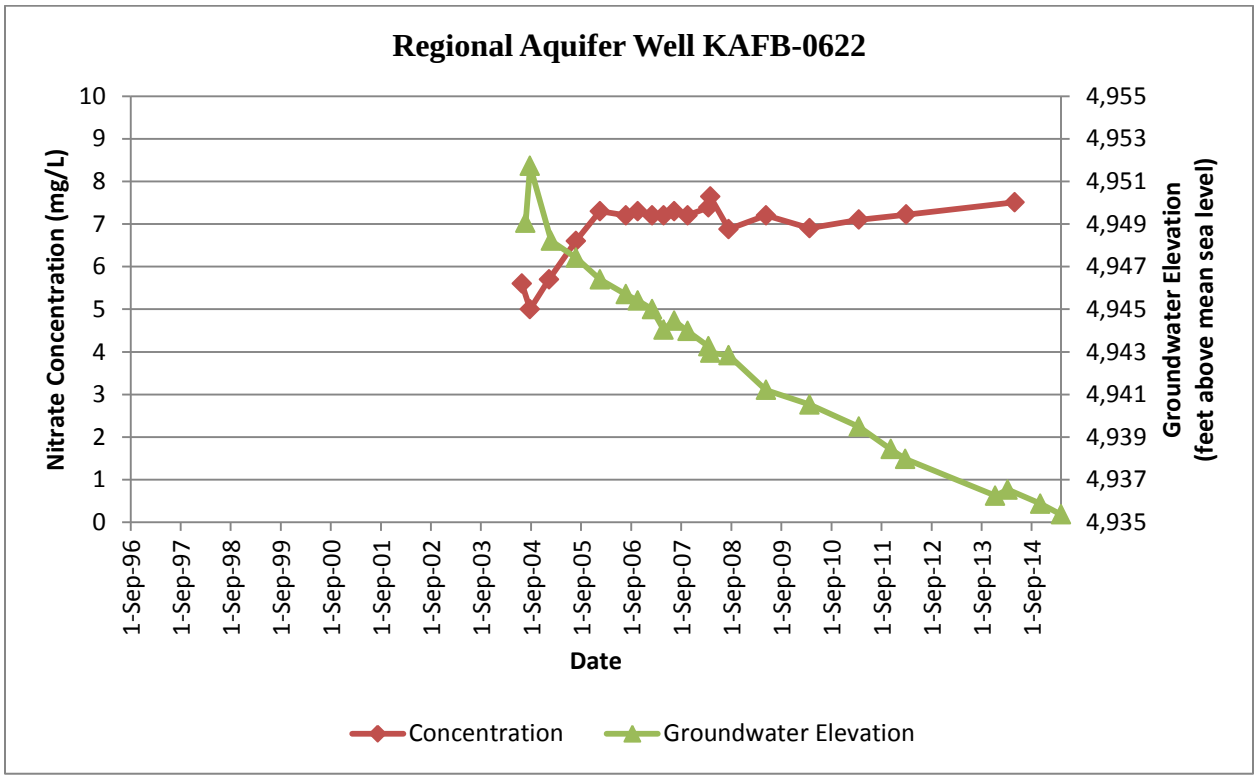

Figure 4-33. Well KAFB-0622 Nitrate and Groundwater Elevation Trends

4.2.2.14 KAFB-0624

Located on the northeastern edge of Plume 2, nitrate concentrations for Well KAFB-0624 have ranged from 24 mg/L to 27 mg/L (see Figure 4-34). Because of limited data, neither a nitrate concentration nor a groundwater elevation trend can be discerned. The well is located downgradient of the Four Hills Country Club. Elevated nitrate concentrations seen in the well may be attributed to influences from the golf course depending on the rate of fertilizer application at the course. Nitrate concentrations in Well KAFB-0621 which is located to the southwest of Well KAFB-0624 average approximately 12 mg/L indicating that an upgradient source may be impacting Well KAFB-0624. Wells ST105-MW15 and ST105-MW17 which were recently added to the ST-105 monitoring network are located between Wells KAFB-0621 and KAFB-0624. Nitrate concentrations in ST105-MW15 and ST105-MW17 from the FY 2015 sampling event were 12.0 mg/L and 9.0 mg/L, respectively, and are in close agreement with the nitrate concentrations seen for KAFB-0621. The results for these two newer wells coupled with the results for KAFB-0621 support the assertion that an upgradient source exists that is impacting nitrate concentrations in Well KAFB-0624. Monitoring of this well will be continued.

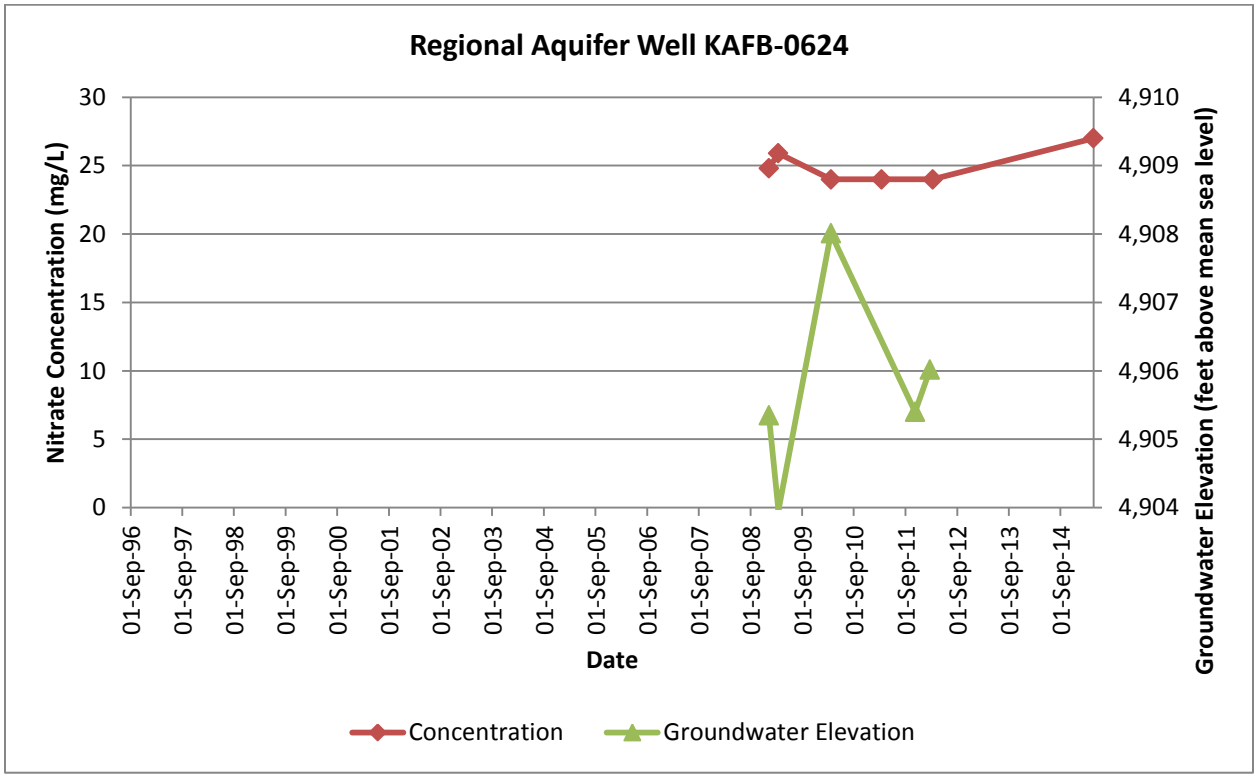

Figure 4-34. Well KAFB-0624 Nitrate and Groundwater Elevation Trends

4.2.2.15 KAFB-0625

Located on the southwestern edge of Plume 2, Well KAFB-0625 was installed in November 2008. As shown in Figure 4-35, the nitrate concentrations for the samples collected from the well have been above the regulatory level of 10 mg/L ranging from 10.6 mg/L to 13.9 mg/L and remain fairly consistent. There is no apparent trend in the concentration data. The groundwater elevation has steadily been decreasing consistent with groundwater elevations for other wells in the vicinity, including well KAFB-0618 and KAFB-0620. Monitoring of this well will be continued.

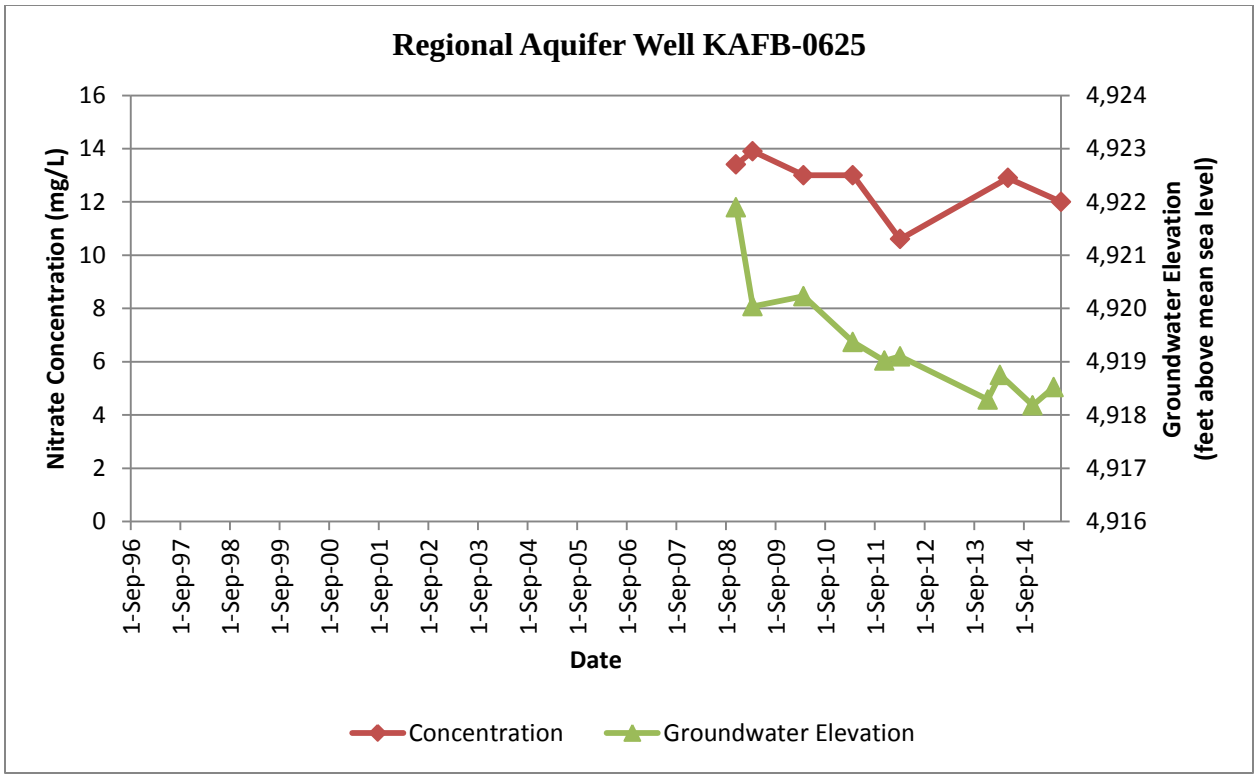

Figure 4-35. Well KAFB-0625 Nitrate and Groundwater Elevation Trends

4.2.2.16 KAFB-0626

Well KAFB-0626 is located in the north central region of the historic Plume 2 location. As previously noted, KAFB-0626 is equipped with a FLUTe® liner which allows the well to be sampled at four discrete intervals. Figure 4-36 presents the nitrate concentrations for the four intervals. The depths associated with intervals KAFB-0626A, KAFB-0626B, KAFB-0626C, and KAFB-0626D are 412.1 to 431.9 ft bgs, 466.2 to 476.0 ft bgs, 510.3 to 520.0 ft bgs, and 623.7 to 633.4 ft bgs, respectively. As can be seen from the graphical presentation, nitrate concentrations in the two deeper intervals were initially elevated, but have steadily declined. The nitrate concentrations for all four intervals have consistently been below the regulatory level of 10 mg/L, with the concentrations for the upper two intervals being very similar and the concentrations for the lower two intervals being approximately half that of the upper two intervals. There appears to be stratification between the upper two intervals and the lower two intervals, but additional data will need to be collected before this can be statistically evaluated. Because of its location in the plume, it is recommended to continue to monitor this well using the FLUTe® liner system.

4.2.2.17 KAFB-0904

Well KAFB-0904 is located in the western portion of the ST-105 Plume 2. The nitrate concentrations for samples collected from this well have consistently exceeded the regulatory level of 10 mg/L ranging from 18.5 mg/L to 26.6 mg/L, demonstrating an increasing trend over time (see Figure 4-37). A number of new wells have recently been installed in the vicinity of Well KAFB-0904 which will help to refine the understanding of the nature and extent of nitrate impacts in the area. The groundwater elevation for well KAFB-0904 demonstrated a slight decline between 2003 and 2006, but has remained fairly consistent since that time. It is recommended to continue monitoring this well.

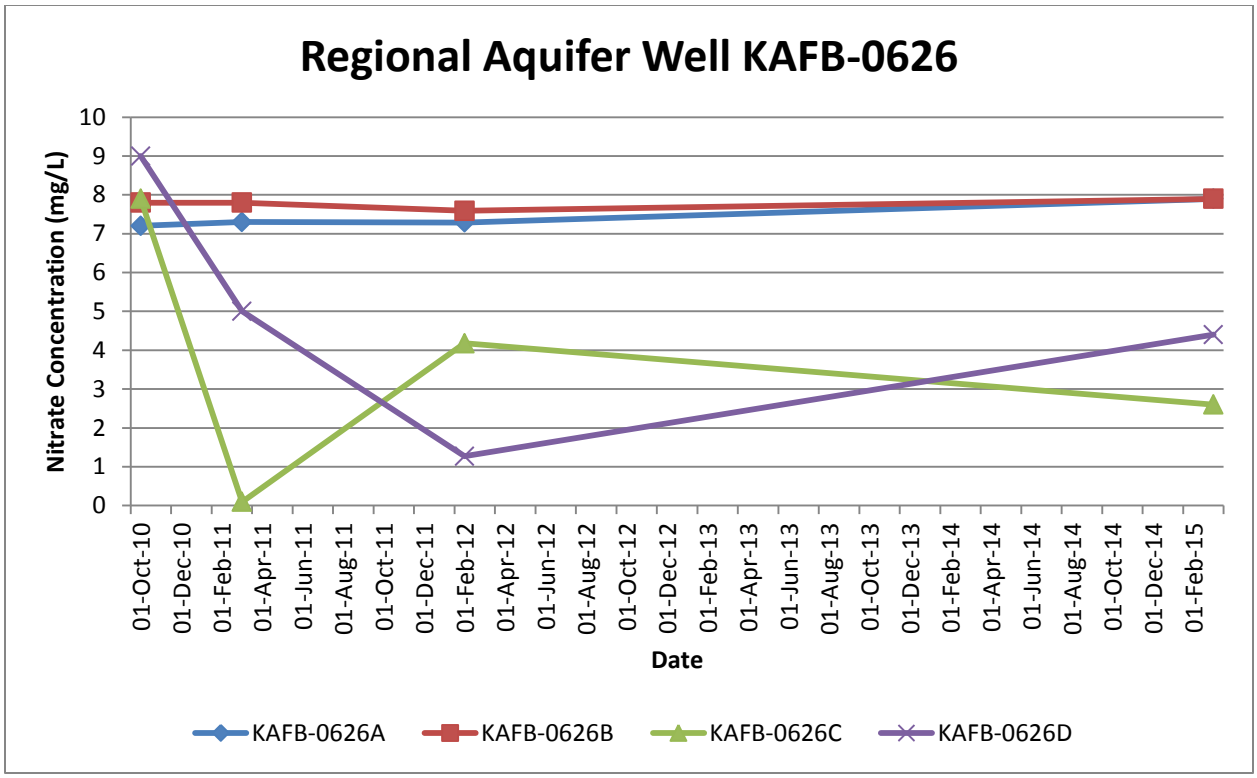

Figure 4-36. Well KAFB-0626 Nitrate Concentration Trends

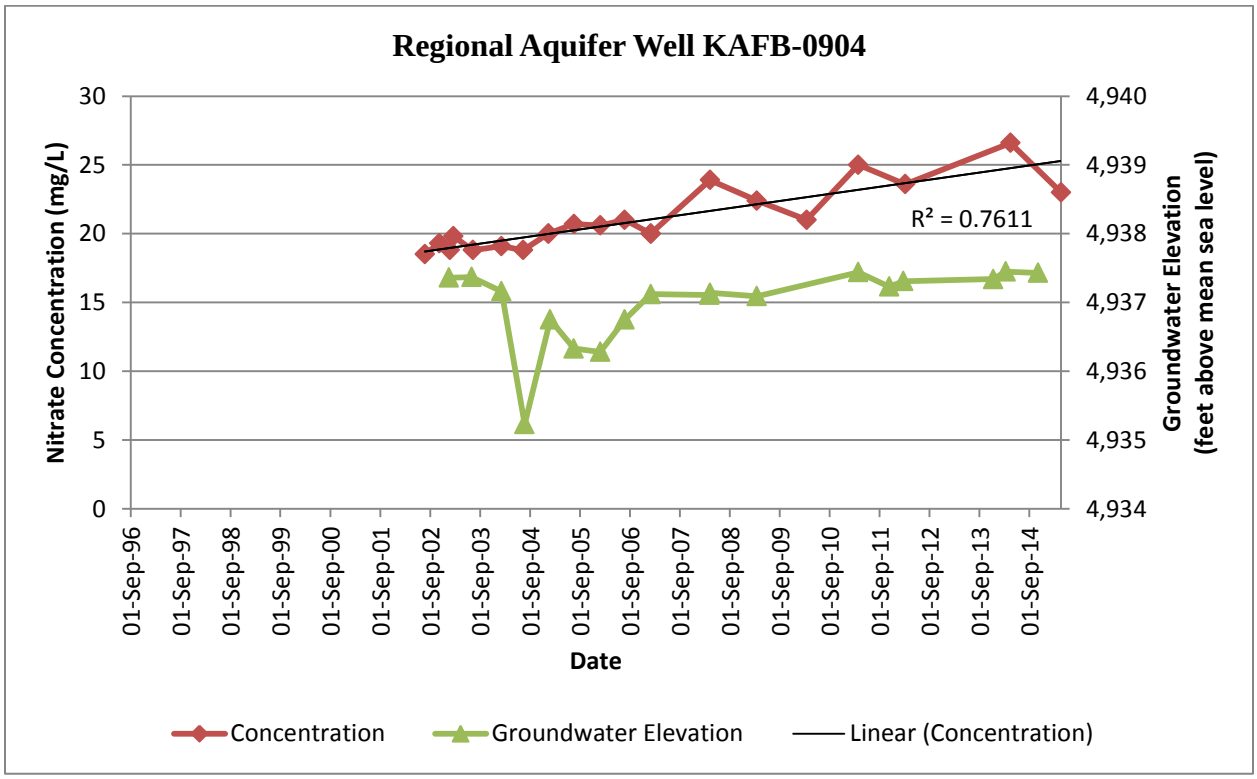

Figure 4-37. Well KAFB-0904 Nitrate and Groundwater Elevation Trends

4.2.2.18 TJA-4

Well TJA-4 is located in the north-central portion of Plume 2. As shown in Figure 4-38, the nitrate concentrations for this well exceed the regulatory level of 10 mg/L, ranging from 24 mg/L to 30.8 mg/L. The data appear to be fairly consistent with an average of approximately 27.5 mg/L. The groundwater elevation has steadily been increasing with an overall change of approximately 12 ft over 14 years. There does not appear to be a correlation between groundwater elevation and nitrate concentration. This well will continue to be monitored in support of ST-105.

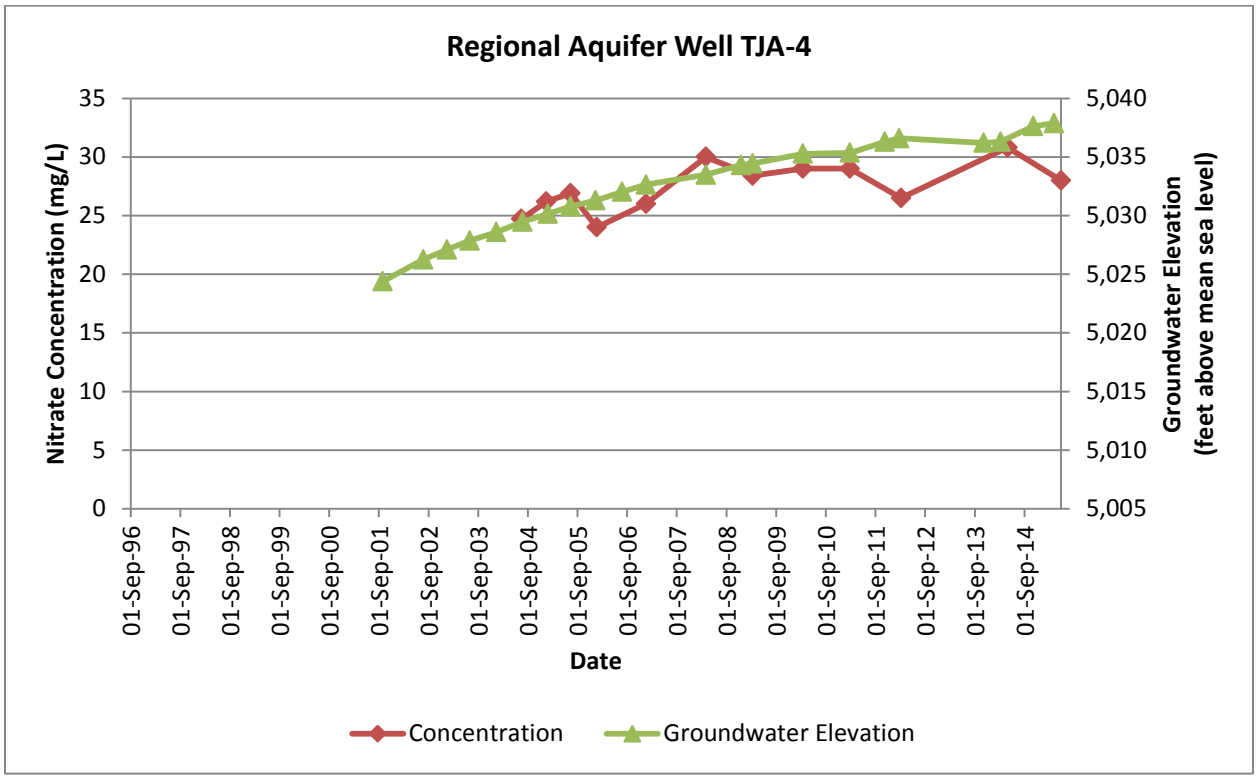

Figure 4-38. Well TJA-4 Nitrate and Groundwater Elevation Trends

4.2.2.19 New Wells in the Vicinity of Plume 2

Wells ST105-MW09, ST105-MW13, ST105-MW15, ST105-MW17, and ST105-MW24 were installed in the vicinity of Plume 1 in the February-March timeframe of 2013. The FY 2015 sampling event represents the first time that these wells were included in the ST-105 monitoring network.

ST105-MW09 is located to the south-southwest of Plume 2 with a nitrate concentration of 10.0 mg/L. Wells ST105-MW13 and ST105-MW24 are located along the southeastern edge of the plume with concentrations of 13.0 and 0.94 mg/L, respectively. Wells ST105-MW15 and ST105-MW17 near the eastern most end of the plume with nitrate concentrations of 12.0 and 9.0 mg/L, respectively. The wells provide additional data to refine the delineation of the plume and will continue to be monitored.

4.2.3 McCormick Ranch

Three regional aquifer wells associated with the McCormick Ranch were sampled, including of KAFB-1007R, KAFB-1008, and KAFB-1009 as listed in Table 3-1. As previously noted, Well KAFB-1006, also

located at McCormick Ranch, could not be sampled because the groundwater was below the screened interval in the well.

4.2.3.1 KAFB-1006

Well KAFB-1006 was last sampled in October 2010. Because of declining groundwater levels, insufficient groundwater exists in the well from which a viable analytical sample can be obtained. As shown in Figure 4-39, nitrate concentrations for Well KAFB-1006 have consistently been at or below the 10 mg/L regulatory level ranging from a non-detect in September 2008 to 10 mg/L in September 2003. Given the low nitrate concentrations and the declining groundwater levels, it is recommended to discontinue monitoring of Well KAFB-1006.

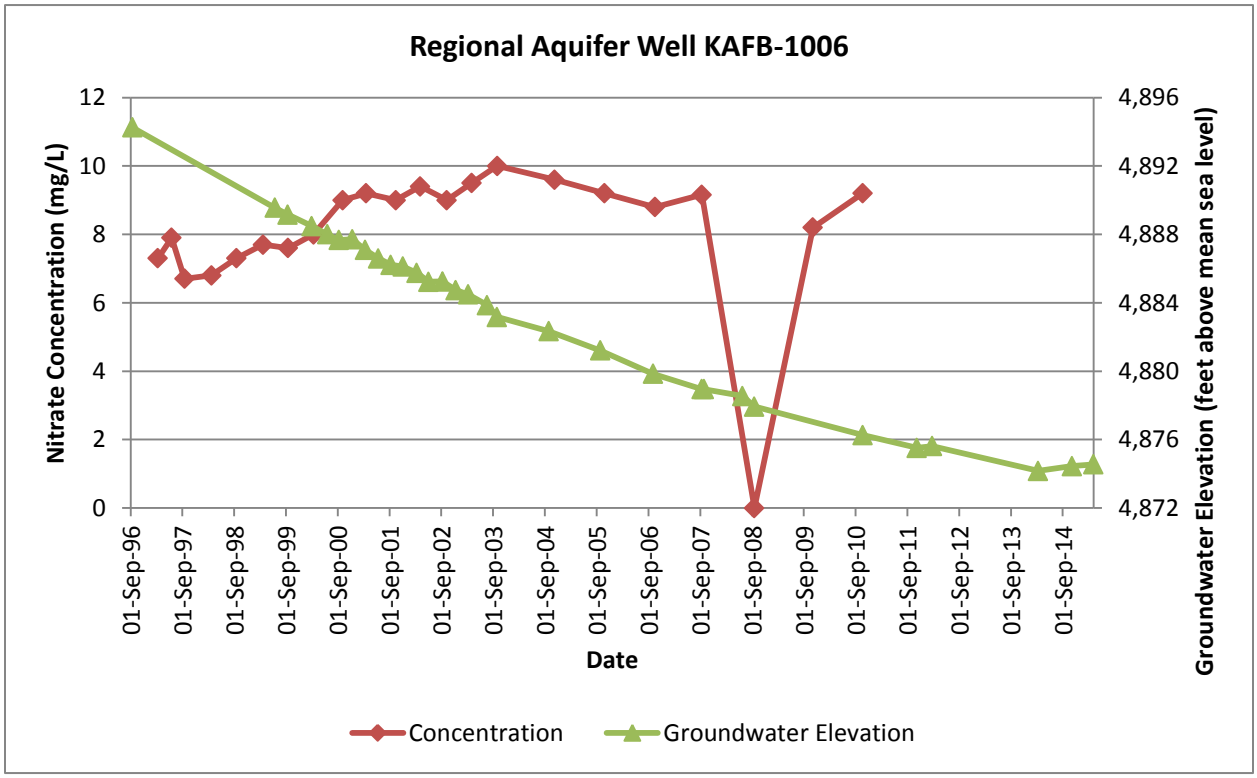

Figure 4-39. Well KAFB-1006 Nitrate and Groundwater Elevation Trends

4.2.3.2 KAFB-1007/1007R

Wells KAFB-1007/1007R have demonstrated a consistent trend in nitrate concentrations over time. Well KAFB-1007 was abandoned in June 2013 because water levels had declined, with KAFB-1007R installed in May 2013. Similar to other wells in the vicinity, Well KAFB-1007 demonstrated a decreasing trend in groundwater elevation over the past 18 years. Well KAFB-1007R does not have sufficient data from which to draw any inferences pertaining to groundwater elevation trends. Figure 4-40 illustrates both the nitrate concentration trend and the groundwater elevation trend. There does not to be a correlation between the nitrate concentrations and the groundwater elevation. The most recent nitrate data collected from Well KAFB-1007R provided a concentration of 8.8 mg/L. Previous nitrate concentrations obtained for Well KAFB-1007 were occasionally above the 10 mg/L regulatory level. Given the limited data for KAFB-1007R, it is recommended monitoring continue on an annual basis.

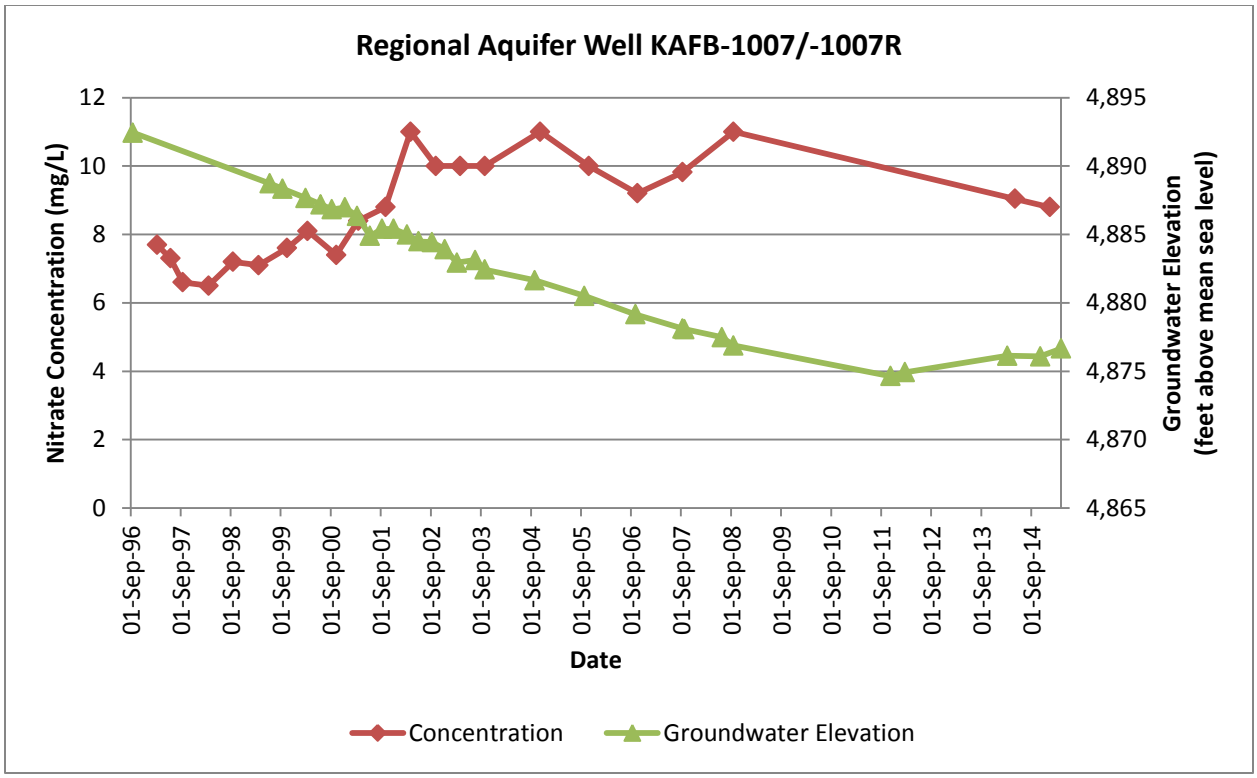

Figure 4-40. Well KAFB-1007/1007R Nitrate and Groundwater Elevation Trends

4.2.3.3 KAFB-1008

Nitrate concentrations in samples collected from well KAFB-1008 have remained below the regulatory level of 10 mg/L, averaging less than 6 mg/L over the past 10 years (see Figure 4-41). As with well KAFB-1007, the groundwater elevations have steadily been declining with an overall decrease of just over 11 ft between October 2004 and March 2014. Given the consistency of the nitrate measurements over the past 10 years being less than the regulatory level of 10 mg/L, it is recommended that monitoring of Well KAFB-1008 be discontinued.

4.2.3.4 KAFB-1009

Nitrate concentrations in samples collected from well KAFB-1009 have consistently been less than the regulatory level of 10 mg/L, averaging less than 8 mg/L over the past 10 years (see Figure 4-42). As with wells KAFB-1007 and KAFB-1008, the groundwater elevations have steadily been declining with an overall decrease of just over 7 ft between October 2004 and March 2014. Given the consistency of the nitrate measurements over the past 10 years being less than the regulatory level of 10 mg/L, it is recommended that monitoring of Well KAFB-1009 be discontinued.

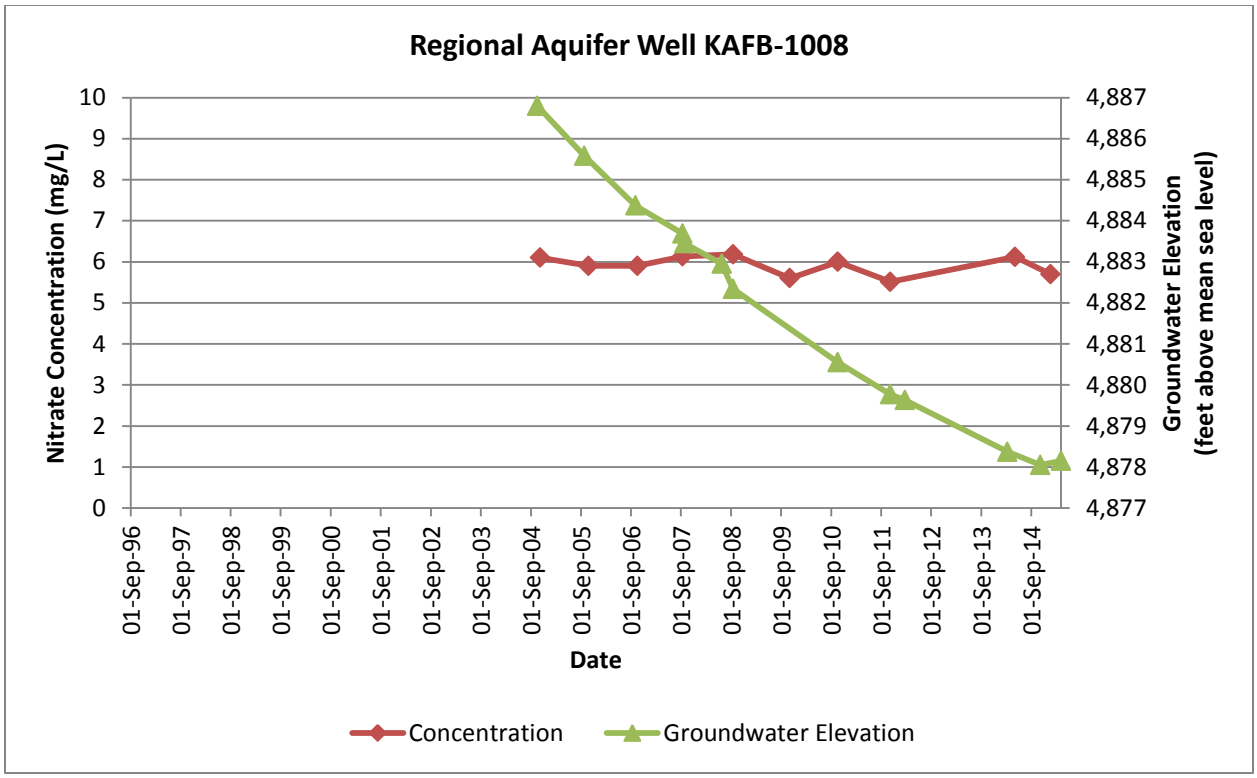

Figure 4-41. Well KAFB-1008 Nitrate and Groundwater Elevation Trends

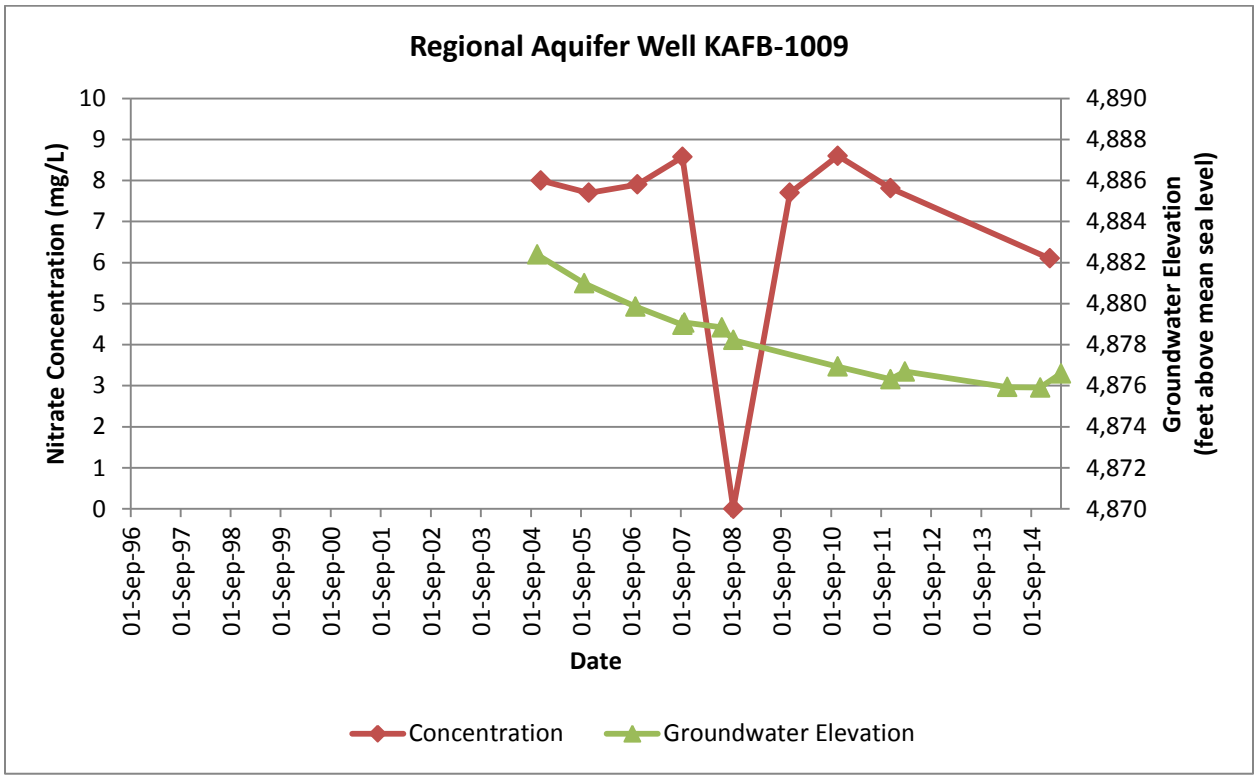

Figure 4-42. Well KAFB-1009 Nitrate and Groundwater Elevation Trends

4.3 REGIONAL AQUIFER GROUNDWATER ELEVATIONS

Regional aquifer groundwater elevations were measured in the fall of 2014 and the spring of 2015. Table 4-2 summarizes the results from the field measurements. Groundwater contour maps based on the fall 2014 and spring 2015 groundwater elevation data are provided in Figures 4-43 and 4-44, respectively. To note, the groundwater contours were created based on existing monitoring point elevations. An effort is underway to update the monitoring point elevations basewide for consistency.

Table 4-2. Regional Aquifer Groundwater Elevations

Well	Measuring Point Elevation (ft amsl)	Fall 2014		Spring 2015	
		DTW (ft)	Groundwater Elevation (ft)	DTW (ft)	Groundwater Elevation (ft)
KAFB-0118	5,318.02	455.95	4,862.07	454.40	4,863.62
KAFB-0119	5,313.09	451.43	4,861.66	449.93	4,863.16
KAFB-0120	5,286.89	423.90	4,862.99	422.65	4,864.24
KAFB-0121	5,304.93	443.03	4,861.90	441.36	4,863.57
KAFB-0213	5,279.33	416.83	4,862.50	415.82	4,863.51
KAFB-0219	5,261.02	397.71	4,863.31	397.04	4,863.98
KAFB-0220	5,262.43	399.67	4,862.76	398.74	4,863.69
KAFB-0221	5,271.69	409.18	4,862.51	407.99	4,863.70
KAFB-0307	5,361.86	427.77	4,934.09	427.65	4,934.21
KAFB-0308	5,378.98	446.66	4,932.32	446.25	4,932.73
KAFB-0309	5,409.13	478.69	4,930.44	479.82	4,929.31
KAFB-0311	5,350.62	420.19	4,930.43	419.85	4,930.77
KAFB-0312	5,429.50	417.58	5,011.92	417.20	5,012.30
KAFB-0315	5,463.44	438.25	5,025.19	438.06	5,025.38
KAFB-0417	5,314.86	451.18	4,863.68	450.65	4,864.21
KAFB-0504	5,354.04	496.77	4,857.27	495.60	4,858.44
KAFB-0505	5,360.14	500.51	4,859.63	498.63	4,861.51
KAFB-0507R	5,358.21	495.38	4,862.83	493.65	4,864.56
KAFB-0508	5,349.21	490.44	4,858.77	489.50	4,859.71
KAFB-0510	5,364.43	506.79	4,857.64	504.80	4,859.63
KAFB-0512R	5,302.73	439.20	4,863.53	437.75	4,864.98
KAFB-0514	5,203.74	342.99	4,860.75	341.90	4,861.84
KAFB-0516	5,202.97	341.91	4,861.06	340.93	4,862.04
KAFB-0517	5,194.43	330.69	4,863.74	329.92	4,864.51
KAFB-0518	5,175.09	310.81	4,864.28	309.81	4,865.28
KAFB-0520	5,245.23	385.20	4,860.03	383.76	4,861.47
KAFB-0522	5,264.81	405.78	4,859.03	404.46	4,860.35
KAFB-0523	5,349.95	486.43	4,863.52	484.94	4,865.01
KAFB-0524	5,342.94	481.87	4,861.07	480.25	4,862.69
KAFB-0525	5,227.08	367.70	4,859.38	363.78	4,863.30
KAFB-0611	5,383.42	462.69	4,920.73	462.34	4,921.08
KAFB-0613	5,388.11	351.52	5,036.59	331.57	5,056.54

Well	Measuring Point Elevation (ft amsl)	Fall 2014		Spring 2015	
		DTW (ft)	Groundwater Elevation (ft)	DTW (ft)	Groundwater Elevation (ft)
KAFB-0615	5,635.76	203.07	5,432.69	203.52	5,432.24
KAFB-0616	5,478.40	442.74	5,035.66	442.47	5,035.93
KAFB-0617	5,503.11	558.75	4,944.36	558.10	4,945.01
KAFB-0618	5,407.38	483.94	4,923.44	484.00	4,923.38
KAFB-0620	5,331.97	442.83	4,889.14	442.65	4,889.32
KAFB-0621	5,567.22	626.79	4,940.43	626.06	4,941.16
KAFB-0622	5,485.97	550.10	4,935.87	550.60	4,935.37
KAFB-0625	5,390.23	472.05	4,918.18	471.71	4,918.52
KAFB-0901	5,387.40	470.64	4,916.76	470.20	4,917.20
KAFB-0904	5,289.23	351.80	4,937.43	351.76	4,937.47
KAFB-1006	5,254.34	379.89	4,874.45	379.79	4,874.55
KAFB-1007R	5,260.62	384.41	4,876.18	383.86	4,876.76
KAFB-1008	5,255.49	380.05	4,875.44	379.95	4,875.54
KAFB-1009	5,266.86	393.58	4,873.28	392.90	4,873.96
KAFB-10611	5353.03	490.16	4,862.87	488.19	4,864.84
KAFB-1062	5339.12	478.67	4,860.45	476.63	4,862.49
KAFB-1063	5336.85	476.36	4,860.49	474.46	4,862.39
KAFB-2005	5,621.60	100.97	5,520.63	122.62	5,498.98
KAFB-2007	5,564.51	265.23	5,299.28	264.06	5,300.45
KAFB-2008	5,541.77	597.27	4,944.50	597.15	4,944.62
KAFB-2009	5,652.96	69.92	5,583.04	70.70	5,582.26
KAFB-2628	5369.34	506.82	4,862.52	504.68	4,864.66
KAFB-2629	5361.53	499.31	4,862.22	497.42	4,864.11
KAFB-3392	5,391.84	534.40	4,857.44	532.24	4,859.60
KAFB-6241	5,463.83	537.63	4,926.20	538.24	4,925.59
KAFB-6243	5,423.55	498.04	4,925.51	498.48	4,925.07
KAFB-6301	5,456.97	NM	NM	NM	NM
KAFB-8351	5,322.84	357.31	4,963.53	456.76	4,866.08
ST105-MW01	5,279.34	414.74	4,864.60	413.22	4,866.12
ST105-MW02	5,180.32	314.03	4,866.29	312.90	4,867.42
ST105-MW03	5,174.61	NM	NM	NM	NM
ST105-MW04	5,234.61	369.33	4,865.28	368.56	4,866.05
ST105-MW09	5,519.71	484.61	5,035.10	484.32	5,035.39
ST105-MW13	5,447.27	437.37	5,009.90	436.96	5,010.31
ST105-MW15	5,623.95	690.85	4,933.10	689.98	4,933.97
ST105-MW17	5,621.97	708.81	4,913.16	706.98	4,914.99
ST105-MW18	5,221.68	356.83	4,864.85	355.45	4,866.23
ST105-MW23	5,275.86	411.13	4,864.73	410.54	4,865.32
ST105-MW24	5,595.67	335.19	5,260.48	335.77	5,259.90
PGS-2	5,405.62	546.35	4,859.27	542.94	4,862.68
TA1-W-01	5,401.15	541.06	4,860.09	539.66	4,861.49

Well	Measuring Point Elevation (ft amsl)	Fall 2014		Spring 2015	
		DTW (ft)	Groundwater Elevation (ft)	DTW (ft)	Groundwater Elevation (ft)
TA1-W-02	5,413.95	523.94	4,890.01	537.83	4,876.12
TA1-W-04	5,458.31	570.51	4,887.80	569.61	4,888.70
TA1-W-05	5,433.11	568.58	4,864.53	565.12	4,867.99
TA2-NW1-595	5,418.59	523.35	4,895.24	522.32	4,896.27
TA2-W-24	5,360.99	442.82	4,918.17	442.41	4,918.58
TA2-W-25	5,372.19	469.64	4,902.55	468.90	4,903.29
TJA-3	5,387.89	499.64	4,888.35	499.00	4,888.99
TJA-4	5,338.49	300.87	5,037.62	300.61	5,037.88
TJA-6	5,340.49	451.50	4,888.99	451.13	4,889.36
WYO-3	5,389.42	528.44	4,860.98	527.65	4,861.77

amsl – above mean sea level
DTW – depth to water
ft – feet
NM – not measured

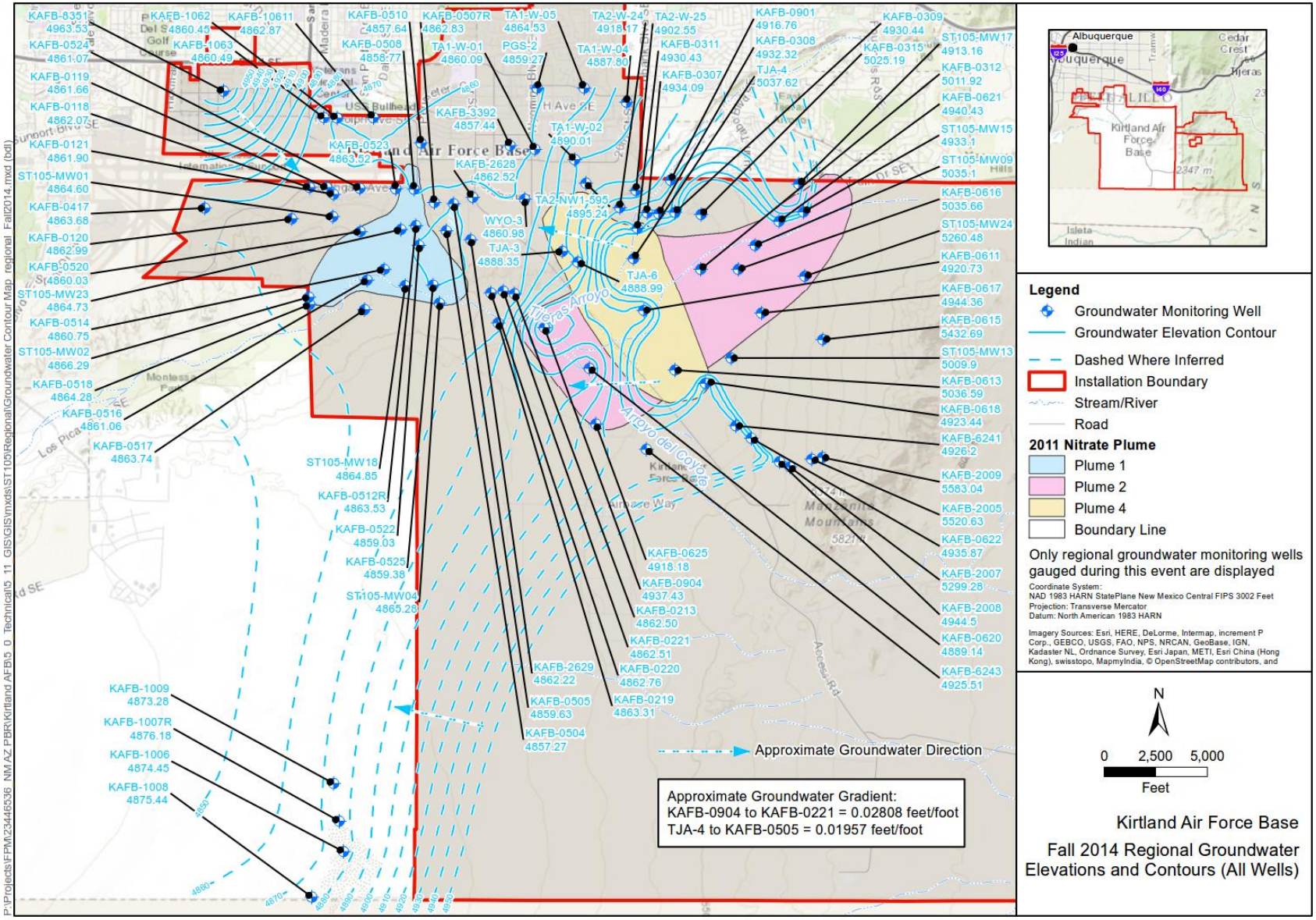

Figure 4-43. ST-105 Regional Aquifer Contour Map – Fall 2014

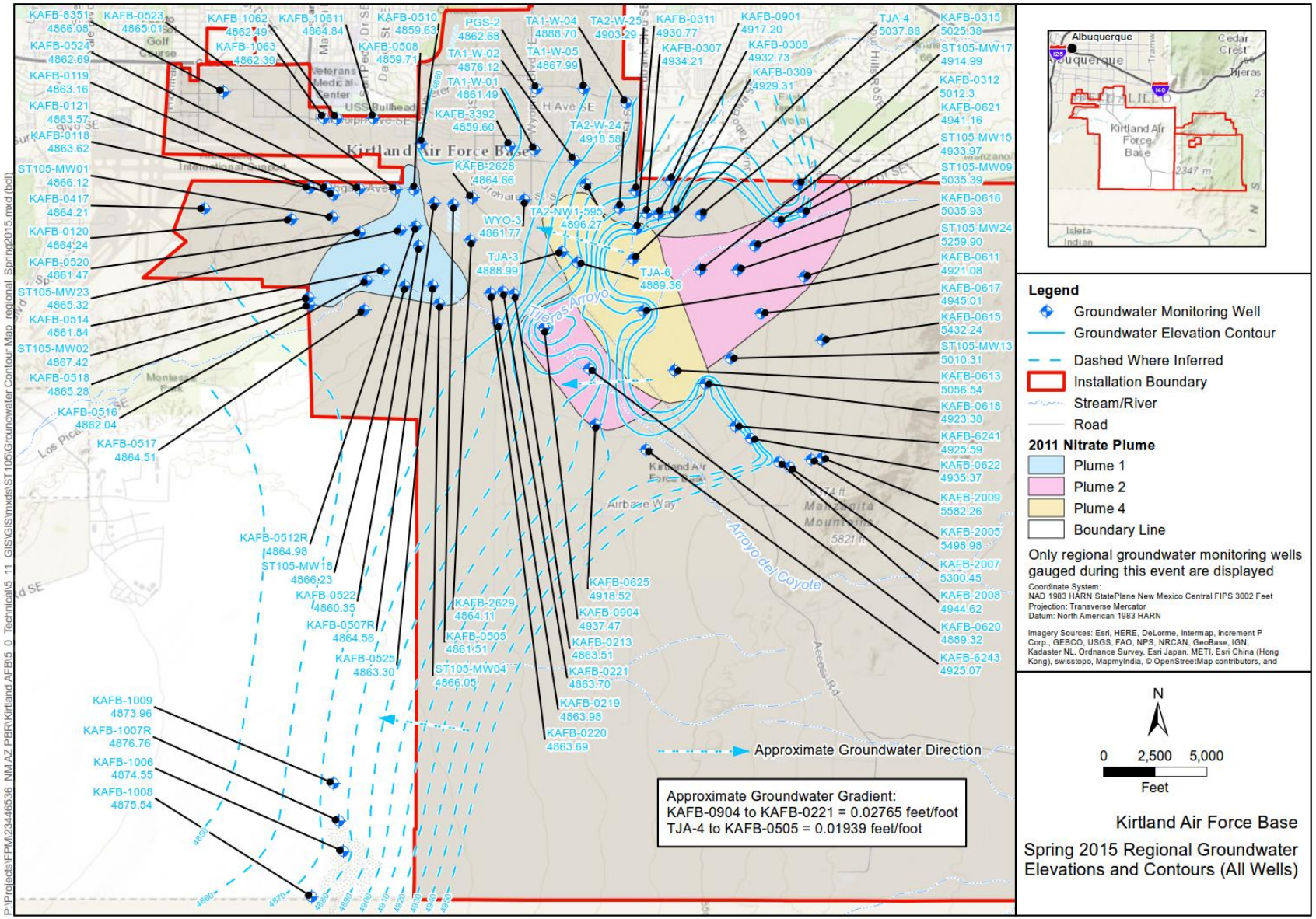

Figure 4-44. ST-105 Regional Aquifer Contour Map – Spring 2015

5.0 PERCHED AQUIFER

As discussed in Section 3.0, groundwater samples were collected from the 17 perched aquifer wells listed in Table 3-1. The samples underwent analyses for the list of analytes provided in Table 3-2. Analytical results are compared to the lowest applicable screening level as obtained from the following sources:

- New Mexico Water Quality Commission Regulations (NMAC 20.6.2)
- Applicable federal standards include EPA MCLs as found in 40 CFR 141 and 40 CFR 142 and NSDWR found in 40 CFR 143
- EPA RSLs for Tapwater available online at http://www.epa.gov/region6/6pd/rcra_c/pd-n/screen.htm.

5.1 GROUNDWATER ANALYTICAL RESULTS

The groundwater analytical results for the samples collected from the perched aquifer wells are summarized in Table 5-1 along with the applicable groundwater screening levels. The results for all analytes are tabulated in Table A-2 provided in Appendix A. The laboratory analytical reports are available in Appendix B.

5.1.1 Bromide

Samples from the 17 perched aquifer wells were analyzed for bromide in accordance with EPA Method 300.0. Bromide was detected in samples collected from 12 of the 17 well locations with concentrations ranging from 88 µg/L to 2,900 µg/L, with an average concentration of 670 µg/L. A regulatory screening level has not been established for bromide.

5.1.2 Chloride

Samples from the 17 perched aquifer wells were analyzed for chloride in accordance with EPA Method 300.0. Chloride was detected in samples collected from all 17 well locations with concentrations ranging from 7,400 µg/L to 120,000 µg/L, with an average concentration of 36,500 µg/L. All chloride concentrations are below both the NMAC and the NSDWR regulatory screening level of 250,000 µg/L.

5.1.3 Fluoride

Samples from the 17 perched aquifer wells were analyzed for fluoride in accordance with EPA Method 300.0. Fluoride was detected in samples collected from all 17 wells at concentrations ranging from 200 µg/L to 460 µg/L, with an average concentration of 343 µg/L. All fluoride concentrations are below the NMAC regulatory screening level of 1,600 µg/L.

5.1.4 Nitrate-Nitrite (as Nitrogen)

Samples from the 17 perched aquifer wells were analyzed for nitrate-nitrite (as nitrogen) in accordance with EPA Method 353.2. Nitrate-nitrite was detected in samples collected from all 17 wells with concentrations ranging from 2,100 µg/L to 70,000 µg/L, with an average concentration of 20,500 µg/L. Sample concentrations for samples collected from 9 of the 17 perched aquifer wells exceeded both the NMAC and the MCL regulatory level of 10,000 µg/L.

Table 5-1. Perched Aquifer Groundwater Analytical Results

Analyte	Units	Minimum	Maximum	Number of Detects	Screening Level	Screening Level Source
Bromide	µg/L	88	2.900	12	NE	—
Chloride	µg/L	7,400	120,000	17	250,000	NMAC/NSDWR
Fluoride	µg/L	200	460	17	1,600	NMAC
Nitrate-Nitrite (as Nitrogen)	µg/L	2,100	**70,000**	17	10,000	NMAC/MCL
Sulfate	µg/L	20,000	**330,000**	17	250,000	NSDWR
Alkalinity	µg/L	75,000	160,000	17	NE	—
Ammonia (as Nitrogen)	µg/L	45	100	11	NE	—
Total Kjeldahl Nitrogen	µg/L	ND	ND	0	NE	—
TDS	µg/L	230,000	750,000	17	1,000,000	NMAC
Dissolved Organic Carbon	µg/L	280	2,600	17	NE	—
Total Organic Carbon	µg/L	140	2,200	14	NE	—
Antimony	µg/L	0.28	1.8	7	6	MCL
Arsenic	µg/L	0.31	1.7	17	10	MCL
Barium	µg/L	31	210	17	1,000	NMAC
Beryllium	µg/L	0.13	0.13	1	4	MCL
Cadmium	µg/L	ND	ND	0	5	MCL
Chromium	µg/L	0.97	14	17	50	NMAC
Copper	µg/L	0.62	5.6	8	1,000	NMAC
Cobalt	µg/L	0.40	1.3	2	50	NMAC
Lead	µg/L	0.25	2.6	6	15	EPA Action Level
Manganese	µg/L	0.26	72	13	200	NMAC
Nickel	µg/L	0.40	5.0	9	200	NMAC
Selenium	µg/L	1.2	11	17	50	NMAC/MCL
Silver	µg/L	0.67	0.67	1	50	NMAC
Thallium	µg/L	ND	ND	0	2	MCL
Vanadium	µg/L	3.3	9.6	17	63.1	EPA RSL for tapwater
Zinc	µg/L	2.8	69	6	10,000	NMAC
Aluminum	µg/L	44	490	8	5,000	NMAC
Boron	µg/L	16	97	16	750	NMAC
Calcium	µg/L	41,000	160,000	17	NE	—
Iron	µg/L	14	690	12	1,000	NMAC
Lithium	µg/L	15	44	16	NE	—
Magnesium	µg/L	6,000	24,000	17	NE	—
Potassium	µg/L	1,700	6,900	17	NE	—
Sodium	µg/L	22,000	42,000	17	NE	—

EPA – U.S. Environmental Protection Agency
MCL – maximum contaminant level
µg/L – microgram per liter
NE – none established
ND – non-detect
NMAC – New Mexico Administrative Code
NSDWR – National Secondary Drinking Water Regulation
RSL – regional screening level
TDS – total dissolved solids
Bold text results indicate a concentration that exceeds the regulatory screening level.

5.1.5 Sulfate

Samples from the 17 perched aquifer wells were analyzed for sulfate in accordance with EPA Method 300.0. Sulfate was detected in all samples at concentrations ranging from 20,000 µg/L to 330,000 µg/L, with an average concentration of 84,600 µg/L. The concentration for the sample collected from well KAFB-0506 exceeded the NSDWR regulatory level of 250,000 µg/L. This is consistent with historical results obtained for this well. Concentrations for samples collected from the other 16 wells were below the regulatory level.

5.1.6 Alkalinity

Samples from the 17 perched aquifer wells were analyzed for alkalinity (as $CaCO_3$) in accordance with EPA SM 2320 B-2011. Alkalinity concentrations ranged from 75,000 µg/L to 160,000 µg/L, with an average concentration of 126,000 µg/L. A regulatory screening level has not been established for alkalinity.

5.1.7 Ammonia (as Nitrogen)

Samples from the 17 perched aquifer wells were analyzed for ammonia (as nitrogen) in accordance with EPA Method 350.1. Ammonia (as nitrogen) was detected in the samples collected from 11 of the 17 wells at concentrations ranging from 45 µg/L to 100 µg/L, with an average concentration of 76 µg/L. A regulatory screening level has not been established for ammonia (as nitrogen).

5.1.8 Total Kjeldahl Nitrogen

Samples from the 17 perched aquifer wells were analyzed for total Kjeldahl nitrogen in accordance with EPA Method 351.2. The total Kjeldahl nitrogen concentrations for all 17 wells were ND. A regulatory screening level has not been established for Total Kjeldahl nitrogen.

5.1.9 Total Dissolved Solids

Samples from the 17 perched aquifer wells were analyzed for TDS in accordance with EPA SM 2540 C-2011. The TDS concentrations ranged from 230,000 µg/L to 750,000 µg/L, with an average concentration of 473,000 µg/L. All results are below the NMAC screening level of 1,000,000 µg/L.

5.1.10 Dissolved Organic Carbon and Total Organic Carbon

Samples from the 17 perched aquifer wells were analyzed for both dissolved organic carbon and total organic carbon in accordance with methods EPA SM 5310 B-2011 and SW-846 Method 9060A, respectively. Dissolved organic carbon was detected in samples collected from all 17 well locations at concentrations ranging from 280 µg/L to 2,600 µg/L, with an average concentration of 754 µg/L. Total organic carbon was detected samples collected from 14 of the 17 well locations at concentrations ranging from 140 µg/L to 2,200 µg/L with an average concentration of 762 µg/L. A regulatory screening level has not been established for either dissolved organic carbon or total organic carbon.

5.1.11 Metals

Samples from the 17 perched aquifer wells were analyzed for total metals in accordance with SW-846 Method 6010B (aluminum, boron, calcium, iron, lithium, magnesium, potassium, and sodium) and SW-846 Method 6020 (antimony, arsenic, barium, beryllium, cadmium, chromium, copper, cobalt, lead,

manganese, nickel, selenium, silver, thallium, vanadium, and zinc). As shown in Table 5-1, concentrations for all metals are below established regulatory levels.

5.2 PERCHED AQUIFER NITRATE TRENDS

As indicated in Table 3-1, the perched aquifer wells sampled during FY 2015 included KAFB-0314, KAFB-0506, KAFB-0602, KAFB-0608, KAFB-0612, KAFB-0614, KAFB-0619, KAFB-0623, ST105-MW06, ST105-MW10, ST105-MW12, ST105-MW19, ST105-MW20, ST105-MW21, ST105-MW22, TJA-2, and TJA-5. Samples were not collected from perched wells ST105-MW05, ST105-MW07, ST105-MW08, or ST105-MW11 because groundwater was below the screened interval in the wells.

5.2.1.1 KAFB-0314

Well KAFB-0314 is located to the northeast of the historically-defined Perched Water Plume 4. As shown in Figure 5-1, the nitrate concentrations have consistently been below the 10 mg/L regulatory level and have been averaging approximately 5 mg/L. Groundwater elevations increased from 1999 to approximately 2005 and have remained steady since the 2005 timeframe. Well KAFB-0314 serves as a good sentinel well for that area; therefore, it is recommended that monitoring of the well be continued.

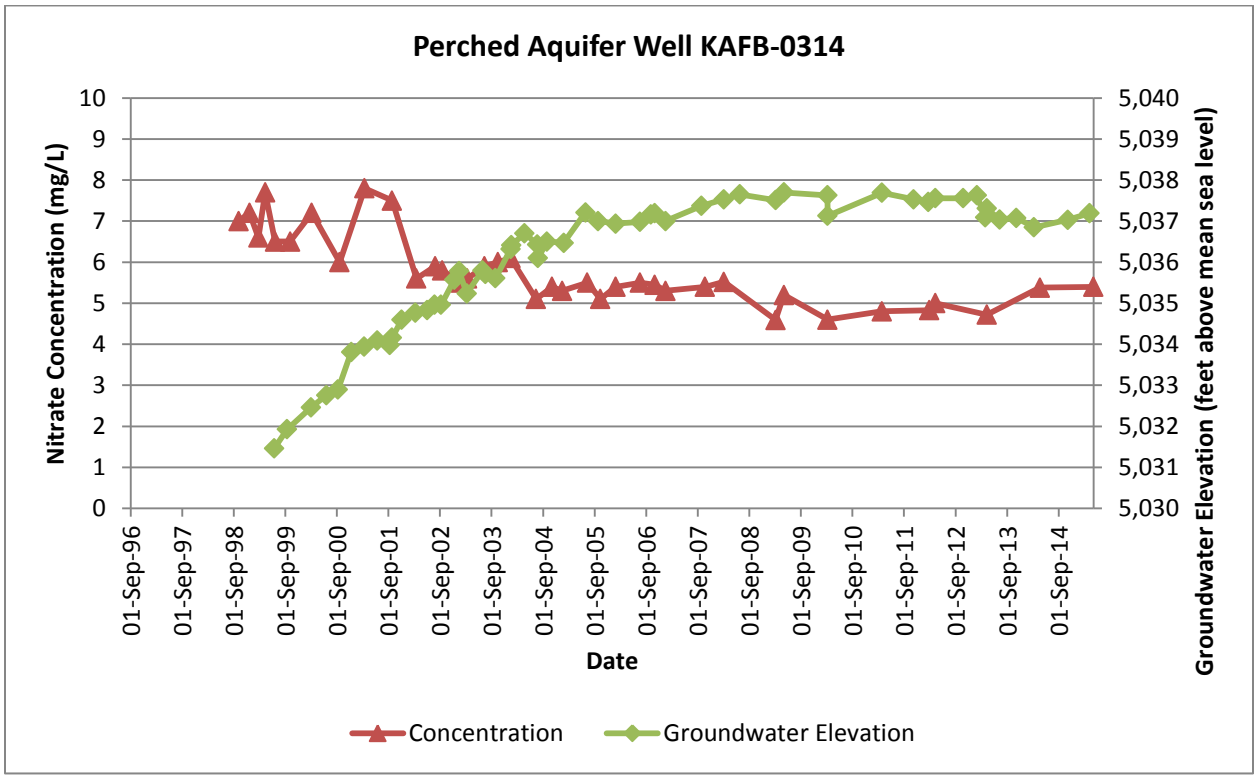

Figure 5-1. Well KAFB-0314 Nitrate and Groundwater Elevation Trends

5.2.1.2 KAFB-0506

Well KAFB-0506 is located to the west of the northern portion of the perched aquifer plume. As shown in Figure 5-2, the nitrate concentrations for samples collected from this well have remained fairly consistent, averaging less than 3 mg/L. The groundwater elevation has generally been decreasing with the noticeable slight increase between October 2006 and the end of 2009 at which time the elevation continued its

decline until early 2014 and has remained fairly consistent for the past year and a half. There is no noticeable correlation between groundwater elevations and nitrate concentrations. Well KAFB-0506 serves as a good sentinel well for that area; therefore, it is recommended that monitoring of the well be continued.

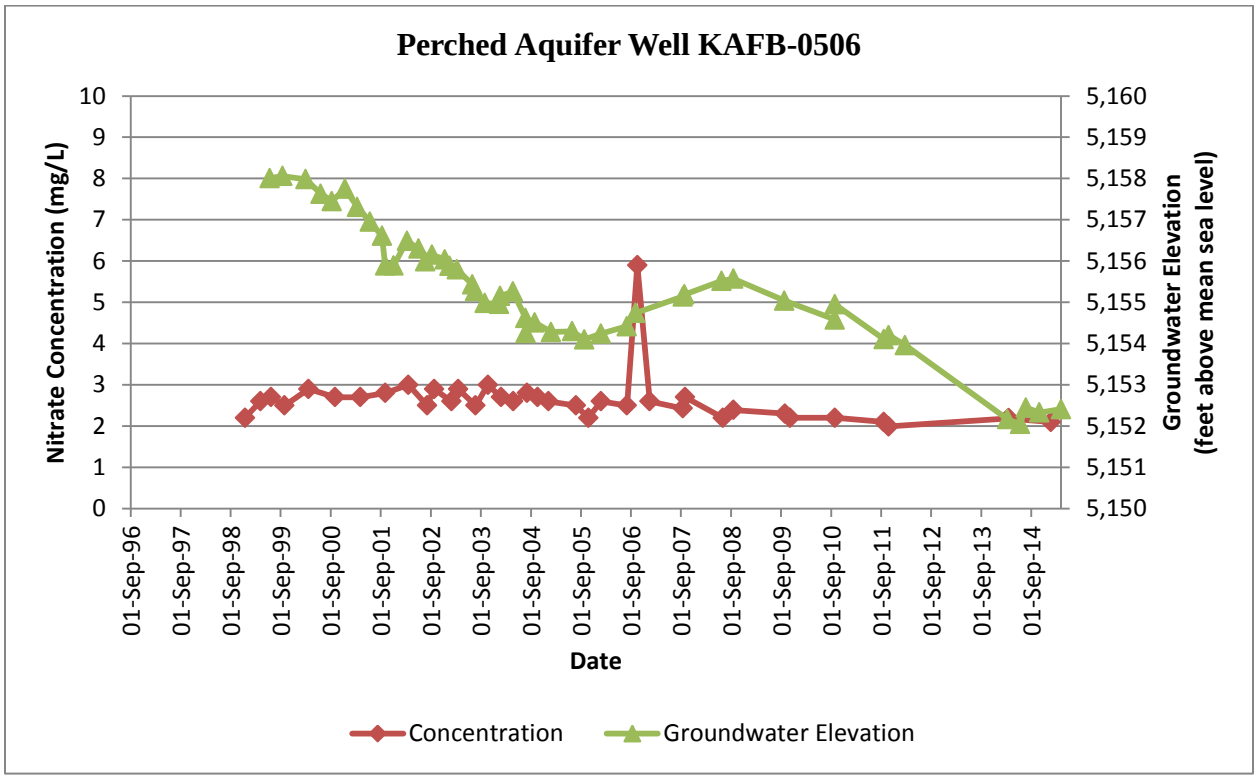

Figure 5-2. Well KAFB-0506 Nitrate and Groundwater Elevation Trends

5.2.1.3 KAFB-0602

Well KAFB-0602 is located in the south-central portion of the perched aquifer plume. The nitrate concentrations for this well have remained fairly consist average approximately 17 mg/L since 2002 (see Figure 5-3). The well is located adjacent to the Kirtland AFB Main Golf Course Pond which has received nitrate-impacted groundwater from production well KAFB-7 in accordance with the nitrate abatement plan. Groundwater elevations have remained consistent for KAFB-0602 given that the perched water in the area receives recharge from grounds maintenance activities at the golf course. Given that the nitrate concentrations for Well KAFB-0602 exceed the regulatory level of 10 mg/L, monitoring will be continued.

5.2.1.4 KAFB-0608

Well KAFB-0608 is located just to the south of Well KAFB-0602 in the south-central portion of the perched aquifer plume. As shown in Figure 5-4, the nitrate concentrations have varied between 20 mg/L and 30 mg/L over the past 18 years. The groundwater elevation showed an increasing trend from 1999 to 2009, but has largely remained between 5,057 ft amsl and 5,064 ft amsl. There does not appear to be a trend between groundwater elevations and nitrate concentrations. Given that the nitrate concentrations for Well KAFB-0608 exceed the regulatory level of 10 mg/L, monitoring will be continued.

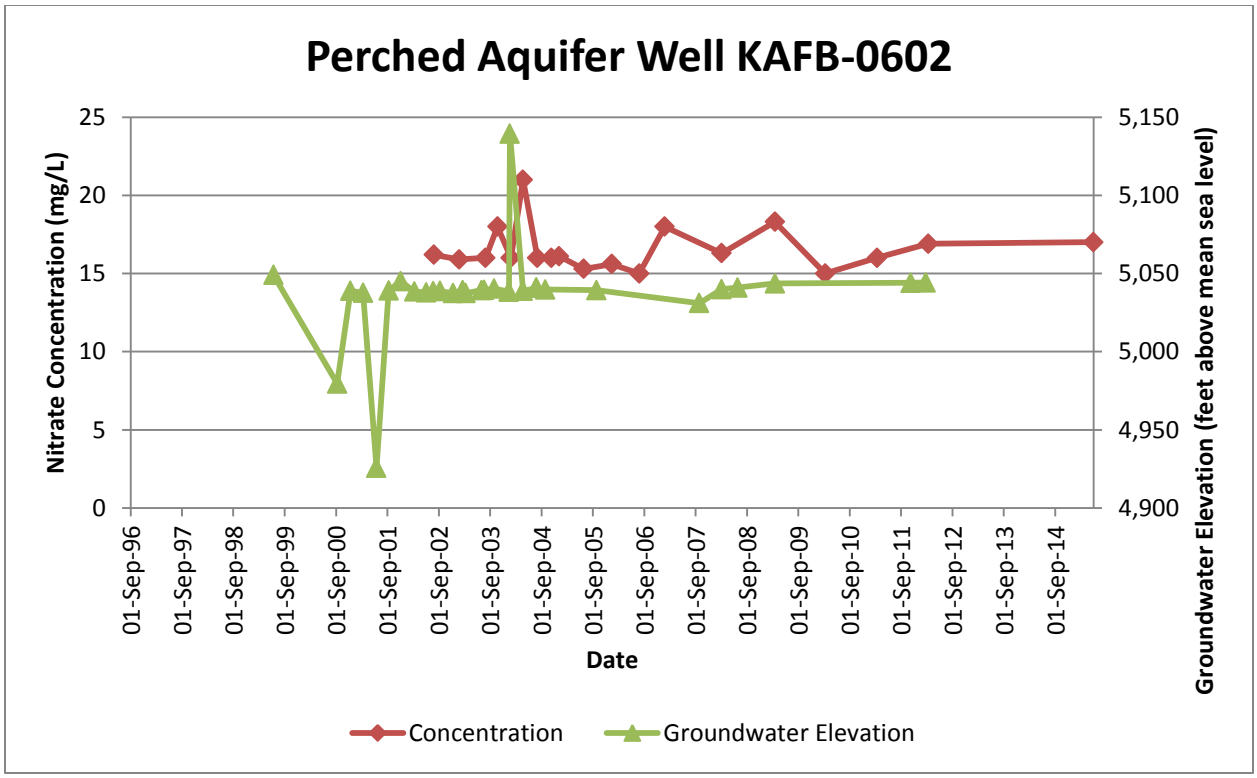

Figure 5-3. Well KAFB-0602 Nitrate and Groundwater Elevation Trends

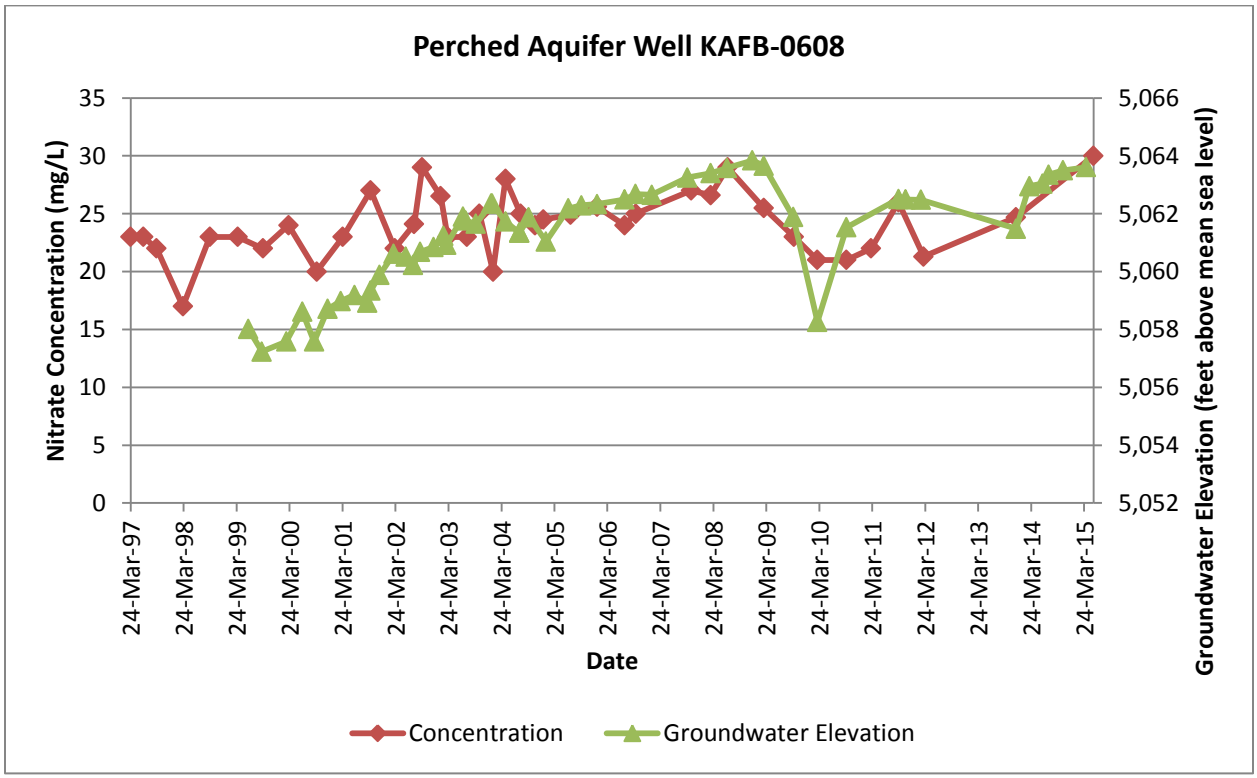

Figure 5-4. Well KAFB-0608 Nitrate and Groundwater Elevation Trends

5.2.1.5 KAFB-0612

Well KAFB-0612 is located in the central portion of the perched aquifer plume. The nitrate concentrations for samples collected from this well have remained fairly consistent averaging less than 30 mg/L (see Figure 5-5). The nitrate concentrations have historically exceeded the regulatory level of 10 mg/L. The groundwater elevation has steadily been rising with a noticeable increase in recharge beginning in 2010 and continuing through the present. There is no apparent trend between nitrate concentrations and groundwater elevation. Given that the nitrate concentrations continue to exceed the regulatory level, monitoring of the well will be continued.

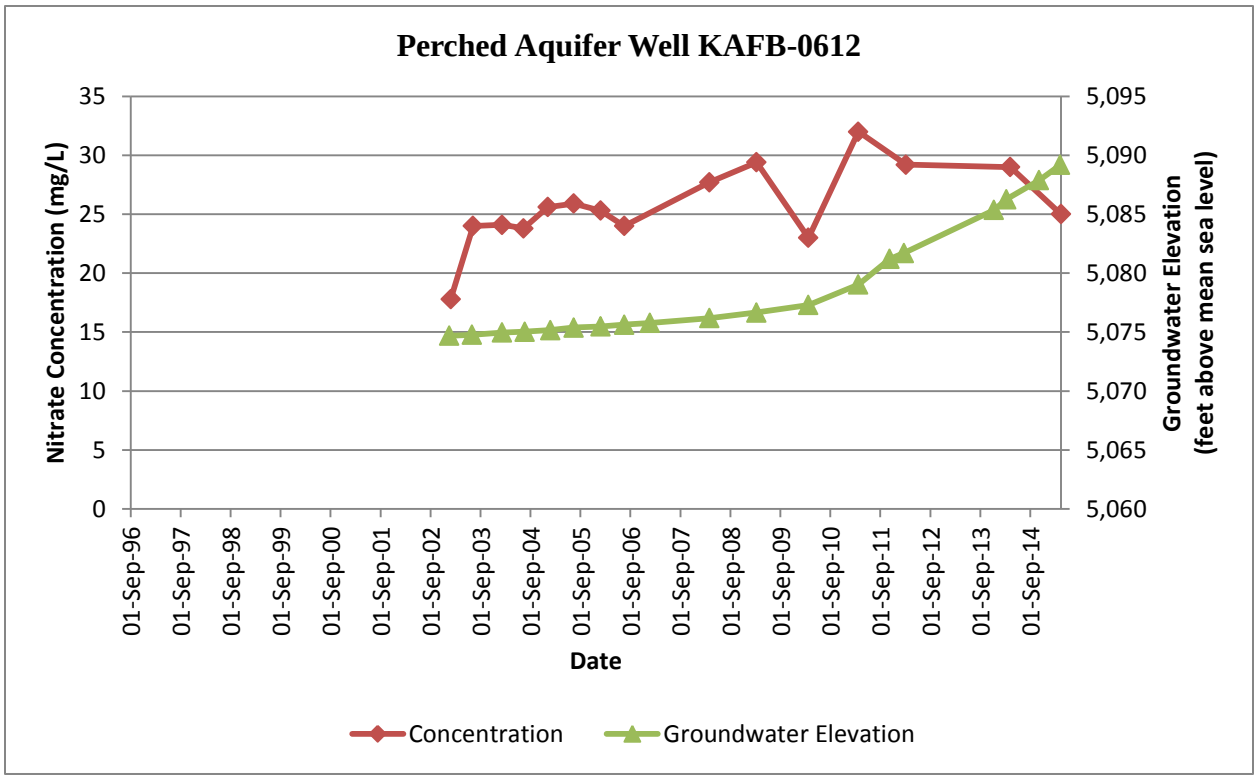

Figure 5-5. Well KAFB-0612 Nitrate and Groundwater Elevation Trends

5.2.1.6 KAFB-0614

Well KAFB-0614 is located in in the southern quadrant of the perched aquifer plume. As shown in Figure 5-6, the nitrate concentrations for samples collected from this well have remained fairly consistent averaging less than 25 mg/L. With one notable exception in July 2005, the nitrate concentrations have remained above the 10 mg/L regulatory level. The groundwater elevation increased from January 2003 through approximately the beginning of 2009, but it appears to have leveled off since that time. As with the previous two wells, groundwater elevation does not appear to have any correlation to nitrate concentration. Monitoring of the well will continue given the elevated nitrate concentrations.

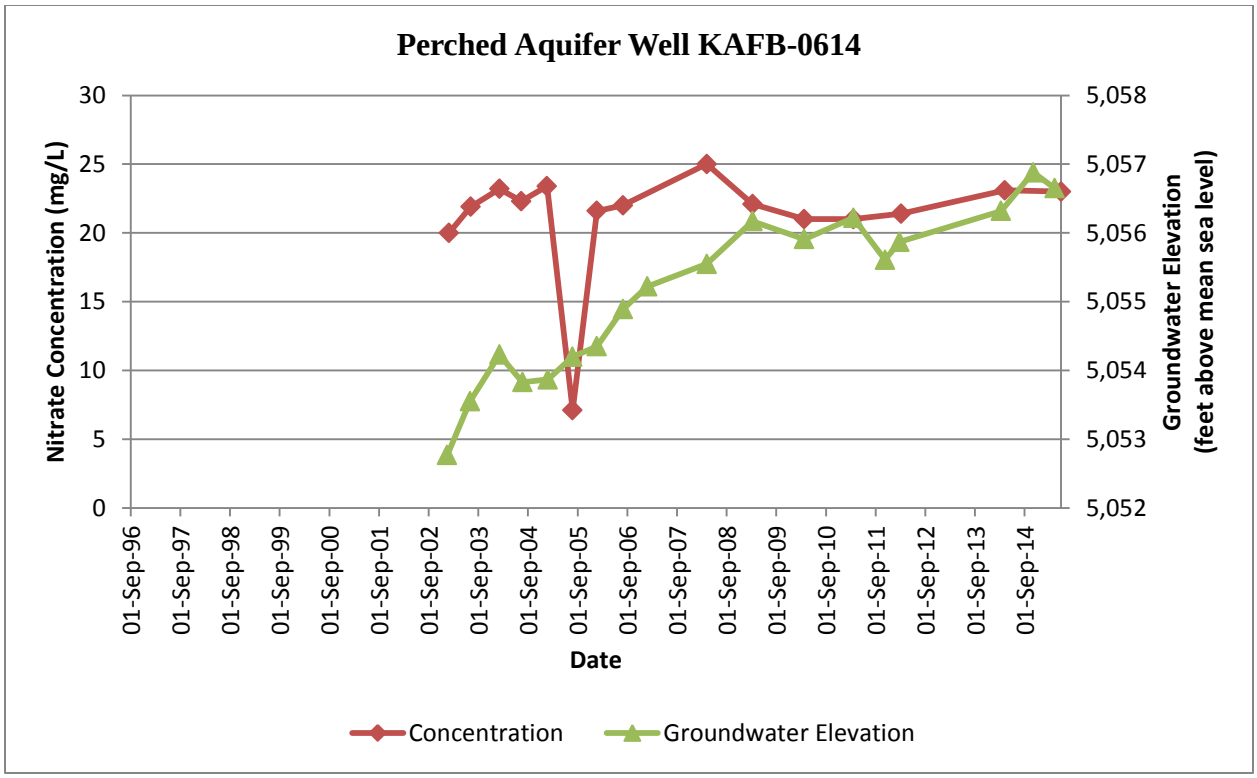

Figure 5-6. Well KAFB-0614 Nitrate and Groundwater Elevation Trends

5.2.1.7 KAFB-0619

Well KAFB-0619 is located on the southeastern edge of the perched aquifer plume. The nitrate concentrations for samples collected from this well have met or exceeded the 10 mg/L regulatory level two times over the past ten years and generally average just less than this level as shown in Figure 5-7. The groundwater elevation for this well has been steadily increasing, but there is no noticeable correlation with nitrate concentrations. The location serves as a good sentinel well for the southern extent of the perched aquifer plume; therefore, monitoring of this well will be continued.

5.2.1.8 KAFB-0623

Well KAFB-0623 is located near the center of the perched aquifer plume. As shown in Figure 5-8, the nitrate concentrations for samples collected from this well have been increasing since early 2009 and consistently exceed the 10 mg/L regulatory level. The nitrate concentrations are consistent between the 2014 and 2015 monitoring events at 63 mg/L. The groundwater elevation is fairly consistent ranging between 5,067 ft amsl and 5,068 ft amsl and does not demonstrate any correlation to the increasing nitrate concentration. Given that the nitrate concentrations continue to exceed the regulatory level, monitoring of the well will be continued.

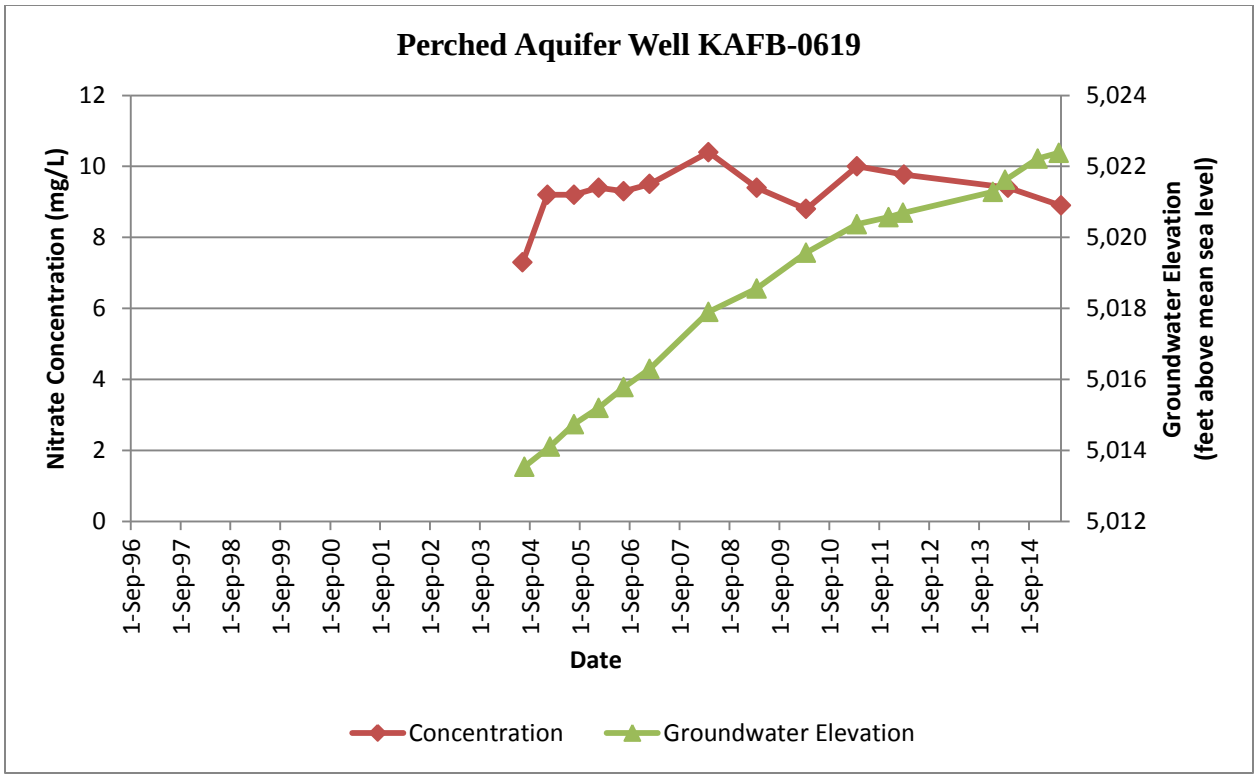

Figure 5-7. Well KAFB-0619 Nitrate and Groundwater Elevation Trends

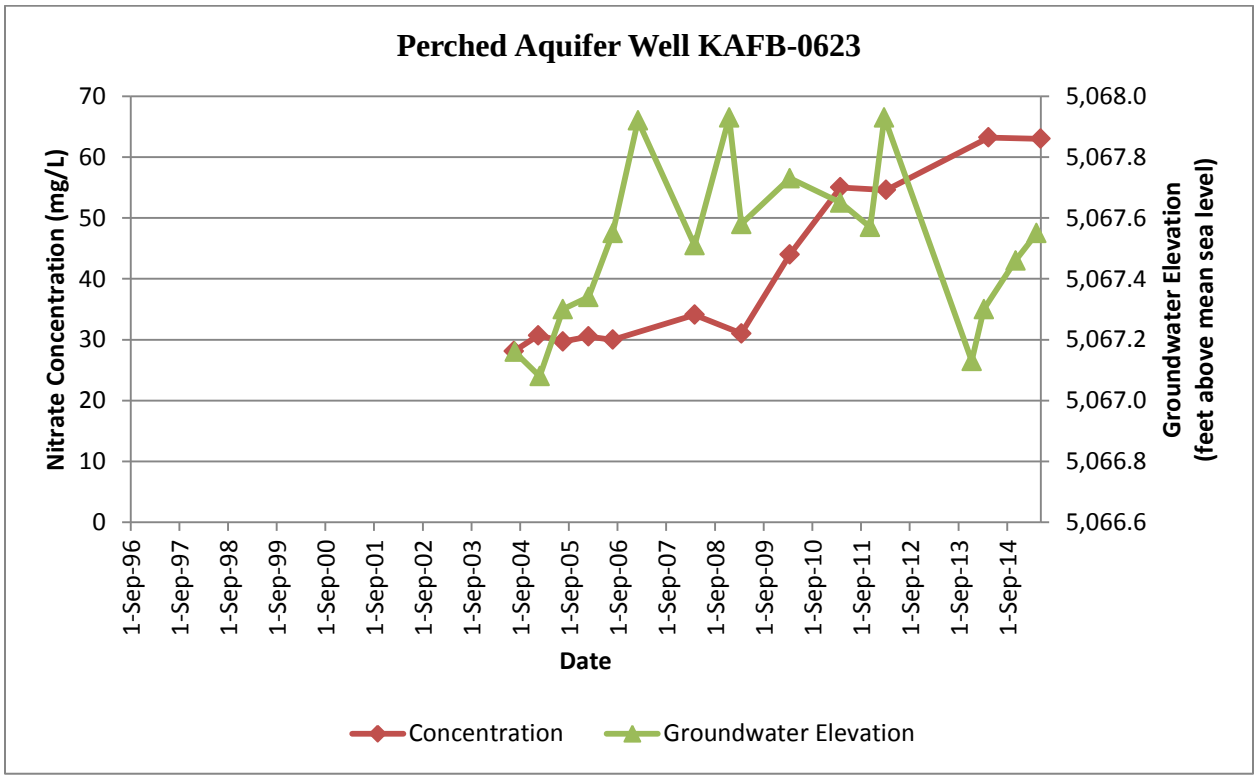

Figure 5-8. Well KAFB-0623 Nitrate and Groundwater Elevation Trends

5.2.1.9 TJA-2

Well TJA-2 is located on the northeastern edge of the perched aquifer plume. The nitrate concentrations for samples collected from this well demonstrated a slight, but noticeable increasing trend wherein the concentrations were initially below the regulatory level of 10 mg/L, but began to exceed this level in early 2008 (see Figure 5-9). The nitrate concentration appears to have stabilized averaging approximately 11 mg/L with the most recent concentration being 9.6 mg/L. The groundwater elevation has shown a decreasing trend but no noticeable correlation to the nitrate concentration. The well still warrants continued monitoring.

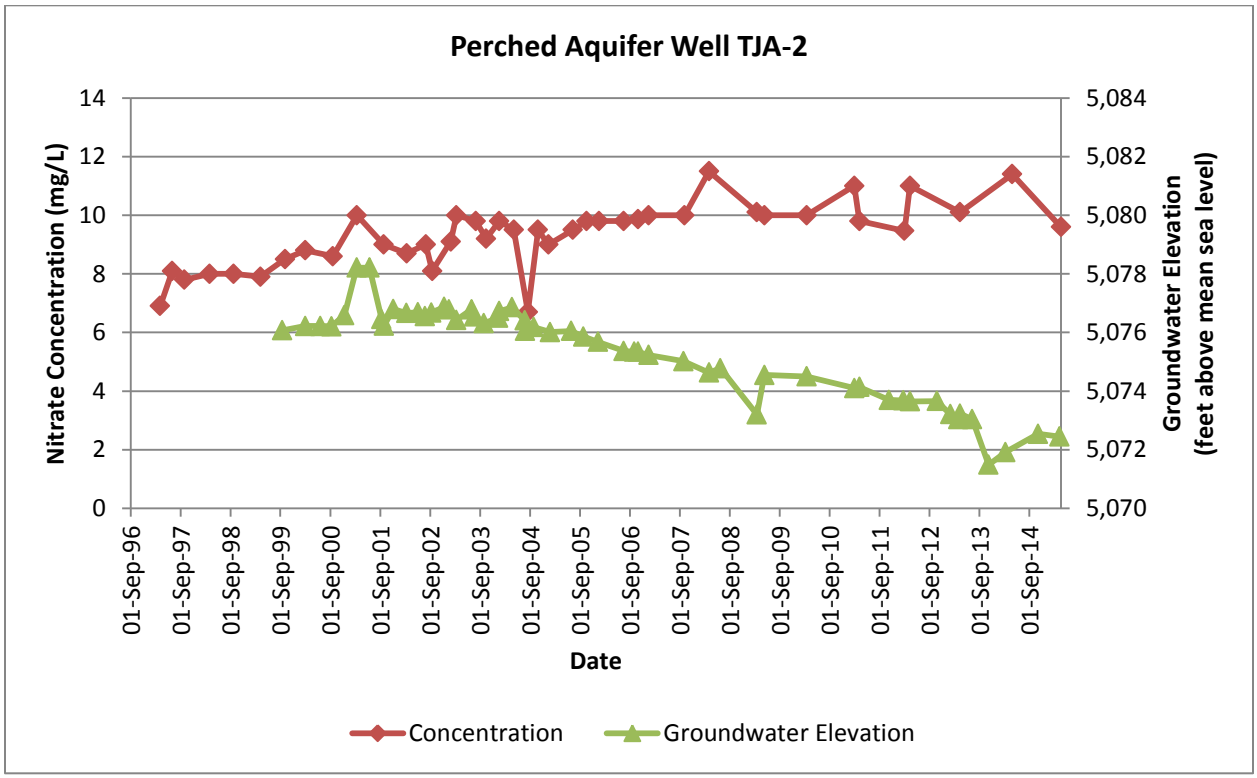

Figure 5-9. Well TJA-2 Nitrate and Groundwater Elevation Trends

5.2.1.10 TJA-5

Well TJA-5 is located in the north central portion of the perched aquifer plume. As shown in Figure 5-10, the nitrate concentration has demonstrated a steadily increasing trend continually exceeding the 10 mg/L regulatory level. The groundwater elevation began showing a decreasing trend in early 2009, but has been increasing the past year. Given that during the initial increase in nitrate concentrations the groundwater elevation was fairly consistent, it does not appear that declining elevation is correlated to the increasing nitrate concentration. Continued monitoring of Well TJA-5 is warranted.

5.2.1.11 New Wells in the Vicinity of the Perched Water Plume

Wells ST105-MW06, ST105-MW10, ST105-MW12, ST105-MW19, ST105-MW20, ST105-MW21, and ST105-MW22 were installed in the vicinity of the perched groundwater plume in the February-March

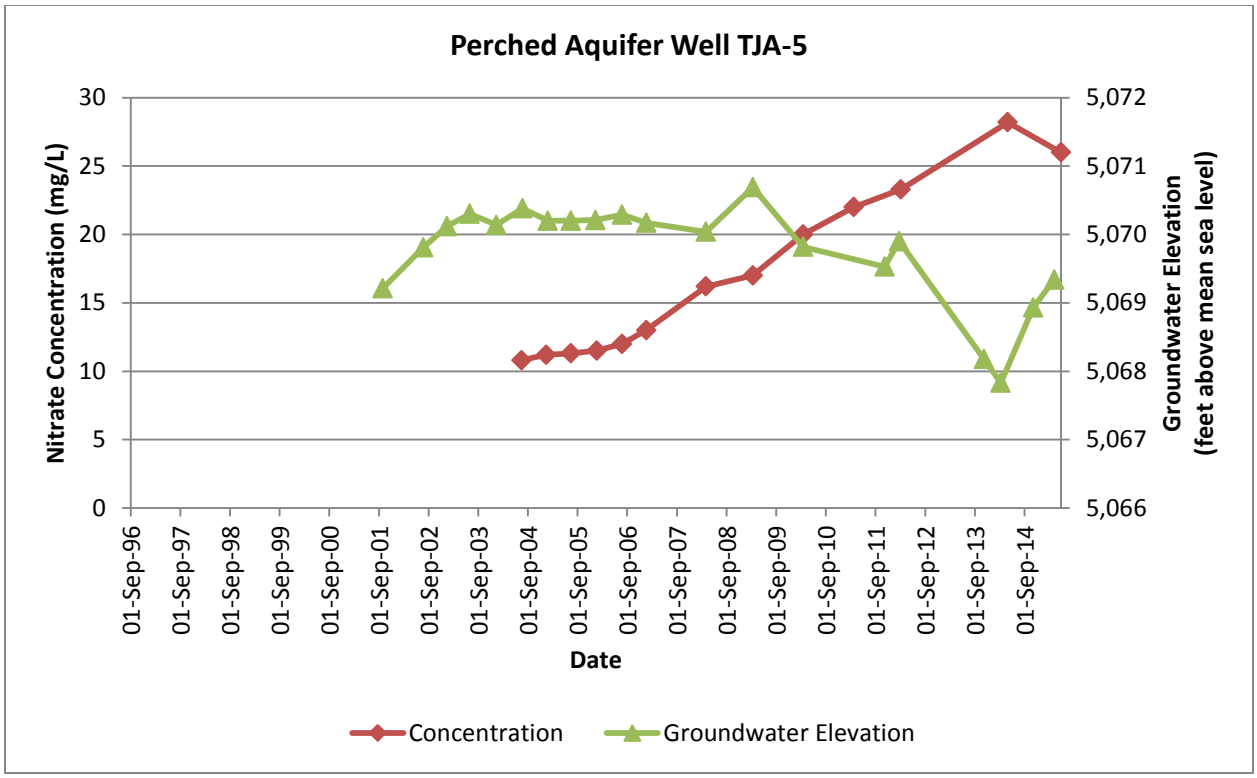

Figure 5-10. Well TJA-5 Nitrate and Groundwater Elevation Trends

timeframe of 2013. The FY 2015 sampling event represents the first time that these wells were included in the ST-105 monitoring network.

Well ST105-MW06 is located in the western portion of the perched aquifer plume. The nitrate concentration for the sample collected from this well was 70.0 mg/L. Well ST105-MW10 is located just to the south of the defined plume with the collected sample having a nitrate concentration of 9.8 mg/L. Well ST105-MW12 is located off the southeastern toe of the plume and the collected sample having a nitrate concentration of 9.0 mg/L. Well ST105-MW20 is located to the northeast of the plume with the collected sample have a nitrate concentration of 5.6 mg/L. Well ST105-MW21 is located on the southwestern edge of the plume and the collected sample had a nitrate concentration of 26.0 mg/L. Well ST105-MW22 is located to the southeast of the historically-defined perched aquifer plume and the collected sample had a nitrate concentration of 13.0 mg/L. The additional data collected from these wells will help to refine the extent of perched aquifer plume.

Perched aquifer well ST105-MW19 is located in the vicinity of the regional aquifer plume 1 providing coverage of the perched groundwater overlying plume 1. The nitrate concentration for the sample collected from this well is 4.4 mg/L.

5.3 PERCHED AQUIFER GROUNDWATER ELEVATIONS

Perched aquifer groundwater elevations were measured in the fall of 2014 and the spring of 2015. Table 5-2 summarizes the results from the field measurements. Groundwater contour maps based on the fall 2014 and spring 2015 groundwater elevation data are provided in Figures 5-11 and 5-12, respectively. As with the regional aquifer monitoring wells, the groundwater contours for the perched aquifer

monitoring wells were created based on existing monitoring point elevations. An effort is underway to update the monitoring point elevations basewide for consistency.

Table 5-2. Perched Aquifer Groundwater Elevations

Well	Measuring Point Elevation (ft amsl)	Fall 2014		Spring 2015	
		DTW (ft)	Groundwater Elevation (ft)	DTW (ft)	Groundwater Elevation (ft)
KAFB-0310	5,413.81	352.53	5,061.28	352.39	5,061.42
KAFB-0313	5,416.31	349.95	5,066.36	349.50	5,066.81
KAFB-0314	5,453.08	416.05	5,037.03	415.89	5,037.19
KAFB-0506	5,360.80	208.47	5,152.33	208.39	5,152.41
KAFB-0608	5,357.23	293.73	5,063.50	293.62	5,063.61
KAFB-0612	5,382.78	294.90	5,087.88	293.60	5,089.18
KAFB-0614	5,388.22	331.34	5,056.88	353.48	5,034.74
KAFB-0619	5,408.11	385.89	5,022.22	385.73	5,022.38
KAFB-0623	5,326.27	258.81	5,067.46	258.72	5,067.55
KAFB-0903	5,388.96	237.21	5,151.75	237.38	5,151.58
KAFB-2622	5,355.47	201.87	5,153.60	201.97	5,153.50
KAFB-2623	5,364.81	221.59	5,142.22	221.46	5,143.35
KAFB-2624	5,359.60	NM	NM	217.52	5,142.08
KAFB-2625	5,356.59	196.71	5,158.88	196.71	5,159.88
KAFB-2626	5,357.51	206.50	5,151.01	206.52	5,150.99
KAFB-2627	5,367.47	217.64	5,149.83	217.65	5,149.82
ST105-MW05	5,287.57	296.86	4,990.71	296.92	4,990.65
ST105-MW06	5,313.26	235.97	5,077.29	235.64	5,077.62
ST105-MW07	5,311.18	317.59	4,993.59	317.61	4,993.57
ST105-MW08	5,358.94	482.01	4,876.93	482.01	4,876.93
ST105-MW10	5,334.70	444.69	4,890.01	445.71	4,888.99
ST105-MW11	5,422.66	484.03	4,938.63	484.00	4,938.66
ST105-MW12	5,419.90	384.11	5,035.79	383.95	5,035.95
ST105-MW19	5,217.94	353.26	4,864.68	352.00	4,865.94
ST105-MW20	5,383.72	295.20	5,088.52	295.35	5,088.37
ST105-MW21	5,390.90	330.77	5,060.13	330.80	5,060.10
ST105-MW22	5,386.66	468.39	4,918.27	468.55	4,918.11
TA1-W-03	5,454.36	351.58	5,102.78	352.16	5,102.20
TA1-W-06	5,454.36	307.77	5,146.59	307.69	5,146.67
TA1-W-07	5,414.43	286.22	5,128.21	286.01	5,128.42
TA1-W-08	5,434.48	311.13	5,123.35	310.94	5,123.54
TA2-NW1-325	5,417.31	318.37	5,098.94	318.30	5,099.01
TA2-W-01	5,417.32	328.28	5,089.04	328.41	5,088.91
TA2-W-19	5,348.54	271.88	5,076.66	272.01	5,076.53
TA2-W-26	5,373.10	287.17	5,085.93	287.35	5,085.75
TA2-W-27	5,360.18	280.07	5,080.11	280.18	5,080.00
TJA-2	5,349.81	277.27	5,072.54	277.36	5,072.45
TJA-5	5,333.79	269.86	5,063.93	269.45	5,064.34
TJA-7	5,388.60	303.62	5,084.98	303.36	5,085.24

Well	Measuring Point Elevation (ft amsl)	Fall 2014		Spring 2015	
		DTW (ft)	Groundwater Elevation (ft)	DTW (ft)	Groundwater Elevation (ft)
WYO-4	5,389.90	293.05	5,096.85	292.64	5,097.26

amsl – above mean sea level
DTW – depth to water
ft – feet
NM – not measured

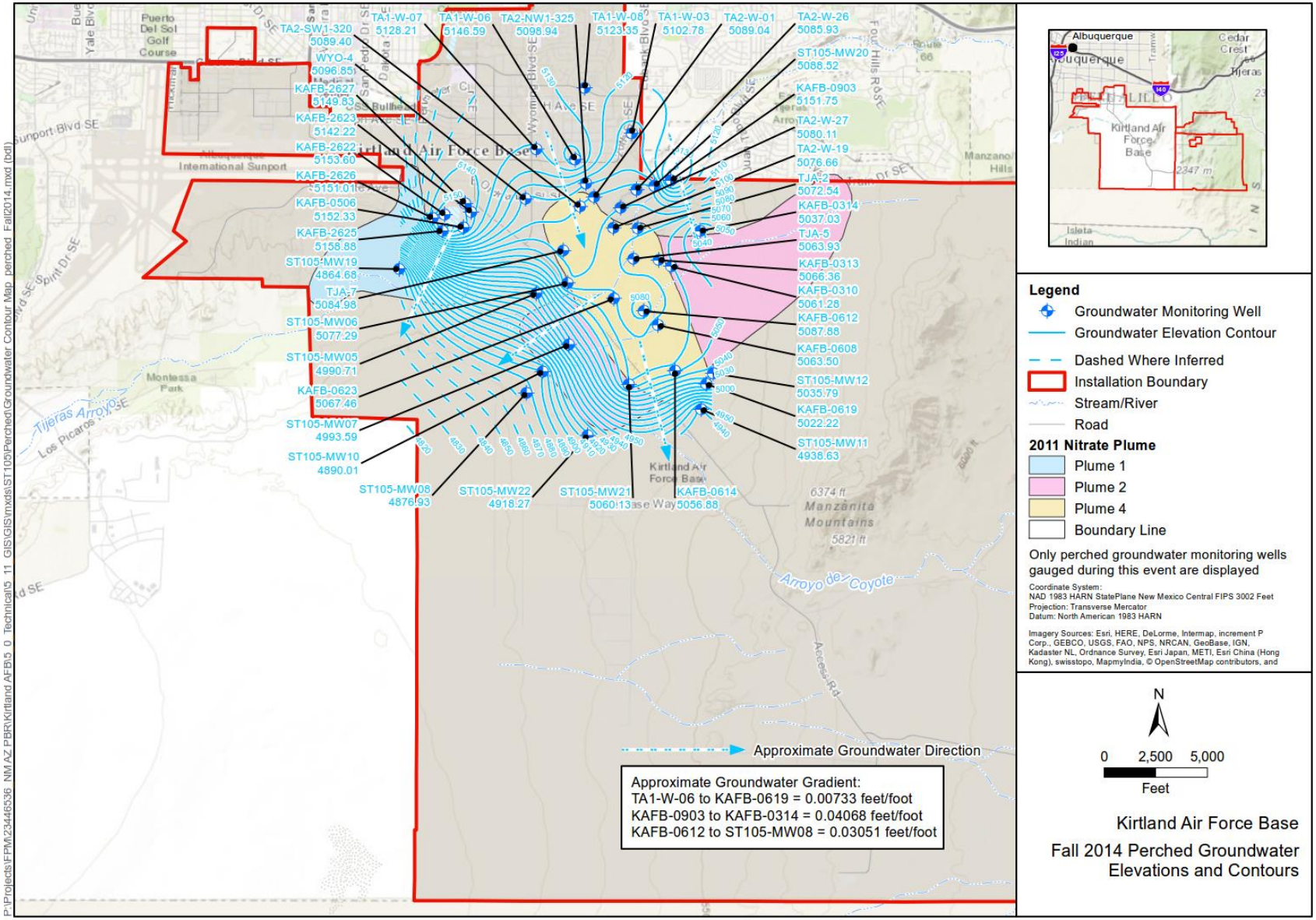

Figure 5-11. ST-105 Perched Aquifer Contour Map – Fall 2014

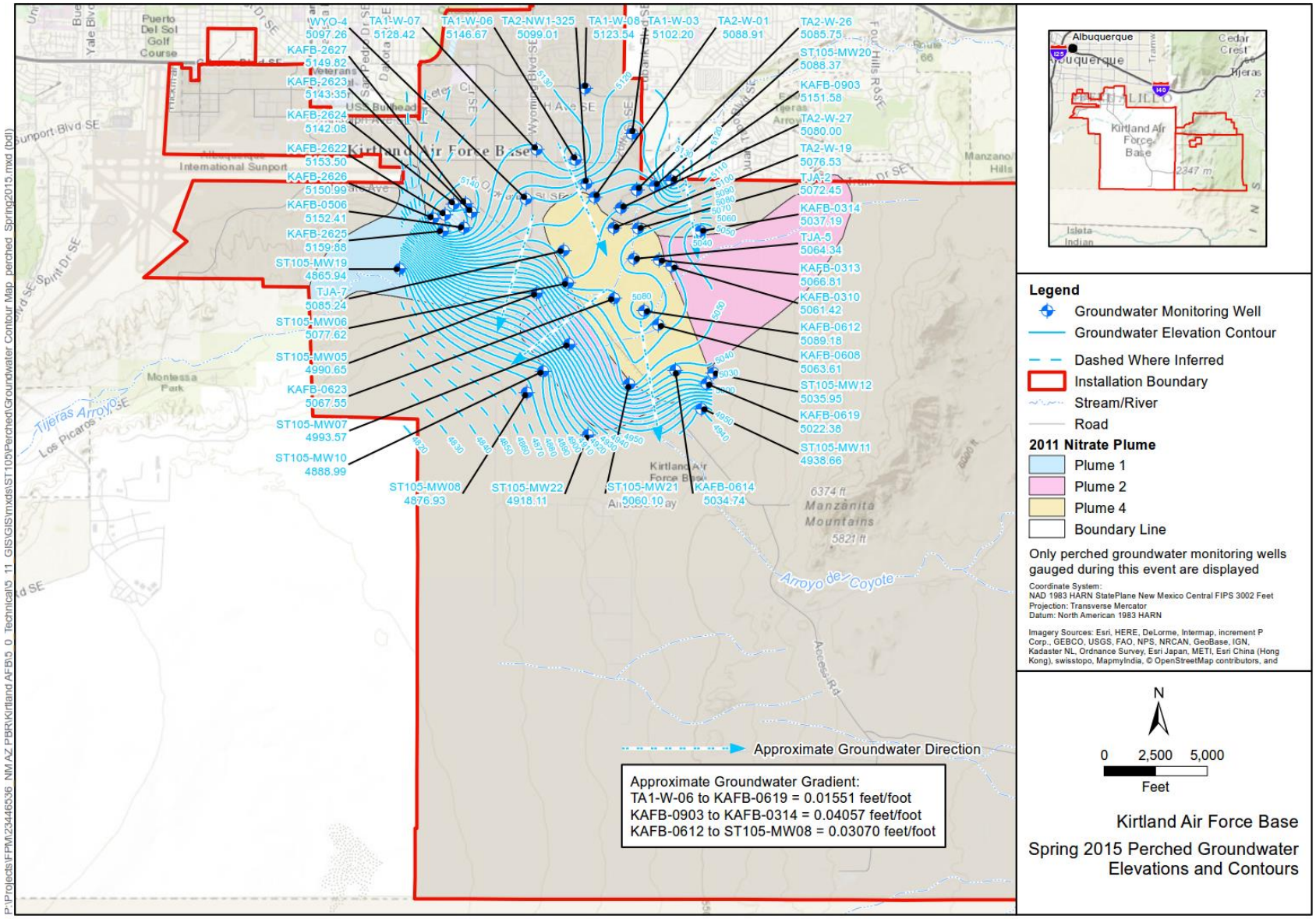

Figure 5-12. ST-105 Perched Aquifer Contour Map – Spring 2015

6.0 GOLF COURSE MAIN POND

Flow from production well KAFB-7; extraction wells KAFB-0602, KAFB-0609, and KAFB-0610; and the golf course production well (KAFB-1598) is monitored on a monthly basis to document the volume of nitrate-impacted groundwater supplied to the GCMP. A groundwater sample was collected from the pond and the results summarized in Table 6-1 and the analytical data tabulated in Table A-3 provided in Appendix A. The analytical laboratory reports are provided in Appendix B.

Table 6-1. Golf Course Main Pond Analytical Summary

Analyte	Units	Concentration	Screening Level	Screening Level Source
Bromide	µg/L	2,300	NE	—
Chloride	µg/L	13,000	250,000	NMAC/NSDWR
Fluoride	µg/L	450	1,600	NMAC
Nitrate-Nitrite (as Nitrogen)	µg/L	2,500	10,000	NMAC/MCL
Sulfate	µg/L	30,000	250,000	NSDWR
Alkalinity	µg/L	110,000	NE	—
Ammonia (as Nitrogen)	µg/L	ND	NE	—
Total Kjeldahl Nitrogen	µg/L	190	NE	—
Total Dissolved Solids	µg/L	190,000	1,000,000	NMAC
Dissolved Organic Carbon	µg/L	1,100	NE	—
Total Organic Carbon	µg/L	2,000	NE	—
Antimony	µg/L	ND	6	MCL
Arsenic	µg/L	0.87	10	MCL
Barium	µg/L	92	1,000	NMAC
Beryllium	µg/L	0.40	4	MCL
Cadmium	µg/L	ND	5	MCL
Chromium	µg/L	2.3	50	NMAC
Copper	µg/L	ND	1,000	NMAC
Cobalt	µg/L	ND	50	NMAC
Lead	µg/L	3.3	15	EPA Action Level
Manganese	µg/L	4.4	200	NMAC
Nickel	µg/L	ND	200	NMAC
Selenium	µg/L	1.6	50	NMAC/MCL
Silver	µg/L	ND	50	NMAC
Thallium	µg/L	ND	2	MCL
Vanadium	µg/L	6.1	63.1	EPA RSL for tapwater
Zinc	µg/L	2.6	10,000	NMAC
Aluminum	µg/L	ND	5,000	NMAC
Boron	µg/L	ND	750	NMAC
Calcium	µg/L	38,000	NE	—
Iron	µg/L	77	1,000	NMAC
Lithium	µg/L	ND	NE	—
Magnesium	µg/L	7,500	NE	—
Potassium	µg/L	2,600	NE	—
Sodium	µg/L	25,000	NE	—

EPA – U.S. Environmental Protection Agency
MCL – maximum contaminant level
µg/L – microgram per liter
NE – none established
ND – non-detect
NMAC – New Mexico Administrative Code
NSDWR – National Secondary Drinking Water Regulation
RSL – regional screening level
TDS – total dissolved solids
Bold text results indicate a concentration that exceeds the regulatory screening level.

As can be seen from review of the analytical data, all constituents are below the applicable regulatory levels of concern.

The abatement option implemented from the Interim Stage 2 Abatement Plan outlines how groundwater pumped from production well KAFB-7 was routed to the GCMP for application to the Tijeras Arroyo Golf Course. Nitrate-impacted groundwater from the regional aquifer is extracted at KAFB-7 and transmitted to the GCMP through an underground pipeline to be used as irrigation water. The objectives of the abatement action are to remove nitrate mass from the regional aquifer and provide partial capture of nitrate in Plume 1 as it migrates towards the downgradient water supply well KAFB-16. The extraction of nitrate-impacted groundwater by well KAFB-7 has resulted in steady or slightly declining groundwater nitrate concentrations in the vicinity of this well. To note, Well KAFB-7 is being converted to use as an injection well for the Kirtland AFB Bulks Fuels Facility groundwater treatment project.

The opportunity exists for more water to be applied to the golf course than is being supplied to the pond by the aforementioned wells because of a difference due to pond storage and an additional potable water connection at the golf course irrigation pump house. If more water is required to maintain the level in the pond than is being provided by the nitrate-impacted wells, water from the potable water connection is used to supplement the water in the pond. The amount of potable water used for irrigation varies based upon system demand, operating pressure, and other variables.

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7.0 FIELD QUALITY CONTROL SAMPLE SUMMARY

This section summarizes the field quality control (QC) samples collected from the site. Field QC samples consisted of field duplicates, equipment blanks, and field blanks.

7.1 FIELD DUPLICATES

Precision was evaluated by measuring the agreement among individual measurements of the same property under similar conditions. Field precision is measured through the collection and analysis of field duplicate samples. A field duplicate is an additional sample collected at the same time from the same location as the normal sample. The field duplicate is intended to represent the same population and is taken through all of the steps of the analytical process in an identical manner to the normal sample. It is used to assess precision of the entire data collection activity, including sampling, analysis, and site heterogeneity.

Duplicate samples were collected simultaneously or in immediate succession to the normal sample, using identical sampling techniques, and were treated in an identical manner during storage, transportation, and analysis. Duplicate samples were collected from regional aquifer wells KAFB-0621, KAFB-1007R, and ST105-MW09 and perched aquifer well KAFB-0623.

Typically, one of four common calculations will be used to assess various measurements for precision. The relative percent difference (RPD) or relative standard deviation is calculated for every analyte for which field or laboratory duplicates exist. The precision of the absolute range can be used when the absolute variation between two measurements is more appropriate. The mean difference is a standard statistical method of assessing the difference between two radioactivity measurements and determining the significance of that difference.

For this sampling event, the RPD is used for two observed values (e.g., field co-located duplicates, laboratory duplicates, and laboratory matrix spike or matrix spike duplicates). The RPD for duplicate samples is calculated as shown in Equation 1.

$$\mathrm{RPD} = \frac{|C_1 - C_2|}{(C_1 + C_2)\mathrm{x}\left(\frac{1}{2}\right)}\mathrm{x}(100\%) \qquad (1)$$

Where:

RPD	=	relative percent difference
C_1	=	larger of the two observed values
C_2	=	smaller of the two observed values

For regional aquifer well KAFB-0621, Table 7-1 summarizes the analytes for which detectable concentrations were obtained and the associated calculated statistical result comparing the two concentrations. The comparison of detectable chemical concentrations was performed by calculating the relative percent difference (RPD) in accordance with Equation 1. For groundwater samples, a resulting RPD of 20 percent (%) or lower indicates acceptable field precision. If the sample or its duplicate are less than the five times the limit of quantitation, and the RPD is greater than 20%, then the relative difference between the sample and its duplicate must be less than two times the limit of quantitation. For total organic carbon, antimony, and arsenic the RPD was greater than 20%; however, the relative difference for each analytical pair was less than five times the limit of quantitation. Based on this criterion, the analytical results for KAFB-0621 demonstrate acceptable precision.

Table 7-1. KAFB-0621 Precision Evaluation

Analyte	Unit	Initial	Duplicate	Δ	RPD	LOQ	5 x LOQ
Bromide	µg/L	400	400	0	0.0%	1,000	5,000
Chloride	µg/L	33,000	32,000	1,000	3.1%	1,000	5,000
Fluoride	µg/L	450	440	10	2.2%	100	500
Nitrate-Nitrite as Nitrogen	µg/L	11,000	11,000	0	0.0%	100	500
Sulfate	µg/L	53,000	53,000	0	0.0%	5,000	25,000
Alkalinity	µg/L	140,000	140,000	0	0.0%	20,000	100,000
Total Dissolved Solids	µg/L	350,000	350,000	0	0.0%	10,000	50,000
Dissolved Organic Carbon	µg/L	2,400	2,200	200	8.7%	1,000	5,000
Total Organic Carbon	µg/L	1,200	970	230	**21.2%**	1,000	5,000
Antimony	µg/L	0.60	0.76	0.16	**23.5%**	2	10
Arsenic	µg/L	1.3	0.44	0.86	**98.9%**	2	10
Barium	µg/L	100	100	0	0.0%	5	25
Chromium	µg/L	1.2	1.1	0.1	8.7%	2	10
Manganese	µg/L	0.80	0.82	0.02	2.5%	5	25
Selenium	µg/L	3.6	3.6	0.0	0.0%	2	10
Vanadium	µg/L	4.1	4.2	0.1	2.4%	5	25
Zinc	µg/L	12	11	1	8.7%	25	125
Boron	µg/L	64	57	7	11.6%	200	1,000
Calcium	µg/L	76,000	76,000	0	0.0%	1,000	5,000
Iron	µg/L	180	200	20	10.5%	100	500
Lithium	µg/L	27	27	0	0.0%	50	250
Magnesium	µg/L	12,000	12,000	0	0.0%	1,000	5,000
Potassium	µg/L	2,100	2,100	0	0.0%	1,000	5,000
Sodium	µg/L	27,000	27,000	0	0.0%	1,000	5,000

µg/L – microgram per liter
RPD – relative percent difference
% – percent

For regional aquifer well KAFB-1007R, Table 7-2 summarizes the analytes which had detectable concentrations. The RPD was calculated for the chemical constituents as prescribed by Equation 1. As with KAFB-0621, acceptable field precision is noted by a RPD being less than 20%. If the sample or its duplicate are less than the five times the limit of quantitation, and the RPD is greater than 20%, then the relative difference between the sample and its duplicate must be less than two times the limit of quantitation. For total organic carbon, beryllium, and iron the RPD was greater than 20%; however, the relative difference for each analytical pair was less than five times the limit of quantitation. Based on this criterion, the analytical results for KAFB-1007R demonstrate acceptable precision.

Table 7-2. KAFB-1007R Precision Evaluation

Analyte	Unit	Initial	Duplicate	Δ	RPD	LOQ	5 x LOQ
Chloride	µg/L	11,000	11,000	0	0.0%	1,000	5,000
Fluoride	µg/L	410	410	0	0.0%	100	500
Nitrate-Nitrite as Nitrogen	µg/L	8,800	8,900	100	1.1%	100	500
Sulfate	µg/L	40,000	40,000	0	0.0%	5,000	25,000
Alkalinity	µg/L	120,000	120,000	0	0.0%	20,000	100,000
Total Dissolved Solids	µg/L	260,000	260,000	0	0.0%	10,000	50,000
Dissolved Organic Carbon	µg/L	110	110	0	0.0%	1,000	5,000
Total Organic Carbon	µg/L	210	130	80	**47.0%**	1,000	5,000
Arsenic	µg/L	1.3	1.3	0.0	0.0%	2	10
Barium	µg/L	83	83	0	0.0%	5	25
Beryllium	µg/L	0.89	0.57	0.32	**43.8%**	2	10
Chromium	µg/L	4.6	4.3	0.3	6.7%	2	10
Manganese	µg/L	1.5	1.6	0.1	6.4%	5	25
Selenium	µg/L	1.4	1.4	0.0	0.0%	2	10
Vanadium	µg/L	9.4	9.3	0.1	1.1%	5	25
Aluminum	µg/L	61	ND	NA	NA	100	500
Boron	µg/L	52	50	2	3.9%	200	1,000
Calcium	µg/L	47,000	47,000	0	0.0%	1,000	5,000
Iron	µg/L	48	66	18	**31.6%**	100	500
Lithium	µg/L	32	31	1	3.1%	50	250
Magnesium	µg/L	11,000	11,000	0	0.0%	1,000	5,000
Potassium	µg/L	3,800	3,800	0	0.0%	1,000	5,000
Sodium	µg/L	22,000	22,000	0	0.0%	1,000	5,000

µg/L – microgram per liter
RPD – relative percent difference
% – percent

For regional aquifer well ST105-MW09, Table 7-3 summarizes the analytes for which detectable concentrations were obtained. The RPD was calculated as provide in Equation 1. As with KAFB-0621, acceptable field precision is noted by a RPD being less than 20%. If the sample or its duplicate are less than the five times the limit of quantitation, and the RPD is greater than 20%, then the relative difference between the sample and its duplicate must be less than two times the limit of quantitation. For dissolved organic carbon, total organic carbon, manganese, and boron, the RPD was greater than 20%; however, the relative difference for each analytical pair was less than five times the limit of quantitation. Based on this criterion, the analytical results for ST105-MW09 demonstrate acceptable precision.

Table 7-3. ST105-MW09 Precision Evaluation

Analyte	Unit	Initial	Duplicate	Δ	RPD	LOQ	5 x LOQ
Bromide	µg/L	830	840	10	1.2%	1,000	5,000
Chloride	µg/L	110,000	110,000	0	0.0%	1,000	5,000
Fluoride	µg/L	280	280	0	0.0%	100	500
Nitrate-Nitrite as Nitrogen	µg/L	10,000	10,000	0	0.0%	100	500
Sulfate	µg/L	100,000	100,000	0	0.0%	5,000	25,000
Alkalinity	µg/L	99,000	100,000	1,000	1.0%	20,000	100,000
Total Dissolved Solids	µg/L	530,000	520,000	10,000	1.9%	10,000	50,000
Dissolved Organic Carbon	µg/L	660	520	140	**23.7%**	1,000	5,000
Total Organic Carbon	µg/L	380	150	230	**86.8%**	1,000	5,000
Arsenic	µg/L	0.47	0.47	0.00	0.0%	2	10
Barium	µg/L	130	130	0	0.0%	5	25
Chromium	µg/L	1.0	1.0	0.0	0.0%	2	10
Manganese	µg/L	0.49	0.35	0.14	**33.3%**	5	25
Selenium	µg/L	12	11	1	8.7%	2	10
Vanadium	µg/L	3.2	3.2	0.0	0.0%	5	25
Boron	µg/L	70	50	20	**33.3%**	200	1,000
Calcium	µg/L	110,000	110,000	0	0.0%	1,000	5,000
Lithium	µg/L	28	26	2	7.4%	50	250
Magnesium	µg/L	18,000	18,000	0	0.0%	1,000	5,000
Potassium	µg/L	2,300	2,300	0	0.0%	1,000	5,000
Sodium	µg/L	28,000	28,000	0	0.0%	1,000	5,000

LOQ – limit of quantitation
µg/L – microgram per liter
RPD – relative percent difference
% – percent
Δ – relative difference

For perched aquifer well KAFB-0623, Table 7-4 summarizes the analytes for which detectable concentrations were obtained. The RPD was calculated as provided in Equation 1. As with KAFB-0621, acceptable field precision is noted by a RPD being less than 20%. If the sample or its duplicate are less than the five times the limit of quantitation, and the RPD is greater than 20%, then the relative difference between the sample and its duplicate must be less than two times the limit of quantitation. For ammonia (as nitrogen), dissolved organic carbon, antimony, arsenic, chromium, manganese, and boron, the RPD was greater than 20%; however, the relative difference for each analytical pair was less than five times the limit of quantitation. Based on this criterion, the analytical results for KAFB-0623 demonstrate acceptable precision.

Table 7-4. KAFB-0623 Precision Evaluation

Analyte	Unit	Initial	Duplicate	Δ	RPD	LOQ	5 x LOQ
Bromide	µg/L	88	91	3		1,000	5,000
Chloride	µg/L	28,000	28,000	0	0.0%	1,000	5,000
Fluoride	µg/L	320	320	0	0.0%	100	500
Nitrate-Nitrite as Nitrogen	µg/L	63,000	63,000	0	0.0%	100	500
Sulfate	µg/L	88,000	88,000	0	0.0%	5,000	25,000
Alkalinity	µg/L	120,000	120,000	0	0.0%	20,000	100,000
Ammonia (as Nitrogen)	µg/L	52	70	18	**29.5%**	250	1,250
Total Dissolved Solids	µg/L	750,000	730,000	20,000	2.7%	10,000	50,000
Dissolved Organic Carbon	µg/L	620	280	340	**75.6%**	1,000	5,000
Antimony	µg/L	0.55	0.78	0.23	**34.6%**	2	10
Arsenic	µg/L	0.70	1.5	0.80	**72.7%**	2	10
Barium	µg/L	93	94	1	1.1%	5	25
Chromium	µg/L	1.6	1.3	0.3	**20.7%**	2	10
Manganese	µg/L	1.2	0.60	0.60	**66.7%**	5	25
Selenium	µg/L	7.3	6.9	0.4	5.6%	2	10
Vanadium	µg/L	4.7	4.5	0.2	4.4%	5	25
Boron	µg/L	16	44	28	**93.3%**	200	1,000
Calcium	µg/L	130,000	130,000	0	0.0%	1,000	5,000
Lithium	µg/L	33	32	1	3.1%	50	250
Magnesium	µg/L	24,000	25,000	1,000	4.1%	1,000	5,000
Potassium	µg/L	2,800	2,800	0	0.0%	1,000	5,000
Sodium	µg/L	25,000	28,000	3,000	11.3%	1,000	5,000

µg/L – microgram per liter
RPD – relative percent difference
% – percent

7.2 EQUIPMENT BLANKS

Three equipment blanks were collected and submitted for laboratory analyses. Table 7-5 summarizes the analytes for which detectable concentrations were obtained. All concentrations are in µg/L.

Table 7-5. Equipment Blank Analytical Summary

Analyte	EB-KAFB-0518-12292014	EB-ST105MW-015-04152015	EB-KAFB-0614-05262015
Total Dissolved Solids	4,000 J	ND	ND T4
Antimony	ND	0.48 J	ND
Arsenic	ND	0.82 J	ND
Chromium	ND	0.88 J	0.63 J
Copper	0.77 J	1.9 J	20
Lead	ND	ND	1.4 J
Manganese	0.65 J	0.72 J	0.50 J

Analyte	EB-KAFB-0518-12292014	EB-ST105MW-015-04152015	EB-KAFB-0614-05262015
Nickel	1.4 J	ND	ND
Silver	0.38 J	ND	ND
Vanadium	ND	0.36 J	0.28 J
Zinc	ND	ND	5.7 J
Boron	110 J	79 J	93 J
Calcium	ND	59 J	ND
Iron	75 J	ND	ND
Magnesium	ND	58 J	ND
Sodium	ND	120 J	120 J
Bromide	ND	ND	100 J
Chloride	370 J	ND	120 J
Sulfate	370 J	ND	ND
Total Organic Carbon	240 J	ND	ND
Dissolved Organic Carbon	ND	2,700	120 J
Ammonia Nitrogen	ND	ND	99 J

ND – non-detect
J - Estimated value below the lowest calibration point. Confidence correlates with concentration.
T4 - Additional method/sampling information: Quantity not sufficient.

The impacted analytical results will be reviewed and flagged appropriately. Overall, the analytical data have already been flagged either by the laboratory or during the method data validation process for issues related to the analytical process. Duplicate flags will not be applied to the analytical results. Interestingly, the total dissolved solids, calcium, magnesium, sodium, chloride, and sulfate results for the field samples are several orders of magnitude higher than the results seen for the equipment blanks. This demonstrates that the overall decontamination process is adequate.

7.3 FIELD BLANKS

Two field blanks were collected and submitted for laboratory analyses. Table 7-6 summarizes the analytes for which detectable concentrations were obtained. All concentrations are in µg/L.

Table 7-6. Field Blank Analytical Summary

Analyte	FB-ST105MW-023-05062015	FB-ST105MW-017-05292015
Total Dissolved Solids	8,000 J	ND T4
Arsenic	0.71 J	1.1 J
Barium	ND	0.68 J
Copper	1.6 J	2.2 J
Lead	ND	0.30 J
Vanadium	0.36 J	0.33 J
Boron	87 J	110 J
Calcium	ND	110 J

Analyte	FB-ST105MW-023-05062015	FB-ST105MW-017-05292015
Magnesium	13 J	ND
Sodium	250 J	110 J
Chloride	180 J	5,700
Fluoride	18 J	51 J
Nitrate/Nitrite	30 J	29 J
Dissolved Organic Carbon	ND	160 J
Ammonia Nitrogen	ND	76 J

ND – non-detect
J – Estimated value below the lowest calibration point. Confidence correlates with concentration.
T4 – Additional method/sampling information: Quantity not sufficient.

The impacted analytical results will be reviewed and flagged appropriately. Overall, the analytical data have already been flagged either by the laboratory or during the method data validation process for issues related to the analytical process. Duplicate flags will not be applied to the analytical results. Interestingly, the total dissolved solids, calcium, magnesium, sodium, chloride, and sulfate results for the field samples are several orders of magnitude higher than the results seen for the field blanks. Given the elevated concentrations seen for some analytes (e.g., chloride), field decontamination procedures will be reviewed and corrective action taken to address the problem.

7.4 REPRESENTATIVENESS

Representativeness is a qualitative term that refers to the degree in which data accurately and precisely depicts the characteristics of a population, whether referring to the distribution of a constituent within a sample, a sample within a matrix, or the distribution of a constituent at a site. Representativeness is determined by employing an appropriate sampling design with consideration of elements such as sampling locations, sample collection methods, and temporal influences.

Because of delays in sample collection, not all of the wells were sampled during the time of year when they have normally been sampled, which had the potential of temporal impacts. However, such influences were not apparent upon examination of the nitrate concentration trend charts presented in Sections 4 and 5. Representativeness was ensured through the use of standard field sampling and analytical procedures.

7.5 COMPARABILITY

Comparability is a qualitative indicator of the confidence with which one data set can be compared to another data set. The objective for this program is to produce data with the greatest possible degree of comparability. The number of matrices that are sampled and the range of field conditions encountered are considered in determining comparability.

Comparability was achieved by using standardized methods for sampling and analysis, reporting data in standard units, normalizing results to standard conditions, and using standard and comprehensive reporting formats. Complete field documentation was accomplished using standardized data collection forms which support the assessment of comparability. Historical comparability of this data set was achieved through consistent use of sampling and analytical methods and standardized documentation procedures based on review of the field logbooks and analytical laboratory reports.

7.6 COMPLETENESS

Completeness is a measure of the amount of valid data obtained compared with the amount that was expected to be obtained under correct, normal conditions. It is calculated for the aggregation of data for each analyte measured for any particular sampling event or other defined set of samples as set out in the specific project quality objectives. Valid data are data which are usable in the context of the project goals. Completeness is calculated and reported for each method, matrix, and analyte combination. The number of valid results divided by the number of possible individual analyte results, expressed as a percentage, determines the completeness of the data set. For completeness requirements, valid results are all results not rejected during the validation process. Completeness should not be determined only on the basis of laboratory data qualifiers. The goal for completeness is 95 % for aqueous samples. Completeness is calculated as shown in Equation 2.

$$\%C = \frac{S_a}{S_t} \text{ x } (100\%) \qquad (2)$$

Where:

%C	=	percent completeness
S_a	=	number of samples for which acceptable data are generated
S_t	=	total number of samples planned for a particular sampling event

For the groundwater monitoring wells sampled during this monitoring event, 100% completeness was achieved.

7.7 SENSITIVITY

Sensitivity is the ability of an analytical method or instrument to discriminate between measurement responses representing different concentrations. This capability is established during the planning phase to meet project-specific objectives. It is important to be able to detect the target analytes at the levels of interest. Sensitivity requirements include the establishment of various limits such as calibration requirements, instrument limits of detection (LODs), and instrument limits of quantitation (LOQs). The project quality assurance/quality control on method requirements was established to be compliant with *U.S. Department of Defense Quality Systems Manual for Environmental Laboratories*, Version 4.2 (Department of Defense [DoD], 2010) as outlined in the *ST-105 – Nitrate Contaminated Groundwater Quality Assurance Project Plan* (USAF, 2014b). Project-specific LODs and LOQs were based on project-specific action level objectives. To note, matrix effects and laboratory limitations may have the potential to raise LOQs from the LOQ goals in the project quality assurance project plan. An evaluation of the LOQs has been performed and any potential implications have been assessed for the sampling event. As shown in the data summary tables provided in Appendix A, the LODs and LOQs were adequate to assess whether any constituents exceeded the applicable regulatory levels.

8.0 DATA VALIDATION PROCEDURES

The objective of data validation is to assess the performance associated with the analysis in order to determine the quality of the data. This was accomplished by evaluating whether the collected data comply with the pre-defined project requirements (including method, procedural, and contractual requirements) and by comparing the collected data with criteria established based on the project data quality objectives. All types of data, including screening data and definitive data, are relevant to the usability assessment. The following requirements are applicable to definitive data only obtained from laboratory analyses of the field samples.

Table 8-1. Data Validation Summary

Matrix	Analytical Group	Validation Procedures	Data Validator
Groundwater	Anions Nitrate-Nitrite Alkalinity Ammonia Total Kjeldahl Nitrogen Dissolved Organic Carbon Total Organic Carbon Metals	• Department of Defense Quality Systems Manual Version 4.2 (DoD, 2010) • *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review* (EPA, 2010) • *USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (EPA, 2008)	Project Chemist, Quality Assurance Manager
DoD – Department of Defense EPA – U.S. Environmental Protection Agency			

All laboratory analytical data underwent Stage 2A Verification and Validation Checks as defined in the *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (EPA, 2009). Stage 2A expands beyond the basic data verification requirements to address the verification and validation checks for the compliance of sample-related QC, including method blanks, surrogate recoveries, deuterated monitoring compound recoveries, laboratory control sample recoveries, duplicate analyses, matrix spike and matrix spike duplicate recoveries, serial dilutions, post-digestion spikes, and standard reference material traceability. In addition, sample holding times are evaluated and the frequency of QC samples is checked for appropriateness. The validation reports are provided in Appendix C.

The following data qualifiers were applied during data validation. Potential impacts on project-specific data quality objectives are discussed in the data validation report.

U The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte 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 numerical value represents its approximate concentration.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit 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 sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. The presence or absence of the analyte cannot be verified.

9.0 EVALUATION AND RECOMMENDATIONS

The following sections provide the evaluation of the ST-105 groundwater associated with the nitrate impacts and recommendations for continued monitoring in support of the on-going evaluation associated with the impacts of nitrate to groundwater.

9.1 NITRATE EVALUATION

As discussed in Section 4, nitrate concentrations and associated trends vary depending on location within the plumes, as well as groundwater elevations.

9.1.1 Regional Aquifer Plume 1

For the wells associated with Regional Aquifer Plume 1, the overall nitrate concentration trend appears to be decreasing with the exception of the notable spike associated with well KAFB-0517. The overall decline in nitrate concentrations is promising and may be indicative that any remaining source in the vadose zone contributing to the nitrate impacts on the regional aquifer may be decreasing.

Figure 9-1 provides an isoconcentration contour map for the regional aquifer based on the FY 2015 nitrate analytical data. As can be seen from the map, it appears that Plume 1 may have migrated to the south. It was noted in the conclusions provided in the *Stage 2 Abatement Program for Nitrate-Contaminated Groundwater (Site ST-105) Fifth Annual Groundwater Monitoring Report* (USAF, 2012) that increasing nitrate concentrations in well KAFB-0510 were a cause for concern with regard to potential impacts on production well KAFB-16. The nitrate concentration trend for this well appears to have reversed and has demonstrated a decreasing trend since 2010.

The groundwater elevations for the wells associated with Plume 1 have been increasing over time. For some wells, there may be a correlation between the groundwater elevation and the nitrate concentration, but for many of the wells, a correlation is not apparent. Both the groundwater elevation and nitrate concentrations will continue to be monitored and potential trends and correlation between elevation and concentration evaluated as additional data are collected.

9.1.2 Regional Aquifer Plume 2

For the wells associated with Regional Aquifer Plume 2, there is not an apparent overall trend in nitrate concentrations. The nitrate concentrations for the wells are fairly consistent falling within the analytical error of the laboratory analytical method employed.

The groundwater elevations show a mix of increasing, decreasing, and consistent trends depending on location. Overall, there is no apparent correlation between groundwater elevation and nitrate concentration, although data well KAFB-0621 perhaps shows a slight correlation between the two. As with Plume 1, monitoring will be continued and further evaluation of potential trends and correlation between elevation and concentration performed as additional data are collected.

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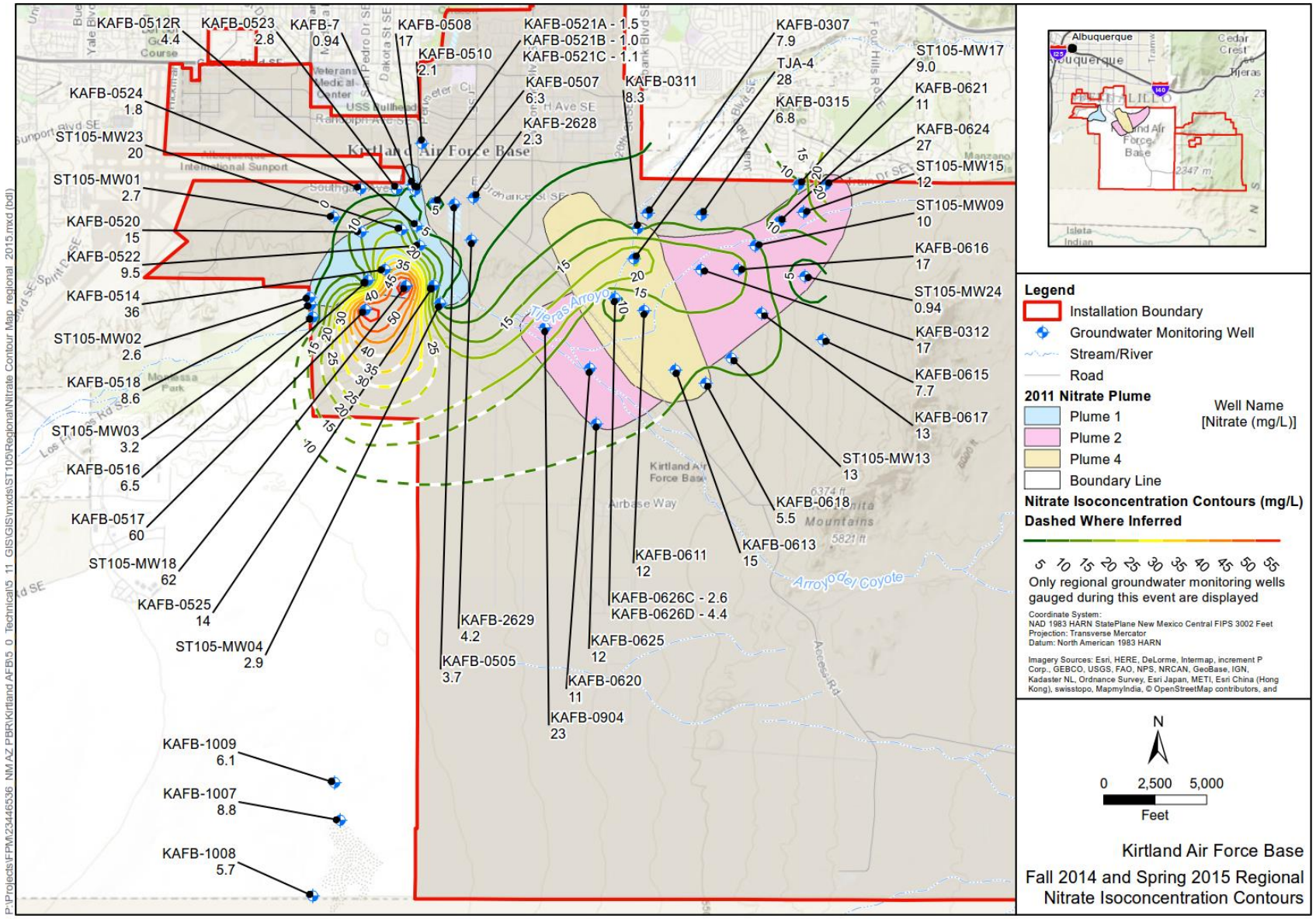

Figure 9-1. Regional Aquifer Nitrate Isoconcentration Contours – FY 2015

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9.1.3 McCormick Ranch

For the wells associated with McCormick Ranch located at the southwestern corner of Kirtland AFB, the nitrate concentrations appear to be fairly consistent with the nitrate concentration for the sample collected from well KAFB-1007 being slightly below the 10 mg/L regulatory level and those obtained from well KAFB-1008 remaining below. The groundwater elevation trend is decreasing, with no correlation between elevation and concentration.

9.1.4 Perched Aquifer Plume

For the perched aquifer plume, nitrate concentrations in the central to northeastern portion of the plume demonstrate an increasing trend; whereas, the nitrate concentrations for wells elsewhere in the plume appear to be fairly consistent over time. The groundwater elevations in the northern portion of the plume appear to be decreasing with those in the southern portion of plume increasing. There does not appear to be a strong indication of any correlation between nitrate concentrations and groundwater elevation.

Figure 9-2 provides an isoconcentration contour map for the perched aquifer based on the FY 2015 nitrate analytical data. Because of the limited data, adequate control is not available upon which the contours can be based on the western portion of the plume. The contours for the eastern portion of the plume are in fairly good agreement with the 2011 nitrate plume map. The addition of new monitoring wells to the network have allowed for better refinement of the nitrate contours.

9.2 EVALUATION OF THE SOURCE OF NITRATE AND ANIONIC COMPOUNDS

Compound specific isotope analysis (CSIA) and inorganic anion chemicals were analyzed in groundwater samples from the KAFB site ST-105 monitoring well network for samples collected between December 2014 and June 2015. This section provides a summary of the analyses that were conducted and interpretation of sampling results in the context of potential sources of nitrate and other elevated anionic compounds in groundwater at ST-105. A review of previous sampling for pharmaceuticals and personal care products (PPCP) is also provided.

The MCL and the New Mexico Water Quality Control Commission (NMWQCC) standard for nitrate in groundwater is 10 mg/L (as N). The SNL/KAFB Background Concentrations Report determined a 95% Upper Tolerance Limit (UTL) background concentration of 6 mg/L for nitrate in groundwater. Following review of the SNL/KAFB report, NMED approved a reduced nitrate background 95% UTL concentration of 4 mg/L (NMED, 1997).

9.2.1 Compound-Specific Isotope Analysis

CSIA is an analytical method that measures the ratios of naturally occurring stable isotopes in environmental samples. Nitrate is comprised of nitrogen and oxygen, each of which exists in nature in differing ratios of their stable isotopes. Nitrogen occurs in stable isotopes of ^{14}N and ^{15}N, and oxygen in the stable isotopes of ^{16}O, ^{17}O, and ^{18}O, where the numbers (e.g., 14 or 15) refer to the atomic mass of the stable isotopes. In ambient air, ^{14}N comprises about 99.636% of stable nitrogen, with the remainder in the heavier isotope of ^{15}N (Junk and Svec, 1958), providing a constant ratio of $(^{15}N/^{14}N)_{air} = 1/272$. This ratio of isotopes in air is used as the common reference value to which isotopic ratios of nitrogen from other sources can be compared, and reported as $\delta^{15}N$or “delta ^{15}N,” also referred to as “fractionation”. These isotopic ratios, in reference to the change (or delta) from that of the ratios in air, are commonly reported in parts per thousand (or per mil), with the symbol ‰, in accordance with the following equation (Kendall, 1998):

$$\delta^{15}N(‰) = \{[(^{15}N/^{14}N)_{sample} / (^{15}N/^{14}N)_{air}]-1\}*1000$$

Nitrification, the oxidation of ammonium ions to nitrite and then nitrate ions, incorporates oxygen from air and/or water. For oxygen, stable isotopic ratios of $^{18}O/^{16}O$ or $^{17}O/^{16}O$ are referred to as $\delta^{18}O$ and $\delta^{17}O$, respectively, when compared to their reference values. In CSIA, the $\delta^{18}O$ fraction is typically used and represents the "delta" from the analyzed sample to that of the$^{18}O/^{16}O$ ratio in the reference substance, i.e., the Vienna Standard Mean Ocean Water (VSMOW), which is representative of deep offshore ocean water comprised of approximately 0.2% ^{18}O by mass. As describe below, nitrate isotopic forensic analysis of groundwater can include consideration of just stable nitrogen isotopes, or can consider isotopic fractions for both oxygen and nitrogen, the dual isotope method.

Within the nitrogen cycle, biologically mediated reactions (e.g. assimilation, nitrification, and denitrification) nearly always result in enrichment of the heavier isotope (^{15}N) in the substrate (reactant) and enrichment of the lighter, ^{14}N in the product (USGS, 2004). Thus, depending on where nitrogen currently resides in the overall cycle, and the biotic and abiotic processes it has undergone, its ratio of stable isotopes at a given time can be used to draw inferences as to its origin. Sources of anthropogenic nitrate contamination in groundwater include septic systems, sanitary sewage effluent releases, domestic animal wastes, nitrogen fertilizers, explosives and pyrotechnics (flares, torches, munitions) (Motzer, 2006). Natural sources of nitrate in groundwater have also been identified, and include desert-derived deposits, caliche and playa lake evaporate deposits, and desert vadose zone soils (Motzer, 2006). Like nitrogen, the stable isotopic ratios of oxygen in nitrate can provide additional insight into the origin of the oxygen incorporated during nitrate reactions. Dual isotopic analysis of nitrate considers isotopic ratios of both nitrogen and oxygen and can be more informative when there is a range or overlap of possible sources of this compound.

Groundwater samples were collected from 72 site ST-105 monitoring wells during multiple field mobilizations between January and June of 2015 and analyzed for nitrate (EPA 353.2 method), $^{15}N/^{14}N$ and $^{18}O/^{16}O$ (Continuous Flow-Isotope Ratio Mass Spectrometric method). Table 9-1 lists the sample dates and the nitrate and isotopic fractionation results for each sample. Figure 9-3 shows the relationship between nitrate concentrations (nitrate reported as nitrogen) and the $\delta^{15}N$ fractionation in the groundwater samples. The average $\delta^{15}N$ value for the site is 6.31‰. As described above, this represents an increase of 6.31 parts per thousand between the groundwater sample average and the "air" reference ratio of ^{15}N to ^{14}N. Additionally, Figure 9-3 illustrates that $\delta^{15}N$ levels are grouped closer, slightly below the site average at higher nitrate concentrations, with a slight general increase in $\delta^{15}N$ fractionation at lower nitrate concentrations. This could be indicative of increased ^{15}N fractionation due to denitrification (or degradation by bacteria) over time, meaning that the lower nitrate concentrations with the higher ^{15}N fractionation could have resulted from natural attenuation of nitrate (denitrification), however, additional lines of evidence, as described below, are not consistent with the occurrence of widespread denitrification in the plumes.

Figure 9-4 illustrates the dual isotopic data for nitrate nitrogen and oxygen in the ST-105 samples compared to identified ranges of isotopic fractionations based on nitrate origin materials (Motzer, 2006). The plot shown in Figure 9-4 indicates a terrestrial source of nitrate nitrogen (soil nitrogen and/or manure or septic waste) that has undergone nitrification. Soil nitrogen, as indicated in this plot, represents organic nitrogen (i.e., fixed by plants or microbes) which mineralizes to ammonium and then is nitrified to nitrate in the groundwater. The isotopic fractionation data are all fairly tightly grouped, despite a relatively large range of nitrate concentrations (i.e., from 0.94 mg/L to 62 mg/L), which would indicate a common source of nitrate, with the possible exception of three samples (collected on March 18, 2015) that could indicate additional nitrogen and oxygen fractionation attributable to denitrification. It is further noted that these three samples were taken from a single well (KAFB-0521) at shallow, mid and deep screened intervals,

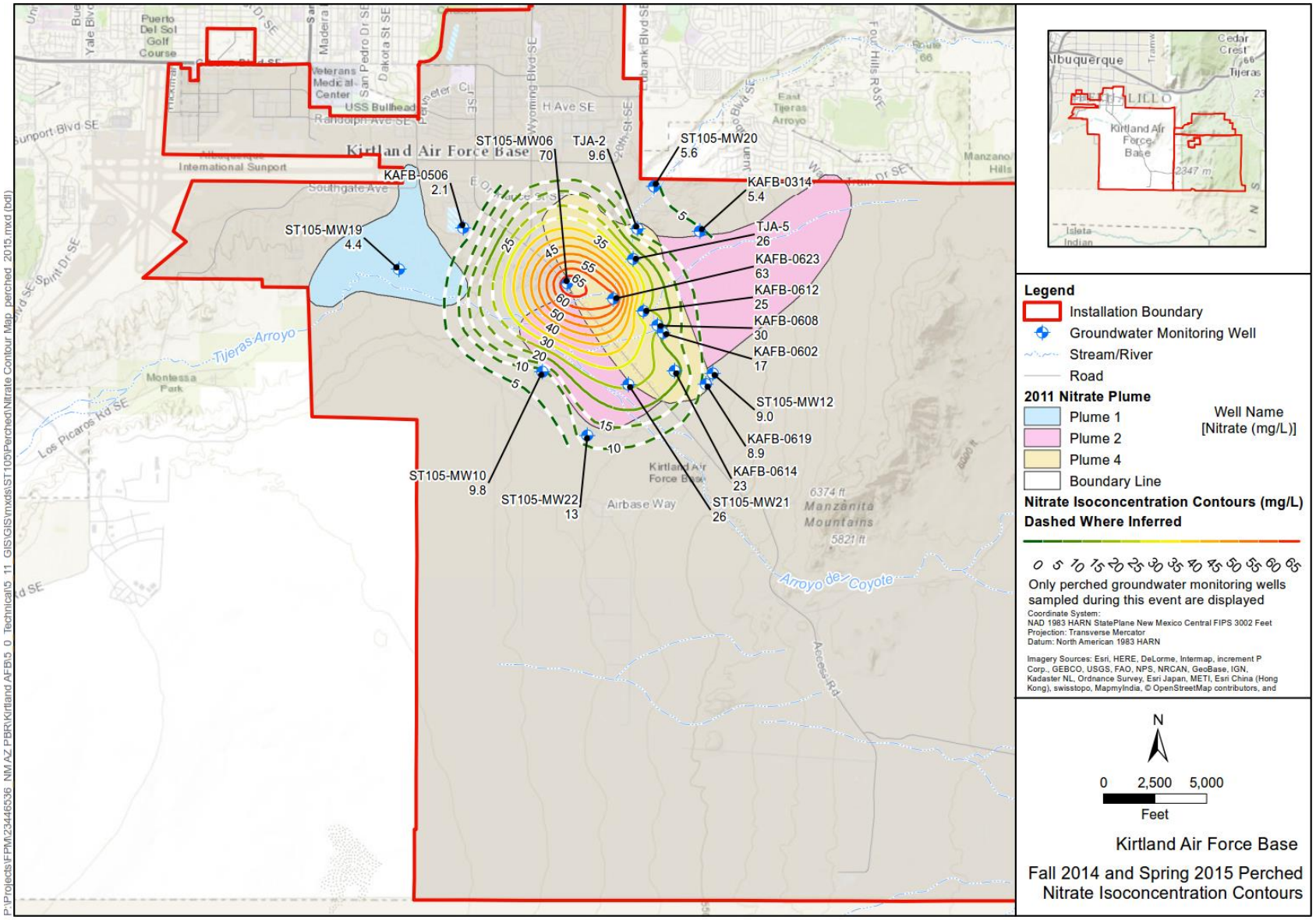

Figure 9-2. Perched Aquifer Nitrate Isoconcentration Contours – FY 2015

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Table 9-1. ST-105 Analytical Summary

Sample ID	Sample Date	Nitrate (mg/L)	$\delta^{15}N$	$\delta^{18}O$	Bromide (mg/L)*	Chloride (mg/L)	Fluoride (mg/L)	Ammonia (mg/L)	TKN (mg/L)	TDS (mg/L)	Sample Source	Chloride/Bromide Ratio
KAFB-0314-05062015	5/6/2015	5.4	6.34	-0.6	ND	120	0.27	ND	ND	690	Perched	
KAFB-0506-01222015	1/22/2015	2.1	5.51	-0.94	2.2	68	0.29	ND	ND	730	Perched	30.9
KAFB-0602-06012015	6/12/2015	17	5.86	5.01	0.36	38	0.41	0.081	ND	410	Perched	105.6
KAFB-0608-05282015	5/28/2015	30	6.09	4.16	0.34	33	0.38	0.088	ND	500	Perched	97.1
KAFB-0612-04132015	4/13/2015	25	6.33	1.73	0.38	22	0.33	ND	ND	520	Perched	57.9
KAFB-0614-05262015	5/26/2015	23	5.89	5.39	0.29	25	0.40	0.087	ND	390	Perched	86.2
KAFB-0619-04232015	4/23/2015	8.9	5.99	2.74	ND	12	0.38	0.058	ND	280	Perched	
KAFB-0623-05112015	5/11/2015	63	5.66	4.92	0.088	28	0.32	0.052	ND	750	Perched	318.2
ST105MW006-01082015	1/8/2015	70	7.74	5.79	0.20	35	0.23	0.045	ND	680	Perched	175.0
ST105MW010-12162014	12/16/2014	9.8	5.92	4.6	2.9	17	0.31	ND	ND	350	Perched	5.9
ST105MW012-01072015	1/7/2015	9	7.02	3.1	ND	11	0.40	ND	ND	280	Perched	
ST105MW-19-05112015	5/11/2015	4.4	5.66	3.26	ND	7.4	0.43	0.075	ND	230	Perched	
ST105MW-20-05132015	5/13/2015	5.6	7.89	1.25	0.28	55	0.20	0.078	ND	500	Perched	196.4
ST105MW-021-05212015	5/21/2015	26	5.84	5.64	0.38	32	0.40	0.099	ND	460	Perched	84.2
ST105MW-022-06022015	6/22/2015	13	5.65	5.21	ND	22	0.46	0.077	ND	390	Perched	
TJA-2-04202015	4/20/2015	9.6	6.28	3.35	0.30	67	0.28	ND	ND	420	Perched	223.3
TJA-5-05272015	5/27/2015	26	5.81	6.19	0.32	28	0.34	0.100	ND	460	Perched	87.5
GC-MP-12162014	12/16/2014	2.5	7.74	4.82	2.3	13	0.45	ND	0.19	190	Pond	5.7
KAFB-7-12112014	12/11/2014	0.94	5.92	-0.22	0.54	12	0.48	nd	ND	190	Regional	22.2
KAFB-0307-05052015	5/5/2015	7.9	5.62	2.95	0.37	61	0.35	nd	ND	380	Regional	164.9
KAFB-0311-04172015	4/17/2015	8.3	5.61	3.56	0.26	20	0.46	ND	ND	230	Regional	76.9

Sample ID	Sample Date	Nitrate (mg/L)	$\delta^{15}N$	$\delta^{18}O$	Bromide (mg/L)*	Chloride (mg/L)	Fluoride (mg/L)	Ammonia (mg/L)	TKN (mg/L)	TDS (mg/L)	Sample Source	Chloride/Bromide Ratio
KAFB-0312-04162015	4/16/2015	17	6.24	5.34	0.28	20	0.41	ND	ND	320	Regional	71.4
KAFB-0315-05072015	5/7/2015	6.8	5.83	2	0.28	68	0.23	nd	0.084	450	Regional	242.9
KAFB-0505-01212015	1/21/2015	3.7	6.4	4.12	2.8	14	0.35	ND	ND	370	Regional	5.0
KAFB-0507R-01132015	1/13/2015	6.3	6.28	4.15	ND	14	0.24	ND	ND	390	Regional	
KAFB-0508-01092015	1/9/2015	17	6.31	4.28	ND	12	0.35	0.15	ND	290	Regional	
KAFB-0510-12152014	12/15/2014	2.1	6.27	3.16	2.4	14	0.47	ND	ND	200	Regional	5.8
KAFB-512R-01082015	1/8/2015	4.4	7.29	3.83	ND	8.7	0.29	0.11	0.04	250	Regional	
KAFB-0514-01142015	1/14/2015	36	6.11	3.53	ND	18	0.32	ND	ND	480	Regional	
KAFB-0516-01142015	1/14/2015	6.5	5.99	4.12	ND	11	0.35	ND	0.089	240	Regional	
KAFB-0517-12142014	12/14/2014	60	5.78	4.74	2.0	17	0.32	0.074	ND	570	Regional	8.5
KAFB-0518-01062015	1/6/2015	8.6	5.72	5.27	2.2	8.2	0.40	ND	ND	240	Regional	3.7
KAFB-0520-01092015	1/9/2015	15	5.97	5.44	ND	14	0.29	0.22	ND	300	Regional	
KAFB-0521A-03052015	3/5/2015	1.5	10.16	7.66	ND	10	0.50	2.0	3.1	250	Regional	
KAFB-0521B-03052015	3/5/2015	1	15.22	8.03	ND	6.1	0.55	ND	0.16	210	Regional	
KAFB-0521C-03052015	3/5/2015	1.1	9.71	3.31	ND	6.8	0.46	0.42	0.98	210	Regional	
KAFB-0522-01132015	1/13/2015	9.5	6.33	4.26	ND	12	0.24	0.048	ND	350	Regional	
KAFB-0523-01122015	1/12/2015	2.8	6.22	3.72	ND	7.1	0.34	ND	ND	200	Regional	
KAFB-0524-12112014	12/11/2014	1.8	6.02	4.28	0.52	8.2	0.36	ND	ND	200	Regional	15.8
KAFB-0525-01142015	1/14/2015	14	6.8	5.33	ND	18	0.29	ND	ND	430	Regional	
KAFB-0611-04132015	4/13/2015	12	7.54	7.96	ND	7.8	0.59	ND	ND	320	Regional	
KAFB-0613-06012015	6/12/2015	15	5.76	4.41	ND	19	0.46	0.080	ND	380	Regional	
KAFB-0615-05132015	5/13/2015	7.7	5.92	2.71	ND	57	2.1	0.081	ND	680	Regional	
KAFB-0616-05202015	5/20/2015	17	5.92	5.02	0.61	57	0.46	0.100	ND	470	Regional	93.4

Sample ID	Sample Date	Nitrate (mg/L)	$\delta^{15}N$	$\delta^{18}O$	Bromide (mg/L)*	Chloride (mg/L)	Fluoride (mg/L)	Ammonia (mg/L)	TKN (mg/L)	TDS (mg/L)	Sample Source	Chloride/Bromide Ratio
KAFB-0617-05192015	5/19/2015	13	5.56	4.1	0.12	16	0.52	0.077	ND	300	Regional	133.3
KAFB-0618-04232015	4/23/2015	5.5	6.24	3.53	ND	8.2	0.49	0.100	ND	1200	Regional	
KAFB-0620-04142015	4/14/2015	11	5.97	4.8	ND	17	0.43	ND	ND	360	Regional	
KAFB-0621-04142015	4/14/2015	11	5.82	4.73	0.40	33	0.45	ND	ND	350	Regional	82.5
KAFB-0624-04232015	4/23/2015	27	6.3	5.62	0.14	26	0.31	ND	ND	290	Regional	185.7
KAFB-0625-06022015	6/22/2015	12	5.87	4.87	ND	20	0.42	0.075	ND	380	Regional	
KAFB-0626A-03052015	3/5/2015	7.9	5.49	2.23	0.25	14	0.45	ND	0.13	310	Regional	56.0
KAFB-0626B-03052015	3/5/2015	7.9	6.03	2.8	0.27	15	0.41	ND	ND	320	Regional	55.6
KAFB-0626C-03052015	3/5/2015	2.6	6.28	1.28	ND	13	0.48	ND	0.58	280	Regional	
KAFB-0626D-03052015	3/5/2015	4.4	5.16	-0.09	ND	9.5	0.49	ND	0.44	260	Regional	
KAFB-0904-04202015	4/20/2015	23	5.84	3.89	ND	14	0.38	ND	ND	380	Regional	
KAFB-1007R-01152015	1/15/2015	8.8	6.15	4.68	ND	11	0.41	ND	ND	260	Regional	
KAFB-1008-01192015	1/19/2015	5.7	5.72	3.57	ND	8.3	0.42	0.039	8.5	240	Regional	
KAFB-1009-01152015	1/15/2015	6.1	5.88	4.42	ND	13	0.64	ND	ND	270	Regional	
KAFB-2628-05182015	5/18/2015	2.3	5.92	2.57	ND	17	0.39	0.075	200	350	Regional	
KAFB-2629-05182015	5/18/2015	4.2	5.55	3.27	0.10	17	0.44	0.078	ND	360	Regional	170.0
ST105MW001-12112014	12/11/2014	2.7	2.88	-2.7	0.54	13	0.26	ND	ND	280	Regional	24.1
ST105MW002-01062015	1/6/2015	2.6	6.3	5.01	ND	7.3	0.42	ND	ND	210	Regional	
ST105MW003-01272015	1/27/2015	3.2	6.31	5.81	ND	7.4	0.42	0.058	ND	200	Regional	
ST105MW004-12152014	12/15/2014	2.9	6.46	3.01	3.0	16	0.34	ND	ND	370	Regional	5.3
ST105MW009-01082015	1/8/2015	10	6.77	3.29	0.83	110	0.28	ND	ND	530	Regional	132.5
ST105MW013-01062015	1/6/2015	13	6.5	4.74	0.28	19	0.40	ND	0.12	330	Regional	67.9
ST105MW-015-04152015	4/15/2015	12	6.7	5.48	0.28	22	0.42	ND	ND	400	Regional	78.6

Sample ID	Sample Date	Nitrate (mg/L)	$\delta^{15}N$	$\delta^{18}O$	Bromide (mg/L)*	Chloride (mg/L)	Fluoride (mg/L)	Ammonia (mg/L)	TKN (mg/L)	TDS (mg/L)	Sample Source	Chloride/Bromide Ratio
ST105MW-017-05292015	5/29/2015	9	5.67	3.84	0.18	23	0.39	0.075	ND	320	Regional	127.8
ST105MW-018-05272015	5/27/2015	62	5.9	4.78	0.34	18	0.30	0.097	ND	710	Regional	52.9
ST105MW-023-05062015	5/6/2015	20	5.22	4.25	0.11	17	0.36	ND	ND	320	Regional	154.5
ST105MW-24-05132015	5/13/2015	0.94	6.82	3.81	0.15	61	2.1	0.090	ND	600	Regional	406.7
TJA-4-05282015	5/28/2015	28	5.2	5.14	0.27	27	0.4	0.088	ND	400	Regional	100.0

mg/L – milligrams per liter
ND – non-detect
TDS – total dissolved solids
TKN – total Kjeldahl nitrogen

and that the associated nitrate concentrations in this well range from 1.0 to 1.5 mg/L, below the NMWQCC and MCL standards (10 mg/L) for nitrate (as N).

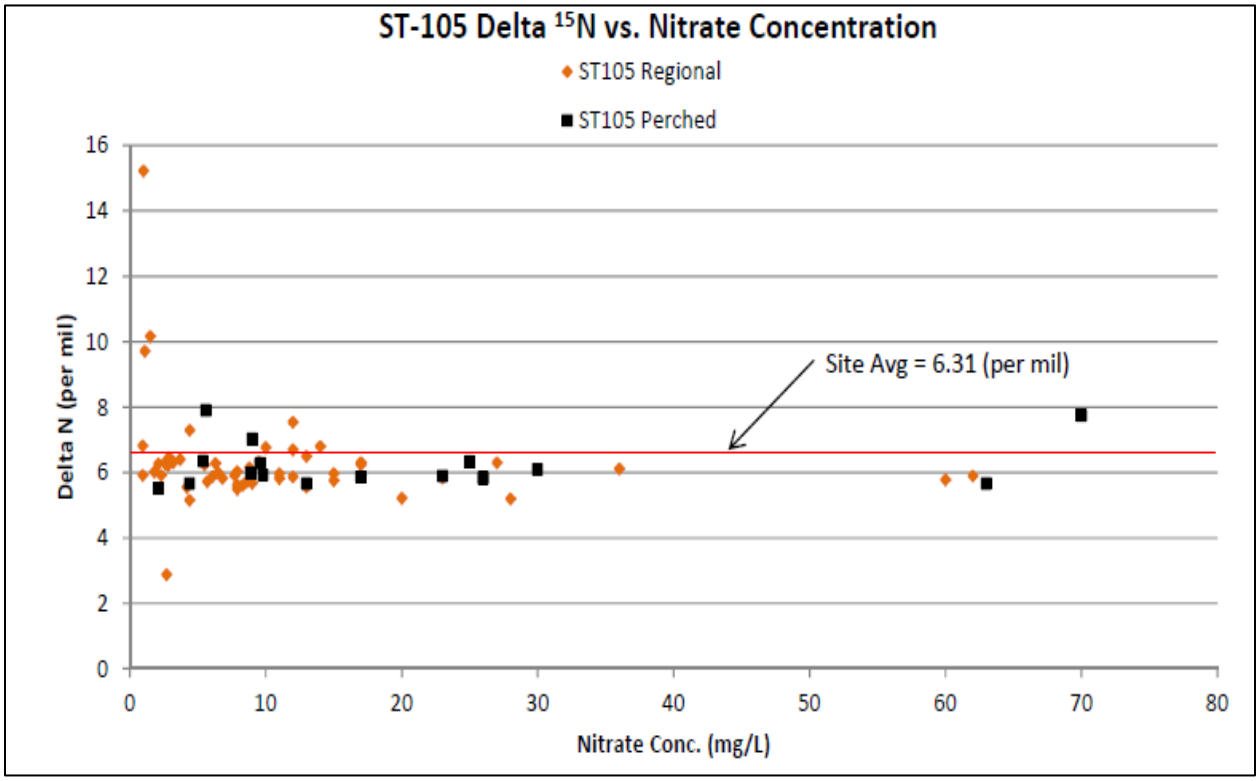

Figure 9-3. ST-105 Delta ^{15}N versus Nitrate Concentration

The dual isotope plot shown in Figure 9-5 is based on Motzer, 2006. The samples are grouped (marker style and color) based on their shipment date to the analytical laboratory.

9.2.2 Summary of Anion and Other Sampling Results at ST-105

The groundwater sampling data from the 2014/2015 sampling events for ST-105 were reviewed with respect to nitrate, bromide, chloride, fluoride, ammonia, TKN and TDS concentrations. The results of the sampling are tabulated in Table 9-1.

Elevated TDS and chloride concentrations have been linked to domestic sewage impacts in groundwater (USGS, 2009). In particular, chloride is a useful indicator parameter for septic waste due to its non-reactive (conservative) nature in groundwater and ubiquitous occurrence in septic waste streams (McQuallan 2004). Figure 9-5 shows the plot of TDS vs. nitrate for the ST-105 groundwater samples. As shown in Figure 9-5, there appears to be a weak correlation between TDS and nitrate concentrations (R2 = 0.1333 regional and R2 = .2511 perched), and with removal of the single 1,200 mg/L TDS outlier, R2 = 0.337 for samples from the regional aquifer. It is suspected that the single high value of TDS (1,200 mg/L, from well KAFB-0618) may represent an errant value since the previously measured TDS for this well (March, 2014) was 279 mg/L. Thus, a reasonable inference is that source water at elevated nitrate and TDS levels is impacting groundwater at ST-105.

Based on the chloride concentration data, there is no apparent relationship between chloride levels and nitrate levels in either the perched or regional ST-105 monitoring wells.

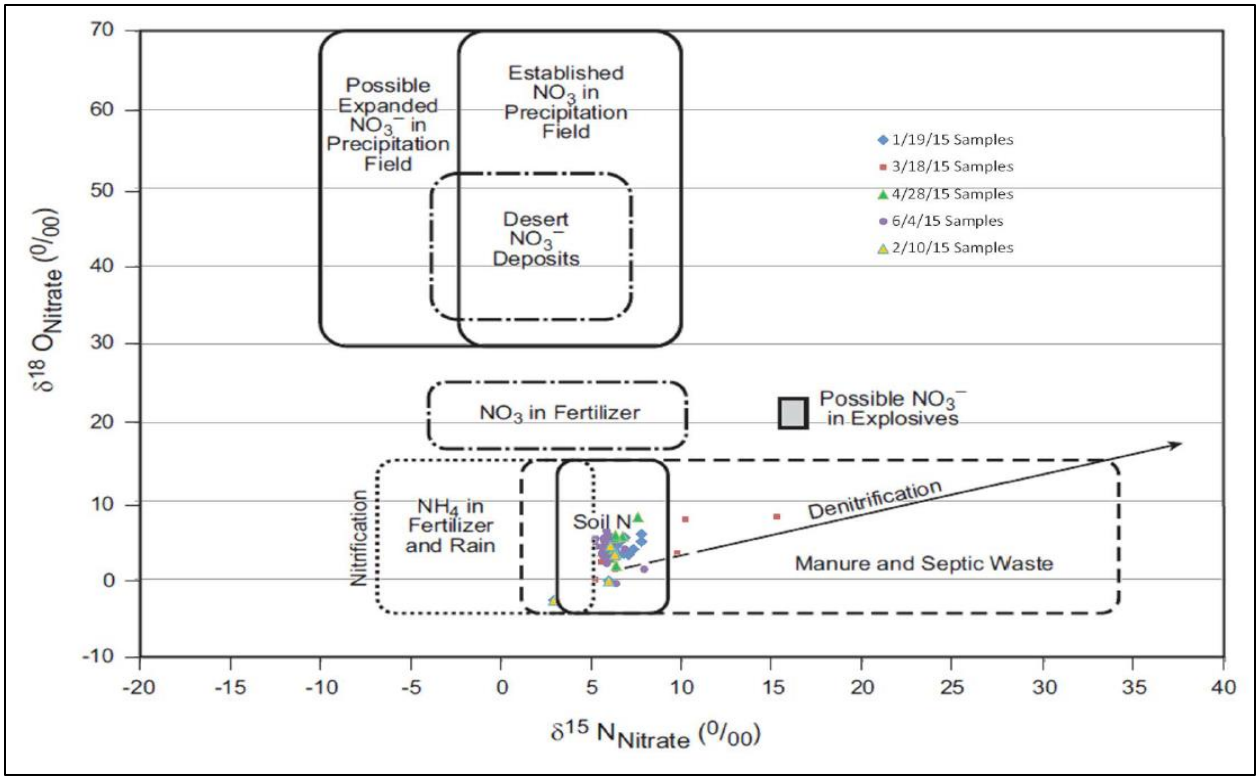

Figure 9-4. Dual-Isotope Plot for ST-105 Groundwater Samples

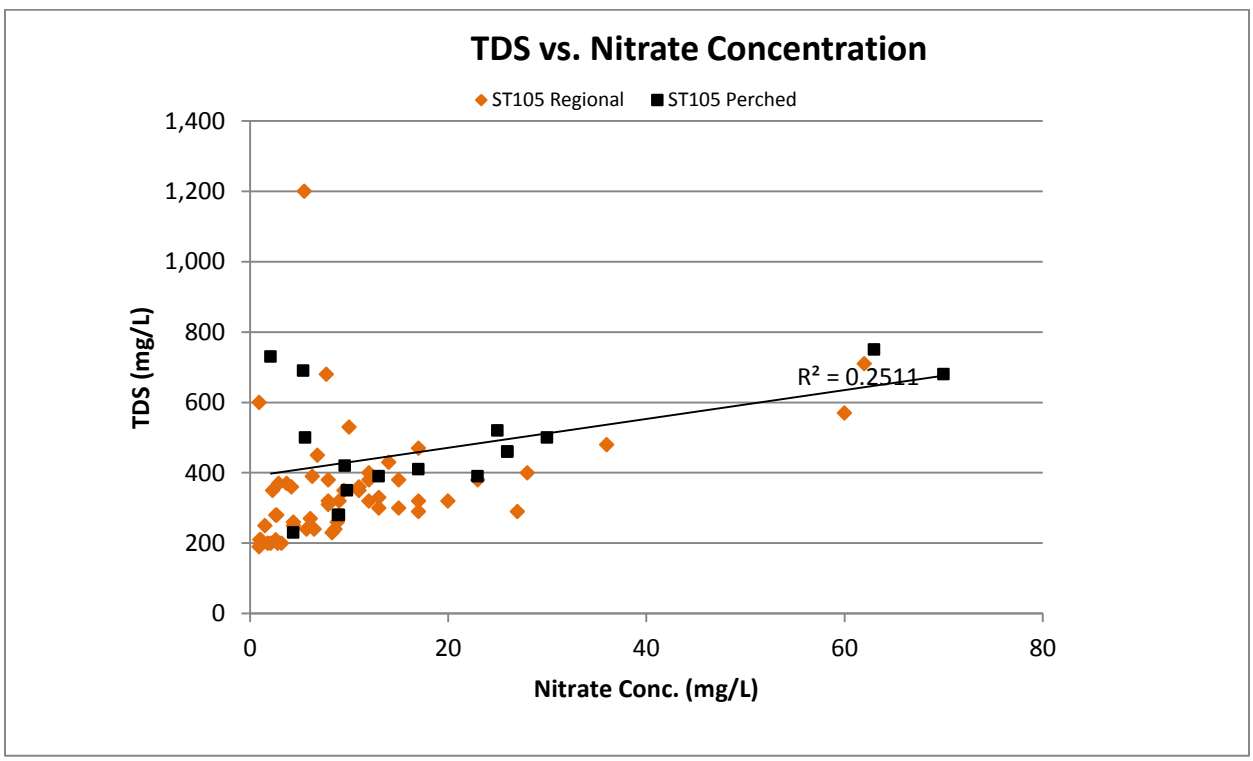

Figure 9-5. Total Dissolved Solids versus Nitrate Concentration

McQuillan (2004) developed relationships between chloride and nitrate in groundwater based on impacts from dairies, septic systems and natural evaporation of meteoric water using data from the Middle Rio Grande Valley in New Mexico. Site ST-105 data, along with the relationships developed by McQuillan (2004), are shown in Figure 9-6. The figure is overlaid with known nitrate/chloride relationships in the Middle Rio Grande Valley of New Mexico (McQuillan, 2004).

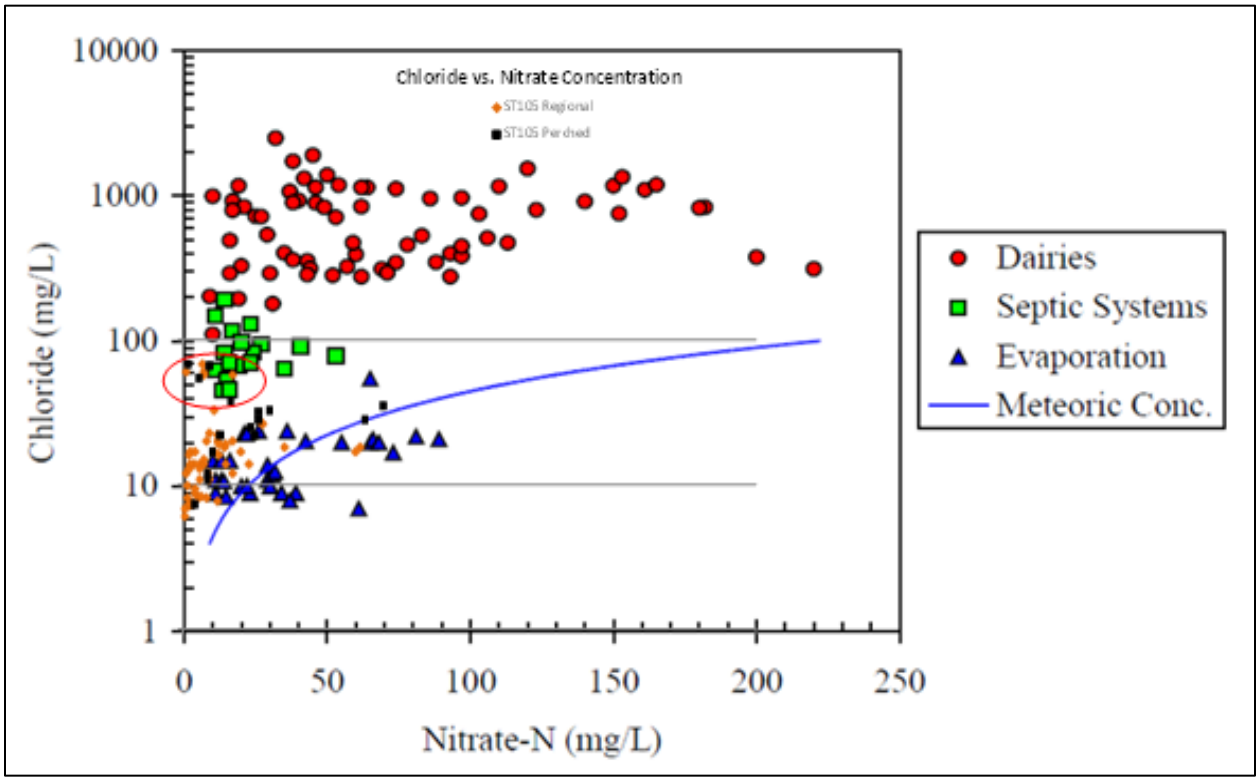

Figure 9-6. Chloride versus Nitrate Concentration with Known Relationships

Most of the ST-105 groundwater nitrate/chloride data correlate best with the 'Evaporation' source signature, which is thought to be representative of evaporation of atmospheric recharge along ephemeral watercourses (McQuillan, 2004). A smaller grouping of the site data (red circle area in Figure 9-6) from both the perched and regional aquifers plot near the lower bounds of septic system source data region. The samples that are marginally within the septic system source region of McQuillan (2004) include four perched wells (KAFB-0314, KAFB-0506, ST105MW-20, and TJA-2) and five regional wells (KAFB-0307, KAFB-0315, KAFB-0615, KAFB-0616 and ST105MW009). Of the perched wells listed, only TJA-2 is located on the periphery of Plume 4 (the perched nitrate plume), and most recently has a nitrate concentration of 9.6 mg/L. The three others are not located within the Plume 4 footprint, and are near or below the approved nitrate background level (4 mg/L). Of the five regional monitoring wells listed, KAFB-0616 (17 mg/L NO3) and ST105MW009 (10 mg/L NO3) are located within Plume 2, and the other three are located in the vicinity but outside of plume 2, as depicted in the 2014 LTM Report (URS, 2015).

Mullaney et al. (USGS, 2009) presented binary mixing curves as a means of determining the origin of chloride in groundwater. The curves are based on the ratio of chloride/bromide as a function of the chloride concentration, and representing various sources, including deicing materials, sewage or animal wastes, fertilizers, brines, seawater and landfill leachate in samples from monitoring wells. The site ST-105 data are shown overlaid with the binary curves (USGS, 2009) in Figure 9-9.

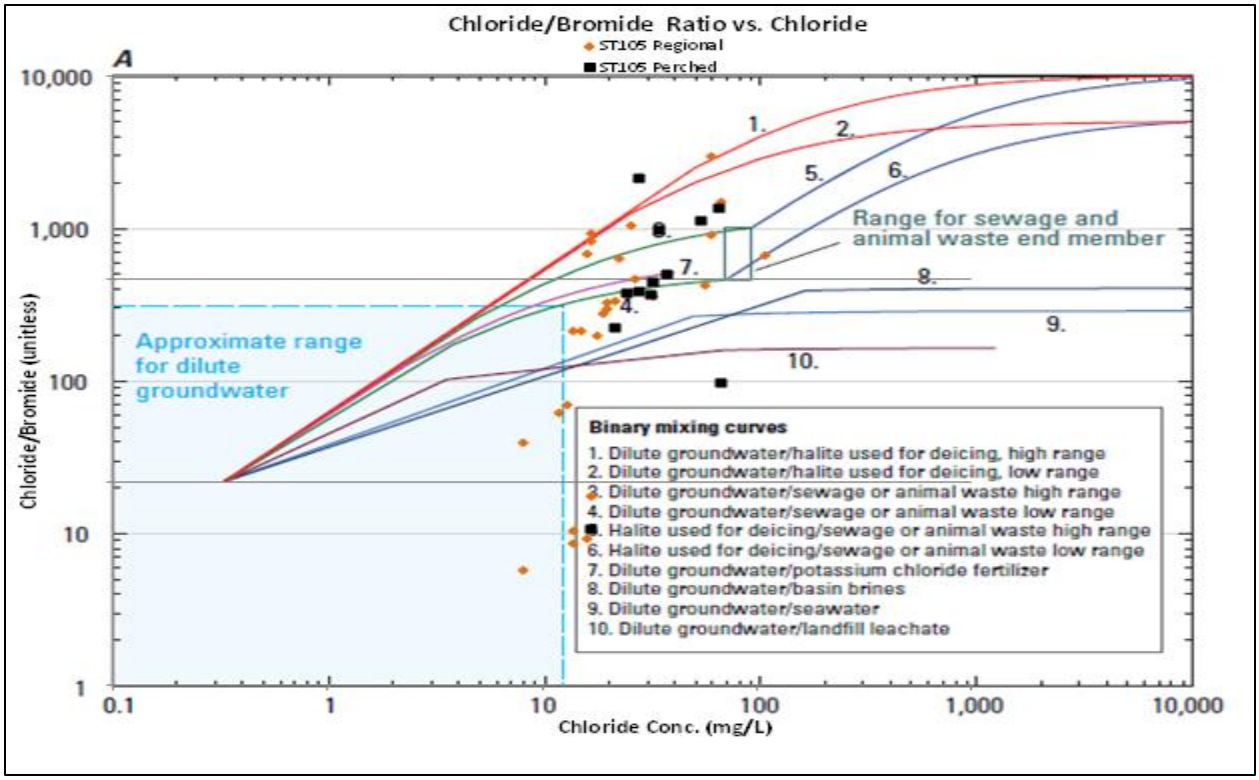

Figure 9-7. Chloride/Bromide Ratios versus Chloride Concentration

As shown in Figure 9-7, the chloride/bromide vs. chloride concentration data for ST-105 are primarily grouped between curves 1 and 8, and are, therefore, not uniquely identifiable based on this approach. It is noted that 32 of the samples were non-detect for bromide, so the lack of low resolution on bromide data is likely screening out numerous results in the high range of chloride/bromide ratio. Ten of the data pairs fall in the region below the lowest source curve line (landfill leachate).

In studying the fate of nitrate based on a multi-tracer approach, Pasten-Zapata et al. (2014) presented an alternative interpretation of mixing lines between precipitation and different end members based on data compiled from other studies. Figure 9-8 includes the ST-105 chloride/bromide ratio as a function of chloride concentration based on the Pasten-Zapata et al. (2014) identified source regions. The regions identified for differing sources do not suggest a unique source for nitrate in groundwater at ST-105 (Figure 9-8), based on the data presented by Pasten-Zapate et al. (2014).

Others have evaluated the range of Cl/Br ratios as a means of attributing contamination to different sources. Vengosh and Pankratov (1998) identified relationships based on previous studies. Figure 9-9 shows the range of ST-105 Cl/Br ratios overlaid with the relationships compiled by Vengosh and Pankratov (1998). Based on the data presented in Figure 9-9, the chloride/bromide ratios of the ST-105 groundwater samples best accord with source water from street runoff, agricultural return flows (deep infiltration), and evaporated sea water. Again, it is noted that numerous data, at presumably the higher chloride/bromide range, are not considered in this comparison due to the 32 data points that had non-detected concentrations of bromide, precluding their use in the ratio calculations.

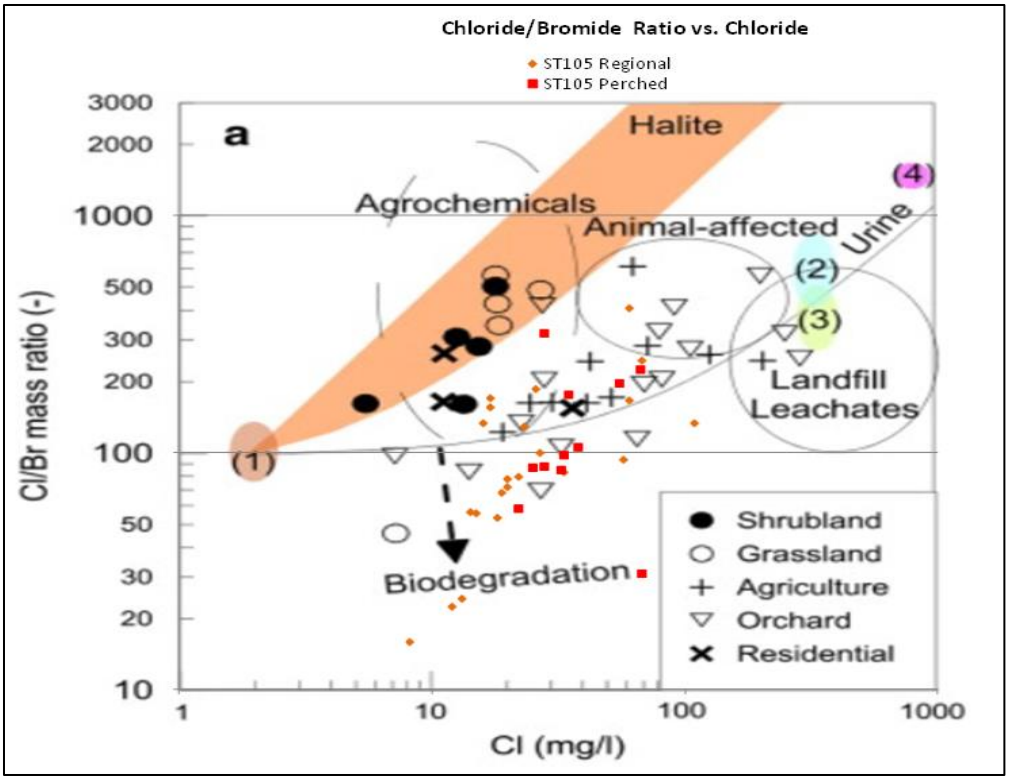

Figure 9-8. Chloride/Bromide Ratios versus Chloride with Precipitation Mixing Lines

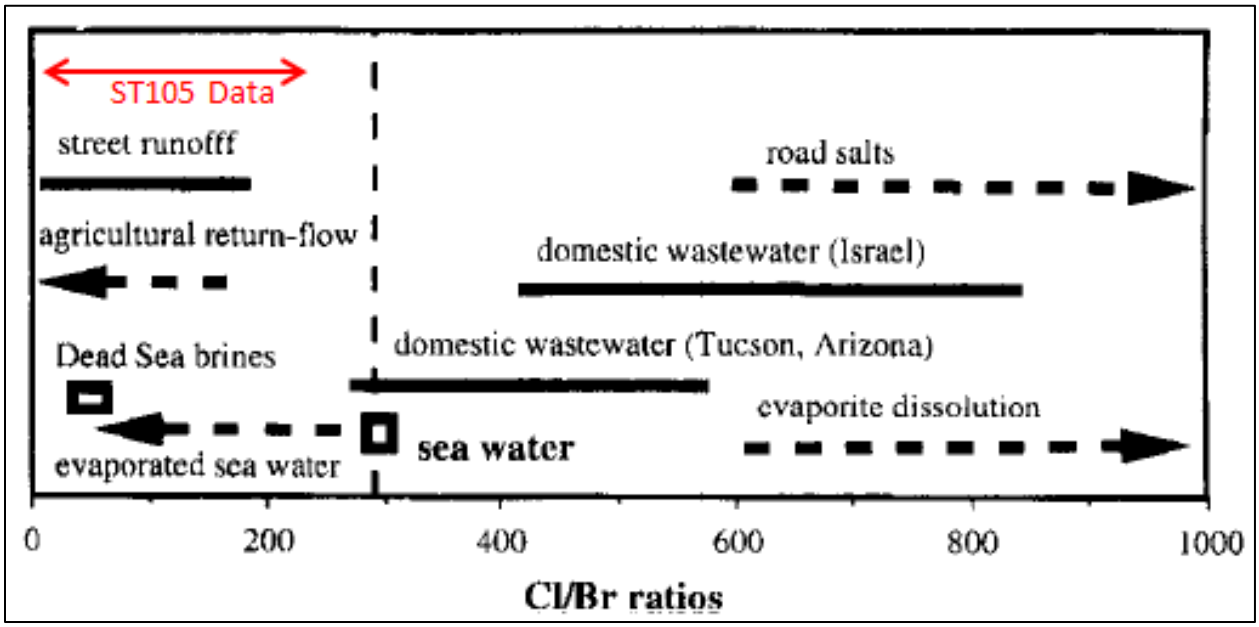

Figure 9-9. Range of Chloride/Bromide Ration

Figure 9-9 represents the chloride/bromide ratios overlaid with data compiled by Vengosh and Pankratov (1998). The data for ST-105 (red-line) represent the range from the 5th to 95th percentile (5.3 to 246.6, respectively) of the chloride/bromide ratios presented in Table 1.

Vergosh and Pankratov (1998) also considered the use of chloride/fluoride ratios as a means of contaminant source identification in groundwater samples. They concluded that chloride/fluoride ratios would not be a useful inorganic tracer for identification of the origin of contamination in groundwater, due to apparent dissolution effects in the sewage-impacted groundwater which resulted in higher ratios in-situ than in the origin waste streams.

9.2.3 Previous Investigations – Pharmaceutical and Personal Care Products Groundwater Sampling

Groundwater samples from plumes 1, 2 and 4 were analyzed for pharmaceuticals and personal care products (PPCPs) as a means of assessing the source of nitrate contamination (USAF, 2009). Up to six common PPCP analytes were detected in low concentrations in nine of the ten samples (and one sample duplicate) collected. The five wells sampled in Plume 1 were located in various arrangements with respect to potential nitrate sources, including the former sewage lagoon, the 1994 and the 2003 sewer line break locations, and the Tijeras Arroyo. The three wells sampled in Plume 2 were located near the Tijeras Arroyo, the golf course area, and the golf course main pond. The three wells sampled in the perched aquifer (Plume 4) were located near the Tijeras Arroyo, the golf course main pond, and SNL SWMU 46, the Old Acid Waste Line Outfall. The sample that did not indicate any detected levels of the six primary PPCPs was from well KAFB-0608, which is located adjacent to the golf course main pond and completed in Plume 4 of the perched aquifer. The PPCP chemicals were indicative of common medications (acetaminophen, salicylic acid), sunscreen (oxybenzone), insect repellent (DEET), caffeine, and common household plastic and/or epoxy resin (bisphenol A). The PPCP compounds detected in groundwater samples were noted to be consistent with chemicals detected in sewage (USAF, 2009).

9.2.4 Summary of Nitrate Source Investigations

Site groundwater data for stable isotope analysis and anion chemistry have been evaluated based on known techniques for contaminant source identification. Results of isotopic analyses of oxygen and nitrogen in groundwater nitrate indicate a terrestrial source of nitrate (soil nitrogen and/or manure or septic waste) that has undergone nitrification. Results of previous sampling of PPCP chemicals were consistent with a sewage contaminant source of nitrate (USAF, 2009) in plumes 1, 2 & 4, and nitrate concentrations in groundwater are moderately correlated to TDS levels, which is also consistent with a sewage water source of contamination.

Other lines of evidence are inconsistent or inclusive in regards the potential source of nitrate contamination in the ST-105 plumes. Based on relationships between groundwater chloride and nitrate concentrations developed from numerous nitrate-impacted sites in the Middle Rio Grande Valley, the ST-105 data accords best with nitrate contamination attributed to the ‘evaporation’ source signature, thought to be representative of evaporation of atmospheric recharge along ephemeral watercourses (McQuillan, 2004). An atmospheric source of nitrate is inconsistent with the lower values of delta ^{18}O as shown in Figure 9-4. Various other relationships were also evaluated and were inclusive with regards to the potential source of chemicals in the ST-105 plumes, including chloride/bromide ratios vs. chloride concentrations (USGS, 2009 and Pasten-Zapata et al., 2014), and only considering the range of chloride/bromide ratios (Vengosh and Pankratov, 1998).

9.3 RECOMMENDATIONS

As discussed in Section 4, monitoring of the following regional aquifer wells should be discontinued because (1) nitrate levels have been and continue to remain below concentrations of regulatory concern, (2) the other wells are located in proximity to them that provide adequate coverage for monitoring of the nitrate plume, or (3) the well will be monitored in support of another site at Kirtland AFB and data will be obtained from that monitoring effort.

Regional Nitrate Plume 1

- KAFB-7
- KAFB-16
- KAFB-0505
- KAFB-0510
- KAFB-0519
- KAFB-0524
- KAFB-2628
- KAFB-2629

Regional Nitrate Plume 2

- KAFB-0307
- KAFB-0311
- KAFB-0312
- KAFB-0315
- KAFB-0615

McCormick Ranch

- KAFB-1006
- KAFB-1008
- KAFB-1009

Monitoring of all other regional aquifer wells should be continued under the ST-105 nitrate abatement project along with all of the perched aquifer wells.

In addition, it is recommended to reduce the analyte list to those constituents that provide data intrinsic to the understanding of the nitrate impacted groundwater. Historically, groundwater samples have been collected and submitted for the analysis of the following:

- Anions (chloride, bromide, fluoride, and sulfate)
- Nitrate-nitrite (by 353.2)
- Alkalinity
- Total Kjeldahl nitrogen
- Ammonia
- TDS
- Dissolved organic carbon

- Total organic carbon
- The full metals suite.

The recommended list for future monitoring should be limited to the following:

- Anions (chloride and sulfate)
- Nitrate-nitrite (by 353.2)
- Alkalinity
- TDS
- Only iron and manganese from the metals list.

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APPENDIX A

Analytical Data Summary

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Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		Golf Course Main Pond					KAFB-7					KAFB-0307				
SAMPLE_NO		GC-MP-12162014					KAFB-7-12112014					KAFB-0307-05052015				
SAMPLE_DATE		16-Dec-14					11-Dec-14					5-May-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Dissolved Solids	µg/l	190,000		2,800	5,000	10,000	190,000		2,800	5,000	10,000	380,000		2,800	5,000	10,000
Antimony	µg/l	U		0.21	0.5	2	U		0.21	0.5	2	U		0.21	0.5	2
Arsenic	µg/l	0.87	J	0.25	0.5	2	1.2	J	0.25	0.5	2	0.75	J	0.25	0.5	2
Barium	µg/l	92		0.36	1	5	100		0.36	1	5	170		0.36	1	5
Beryllium	µg/l	0.40	JJ4J3	0.12	0.5	2	U	J4J3	0.12	0.5	2	U		0.12	0.5	2
Cadmium	µg/l	U		0.16	0.5	1	U		0.16	0.5	1	U		0.16	0.5	1
Chromium	µg/l	2.3		0.54	1.5	2	4.5		0.54	1.5	2	38		0.54	1.5	2
Copper	µg/l	U		0.52	1.5	5	10		0.52	1.5	5	2.8	J	0.52	1.5	5
Cobalt	µg/l	U		0.26	0.5	2	U		0.26	0.5	2	U		0.26	0.5	2
Lead	µg/l	3.3		0.24	0.5	2	3.5		0.24	0.5	2	U		0.24	0.5	2
Manganese	µg/l	4.4	J	0.25	0.5	5	1.6	J	0.25	0.5	5	1.5	J	0.25	0.5	5
Nickel	µg/l	U		0.35	1	2	U		0.35	1	2	5.6		0.35	1	2
Selenium	µg/l	1.6	J	0.38	1	2	1.2	J	0.38	1	2	4.5		0.38	1	2
Silver	µg/l	U		0.31	0.5	2	U		0.31	0.5	2	U		0.31	0.5	2
Thallium	µg/l	U		0.19	0.5	2	U		0.19	0.5	2	U		0.19	0.5	2
Vanadium	µg/l	6.1		0.18	0.5	5	8.6		0.18	0.5	5	5.5		0.18	0.5	5
Zinc	µg/l	2.6	J	2.6	5	25	30		2.6	5	25	3.7	J	2.6	5	25
Aluminum	µg/l	U		180	250	500	U		180	250	500	U		35	50	100
Boron	µg/l	U		63	500	1,000	U		63	500	1,000	56	J	13	100	200
Calcium	µg/l	38,000	J6	230	2,500	5,000	30,000		230	2,500	5,000	68,000		46	500	1,000
Iron	µg/l	77	J	70	250	500	U		70	250	500	190		14	50	100
Lithium	µg/l	U		26	130	250	U		26	130	250	26	J	5.3	25	50
Magnesium	µg/l	7,500		56	2,500	5,000	6,000		56	2,500	5,000	13,000		11	500	1,000

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		Golf Course Main Pond					KAFB-7					KAFB-0307				
SAMPLE_NO		GC-MP-12162014					KAFB-7-12112014					KAFB-0307-05052015				
SAMPLE_DATE		16-Dec-14					11-Dec-14					5-May-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Potassium	µg/l	2,600	J	510	2,500	5,000	1,900	J	510	2,500	5,000	2,400		100	500	1,000
Sodium	µg/l	25,000		490	2,500	5,000	20,000		490	2,500	5,000	23,000	B	98	500	1,000
Bromide	µg/l	2,300		79	500	1,000	540	J	79	500	1,000	370	J	79	500	1,000
Chloride	µg/l	13,000		52	500	1,000	12,000		52	500	1,000	61,000		52	500	1,000
Fluoride	µg/l	450		9.9	50	100	480		9.9	50	100	350		9.9	50	100
Sulfate	µg/l	30,000		77	500	5,000	21,000		77	500	5,000	45,000		77	500	5,000
Nitrate-Nitrite	µg/l	2,500		20	85	100	940		20	85	100	7,900		20	85	100
Alkalinity	µg/l	110,000		2,600	10,000	20,000	120,000		2,600	10,000	20,000	150,000		2,600	10,000	20,000
Alkalinity, Bicarbonate	µg/l	110,000		2,600	10,000	20,000	87,000		2,600	10,000	20,000			—	—	—
Alkalinity, Carbonate	µg/l	U		2,600	10,000	20,000	37,000		2,600	10,000	20,000			—	—	—
Total Organic Carbon	µg/l	2,000		100	500	1,000	U		100	500	1,000	850	J	100	500	1,000
Dissolved Organic Carbon	µg/l	1,100		110	300	1,000	U		110	300	1,000	1,100	P1	110	300	1,000
Ammonia Nitrogen	µg/l	U		38	41	250	U		38	41	250	U		38	41	250
Kjeldahl Nitrogen	µg/l	190	J	35	80	250	U		35	80	250	U		35	80	250

Notes:
- µg/L - Micrograms per liter
- DL - Detection Limit
- LOD - Limit of Detection
- LOQ - Limit of Quantification
- U - Not detected at the LOD

Qualifiers:
- B - The indicated compound was found in the associated method blank as well as the laboratory sample.
- J - Estimated value below the lowest calibration point. Confidence correlates with the concentration.
- J3 -The associated batch quality control was outside the established quality control range for precision.
- J4 -The associated batch quality control was outside the established quality control range for accuracy.
- J6 - The sample matrix interfered with the ability to make any accurate determination; spike value is low.
- P1 - Relative percent difference value not applicable for sample concentrations less than 5 times the reporting limit.

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		KAFB-0311					KAFB-0312					KAFB-0315				
SAMPLE_NO		KAFB-0311-04172015					KAFB-0312-04162015					KAFB-0315-05072015				
SAMPLE_DATE		17-Apr-15					16-Apr-15					7-May-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Dissolved Solids	µg/l	230,000		2,800	5,000	10,000	320,000		2,800	5,000	10,000	450,000		2,800	5,000	10,000
Antimony	µg/l	0.48	J	0.21	0.5	2	0.38	J	0.21	0.5	2	U		0.21	0.5	2
Arsenic	µg/l	0.58	J	0.25	0.5	2	0.45	J	0.25	0.5	2	0.54	J	0.25	0.5	2
Barium	µg/l	130		0.36	1	5	160		0.36	1	5	76		0.36	1	5
Beryllium	µg/l	U		0.12	0.5	2	U		0.12	0.5	2	U		0.12	0.5	2
Cadmium	µg/l	U		0.16	0.5	1	U		0.16	0.5	1	U		0.16	0.5	1
Chromium	µg/l	1.3	J	0.54	1.5	2	0.97	J	0.54	1.5	2	0.74	J	0.54	1.5	2
Copper	µg/l	0.83	J	0.52	1.5	5	U		0.52	1.5	5	U		0.52	1.5	5
Cobalt	µg/l	U		0.26	0.5	2	U		0.26	0.5	2	U		0.26	0.5	2
Lead	µg/l	U		0.24	0.5	2	U		0.24	0.5	2	U		0.24	0.5	2
Manganese	µg/l	0.36	J	0.25	0.5	5	1.6	J	0.25	0.5	5	0.31	J	0.25	0.5	5
Nickel	µg/l	0.40	J	0.35	1	2	U		0.35	1	2	U		0.35	1	2
Selenium	µg/l	2.1		0.38	1	2	3.0		0.38	1	2	6.0		0.38	1	2
Silver	µg/l	U		0.31	0.5	2	U		0.31	0.5	2	U		0.31	0.5	2
Thallium	µg/l	U		0.19	0.5	2	U		0.19	0.5	2	U		0.19	0.5	2
Vanadium	µg/l	4.3	J	0.18	0.5	5	4.1	J	0.18	0.5	5	4.1	J	0.18	0.5	5
Zinc	µg/l	U		2.6	5	25	U		2.6	5	25	U		2.6	5	25
Aluminum	µg/l	U		35	50	100	U		35	50	100	U		35	50	100
Boron	µg/l	65	J	13	100	200	64	J	13	100	200	43	J	13	100	200
Calcium	µg/l	63,000		46	500	1,000	70,000		46	500	1,000	91,000		46	500	1,000
Iron	µg/l	U		14	50	100	U		14	50	100	U		14	50	100
Lithium	µg/l	20	J	5.3	25	50	28	J	5.3	25	50	23	J	5.3	25	50
Magnesium	µg/l	10,000		11	500	1,000	12,000		11	500	1,000	14,000		11	500	1,000

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		KAFB-0311					KAFB-0312					KAFB-0315				
SAMPLE_NO		KAFB-0311-04172015					KAFB-0312-04162015					KAFB-0315-05072015				
SAMPLE_DATE		17-Apr-15					16-Apr-15					7-May-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Potassium	µg/l	2,100		100	500	1,000	2,800		100	500	1,000	2,300		100	500	1,000
Sodium	µg/l	21,000		98	500	1,000	26,000		98	500	1,000	26,000	B	98	500	1,000
Bromide	µg/l	260	J	79	500	1,000	280	J	79	500	1,000	280	J	79	500	1,000
Chloride	µg/l	20,000		52	500	1,000	20,000		52	500	1,000	68,000		52	500	1,000
Fluoride	µg/l	460		9.9	50	100	410		9.9	50	100	230		9.9	50	100
Sulfate	µg/l	36,000		77	500	5,000	41,000		77	500	5,000	94,000		77	500	5,000
Nitrate-Nitrite	µg/l	8,300		20	85	100	17,000		20	85	100	6,800		20	85	100
Alkalinity	µg/l	150,000		2,600	10,000	20,000	140,000		2,600	10,000	20,000	130,000		2,600	10,000	20,000
Alkalinity, Bicarbonate	µg/l			—	—	—			—	—	—			—	—	—
Alkalinity, Carbonate	µg/l			—	—	—			—	—	—			—	—	—
Total Organic Carbon	µg/l	810	J	100	500	1,000	1,200		100	500	1,000	1,100		100	500	1,000
Dissolved Organic Carbon	µg/l	220	JP1	110	300	1,000	2,000		110	300	1,000	420	J	110	300	1,000
Ammonia Nitrogen	µg/l	U		38	41	250	U		38	41	250	U		38	41	250
Kjeldahl Nitrogen	µg/l	U		35	80	250	U		35	80	250	84	JB	35	80	250

Notes:
- µg/L - Micrograms per liter
- DL - Detection Limit
- LOD - Limit of Detection
- LOQ - Limit of Quantification
- U - Not detected at the LOD

Qualifiers:
- B - The indicated compound was found in the associated method blank as well as the laboratory sample.
- J - Estimated value below the lowest calibration point. Confidence correlates with the concentration.
- J3 -The associated batch quality control was outside the established quality control range for precision.
- J4 -The associated batch quality control was outside the established quality control range for accuracy.
- J6 - The sample matrix interfered with the ability to make any accurate determination; spike value is low.
- P1 - Relative percent difference value not applicable for sample concentrations less than 5 times the reporting limit.

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		KAFB-0505					KAFB-0507R					KAFB-0508				
SAMPLE_NO		KAFB-0505-01212015					KAFB-0507R-01132015					KAFB-0508-01092015				
SAMPLE_DATE		21-Jan-15					13-Jan-15					9-Jan-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Dissolved Solids	µg/l	370,000		2,800	5,000	10,000	390,000		2,800	5,000	10,000	290,000		2,800	5,000	10,000
Antimony	µg/l	U		0.21	0.5	2	U		0.21	0.5	2	U		0.21	0.5	2
Arsenic	µg/l	0.57	J	0.25	0.5	2	0.37	J	0.25	0.5	2	0.78	J	0.25	0.5	2
Barium	µg/l	78		0.36	1	5	64		0.36	1	5	120		0.36	1	5
Beryllium	µg/l	U		0.12	0.5	2	U		0.12	0.5	2	U		0.12	0.5	2
Cadmium	µg/l	U		0.16	0.5	1	U		0.16	0.5	1	U		0.16	0.5	1
Chromium	µg/l	1.7	J	0.54	1.5	2	1.3	J	0.54	1.5	2	3.0		0.54	1.5	2
Copper	µg/l	0.56	J	0.52	1.5	5	U		0.52	1.5	5	1.0	J	0.52	1.5	5
Cobalt	µg/l	1.0	J	0.26	0.5	2	U		0.26	0.5	2	U		0.26	0.5	2
Lead	µg/l	U		0.24	0.5	2	U		0.24	0.5	2	U		0.24	0.5	2
Manganese	µg/l	8.3		0.25	0.5	5	U		0.25	0.5	5	0.38	J	0.25	0.5	5
Nickel	µg/l	0.91	J	0.35	1	2	U		0.35	1	2	U		0.35	1	2
Selenium	µg/l	1.9	J	0.38	1	2	2.0	J	0.38	1	2	1.9	J	0.38	1	2
Silver	µg/l	U		0.31	0.5	2	U		0.31	0.5	2	U		0.31	0.5	2
Thallium	µg/l	0.49	J	0.19	0.5	2	0.39	J	0.19	0.5	2	U		0.19	0.5	2
Vanadium	µg/l	4.0	J	0.18	0.5	5	2.3	J	0.18	0.5	5	4.8	J	0.18	0.5	5
Zinc	µg/l	11	J	2.6	5	25	U		2.6	5	25	U		2.6	5	25
Aluminum	µg/l	U		35	50	100	U		35	50	100	U		35	50	100
Boron	µg/l	52	J	13	100	200	61	J	13	100	200	54	J	13	100	200
Calcium	µg/l	75,000		46	500	1,000	77,000		46	500	1,000	54,000		46	500	1,000
Iron	µg/l	14	J	14	50	100	U		14	50	100	U		14	50	100
Lithium	µg/l	20	J	5.3	25	50	19	J	5.3	25	50	17	J	5.3	25	50
Magnesium	µg/l	12,000		11	500	1,000	11,000		11	500	1,000	7,300		11	500	1,000

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		KAFB-0505					KAFB-0507R					KAFB-0508				
SAMPLE_NO		KAFB-0505-01212015					KAFB-0507R-01132015					KAFB-0508-01092015				
SAMPLE_DATE		21-Jan-15					13-Jan-15					9-Jan-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Potassium	µg/l	2,600		100	500	1,000	2,300		100	500	1,000	2,000		100	500	1,000
Sodium	µg/l	28,000		98	500	1,000	30,000		98	500	1,000	24,000		98	500	1,000
Bromide	µg/l	2,800		79	500	1,000	U		79	500	1,000	U		79	500	1,000
Chloride	µg/l	14,000		52	500	1,000	14,000		52	500	1,000	12,000		52	500	1,000
Fluoride	µg/l	350		9.9	50	100	240		9.9	50	100	350		9.9	50	100
Sulfate	µg/l	90,000		77	500	5,000	84,000		77	500	5,000	27,000		77	500	5,000
Nitrate-Nitrite	µg/l	3,700		20	85	100	6,300		20	85	100	17,000		20	85	100
Alkalinity	µg/l	170,000		2,600	10,000	20,000	150,000		2,600	10,000	20,000	120,000		2,600	10,000	20,000
Alkalinity, Bicarbonate	µg/l	—		—	—	—	—		—	—	—	—		—	—	—
Alkalinity, Carbonate	µg/l	—		—	—	—	—		—	—	—	—		—	—	—
Total Organic Carbon	µg/l	1,800		100	500	1,000	U		100	500	1,000	190	J	100	500	1,000
Dissolved Organic Carbon	µg/l	1,100		110	300	1,000	350	J	110	300	1,000	460	J	110	300	1,000
Ammonia Nitrogen	µg/l	U		38	41	250	U		38	41	250	150	J	38	41	250
Kjeldahl Nitrogen	µg/l	U		35	80	250	U		35	80	250	U		35	80	250

Notes:
- µg/L - Micrograms per liter
- DL - Detection Limit
- LOD - Limit of Detection
- LOQ - Limit of Quantification
- U - Not detected at the LOD

Qualifiers:
- B - The indicated compound was found in the associated method blank as well as the laboratory sample.
- J - Estimated value below the lowest calibration point. Confidence correlates with the concentration.
- J3 -The associated batch quality control was outside the established quality control range for precision.
- J4 -The associated batch quality control was outside the established quality control range for accuracy.
- J6 - The sample matrix interfered with the ability to make any accurate determination; spike value is low.
- P1 - Relative percent difference value not applicable for sample concentrations less than 5 times the reporting limit.

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		KAFB-0510					KAFB-512R					KAFB-0514				
SAMPLE_NO		KAFB-0510-12152014					KAFB-512R-01082015					KAFB-0514-01142015				
SAMPLE_DATE		15-Dec-14					8-Jan-15					14-Jan-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Dissolved Solids	µg/l	200,000		2,800	5,000	10,000	250,000		2,800	5,000	10,000	480,000		2,800	5,000	10,000
Antimony	µg/l	U		0.21	0.5	2	U		0.21	0.5	2	U		0.21	0.5	2
Arsenic	µg/l	0.76	J	0.25	0.5	2	0.62	J	0.25	0.5	2	0.76	J	0.25	0.5	2
Barium	µg/l	98		0.36	1	5	79		0.36	1	5	120		0.36	1	5
Beryllium	µg/l	U	J4J3	0.12	0.5	2	U		0.12	0.5	2	U		0.12	0.5	2
Cadmium	µg/l	U		0.16	0.5	1	U		0.16	0.5	1	U		0.16	0.5	1
Chromium	µg/l	4.6		0.54	1.5	2	2.6		0.54	1.5	2	3.4		0.54	1.5	2
Copper	µg/l	U		0.52	1.5	5	U		0.52	1.5	5	U		0.52	1.5	5
Cobalt	µg/l	U		0.26	0.5	2	U		0.26	0.5	2	U		0.26	0.5	2
Lead	µg/l	U		0.24	0.5	2	U		0.24	0.5	2	U		0.24	0.5	2
Manganese	µg/l	0.76	J	0.25	0.5	5	0.64	J	0.25	0.5	5	0.67	J	0.25	0.5	5
Nickel	µg/l	U		0.35	1	2	U		0.35	1	2	U		0.35	1	2
Selenium	µg/l	1.2	J	0.38	1	2	1.2	J	0.38	1	2	4.6		0.38	1	2
Silver	µg/l	U		0.31	0.5	2	U		0.31	0.5	2	U		0.31	0.5	2
Thallium	µg/l	U		0.19	0.5	2	U		0.19	0.5	2	U		0.19	0.5	2
Vanadium	µg/l	5.0	J	0.18	0.5	5	4.1	J	0.18	0.5	5	3.6	J	0.18	0.5	5
Zinc	µg/l	U		2.6	5	25	4.0	J	2.6	5	25	U		2.6	5	25
Aluminum	µg/l	U		180	250	500	U		35	50	100	U		35	50	100
Boron	µg/l	U		63	500	1,000	58	J	13	100	200	53	J	13	100	200
Calcium	µg/l	38,000		230	2,500	5,000	48,000		46	500	1,000	91,000		46	500	1,000
Iron	µg/l	U		70	250	500	20	J	14	50	100	25	J	14	50	100
Lithium	µg/l	U		26	130	250	17	J	5.3	25	50	17	J	5.3	25	50
Magnesium	µg/l	5,100		56	2,500	5,000	7,000		11	500	1,000	12,000		11	500	1,000

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		KAFB-0510					KAFB-512R					KAFB-0514				
SAMPLE_NO		KAFB-0510-12152014					KAFB-512R-01082015					KAFB-0514-01142015				
SAMPLE_DATE		15-Dec-14					8-Jan-15					14-Jan-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Potassium	µg/l	2,000	J	510	2,500	5,000	1,900		100	500	1,000	3,000		100	500	1,000
Sodium	µg/l	20,000		490	2,500	5,000	23,000		98	500	1,000	26,000		98	500	1,000
Bromide	µg/l	2,400		79	500	1,000	U		79	500	1,000	U		79	500	1,000
Chloride	µg/l	14,000		52	500	1,000	8,700		52	500	1,000	18,000		52	500	1,000
Fluoride	µg/l	470		9.9	50	100	290		9.9	50	100	320		9.9	50	100
Sulfate	µg/l	28,000		77	500	5,000	39,000		77	500	5,000	41,000		77	500	5,000
Nitrate-Nitrite	µg/l	2,100		20	85	100	4,400		20	85	100	36,000		20	85	100
Alkalinity	µg/l	110,000		2,600	10,000	20,000	120,000		2,600	10,000	20,000	110,000		2,600	10,000	20,000
Alkalinity, Bicarbonate	µg/l	110,000		2,600	10,000	20,000	—		—	—	—	—		—	—	—
Alkalinity, Carbonate	µg/l	U		2,600	10,000	20,000	—		—	—	—	—		—	—	—
Total Organic Carbon	µg/l	U		100	500	1,000	140	J	100	500	1,000	560	JP1	100	500	1,000
Dissolved Organic Carbon	µg/l	360	J	110	300	1,000	520	J	110	300	1,000	400	J	110	300	1,000
Ammonia Nitrogen	µg/l	U		38	41	250	110	J	38	41	250	U		38	41	250
Kjeldahl Nitrogen	µg/l	U		35	80	250	40	J	35	80	250	U		35	80	250

Notes:
- µg/L - Micrograms per liter
- DL - Detection Limit
- LOD - Limit of Detection
- LOQ - Limit of Quantification
- U - Not detected at the LOD

Qualifiers:
- B - The indicated compound was found in the associated method blank as well as the laboratory sample.
- J - Estimated value below the lowest calibration point. Confidence correlates with the concentration.
- J3 -The associated batch quality control was outside the established quality control range for precision.
- J4 -The associated batch quality control was outside the established quality control range for accuracy.
- J6 - The sample matrix interfered with the ability to make any accurate determination; spike value is low.
- P1 - Relative percent difference value not applicable for sample concentrations less than 5 times the reporting limit.

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		KAFB-0516					KAFB-0517					KAFB-0518				
SAMPLE_NO		KAFB-0516-01142015					KAFB-0517-12152014					KAFB-0518-01062015				
SAMPLE_DATE		14-Jan-15					15-Dec-14					6-Jan-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Dissolved Solids	µg/l	240,000		2,800	5,000	10,000	570,000		2,800	5,000	10,000	240,000		2,800	5,000	10,000
Antimony	µg/l	U		0.21	0.5	2	U		0.21	0.5	2	U		0.21	0.5	2
Arsenic	µg/l	1.0	J	0.25	0.5	2	0.51	J	0.25	0.5	2	0.88	J	0.25	0.5	2
Barium	µg/l	130		0.36	1	5	350		0.36	1	5	97		0.36	1	5
Beryllium	µg/l	U		0.12	0.5	2	0.20	JJ4J3	0.12	0.5	2	U		0.12	0.5	2
Cadmium	µg/l	U		0.16	0.5	1	U		0.16	0.5	1	U		0.16	0.5	1
Chromium	µg/l	4.1		0.54	1.5	2	3.5		0.54	1.5	2	2.1		0.54	1.5	2
Copper	µg/l	U		0.52	1.5	5	U		0.52	1.5	5	U		0.52	1.5	5
Cobalt	µg/l	U		0.26	0.5	2	U		0.26	0.5	2	U		0.26	0.5	2
Lead	µg/l	U		0.24	0.5	2	1.8		0.24	0.5	2	U		0.24	0.5	2
Manganese	µg/l	0.32	J	0.25	0.5	5	0.35	J	0.25	0.5	5	0.30	J	0.25	0.5	5
Nickel	µg/l	U		0.35	1	2	U	J	0.35	1	2	U		0.35	1	2
Selenium	µg/l	1.0	J	0.38	1	2	4.9		0.38	1	2	0.5	J	0.38	1	2
Silver	µg/l	U		0.31	0.5	2	U		0.31	0.5	2	U		0.31	0.5	2
Thallium	µg/l	0.47	J	0.19	0.5	2	U		0.19	0.5	2	0.20	J	0.19	0.5	2
Vanadium	µg/l	4.5	J	0.18	0.5	5	2.8	J	0.18	0.5	5	3.2	J	0.18	0.5	5
Zinc	µg/l	U		2.6	5	25	3.4	J	2.6	5	25	U		2.6	5	25
Aluminum	µg/l	U		35	50	100	U		180	250	500	U		180	250	500
Boron	µg/l	76	J	13	100	200	U		63	500	1,000	72	J	63	500	1,000
Calcium	µg/l	46,000		46	500	1,000	92,000		230	2,500	5,000	45,000		230	2,500	5,000
Iron	µg/l	U		14	50	100	U		70	250	500	U		70	250	500
Lithium	µg/l	14	J	5.3	25	50	U		26	130	250	U		26	130	250
Magnesium	µg/l	5,500		11	500	1,000	10,000		56	2,500	5,000	4,700	J	56	2,500	5,000

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		KAFB-0516					KAFB-0517					KAFB-0518				
SAMPLE_NO		KAFB-0516-01142015					KAFB-0517-12152014					KAFB-0518-01062015				
SAMPLE_DATE		14-Jan-15					15-Dec-14					6-Jan-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Potassium	µg/l	2,600		100	500	1,000	3,300	J	510	2,500	5,000	2,400	J	510	2,500	5,000
Sodium	µg/l	24,000		98	500	1,000	33,000		490	2,500	5,000	22,000		490	2,500	5,000
Bromide	µg/l	U		79	500	1,000	2,000		79	500	1,000	2,200		79	500	1,000
Chloride	µg/l	11,000		52	500	1,000	17,000		52	500	1,000	8,200		52	500	1,000
Fluoride	µg/l	350		9.9	50	100	320		9.9	50	100	400		9.9	50	100
Sulfate	µg/l	29,000		77	500	5,000	32,000		77	500	5,000	29,000		77	500	5,000
Nitrate-Nitrite	µg/l	6,500		20	85	100	60,000		20	85	100	8,600		20	85	100
Alkalinity	µg/l	110,000		2,600	10,000	20,000	89,000		2,600	10,000	20,000	97,000		2,600	10,000	20,000
Alkalinity, Bicarbonate	µg/l	—		—	—	—	89,000		2,600	10,000	20,000	—		—	—	—
Alkalinity, Carbonate	µg/l	—		—	—	—	U		2,600	10,000	20,000	—		—	—	—
Total Organic Carbon	µg/l	550	J	100	500	1,000	260	J	100	500	1,000	U		100	500	1,000
Dissolved Organic Carbon	µg/l	380	J	110	300	1,000	U		110	300	1,000	140	J	110	300	1,000
Ammonia Nitrogen	µg/l	U		38	41	250	74	J	38	41	250	U		38	41	250
Kjeldahl Nitrogen	µg/l	89	J	35	80	250	U		35	80	250	U		35	80	250

Notes:
- µg/L - Micrograms per liter
- DL - Detection Limit
- LOD - Limit of Detection
- LOQ - Limit of Quantification
- U - Not detected at the LOD

Qualifiers:
- B - The indicated compound was found in the associated method blank as well as the laboratory sample.
- J - Estimated value below the lowest calibration point. Confidence correlates with the concentration.
- J3 -The associated batch quality control was outside the established quality control range for precision.
- J4 -The associated batch quality control was outside the established quality control range for accuracy.
- J6 - The sample matrix interfered with the ability to make any accurate determination; spike value is low.
- P1 - Relative percent difference value not applicable for sample concentrations less than 5 times the reporting limit.

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		KAFB-0520					KAFB-0521A					KAFB-0521B				
SAMPLE_NO		KAFB-0520-01092015					KAFB-0521A-03052015					KAFB-0521B-03052015				
SAMPLE_DATE		9-Jan-15					5-Mar-15					5-Mar-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Dissolved Solids	µg/l	300,000		2,800	5,000	10,000	250,000		2,800	5,000	10,000	210,000		2,800	5,000	10,000
Antimony	µg/l	U		0.21	0.5	2	0.38	J	0.21	0.5	2	0.26	J	0.21	0.5	2
Arsenic	µg/l	1.4	J	0.25	0.5	2	27		0.25	0.5	2	3.3		0.25	0.5	2
Barium	µg/l	170		0.36	1	5	100		0.36	1	5	90		0.36	1	5
Beryllium	µg/l	U		0.12	0.5	2	U		0.12	0.5	2	U		0.12	0.5	2
Cadmium	µg/l	U		0.16	0.5	1	U		0.16	0.5	1	U		0.16	0.5	1
Chromium	µg/l	3.5		0.54	1.5	2	1.1	J	0.54	1.5	2	0.66	J	0.54	1.5	2
Copper	µg/l	0.61	J	0.52	1.5	5	1.4	J	0.52	1.5	5	0.76	J	0.52	1.5	5
Cobalt	µg/l	U		0.26	0.5	2	U		0.26	0.5	2	U		0.26	0.5	2
Lead	µg/l	U		0.24	0.5	2	1.4	J	0.24	0.5	2	2.0	J	0.24	0.5	2
Manganese	µg/l	0.26	J	0.25	0.5	5	25		0.25	0.5	5	7.7		0.25	0.5	5
Nickel	µg/l	U		0.35	1	2	U		0.35	1	2	U		0.35	1	2
Selenium	µg/l	1.7	J	0.38	1	2	0.44	J	0.38	1	2	0.56	J	0.38	1	2
Silver	µg/l	U		0.31	0.5	2	U		0.31	0.5	2	U		0.31	0.5	2
Thallium	µg/l	0.33	J	0.19	0.5	2	U		0.19	0.5	2	U		0.19	0.5	2
Vanadium	µg/l	5.4		0.18	0.5	5	2.6	J	0.18	0.5	5	5.2		0.18	0.5	5
Zinc	µg/l	U		2.6	5	25	5.1	J	2.6	5	25	2.7	J	2.6	5	25
Aluminum	µg/l	60	J	35	50	100	U		35	50	100	36	J	35	50	100
Boron	µg/l	91	J	13	100	200	60	J	13	100	200	50	J	13	100	200
Calcium	µg/l	50,000		46	500	1,000	43,000		46	500	1,000	40,000		46	500	1,000
Iron	µg/l	U		14	50	100	97	J	14	50	100	U		14	50	100
Lithium	µg/l	17	J	5.3	25	50	18	J	5.3	25	50	16	J	5.3	25	50
Magnesium	µg/l	7,100		11	500	1,000	6,200		11	500	1,000	5,700		11	500	1,000

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		KAFB-0520					KAFB-0521A					KAFB-0521B				
SAMPLE_NO		KAFB-0520-01092015					KAFB-0521A-03052015					KAFB-0521B-03052015				
SAMPLE_DATE		9-Jan-15					5-Mar-15					5-Mar-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Potassium	µg/l	2,600		100	500	1,000	1,900		100	500	1,000	1,700		100	500	1,000
Sodium	µg/l	30,000		98	500	1,000	27,000	B	98	500	1,000	20,000	B	98	500	1,000
Bromide	µg/l	U	J6	79	500	1,000	U		79	500	1,000	U		79	500	1,000
Chloride	µg/l	14,000	J6	52	500	1,000	10,000		52	500	1,000	6,100		52	500	1,000
Fluoride	µg/l	290	J6	9.9	50	100	500		9.9	50	100	550		9.9	50	100
Sulfate	µg/l	26,000	J6	77	500	5,000	47,000		77	500	5,000	23,000		77	500	5,000
Nitrate-Nitrite	µg/l	15,000		20	85	100	1,500		20	85	100	1,000		20	85	100
Alkalinity	µg/l	97,000		2,600	10,000	20,000	120,000		2,600	10,000	20,000	120,000		2,600	10,000	20,000
Alkalinity, Bicarbonate	µg/l	—		—	—	—	—		—	—	—	—		—	—	—
Alkalinity, Carbonate	µg/l	—		—	—	—	—		—	—	—	—		—	—	—
Total Organic Carbon	µg/l	240	J	100	500	1,000	11,000		100	500	1,000	3,200		100	500	1,000
Dissolved Organic Carbon	µg/l	440	J	110	300	1,000	6,700		110	300	1,000	2,300		110	300	1,000
Ammonia Nitrogen	µg/l	220	J	38	41	250	2000		38	41	250	U		38	41	250
Kjeldahl Nitrogen	µg/l	U	J3J	35	80	250	3100		35	80	250	160	J	35	80	250

Notes:
- µg/L - Micrograms per liter
- DL - Detection Limit
- LOD - Limit of Detection
- LOQ - Limit of Quantification
- U - Not detected at the LOD

Qualifiers:
- B - The indicated compound was found in the associated method blank as well as the laboratory sample.
- J - Estimated value below the lowest calibration point. Confidence correlates with the concentration.
- J3 -The associated batch quality control was outside the established quality control range for precision.
- J4 -The associated batch quality control was outside the established quality control range for accuracy.
- J6 - The sample matrix interfered with the ability to make any accurate determination; spike value is low.
- P1 - Relative percent difference value not applicable for sample concentrations less than 5 times the reporting limit.

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		KAFB-0521C					KAFB-0522					KAFB-0523				
SAMPLE_NO		KAFB-0521C-03052015					KAFB-0522-01132015					KAFB-0523-01122015				
SAMPLE_DATE		5-Mar-15					13-Jan-15					12-Jan-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Dissolved Solids	µg/l	210,000		2,800	5,000	10,000	350,000		2,800	5,000	10,000	200,000		2,800	5,000	10,000
Antimony	µg/l	U		0.21	0.5	2	U		0.21	0.5	2	U		0.21	0.5	2
Arsenic	µg/l	2.3		0.25	0.5	2	0.55	J	0.25	0.5	2	1.2	J	0.25	0.5	2
Barium	µg/l	85		0.36	1	5	58		0.36	1	5	110		0.36	1	5
Beryllium	µg/l	U		0.12	0.5	2	U		0.12	0.5	2	U		0.12	0.5	2
Cadmium	µg/l	U		0.16	0.5	1	U		0.16	0.5	1	U		0.16	0.5	1
Chromium	µg/l	1.6	J	0.54	1.5	2	1.6	J	0.54	1.5	2	2.7		0.54	1.5	2
Copper	µg/l	5.3		0.52	1.5	5	U		0.52	1.5	5	U		0.52	1.5	5
Cobalt	µg/l	U		0.26	0.5	2	U		0.26	0.5	2	U		0.26	0.5	2
Lead	µg/l	5.0		0.24	0.5	2	U		0.24	0.5	2	U		0.24	0.5	2
Manganese	µg/l	8.0		0.25	0.5	5	0.27	J	0.25	0.5	5	0.35	J	0.25	0.5	5
Nickel	µg/l	U		0.35	1	2	U		0.35	1	2	U		0.35	1	2
Selenium	µg/l	0.57	J	0.38	1	2	1.7	J	0.38	1	2	0.90	J	0.38	1	2
Silver	µg/l	U		0.31	0.5	2	U		0.31	0.5	2	U		0.31	0.5	2
Thallium	µg/l	0.33	J	0.19	0.5	2	U		0.19	0.5	2	0.38	J	0.19	0.5	2
Vanadium	µg/l	5.3		0.18	0.5	5	4.1	J	0.18	0.5	5	6.3		0.18	0.5	5
Zinc	µg/l	8.7	J	2.6	5	25	U		2.6	5	25	U		2.6	5	25
Aluminum	µg/l	U		35	50	100	53	J	35	50	100	U		35	50	100
Boron	µg/l	59	J	13	100	200	52	J	13	100	200	60	J	13	100	200
Calcium	µg/l	39,000		46	500	1,000	66,000		46	500	1,000	38,000		46	500	1,000
Iron	µg/l	U		14	50	100	41	J	14	50	100	U		14	50	100
Lithium	µg/l	16	J	5.3	25	50	17	J	5.3	25	50	13	J	5.3	25	50
Magnesium	µg/l	5,700		11	500	1,000	10,000		11	500	1,000	5,600		11	500	1,000

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		KAFB-0521C					KAFB-0522					KAFB-0523				
SAMPLE_NO		KAFB-0521C-03052015					KAFB-0522-01132015					KAFB-0523-01122015				
SAMPLE_DATE		5-Mar-15					13-Jan-15					12-Jan-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Potassium	µg/l	1,800		100	500	1,000	2,200		100	500	1,000	1,800		100	500	1,000
Sodium	µg/l	20,000	B	98	500	1,000	27,000		98	500	1,000	24,000		98	500	1,000
Bromide	µg/l	U		79	500	1,000	U		79	500	1,000	U		79	500	1,000
Chloride	µg/l	6,800		52	500	1,000	12,000		52	500	1,000	7,100		52	500	1,000
Fluoride	µg/l	460		9.9	50	100	240		9.9	50	100	340		9.9	50	100
Sulfate	µg/l	21,000		77	500	5,000	59,000		77	500	5,000	21,000		77	500	5,000
Nitrate-Nitrite	µg/l	1,100		20	85	100	9,500		20	85	100	2,800		20	85	100
Alkalinity	µg/l	120,000		2,600	10,000	20,000	140,000		2,600	10,000	20,000	120,000		2,600	10,000	20,000
Alkalinity, Bicarbonate	µg/l	—		—	—	—	—		—	—	—	—		—	—	—
Alkalinity, Carbonate	µg/l	—		—	—	—	—		—	—	—	—		—	—	—
Total Organic Carbon	µg/l	2,600		100	500	1,000	U		100	500	1,000	U		100	500	1,000
Dissolved Organic Carbon	µg/l	2,100		110	300	1,000	170	J	110	300	1,000	200	JP1	110	300	1,000
Ammonia Nitrogen	µg/l	420		38	41	250	48	J	38	41	250	U		38	41	250
Kjeldahl Nitrogen	µg/l	980		35	80	250	U		35	80	250	U		35	80	250

Notes:
- µg/L - Micrograms per liter
- DL - Detection Limit
- LOD - Limit of Detection
- LOQ - Limit of Quantification
- U - Not detected at the LOD

Qualifiers:
- B - The indicated compound was found in the associated method blank as well as the laboratory sample.
- J - Estimated value below the lowest calibration point. Confidence correlates with the concentration.
- J3 -The associated batch quality control was outside the established quality control range for precision.
- J4 -The associated batch quality control was outside the established quality control range for accuracy.
- J6 - The sample matrix interfered with the ability to make any accurate determination; spike value is low.
- P1 - Relative percent difference value not applicable for sample concentrations less than 5 times the reporting limit.

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		KAFB-0524					KAFB-0525					KAFB-0611				
SAMPLE_NO		KAFB-0524-12112014					KAFB-0525-01142015					KAFB-0611-04132015				
SAMPLE_DATE		11-Dec-14					14-Jan-15					13-Apr-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Dissolved Solids	µg/l	200,000		2,800	5,000	10,000	430,000		2,800	5,000	10,000	320,000		2,800	5,000	10,000
Antimony	µg/l	U		0.21	0.5	2	U		0.21	0.5	2	1.6	J	0.21	0.5	2
Arsenic	µg/l	1.1	J	0.25	0.5	2	0.55	J	0.25	0.5	2	1.2	J	0.25	0.5	2
Barium	µg/l	110		0.36	1	5	77		0.36	1	5	100		0.36	1	5
Beryllium	µg/l	0.44	J4J3	0.12	0.5	2	U		0.12	0.5	2	U		0.12	0.5	2
Cadmium	µg/l	U		0.16	0.5	1	U		0.16	0.5	1	U		0.16	0.5	1
Chromium	µg/l	4.4		0.54	1.5	2	1.7	J	0.54	1.5	2	0.72	J	0.54	1.5	2
Copper	µg/l	U		0.52	1.5	5	U		0.52	1.5	5	U		0.52	1.5	5
Cobalt	µg/l	U		0.26	0.5	2	U		0.26	0.5	2	U		0.26	0.5	2
Lead	µg/l	0.98	J	0.24	0.5	2	U		0.24	0.5	2	U		0.24	0.5	2
Manganese	µg/l	1.2	J	0.25	0.5	5	1.2	J	0.25	0.5	5	4.5	J	0.25	0.5	5
Nickel	µg/l	0.37	J	0.35	1	2	0.46	J	0.35	1	2	U		0.35	1	2
Selenium	µg/l	0.84	J	0.38	1	2	2.6		0.38	1	2	U		0.38	1	2
Silver	µg/l	U		0.31	0.5	2	U		0.31	0.5	2	U		0.31	0.5	2
Thallium	µg/l	U		0.19	0.5	2	U		0.19	0.5	2	0.19	J	0.19	0.5	2
Vanadium	µg/l	6.4		0.18	0.5	5	3.9	J	0.18	0.5	5	6.9		0.18	0.5	5
Zinc	µg/l	3.9	J	2.6	5	25	U		2.6	5	25	U		2.6	5	25
Aluminum	µg/l	U		180	250	500	U		35	50	100	U		35	50	100
Boron	µg/l	U		63	500	1,000	52	J	13	100	200	82	J	13	100	200
Calcium	µg/l	31,000		230	2,500	5,000	90,000		46	500	1,000	52,000		46	500	1,000
Iron	µg/l	U		70	250	500	U		14	50	100	260		14	50	100
Lithium	µg/l	U		26	130	250	22	J	5.3	25	50	38	J	5.3	25	50
Magnesium	µg/l	4,400	J	56	2,500	5,000	14,000		11	500	1,000	10,000		11	500	1,000

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		KAFB-0524					KAFB-0525					KAFB-0611				
SAMPLE_NO		KAFB-0524-12112014					KAFB-0525-01142015					KAFB-0611-04132015				
SAMPLE_DATE		11-Dec-14					14-Jan-15					13-Apr-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Potassium	µg/l	1,600	J	510	2,500	5,000	2,900		100	500	1,000	4,000		100	500	1,000
Sodium	µg/l	22,000		490	2,500	5,000	29,000		98	500	1,000	28,000		98	500	1,000
Bromide	µg/l	520	J	79	500	1,000	U		79	500	1,000	U		79	500	1,000
Chloride	µg/l	8,200		52	500	1,000	18,000		52	500	1,000	7,800		52	500	1,000
Fluoride	µg/l	360		9.9	50	100	290		9.9	50	100	590		9.9	50	100
Sulfate	µg/l	28,000		77	500	5,000	90,000		77	500	5,000	23,000		77	500	5,000
Nitrate-Nitrite	µg/l	1,800		20	85	100	14,000		20	85	100	12,000		20	85	100
Alkalinity	µg/l	100,000		2,600	10,000	20,000	160,000		2,600	10,000	20,000	140,000		2,600	10,000	20,000
Alkalinity, Bicarbonate	µg/l	100,000		2,600	10,000	20,000	—		—	—	—			—	—	—
Alkalinity, Carbonate	µg/l	U		2,600	10,000	20,000	—		—	—	—			—	—	—
Total Organic Carbon	µg/l	U		100	500	1,000	290	J	100	500	1,000	1,400		100	500	1,000
Dissolved Organic Carbon	µg/l	520	J	110	300	1,000	240	J	110	300	1,000	2,400		110	300	1,000
Ammonia Nitrogen	µg/l	U		38	41	250	U		38	41	250	U		38	41	250
Kjeldahl Nitrogen	µg/l	U		35	80	250	U		35	80	250	U		35	80	250

Notes:
- µg/L - Micrograms per liter
- DL - Detection Limit
- LOD - Limit of Detection
- LOQ - Limit of Quantification
- U - Not detected at the LOD

Qualifiers:
- B - The indicated compound was found in the associated method blank as well as the laboratory sample.
- J - Estimated value below the lowest calibration point. Confidence correlates with the concentration.
- J3 -The associated batch quality control was outside the established quality control range for precision.
- J4 -The associated batch quality control was outside the established quality control range for accuracy.
- J6 - The sample matrix interfered with the ability to make any accurate determination; spike value is low.
- P1 - Relative percent difference value not applicable for sample concentrations less than 5 times the reporting limit.

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		KAFB-0613					KAFB-0615					KAFB-0616				
SAMPLE_NO		KAFB-0613-06012015					KAFB-0615-05132015					KAFB-0616-05202015				
SAMPLE_DATE		1-Jun-15					13-May-15					20-May-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Dissolved Solids	µg/l	380,000		2,800	5,000	10,000	680,000		2,800	5,000	10,000	470,000		2,800	5,000	10,000
Antimony	µg/l	0.94	J	0.21	0.5	2	U		0.21	0.5	2	U		0.21	0.5	2
Arsenic	µg/l	1.2	J	0.25	0.5	2	U		0.25	0.5	2	0.67	J	0.25	0.5	2
Barium	µg/l	140		0.36	1	5	3.9	J	0.36	1	5	150		0.36	1	5
Beryllium	µg/l	U		0.12	0.5	2	U		0.12	0.5	2	U		0.12	0.5	2
Cadmium	µg/l	U		0.16	0.5	1	U		0.16	0.5	1	U		0.16	0.5	1
Chromium	µg/l	2.0		0.54	1.5	2	0.59	J	0.54	1.5	2	1.0	J	0.54	1.5	2
Copper	µg/l	U		0.52	1.5	5	0.59	J	0.52	1.5	5	U		0.52	1.5	5
Cobalt	µg/l	U		0.26	0.5	2	U		0.26	0.5	2	U		0.26	0.5	2
Lead	µg/l	U		0.24	0.5	2	U		0.24	0.5	2	U		0.24	0.5	2
Manganese	µg/l	0.41	J	0.25	0.5	5	2.4	J	0.25	0.5	5	U		0.25	0.5	5
Nickel	µg/l	U		0.35	1	2	U		0.35	1	2	U		0.35	1	2
Selenium	µg/l	2.2		0.38	1	2	14		0.38	1	2	5.8		0.38	1	2
Silver	µg/l	U		0.31	0.5	2	U		0.31	0.5	2	U		0.31	0.5	2
Thallium	µg/l	U		0.19	0.5	2	U		0.19	0.5	2	U		0.19	0.5	2
Vanadium	µg/l	6.2		0.18	0.5	5	1.5	J	0.18	0.5	5	4.7	J	0.18	0.5	5
Zinc	µg/l	U		2.6	5	25	U		2.6	5	25	U		2.6	5	25
Aluminum	µg/l	U		35	50	100	U		35	50	100	U		35	50	100
Boron	µg/l	82	J	13	100	200	88		13	100	200	74	J	13	100	200
Calcium	µg/l	53,000	V	46	500	1,000	120,000		46	500	1,000	80,000		46	500	1,000
Iron	µg/l	17	J	14	50	100	U		14	50	100	U		14	50	100
Lithium	µg/l	39	J	5.3	25	50	26		5.3	25	50	33	J	5.3	25	50
Magnesium	µg/l	9,700		11	500	1,000	31,000		11	500	1,000	16,000		11	500	1,000

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		KAFB-0613					KAFB-0615					KAFB-0616				
SAMPLE_NO		KAFB-0613-06012015					KAFB-0615-05132015					KAFB-0616-05202015				
SAMPLE_DATE		1-Jun-15					13-May-15					20-May-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Potassium	µg/l	3,600		100	500	1,000	7,100		100	500	1,000	2,500		100	500	1,000
Sodium	µg/l	36,000	J6	98	500	1,000	47,000		98	500	1,000	29,000		98	500	1,000
Bromide	µg/l	U		79	500	1,000	U		79	500	1,000	610	J	79	500	1,000
Chloride	µg/l	19,000		52	500	1,000	57,000		52	500	1,000	57,000		52	500	1,000
Fluoride	µg/l	460		9.9	50	100	2100		9.9	50	100	460		9.9	50	100
Sulfate	µg/l	19,000		77	500	5,000	280,000		770	5,000	50,000	58,000		77	500	5,000
Nitrate-Nitrite	µg/l	15,000		39	170	200	7,700		20	85	100	17,000		98	430	500
Alkalinity	µg/l	150,000		2,600	10,000	20,000	110,000		2,600	10,000	20,000	120,000		2,600	10,000	20,000
Alkalinity, Bicarbonate	µg/l			—	—	—			—	—	—			—	—	—
Alkalinity, Carbonate	µg/l			—	—	—			—	—	—			—	—	—
Total Organic Carbon	µg/l	1,500		100	500	1,000	100	J	100	500	1,000	960	J	100	500	1,000
Dissolved Organic Carbon	µg/l	660	J	110	300	1,000	280	J	110	300	1,000	460	J	110	300	1,000
Ammonia Nitrogen	µg/l	80	J	38	41	250	81	J	38	41	250	100	J	38	41	250
Kjeldahl Nitrogen	µg/l	U		35	80	250	U		35	80	250	U		35	80	250

Notes:
- µg/L - Micrograms per liter
- DL - Detection Limit
- LOD - Limit of Detection
- LOQ - Limit of Quantification
- U - Not detected at the LOD

Qualifiers:
- B - The indicated compound was found in the associated method blank as well as the laboratory sample.
- J - Estimated value below the lowest calibration point. Confidence correlates with the concentration.
- J3 -The associated batch quality control was outside the established quality control range for precision.
- J4 -The associated batch quality control was outside the established quality control range for accuracy.
- J6 - The sample matrix interfered with the ability to make any accurate determination; spike value is low.
- P1 - Relative percent difference value not applicable for sample concentrations less than 5 times the reporting limit.

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		KAFB-0617					KAFB-0618					KAFB-0620				
SAMPLE_NO		KAFB-0617-05192015					KAFB-0618-04232015					KAFB-0620-04142015				
SAMPLE_DATE		19-May-15					23-Apr-15					14-Apr-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Dissolved Solids	µg/l	300,000		2,800	5,000	10,000	1,200,000		2,800	5,000	10,000	360,000		2,800	5,000	10,000
Antimony	µg/l	U		0.21	0.5	2	0.86	J	0.21	0.5	2	0.79	J	0.21	0.5	2
Arsenic	µg/l	0.58	J	0.25	0.5	2	1.1	J	0.25	0.5	2	0.91	J	0.25	0.5	2
Barium	µg/l	140		0.36	1	5	76		0.36	1	5	84		0.36	1	5
Beryllium	µg/l	U		0.12	0.5	2	U		0.12	0.5	2	U		0.12	0.5	2
Cadmium	µg/l	U		0.16	0.5	1	U		0.16	0.5	1	U		0.16	0.5	1
Chromium	µg/l	1.2	J	0.54	1.5	2	6.9		0.54	1.5	2	2.0	J	0.54	1.5	2
Copper	µg/l	U		0.52	1.5	5	4.4	J	0.52	1.5	5	3.6	J	0.52	1.5	5
Cobalt	µg/l	U		0.26	0.5	2	U		0.26	0.5	2	U		0.26	0.5	2
Lead	µg/l	U		0.24	0.5	2	1.3	J	0.24	0.5	2	0.77	J	0.24	0.5	2
Manganese	µg/l	0.53	J	0.25	0.5	5	7.1		0.25	0.5	5	1.8	J	0.25	0.5	5
Nickel	µg/l	U		0.35	1	2	5.8		0.35	1	2	U		0.35	1	2
Selenium	µg/l	2.4		0.38	1	2	1.6	J	0.38	1	2	1.9	J	0.38	1	2
Silver	µg/l	U		0.31	0.5	2	U		0.31	0.5	2	U		0.31	0.5	2
Thallium	µg/l	U		0.19	0.5	2	0.22	J	0.19	0.5	2	U		0.19	0.5	2
Vanadium	µg/l	5.0		0.18	0.5	5	4.8	J	0.18	0.5	5	5.8		0.18	0.5	5
Zinc	µg/l	U		2.6	5	25	9.1	J	2.6	5	25	28		2.6	5	25
Aluminum	µg/l	98	J	35	50	100	170		35	50	100	35	J	35	50	100
Boron	µg/l	60	J	13	100	200	76	J	13	100	200	55	J	13	100	200
Calcium	µg/l	54,000		46	500	1,000	34,000	J5	46	500	1,000	73,000		46	500	1,000
Iron	µg/l	U		14	50	100	89	J	14	50	100	240		14	50	100
Lithium	µg/l	22	J	5.3	25	50	48	J	5.3	25	50	28	J	5.3	25	50
Magnesium	µg/l	11,000		11	500	1,000	4,600		11	500	1,000	12,000		11	500	1,000

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		KAFB-0617					KAFB-0618					KAFB-0620				
SAMPLE_NO		KAFB-0617-05192015					KAFB-0618-04232015					KAFB-0620-04142015				
SAMPLE_DATE		19-May-15					23-Apr-15					14-Apr-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Potassium	µg/l	2,000		100	500	1,000	4,800		100	500	1,000	4,100		100	500	1,000
Sodium	µg/l	32,000		98	500	1,000	54,000	BV	98	500	1,000	25,000		98	500	1,000
Bromide	µg/l	120	J	79	500	1,000	U		79	500	1,000	U		79	500	1,000
Chloride	µg/l	16,000		52	500	1,000	8,200		52	500	1,000	17,000		52	500	1,000
Fluoride	µg/l	520		9.9	50	100	490		9.9	50	100	430		9.9	50	100
Sulfate	µg/l	21,000		77	500	5,000	29,000		77	500	5,000	38,000		77	500	5,000
Nitrate-Nitrite	µg/l	13,000		20	85	100	5,500		20	85	100	11,000		20	85	100
Alkalinity	µg/l	160,000		2,600	10,000	20,000	150,000		2,600	10,000	20,000	150,000		2,600	10,000	20,000
Alkalinity, Bicarbonate	µg/l			—	—	—			—	—	—			—	—	—
Alkalinity, Carbonate	µg/l			—	—	—			—	—	—			—	—	—
Total Organic Carbon	µg/l	U		100	500	1,000	400		100	500	1,000	1,100		100	500	1,000
Dissolved Organic Carbon	µg/l	310	J	110	300	1,000	1,200		110	300	1,000	2,400		110	300	1,000
Ammonia Nitrogen	µg/l	77	J	38	41	250	100	J	38	41	250	U		38	41	250
Kjeldahl Nitrogen	µg/l	U		35	80	250	U		35	80	250	U		35	80	250

Notes:
- µg/L - Micrograms per liter
- DL - Detection Limit
- LOD - Limit of Detection
- LOQ - Limit of Quantification
- U - Not detected at the LOD

Qualifiers:
- B - The indicated compound was found in the associated method blank as well as the laboratory sample.
- J - Estimated value below the lowest calibration point. Confidence correlates with the concentration.
- J3 -The associated batch quality control was outside the established quality control range for precision.
- J4 -The associated batch quality control was outside the established quality control range for accuracy.
- J6 - The sample matrix interfered with the ability to make any accurate determination; spike value is low.
- P1 - Relative percent difference value not applicable for sample concentrations less than 5 times the reporting limit.

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		KAFB-0621					KAFB-0624					KAFB-0625				
SAMPLE_NO		KAFB-0621-04142015					KAFB-0624-04232015					KAFB-0625-06022015				
SAMPLE_DATE		14-Apr-15					23-Apr-15					2-Jun-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Dissolved Solids	µg/l	350,000		2,800	5,000	10,000	290,000		2,800	5,000	10,000	380,000		2,800	5,000	10,000
Antimony	µg/l	0.60	J	0.21	0.5	2	1.4	J	0.21	0.5	2	0.88	J	0.21	0.5	2
Arsenic	µg/l	1.3	J	0.25	0.5	2	0.33	J	0.25	0.5	2	1.8	J	0.25	0.5	2
Barium	µg/l	100		0.36	1	5	79		0.36	1	5	120		0.36	1	5
Beryllium	µg/l	U		0.12	0.5	2	U		0.12	0.5	2	U		0.12	0.5	2
Cadmium	µg/l	U		0.16	0.5	1	U		0.16	0.5	1	U		0.16	0.5	1
Chromium	µg/l	1.2	J	0.54	1.5	2	0.81	J	0.54	1.5	2	1.3	J	0.54	1.5	2
Copper	µg/l	U		0.52	1.5	5	0.55	J	0.52	1.5	5	U		0.52	1.5	5
Cobalt	µg/l	U		0.26	0.5	2	U		0.26	0.5	2	U		0.26	0.5	2
Lead	µg/l	U		0.24	0.5	2	U		0.24	0.5	2	U		0.24	0.5	2
Manganese	µg/l	0.80	J	0.25	0.5	5	U		0.25	0.5	5	U		0.25	0.5	5
Nickel	µg/l	U		0.35	1	2	U		0.35	1	2	0.39	J	0.35	1	2
Selenium	µg/l	3.6		0.38	1	2	4.2		0.38	1	2	2.0	J	0.38	1	2
Silver	µg/l	U		0.31	0.5	2	U		0.31	0.5	2	U		0.31	0.5	2
Thallium	µg/l	U		0.19	0.5	2	U		0.19	0.5	2	U		0.19	0.5	2
Vanadium	µg/l	4.1	J	0.18	0.5	5	2.6	J	0.18	0.5	5	5.5		0.18	0.5	5
Zinc	µg/l	12	J	2.6	5	25	U		2.6	5	25	U		2.6	5	25
Aluminum	µg/l	U		35	50	100	46	J	35	50	100	U		35	50	100
Boron	µg/l	64	J	13	100	200	62	J	13	100	200	71	J	13	100	200
Calcium	µg/l	76,000		46	500	1,000	87,000		46	500	1,000	50,000		46	500	1,000
Iron	µg/l	180		14	50	100	U		14	50	100	U		14	50	100
Lithium	µg/l	27	J	5.3	25	50	33	J	5.3	25	50	43	J	5.3	25	50
Magnesium	µg/l	12,000		11	500	1,000	14,000		11	500	1,000	10,000		11	500	1,000

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		KAFB-0621					KAFB-0624					KAFB-0625				
SAMPLE_NO		KAFB-0621-04142015					KAFB-0624-04232015					KAFB-0625-06022015				
SAMPLE_DATE		14-Apr-15					23-Apr-15					2-Jun-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Potassium	µg/l	2,100		100	500	1,000	2,700		100	500	1,000	6,500		100	500	1,000
Sodium	µg/l	27,000		98	500	1,000	29,000	B	98	500	1,000	31,000		98	500	1,000
Bromide	µg/l	400	J	79	500	1,000	140	J	79	500	1,000	U		79	500	1,000
Chloride	µg/l	33,000		52	500	1,000	26,000		52	500	1,000	20,000		52	500	1,000
Fluoride	µg/l	450		9.9	50	100	310		9.9	50	100	420		9.9	50	100
Sulfate	µg/l	53,000		77	500	5,000	50,000		77	500	5,000	30,000		77	500	5,000
Nitrate-Nitrite	µg/l	11,000		20	85	100	27,000		20	85	100	12,000		39	170	200
Alkalinity	µg/l	140,000		2,600	10,000	20,000	120,000		2,600	10,000	20,000	140,000		2,600	10,000	20,000
Alkalinity, Bicarbonate	µg/l			—	—	—			—	—	—			—	—	—
Alkalinity, Carbonate	µg/l			—	—	—			—	—	—			—	—	—
Total Organic Carbon	µg/l	1,200		100	500	1,000	970	J	100	500	1,000	220	JP1	100	500	1,000
Dissolved Organic Carbon	µg/l	2,400		110	300	1,000	940	J	110	300	1,000	420	J	110	300	1,000
Ammonia Nitrogen	µg/l	U		38	41	250	U		38	41	250	75	J	38	41	250
Kjeldahl Nitrogen	µg/l	U		35	80	250	U		35	80	250	U		35	80	250

Notes:
- µg/L - Micrograms per liter
- DL - Detection Limit
- LOD - Limit of Detection
- LOQ - Limit of Quantification
- U - Not detected at the LOD

Qualifiers:
- B - The indicated compound was found in the associated method blank as well as the laboratory sample.
- J - Estimated value below the lowest calibration point. Confidence correlates with the concentration.
- J3 -The associated batch quality control was outside the established quality control range for precision.
- J4 -The associated batch quality control was outside the established quality control range for accuracy.
- J6 - The sample matrix interfered with the ability to make any accurate determination; spike value is low.
- P1 - Relative percent difference value not applicable for sample concentrations less than 5 times the reporting limit.

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		KAFB-0626A					KAFB-0626B					KAFB-0626C				
SAMPLE_NO		KAFB-0626A-03052015					KAFB-0626B-03052015					KAFB-0626C-03052015				
SAMPLE_DATE		5-Mar-15					5-Mar-15					5-Mar-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Dissolved Solids	µg/l	310,000		2,800	5,000	10,000	320,000		2,800	5,000	10,000	280,000		2,800	5,000	10,000
Antimony	µg/l	0.23	J	0.21	0.5	2	U		0.21	0.5	2	U		0.21	0.5	2
Arsenic	µg/l	0.58	J	0.25	0.5	2	0.55	J	0.25	0.5	2	0.81	J	0.25	0.5	2
Barium	µg/l	110		0.36	1	5	97		0.36	1	5	110		0.36	1	5
Beryllium	µg/l	U		0.12	0.5	2	U		0.12	0.5	2	U		0.12	0.5	2
Cadmium	µg/l	U		0.16	0.5	1	U		0.16	0.5	1	U		0.16	0.5	1
Chromium	µg/l	1.5	J	0.54	1.5	2	1.2	J	0.54	1.5	2	U		0.54	1.5	2
Copper	µg/l	0.59	J	0.52	1.5	5	1.1	J	0.52	1.5	5	U		0.52	1.5	5
Cobalt	µg/l	U		0.26	0.5	2	U		0.26	0.5	2	U		0.26	0.5	2
Lead	µg/l	2.0	J	0.24	0.5	2	2.8		0.24	0.5	2	4.1		0.24	0.5	2
Manganese	µg/l	0.51	J	0.25	0.5	5	U		0.25	0.5	5	0.85	J	0.25	0.5	5
Nickel	µg/l	U		0.35	1	2	U		0.35	1	2	U		0.35	1	2
Selenium	µg/l	1.9	J	0.38	1	2	2.2		0.38	1	2	1.0	J	0.38	1	2
Silver	µg/l	U		0.31	0.5	2	U		0.31	0.5	2	U		0.31	0.5	2
Thallium	µg/l	U		0.19	0.5	2	U		0.19	0.5	2	U		0.19	0.5	2
Vanadium	µg/l	3.6	J	0.18	0.5	5	3.3	J	0.18	0.5	5	5.3		0.18	0.5	5
Zinc	µg/l	16	J	2.6	5	25	12	J	2.6	5	25	11	J	2.6	5	25
Aluminum	µg/l	41	J	35	50	100	U		35	50	100	U		35	50	100
Boron	µg/l	68	J	13	100	200	63	J	13	100	200	72	J	13	100	200
Calcium	µg/l	56,000		46	500	1,000	60,000		46	500	1,000	57,000		46	500	1,000
Iron	µg/l	18	J	14	50	100	U		14	50	100	U		14	50	100
Lithium	µg/l	23	J	5.3	25	50	22	J	5.3	25	50	30	J	5.3	25	50
Magnesium	µg/l	9,500		11	500	1,000	10,000		11	500	1,000	9,900		11	500	1,000

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		KAFB-0626A					KAFB-0626B					KAFB-0626C				
SAMPLE_NO		KAFB-0626A-03052015					KAFB-0626B-03052015					KAFB-0626C-03052015				
SAMPLE_DATE		5-Mar-15					5-Mar-15					5-Mar-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Potassium	µg/l	3,100		100	500	1,000	2,500		100	500	1,000	2,200		100	500	1,000
Sodium	µg/l	20,000	B	98	500	1,000	21,000	B	98	500	1,000	24,000	B	98	500	1,000
Bromide	µg/l	250	J	79	500	1,000	270	J	79	500	1,000	U		79	500	1,000
Chloride	µg/l	14,000		52	500	1,000	15,000		52	500	1,000	13,000		52	500	1,000
Fluoride	µg/l	450		9.9	50	100	410		9.9	50	100	480		9.9	50	100
Sulfate	µg/l	24,000		77	500	5,000	33,000		77	500	5,000	38,000		77	500	5,000
Nitrate-Nitrite	µg/l	7,900		20	85	100	7,900		20	85	100	2,600		20	85	100
Alkalinity	µg/l	160,000		2,600	10,000	20,000	140,000		2,600	10,000	20,000	150,000		2,600	10,000	20,000
Alkalinity, Bicarbonate	µg/l	—		—	—	—	—		—	—	—	—		—	—	—
Alkalinity, Carbonate	µg/l	—		—	—	—	—		—	—	—	—		—	—	—
Total Organic Carbon	µg/l	1,000		100	500	1,000	13,000		100	500	1,000	12,000		100	500	1,000
Dissolved Organic Carbon	µg/l	6,900		110	300	1,000	9,400		110	300	1,000	8,800		110	300	1,000
Ammonia Nitrogen	µg/l	U		38	41	250	U		38	41	250	U		38	41	250
Kjeldahl Nitrogen	µg/l	130	J	35	80	250	U		35	80	250	580		35	80	250

Notes:
- µg/L - Micrograms per liter
- DL - Detection Limit
- LOD - Limit of Detection
- LOQ - Limit of Quantification
- U - Not detected at the LOD

Qualifiers:
- B - The indicated compound was found in the associated method blank as well as the laboratory sample.
- J - Estimated value below the lowest calibration point. Confidence correlates with the concentration.
- J3 -The associated batch quality control was outside the established quality control range for precision.
- J4 -The associated batch quality control was outside the established quality control range for accuracy.
- J6 - The sample matrix interfered with the ability to make any accurate determination; spike value is low.
- P1 - Relative percent difference value not applicable for sample concentrations less than 5 times the reporting limit.

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		KAFB-0626D					KAFB-0904					KAFB-1007R				
SAMPLE_NO		KAFB-0626D-03052015					KAFB-0904-04202015					KAFB-1007R-01152015				
SAMPLE_DATE		5-Mar-15					20-Apr-15					15-Jan-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Dissolved Solids	µg/l	260,000		2,800	5,000	10,000	380,000		2,800	5,000	10,000	260,000		2,800	5,000	10,000
Antimony	µg/l	U		0.21	0.5	2	0.50	J	0.21	0.5	2	U		0.21	0.5	2
Arsenic	µg/l	0.77	J	0.25	0.5	2	0.99	J	0.25	0.5	2	1.3	J	0.25	0.5	2
Barium	µg/l	100		0.36	1	5	130		0.36	1	5	83		0.36	1	5
Beryllium	µg/l	U		0.12	0.5	2	U		0.12	0.5	2	0.89	J	0.12	0.5	2
Cadmium	µg/l	U		0.16	0.5	1	U		0.16	0.5	1	U		0.16	0.5	1
Chromium	µg/l	0.62	J	0.54	1.5	2	2.8		0.54	1.5	2	4.6		0.54	1.5	2
Copper	µg/l	U		0.52	1.5	5	1.2	J	0.52	1.5	5	U		0.52	1.5	5
Cobalt	µg/l	U		0.26	0.5	2	U		0.26	0.5	2	U		0.26	0.5	2
Lead	µg/l	3.5		0.24	0.5	2	0.42	J	0.24	0.5	2	U		0.24	0.5	2
Manganese	µg/l	0.79	J	0.25	0.5	5	3.2	J	0.25	0.5	5	1.5	J	0.25	0.5	5
Nickel	µg/l	U		0.35	1	2	0.94	J	0.35	1	2	U		0.35	1	2
Selenium	µg/l	1.3	J	0.38	1	2	6.7		0.38	1	2	1.4	J	0.38	1	2
Silver	µg/l	U		0.31	0.5	2	U		0.31	0.5	2	U		0.31	0.5	2
Thallium	µg/l	U		0.19	0.5	2	U		0.19	0.5	2	U		0.19	0.5	2
Vanadium	µg/l	6.9		0.18	0.5	5	3.7	J	0.18	0.5	5	9.4		0.18	0.5	5
Zinc	µg/l	16	J	2.6	5	25	11	J	2.6	5	25	U		2.6	5	25
Aluminum	µg/l	44	J	35	50	100	100		35	50	100	61	J	35	50	100
Boron	µg/l	76	J	13	100	200	73	J	13	100	200	52	J	13	100	200
Calcium	µg/l	48,000		46	500	1,000	77,000		46	500	1,000	47,000		46	500	1,000
Iron	µg/l	U		14	50	100	100		14	50	100	48	J	14	50	100
Lithium	µg/l	36	J	5.3	25	50	29	J	5.3	25	50	32	J	5.3	25	50
Magnesium	µg/l	7,800		11	500	1,000	14,000		11	500	1,000	11,000		11	500	1,000

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		KAFB-0626D					KAFB-0904					KAFB-1007R				
SAMPLE_NO		KAFB-0626D-03052015					KAFB-0904-04202015					KAFB-1007R-01152015				
SAMPLE_DATE		5-Mar-15					20-Apr-15					15-Jan-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Potassium	µg/l	2,400		100	500	1,000	5,100		100	500	1,000	3,800		100	500	1,000
Sodium	µg/l	28,000	B	98	500	1,000	23,000	B	98	500	1,000	22,000		98	500	1,000
Bromide	µg/l	U		79	500	1,000	U		79	500	1,000	U		79	500	1,000
Chloride	µg/l	9,500		52	500	1,000	14,000		52	500	1,000	11,000		52	500	1,000
Fluoride	µg/l	490		9.9	50	100	380		9.9	50	100	410		9.9	50	100
Sulfate	µg/l	25,000		77	500	5,000	23,000		77	500	5,000	40,000		77	500	5,000
Nitrate-Nitrite	µg/l	4,400		20	85	100	23,000		20	85	100	8,800		20	85	100
Alkalinity	µg/l	150,000		2,600	10,000	20,000	160,000		2,600	10,000	20,000	120,000		2,600	10,000	20,000
Alkalinity, Bicarbonate	µg/l	—		—	—	—			—	—	—	—		—	—	—
Alkalinity, Carbonate	µg/l	—		—	—	—			—	—	—	—		—	—	—
Total Organic Carbon	µg/l	12,000		100	500	1,000	1,500		100	500	1,000	210	J	100	500	1,000
Dissolved Organic Carbon	µg/l	8,600		110	300	1,000	840	J	110	300	1,000	110	J	110	300	1,000
Ammonia Nitrogen	µg/l	U		38	41	250	U		38	41	250	U		38	41	250
Kjeldahl Nitrogen	µg/l	440		35	80	250	U		35	80	250	U		35	80	250

Notes:
- µg/L - Micrograms per liter
- DL - Detection Limit
- LOD - Limit of Detection
- LOQ - Limit of Quantification
- U - Not detected at the LOD

Qualifiers:
- B - The indicated compound was found in the associated method blank as well as the laboratory sample.
- J - Estimated value below the lowest calibration point. Confidence correlates with the concentration.
- J3 -The associated batch quality control was outside the established quality control range for precision.
- J4 -The associated batch quality control was outside the established quality control range for accuracy.
- J6 - The sample matrix interfered with the ability to make any accurate determination; spike value is low.
- P1 - Relative percent difference value not applicable for sample concentrations less than 5 times the reporting limit.

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		KAFB-1008					KAFB-1009					KAFB-2628				
SAMPLE_NO		KAFB-1008-01192015					KAFB-1009-01152015					KAFB-2628-05182015				
SAMPLE_DATE		19-Jan-15					15-Jan-15					18-May-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Dissolved Solids	µg/l	240,000		2,800	5,000	10,000	270,000		2,800	5,000	10,000	350,000		2,800	5,000	10,000
Antimony	µg/l	U		0.21	0.5	2	U		0.21	0.5	2	U		0.21	0.5	2
Arsenic	µg/l	1.5	J	0.25	0.5	2	1.6	J	0.25	0.5	2	0.49	J	0.25	0.5	2
Barium	µg/l	75		0.36	1	5	71		0.36	1	5	74		0.36	1	5
Beryllium	µg/l	U		0.12	0.5	2	U		0.12	0.5	2	U		0.12	0.5	2
Cadmium	µg/l	U		0.16	0.5	1	U		0.16	0.5	1	U		0.16	0.5	1
Chromium	µg/l	4.7		0.54	1.5	2	4.1		0.54	1.5	2	1.2	J	0.54	1.5	2
Copper	µg/l	0.53	J	0.52	1.5	5	U		0.52	1.5	5	0.56	J	0.52	1.5	5
Cobalt	µg/l	U		0.26	0.5	2	U		0.26	0.5	2	U		0.26	0.5	2
Lead	µg/l	U		0.24	0.5	2	U		0.24	0.5	2	U		0.24	0.5	2
Manganese	µg/l	0.25	J	0.25	0.5	5	U		0.25	0.5	5	2.1	J	0.25	0.5	5
Nickel	µg/l	U		0.35	1	2	U		0.35	1	2	U		0.35	1	2
Selenium	µg/l	1.2	J	0.38	1	2	1.3	J	0.38	1	2	1.7	J	0.38	1	2
Silver	µg/l	0.41	J	0.31	0.5	2	0.37	J	0.31	0.5	2	U		0.31	0.5	2
Thallium	µg/l	U		0.19	0.5	2	0.41	J	0.19	0.5	2	U		0.19	0.5	2
Vanadium	µg/l	9.1		0.18	0.5	5	10		0.18	0.5	5	3.8	J	0.18	0.5	5
Zinc	µg/l	U		2.6	5	25	U		2.6	5	25	U		2.6	5	25
Aluminum	µg/l	U		35	50	100	U		35	50	100	190		35	50	100
Boron	µg/l	46	J	13	100	200	59	J	13	100	200	57	J	13	100	200
Calcium	µg/l	39,000		46	500	1,000	43,000		46	500	1,000	74,000		46	500	1,000
Iron	µg/l	U		14	50	100	U		14	50	100	U		14	50	100
Lithium	µg/l	28	J	5.3	25	50	54		5.3	25	50	21	J	5.3	25	50
Magnesium	µg/l	9,800		11	500	1,000	14,000		11	500	1,000	13,000		11	500	1,000

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		KAFB-1008					KAFB-1009					KAFB-2628				
SAMPLE_NO		KAFB-1008-01192015					KAFB-1009-01152015					KAFB-2628-05182015				
SAMPLE_DATE		19-Jan-15					15-Jan-15					18-May-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Potassium	µg/l	3,400		100	500	1,000	4,600		100	500	1,000	2,300		100	500	1,000
Sodium	µg/l	19,000		98	500	1,000	26,000		98	500	1,000	28,000		98	500	1,000
Bromide	µg/l	U		79	500	1,000	U		79	500	1,000	U		79	500	1,000
Chloride	µg/l	8,300		52	500	1,000	13,000		52	500	1,000	17,000		52	500	1,000
Fluoride	µg/l	420		9.9	50	100	640		9.9	50	100	390		9.9	50	100
Sulfate	µg/l	31,000		77	500	5,000	44,000		77	500	5,000	91,000		77	500	5,000
Nitrate-Nitrite	µg/l	5,700		20	85	100	6,100		20	85	100	2,300		20	85	100
Alkalinity	µg/l	110,000		2,600	10,000	20,000	120,000	J6	2,600	10,000	20,000	180,000		2,600	10,000	20,000
Alkalinity, Bicarbonate	µg/l	—		—	—	—	—		—	—	—			—	—	—
Alkalinity, Carbonate	µg/l	—		—	—	—	—		—	—	—			—	—	—
Total Organic Carbon	µg/l	580	J	100	500	1,000	U		100	500	1,000	U		100	500	1,000
Dissolved Organic Carbon	µg/l	390	J	110	300	1,000	U		110	300	1,000	320	J	110	300	1,000
Ammonia Nitrogen	µg/l	39	J	38	41	250	U		38	41	250	75	J	38	41	250
Kjeldahl Nitrogen	µg/l	8500		35	80	250	U	J6	35	80	250	200	J	35	80	250

Notes:
- µg/L - Micrograms per liter
- DL - Detection Limit
- LOD - Limit of Detection
- LOQ - Limit of Quantification
- U - Not detected at the LOD

Qualifiers:
- B - The indicated compound was found in the associated method blank as well as the laboratory sample.
- J - Estimated value below the lowest calibration point. Confidence correlates with the concentration.
- J3 -The associated batch quality control was outside the established quality control range for precision.
- J4 -The associated batch quality control was outside the established quality control range for accuracy.
- J6 - The sample matrix interfered with the ability to make any accurate determination; spike value is low.
- P1 - Relative percent difference value not applicable for sample concentrations less than 5 times the reporting limit.

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		KAFB-2629					ST105-MW01					ST105-MW02				
SAMPLE_NO		KAFB-2629-05182015					ST105MW001-12112014					ST105MW002-01062015				
SAMPLE_DATE		18-May-15					11-Dec-14					6-Jan-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Dissolved Solids	µg/l	360,000		2,800	5,000	10,000	280,000		2,800	5,000	10,000	210,000		2,800	5,000	10,000
Antimony	µg/l	U		0.21	0.5	2	U		0.21	0.5	2	U		0.21	0.5	2
Arsenic	µg/l	0.63	J	0.25	0.5	2	0.62	J4	0.25	0.5	2	1.0	J	0.25	0.5	2
Barium	µg/l	49		0.36	1	5	190		0.36	1	5	83		0.36	1	5
Beryllium	µg/l	U		0.12	0.5	2	U	J4J3	0.12	0.5	2	U		0.12	0.5	2
Cadmium	µg/l	U		0.16	0.5	1	U		0.16	0.5	1	U		0.16	0.5	1
Chromium	µg/l	1.2	J	0.54	1.5	2	3.60		0.54	1.5	2	2.1		0.54	1.5	2
Copper	µg/l	0.62	J	0.52	1.5	5	U		0.52	1.5	5	U		0.52	1.5	5
Cobalt	µg/l	U		0.26	0.5	2	U		0.26	0.5	2	U		0.26	0.5	2
Lead	µg/l	U		0.24	0.5	2	0.54	J	0.24	0.5	2	U		0.24	0.5	2
Manganese	µg/l	0.4	J	0.25	0.5	5	0.61	J	0.25	0.5	5	U		0.25	0.5	5
Nickel	µg/l	U		0.35	1	2	U		0.35	1	2	U		0.35	1	2
Selenium	µg/l	1.8	J	0.38	1	2	1.5	J	0.38	1	2	U		0.38	1	2
Silver	µg/l	U		0.31	0.5	2	U		0.31	0.5	2	U		0.31	0.5	2
Thallium	µg/l	U		0.19	0.5	2	U		0.19	0.5	2	U		0.19	0.5	2
Vanadium	µg/l	4.1	J	0.18	0.5	5	3.3	J	0.18	0.5	5	3.5	J	0.18	0.5	5
Zinc	µg/l	U		2.6	5	25	U		2.6	5	25	U		2.6	5	25
Aluminum	µg/l	110		35	50	100	U		180	250	500	U		180	250	500
Boron	µg/l	56	J	13	100	200	89	J	63	500	1,000	86	J	63	500	1,000
Calcium	µg/l	83,000		46	500	1,000	50,000		230	2,500	5,000	39,000		230	2,500	5,000
Iron	µg/l	U		14	50	100	U		70	250	500	U		70	250	500
Lithium	µg/l	23	J	5.3	25	50	U		26	130	250	U		26	130	250
Magnesium	µg/l	13,000		11	500	1,000	7,700		56	2,500	5,000	4,000	J	56	2,500	5,000

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		KAFB-2629					ST105-MW01					ST105-MW02				
SAMPLE_NO		KAFB-2629-05182015					ST105MW001-12112014					ST105MW002-01062015				
SAMPLE_DATE		18-May-15					11-Dec-14					6-Jan-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Potassium	µg/l	2,400		100	500	1,000	2,400	J	510	2,500	5,000	2,100	J	510	2,500	5,000
Sodium	µg/l	28,000		98	500	1,000	27,000		490	2,500	5,000	19,000		490	2,500	5,000
Bromide	µg/l	100	J	79	500	1,000	540	J	79	500	1,000	U		79	500	1,000
Chloride	µg/l	17,000		52	500	1,000	13,000		52	500	1,000	7,300		52	500	1,000
Fluoride	µg/l	440		9.9	50	100	260		9.9	50	100	420		9.9	50	100
Sulfate	µg/l	90,000		77	500	5,000	26,000		77	500	5,000	29,000		77	500	5,000
Nitrate-Nitrite	µg/l	4,200		20	85	100	2,700		20	85	100	2,600		20	85	100
Alkalinity	µg/l	180,000		2,600	10,000	20,000	180,000		2,600	10,000	20,000	100,000		2,600	10,000	20,000
Alkalinity, Bicarbonate	µg/l			—	—	—	180,000		2,600	10,000	20,000	—		—	—	—
Alkalinity, Carbonate	µg/l			—	—	—	U		2,600	10,000	20,000	—		—	—	—
Total Organic Carbon	µg/l	U		100	500	1,000	160	J	100	500	1,000	U		100	500	1,000
Dissolved Organic Carbon	µg/l	360	J	110	300	1,000	400	J	110	300	1,000	330	J	110	300	1,000
Ammonia Nitrogen	µg/l	78	J	38	41	250	U		38	41	250	U		38	41	250
Kjeldahl Nitrogen	µg/l	U	J6	35	80	250	U		35	80	250	U		35	80	250

Notes:
- µg/L - Micrograms per liter
- DL - Detection Limit
- LOD - Limit of Detection
- LOQ - Limit of Quantification
- U - Not detected at the LOD

Qualifiers:
- B - The indicated compound was found in the associated method blank as well as the laboratory sample.
- J - Estimated value below the lowest calibration point. Confidence correlates with the concentration.
- J3 -The associated batch quality control was outside the established quality control range for precision.
- J4 -The associated batch quality control was outside the established quality control range for accuracy.
- J6 - The sample matrix interfered with the ability to make any accurate determination; spike value is low.
- P1 - Relative percent difference value not applicable for sample concentrations less than 5 times the reporting limit.

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		ST105-MW03					ST105-MW04					ST105-MW09				
SAMPLE_NO		ST105MW003-01272015					ST105MW004-12152014					ST105MW009-01082015				
SAMPLE_DATE		27-Jan-15					15-Dec-14					8-Jan-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Dissolved Solids	µg/l	200,000		2,800	5,000	10,000	370,000		2,800	5,000	10,000	530,000		2,800	5,000	10,000
Antimony	µg/l	U		0.21	0.5	2	U		0.21	0.5	2	0.25	J	0.21	0.5	2
Arsenic	µg/l	1.5	JJ4	0.25	0.5	2	0.39	J	0.25	0.5	2	0.47	J	0.25	0.5	2
Barium	µg/l	130		0.36	1	5	62		0.36	1	5	130		0.36	1	5
Beryllium	µg/l	U		0.12	0.5	2	U	J4J3	0.12	0.5	2	U		0.12	0.5	2
Cadmium	µg/l	U	J4	0.16	0.5	1	U		0.16	0.5	1	U		0.16	0.5	1
Chromium	µg/l	3.8		0.54	1.5	2	2.2		0.54	1.5	2	1.0	J	0.54	1.5	2
Copper	µg/l	U	J4	0.52	1.5	5	U		0.52	1.5	5	0.65	J	0.52	1.5	5
Cobalt	µg/l	U		0.26	0.5	2	U		0.26	0.5	2	U		0.26	0.5	2
Lead	µg/l	U		0.24	0.5	2	0.9		0.24	0.5	2	U		0.24	0.5	2
Manganese	µg/l	4.5	J	0.25	0.5	5	6.2	J	0.25	0.5	5	0.49	J	0.25	0.5	5
Nickel	µg/l	0.36	JJ4	0.35	1	2	U		0.35	1	2	U		0.35	1	2
Selenium	µg/l	0.58	J	0.38	1	2	2.1		0.38	1	2	12		0.38	1	2
Silver	µg/l	0.31	J	0.31	0.5	2	U		0.31	0.5	2	0.40	J	0.31	0.5	2
Thallium	µg/l	U		0.19	0.5	2	U		0.19	0.5	2	0.27	J	0.19	0.5	2
Vanadium	µg/l	5.8		0.18	0.5	5	3.8	J	0.18	0.5	5	3.2	J	0.18	0.5	5
Zinc	µg/l	U		2.6	5	25	U		2.6	5	25	U		2.6	5	25
Aluminum	µg/l	87	J	35	50	100	U		180	250	500	43	J	35	50	100
Boron	µg/l	73	J	13	100	200	U		63	500	1,000	70	J	13	100	200
Calcium	µg/l	39,000		46	500	1,000	69,000		230	2,500	5,000	110,000		46	500	1,000
Iron	µg/l	60	J	14	50	100	U		70	250	500	U		14	50	100
Lithium	µg/l	13	J	5.3	25	50	U		26	130	250	28	J	5.3	25	50
Magnesium	µg/l	3,800		11	500	1,000	13,000		56	2,500	5,000	18,000		11	500	1,000

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		ST105-MW03					ST105-MW04					ST105-MW09				
SAMPLE_NO		ST105MW003-01272015					ST105MW004-12152014					ST105MW009-01082015				
SAMPLE_DATE		27-Jan-15					15-Dec-14					8-Jan-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Potassium	µg/l	2,200		100	500	1,000	2,400	J	510	2,500	5,000	2,300		100	500	1,000
Sodium	µg/l	21,000		98	500	1,000	25,000		490	2,500	5,000	28,000		98	500	1,000
Bromide	µg/l	U		79	500	1,000	3,000		79	500	1,000	830	J	79	500	1,000
Chloride	µg/l	7,400		52	500	1,000	16,000		52	500	1,000	110,000		260	2,500	5,000
Fluoride	µg/l	420		9.9	50	100	340		9.9	50	100	280		9.9	50	100
Sulfate	µg/l	28,000		77	500	5,000	90,000		77	500	5,000	100,000		390	2,500	25,000
Nitrate-Nitrite	µg/l	3,200		20	85	100	2,900		20	85	100	10,000		20	85	100
Alkalinity	µg/l	100,000		2,600	10,000	20,000	170,000		2,600	10,000	20,000	99,000		2,600	10,000	20,000
Alkalinity, Bicarbonate	µg/l	—		—	—	—	170,000		2,600	10,000	20,000	—		—	—	—
Alkalinity, Carbonate	µg/l	—		—	—	—	U		2,600	10,000	20,000	—		—	—	—
Total Organic Carbon	µg/l	220	J	100	500	1,000	U		100	500	1,000	380	J	100	500	1,000
Dissolved Organic Carbon	µg/l	U		110	300	1,000	170	J	110	300	1,000	660	JP1	110	300	1,000
Ammonia Nitrogen	µg/l	58	J	38	41	250	U		38	41	250	U		38	41	250
Kjeldahl Nitrogen	µg/l	U		35	80	250	U		35	80	250	U		35	80	250

Notes:
- µg/L - Micrograms per liter
- DL - Detection Limit
- LOD - Limit of Detection
- LOQ - Limit of Quantification
- U - Not detected at the LOD

Qualifiers:
- B - The indicated compound was found in the associated method blank as well as the laboratory sample.
- J - Estimated value below the lowest calibration point. Confidence correlates with the concentration.
- J3 -The associated batch quality control was outside the established quality control range for precision.
- J4 -The associated batch quality control was outside the established quality control range for accuracy.
- J6 - The sample matrix interfered with the ability to make any accurate determination; spike value is low.
- P1 - Relative percent difference value not applicable for sample concentrations less than 5 times the reporting limit.

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		ST105-MW13					ST105-MW15					ST105-MW17				
SAMPLE_NO		ST105MW013-01062015					ST105MW-015-04152015					ST105MW-017-05292015				
SAMPLE_DATE		6-Jan-15					15-Apr-15					29-May-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Dissolved Solids	µg/l	330,000		2,800	5,000	10,000	400,000		2,800	5,000	10,000	320,000		2,800	5,000	10,000
Antimony	µg/l	U		0.21	0.5	2	0.42	J	0.21	0.5	2	0.29	J	0.21	0.5	2
Arsenic	µg/l	0.32	J	0.25	0.5	2	0.28	J	0.25	0.5	2	0.40	J	0.25	0.5	2
Barium	µg/l	91		0.36	1	5	190		0.36	1	5	69		0.36	1	5
Beryllium	µg/l	U		0.12	0.5	2	U		0.12	0.5	2	U	J4	0.12	0.5	2
Cadmium	µg/l	U		0.16	0.5	1	U		0.16	0.5	1	U		0.16	0.5	1
Chromium	µg/l	1.1	J	0.54	1.5	2	0.70	J	0.54	1.5	2	1.3	J	0.54	1.5	2
Copper	µg/l	U		0.52	1.5	5	0.53	J	0.52	1.5	5	U		0.52	1.5	5
Cobalt	µg/l	U		0.26	0.5	2	U		0.26	0.5	2	U		0.26	0.5	2
Lead	µg/l	U		0.24	0.5	2	U		0.24	0.5	2	U		0.24	0.5	2
Manganese	µg/l	2.1	J	0.25	0.5	5	280		0.25	0.5	5	0.50	J	0.25	0.5	5
Nickel	µg/l	U		0.35	1	2	0.62	J	0.35	1	2	U		0.35	1	2
Selenium	µg/l	1.3	J	0.38	1	2	2.9		0.38	1	2	2.8		0.38	1	2
Silver	µg/l	U		0.31	0.5	2	U		0.31	0.5	2	U		0.31	0.5	2
Thallium	µg/l	U		0.19	0.5	2	U		0.19	0.5	2	U		0.19	0.5	2
Vanadium	µg/l	2.8	J	0.18	0.5	5	2.3	J	0.18	0.5	5	3.7	J	0.18	0.5	5
Zinc	µg/l	U		2.6	5	25	15	J	2.6	5	25	U		2.6	5	25
Aluminum	µg/l	U		180	250	500	37	J	35	50	100	U		35	50	100
Boron	µg/l	130	J	63	500	1,000	45	J	13	100	200	56	J	13	100	200
Calcium	µg/l	60,000		230	2,500	5,000	74,000		46	500	1,000	68,000		46	500	1,000
Iron	µg/l	130	J	70	250	500	100	J	14	50	100	U		14	50	100
Lithium	µg/l	32	J	26	130	250	29	J	5.3	25	50	22	J	5.3	25	50
Magnesium	µg/l	10,000		56	2,500	5,000	11,000		11	500	1,000	9,400		11	500	1,000

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		ST105-MW13					ST105-MW15					ST105-MW17				
SAMPLE_NO		ST105MW013-01062015					ST105MW-015-04152015					ST105MW-017-05292015				
SAMPLE_DATE		6-Jan-15					15-Apr-15					29-May-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Potassium	µg/l	2,700	J	510	2,500	5,000	2,500		100	500	1,000	1,900		100	500	1,000
Sodium	µg/l	30,000		490	2,500	5,000	25,000		98	500	1,000	24,000		98	500	1,000
Bromide	µg/l	280	J	79	500	1,000	280	J	79	500	1,000	180	J	79	500	1,000
Chloride	µg/l	19,000		52	500	1,000	22,000		52	500	1,000	23,000		52	500	1,000
Fluoride	µg/l	400		9.9	50	100	420		9.9	50	100	390		9.9	50	100
Sulfate	µg/l	21,000		77	500	5,000	45,000		77	500	5,000	57,000		77	500	5,000
Nitrate-Nitrite	µg/l	13,000		20	85	100	12,000		20	85	100	9,000		20	85	100
Alkalinity	µg/l	150,000		2,600	10,000	20,000	160,000		2,600	10,000	20,000	130,000		2,600	10,000	20,000
Alkalinity, Bicarbonate	µg/l	—		—	—	—			—	—	—			—	—	—
Alkalinity, Carbonate	µg/l	—		—	—	—			—	—	—			—	—	—
Total Organic Carbon	µg/l	380	J	100	500	1,000	2,600		100	500	1,000	U		100	500	1,000
Dissolved Organic Carbon	µg/l	260	J	110	300	1,000	2,700		110	300	1,000	390	J	110	300	1,000
Ammonia Nitrogen	µg/l	U		38	41	250	U		38	41	250	75	J	38	41	250
Kjeldahl Nitrogen	µg/l	120	J	35	80	250	U		35	80	250	U		35	80	250

Notes:
- µg/L - Micrograms per liter
- DL - Detection Limit
- LOD - Limit of Detection
- LOQ - Limit of Quantification
- U - Not detected at the LOD

Qualifiers:
- B - The indicated compound was found in the associated method blank as well as the laboratory sample.
- J - Estimated value below the lowest calibration point. Confidence correlates with the concentration.
- J3 -The associated batch quality control was outside the established quality control range for precision.
- J4 -The associated batch quality control was outside the established quality control range for accuracy.
- J6 - The sample matrix interfered with the ability to make any accurate determination; spike value is low.
- P1 - Relative percent difference value not applicable for sample concentrations less than 5 times the reporting limit.

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		ST105-MW18					ST105-MW23					ST105-MW24				
SAMPLE_NO		ST105MW-018-05212015					ST105MW-023-05062015					ST105MW-24-05152015				
SAMPLE_DATE		21-May-15					6-May-15					15-May-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Dissolved Solids	µg/l	710,000		2,800	5,000	10,000	320,000		2,800	5,000	10,000	600,000		2,800	5,000	10,000
Antimony	µg/l	U		0.21	0.5	2	U		0.21	0.5	2	U		0.21	0.5	2
Arsenic	µg/l	0.73	J	0.25	0.5	2	0.87	J	0.25	0.5	2	1.0	J	0.25	0.5	2
Barium	µg/l	160		0.36	1	5	160		0.36	1	5	15		0.36	1	5
Beryllium	µg/l	U	J4	0.12	0.5	2	U		0.12	0.5	2	U		0.12	0.5	2
Cadmium	µg/l	U		0.16	0.5	1	U		0.16	0.5	1	U		0.16	0.5	1
Chromium	µg/l	2.8		0.54	1.5	2	3.1		0.54	1.5	2	1.2	J	0.54	1.5	2
Copper	µg/l	U		0.52	1.5	5	U		0.52	1.5	5	1.2	J	0.52	1.5	5
Cobalt	µg/l	U		0.26	0.5	2	U		0.26	0.5	2	0.4	J	0.26	0.5	2
Lead	µg/l	U		0.24	0.5	2	U		0.24	0.5	2	0.7	J	0.24	0.5	2
Manganese	µg/l	1.7	J	0.25	0.5	5	2.2	J	0.25	0.5	5	78		0.25	0.5	5
Nickel	µg/l	0.40	J	0.35	1	2	0.36	J	0.35	1	2	2.1		0.35	1	2
Selenium	µg/l	4.8		0.38	1	2	2.1		0.38	1	2	6.4		0.38	1	2
Silver	µg/l	U		0.31	0.5	2	U		0.31	0.5	2	U		0.31	0.5	2
Thallium	µg/l	U		0.19	0.5	2	U		0.19	0.5	2	U		0.19	0.5	2
Vanadium	µg/l	3.4	J	0.18	0.5	5	4.4	J	0.18	0.5	5	0.85	J	0.18	0.5	5
Zinc	µg/l	U		2.6	5	25	U		2.6	5	25	11	J	2.6	5	25
Aluminum	µg/l	U		35	50	100	140		35	50	100	290		35	50	100
Boron	µg/l	45	J	13	100	200	43	J	13	100	200	110	J	13	100	200
Calcium	µg/l	120,000		46	500	1,000	56,000		46	500	1,000	120,000		46	500	1,000
Iron	µg/l	39	J	14	50	100	76	J	14	50	100	890		14	50	100
Lithium	µg/l	22	J	5.3	25	50	17	J	5.3	25	50	27	J	5.3	25	50
Magnesium	µg/l	15,000		11	500	1,000	8,300		11	500	1,000	23,000		11	500	1,000

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		ST105-MW18					ST105-MW23					ST105-MW24				
SAMPLE_NO		ST105MW-018-05212015					ST105MW-023-05062015					ST105MW-24-05152015				
SAMPLE_DATE		21-May-15					6-May-15					15-May-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Potassium	µg/l	3,400		100	500	1,000	2,400		100	500	1,000	7,200		100	500	1,000
Sodium	µg/l	31,000		98	500	1,000	25,000	B	98	500	1,000	54,000		98	500	1,000
Bromide	µg/l	340	J	79	500	1,000	110	J	79	500	1,000	150	JJ6	79	500	1,000
Chloride	µg/l	18,000		52	500	1,000	17,000		52	500	1,000	61,000		52	500	1,000
Fluoride	µg/l	300		9.9	50	100	360		9.9	50	100	2100		9.9	50	100
Sulfate	µg/l	61,000		77	500	5,000	30,000		77	500	5,000	260,000		770	5,000	50,000
Nitrate-Nitrite	µg/l	62,000		200	850	1,000	20,000		20	85	100	940		20	85	100
Alkalinity	µg/l	110,000		2,600	10,000	20,000	120,000		2,600	10,000	20,000	150,000	J6	2,600	10,000	20,000
Alkalinity, Bicarbonate	µg/l			—	—	—			—	—	—			—	—	—
Alkalinity, Carbonate	µg/l			—	—	—			—	—	—			—	—	—
Total Organic Carbon	µg/l	U		100	500	1,000	860	J	100	500	1,000	740	J	100	500	1,000
Dissolved Organic Carbon	µg/l	570	J	110	300	1,000	250	J	110	300	1,000	340	J	110	300	1,000
Ammonia Nitrogen	µg/l	97	J	38	41	250	U		38	41	250	90	J	38	41	250
Kjeldahl Nitrogen	µg/l	U		35	80	250	U		35	80	250	U		35	80	250

Notes:
- µg/L - Micrograms per liter
- DL - Detection Limit
- LOD - Limit of Detection
- LOQ - Limit of Quantification
- U - Not detected at the LOD

Qualifiers:
- B - The indicated compound was found in the associated method blank as well as the laboratory sample.
- J - Estimated value below the lowest calibration point. Confidence correlates with the concentration.
- J3 -The associated batch quality control was outside the established quality control range for precision.
- J4 -The associated batch quality control was outside the established quality control range for accuracy.
- J6 - The sample matrix interfered with the ability to make any accurate determination; spike value is low.
- P1 - Relative percent difference value not applicable for sample concentrations less than 5 times the reporting limit.

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		TJA-4				
SAMPLE_NO		TJA-4-05282015				
SAMPLE_DATE		28-May-15				
SAMPLE_TYPE		Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ
Dissolved Solids	µg/l	400,000		2,800	5,000	10,000
Antimony	µg/l	0.33	J	0.21	0.5	2
Arsenic	µg/l	1.1	J	0.25	0.5	2
Barium	µg/l	170		0.36	1	5
Beryllium	µg/l	U	J4	0.12	0.5	2
Cadmium	µg/l	U		0.16	0.5	1
Chromium	µg/l	1.6	J	0.54	1.5	2
Copper	µg/l	0.64	J	0.52	1.5	5
Cobalt	µg/l	U		0.26	0.5	2
Lead	µg/l	U		0.24	0.5	2
Manganese	µg/l	0.46	J	0.25	0.5	5
Nickel	µg/l	0.69	J	0.35	1	2
Selenium	µg/l	3.1		0.38	1	2
Silver	µg/l	U		0.31	0.5	2
Thallium	µg/l	U		0.19	0.5	2
Vanadium	µg/l	5.5		0.18	0.5	5
Zinc	µg/l	U		2.6	5	25
Aluminum	µg/l	U		35	50	100
Boron	µg/l	72	J	13	100	200
Calcium	µg/l	73,000		46	500	1,000
Iron	µg/l	U		14	50	100
Lithium	µg/l	33	J	5.3	25	50
Magnesium	µg/l	13,000		11	500	1,000

Kirtland Air Force Base
ST-105 Regional Aquifer

LOCATION_CODE		TJA-4				
SAMPLE_NO		TJA-4-05282015				
SAMPLE_DATE		28-May-15				
SAMPLE_TYPE		Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ
Potassium	µg/l	3,100		100	500	1,000
Sodium	µg/l	25,000		98	500	1,000
Bromide	µg/l	270	J	79	500	1,000
Chloride	µg/l	27,000		52	500	1,000
Fluoride	µg/l	400		9.9	50	100
Sulfate	µg/l	17,000		77	500	5,000
Nitrate-Nitrite	µg/l	28,000		98	430	500
Alkalinity	µg/l	130,000		2,600	10,000	20,000
Alkalinity, Bicarbonate	µg/l			—	—	—
Alkalinity, Carbonate	µg/l			—	—	—
Total Organic Carbon	µg/l	U		100	500	1,000
Dissolved Organic Carbon	µg/l	130	JP1	110	300	1,000
Ammonia Nitrogen	µg/l	88	J	38	41	250
Kjeldahl Nitrogen	µg/l	U		35	80	250

Notes:
- µg/L - Micrograms per liter
- DL - Detection Limit
- LOD - Limit of Detection
- LOQ - Limit of Quantification
- U - Not detected at the LOD

Qualifiers:
- B - The indicated compound was found in the associated method blank as well as the laboratory sample.
- J - Estimated value below the lowest calibration point. Confidence correlates with the concentration.
- J3 -The associated batch quality control was outside the established quality control range for precision.
- J4 -The associated batch quality control was outside the established quality control range for accuracy.
- J6 - The sample matrix interfered with the ability to make any accurate determination; spike value is low.
- P1 - Relative percent difference value not applicable for sample concentrations less than 5 times the reporting limit.

Kirtland Air Force Base
ST-105 Perched Aquifer

LOCATION_CODE		KAFB-0314					KAFB-0506					KAFB-0602				
SAMPLE_NO		KAFB-0314-05062015					KAFB-0506-01212015					KAFB-0602-06012015				
SAMPLE_DATE		6-May-15					21-Jan-15					1-Jun-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Dissolved Solids	µg/l	690,000		2,800	5,000	10,000	730,000		2,800	5,000	10,000	410,000		2,800	5,000	10,000
Antimony	µg/l	U		0.21	0.5	2	U		0.21	0.5	2	1.1	J	0.21	0.5	2
Arsenic	µg/l	0.67	J	0.25	0.5	2	0.76	J	0.25	0.5	2	0.88	J	0.25	0.5	2
Barium	µg/l	38		0.36	1	5	35		0.36	1	5	140		0.36	1	5
Beryllium	µg/l	U		0.12	0.5	2	U		0.12	0.5	2	U		0.12	0.5	2
Cadmium	µg/l	U		0.16	0.5	1	U		0.16	0.5	1	U		0.16	0.5	1
Chromium	µg/l	5.2		0.54	1.5	2	4.7		0.54	1.5	2	0.97	J	0.54	1.5	2
Copper	µg/l	0.99	J	0.52	1.5	5	U		0.52	1.5	5	0.72	J	0.52	1.5	5
Cobalt	µg/l	U		0.26	0.5	2	U		0.26	0.5	2	U		0.26	0.5	2
Lead	µg/l	U		0.24	0.5	2	U		0.24	0.5	2	0.4	J	0.24	0.5	2
Manganese	µg/l	3.0	J	0.25	0.5	5	0.86	J	0.25	0.5	5	U		0.25	0.5	5
Nickel	µg/l	0.80	J	0.35	1	2	1.6	J	0.35	1	2	1.3	J	0.35	1	2
Selenium	µg/l	9.6		0.38	1	2	11		0.38	1	2	4.0		0.38	1	2
Silver	µg/l	U		0.31	0.5	2	0.67	J	0.31	0.5	2	U		0.31	0.5	2
Thallium	µg/l	U		0.19	0.5	2	U		0.19	0.5	2	U		0.19	0.5	2
Vanadium	µg/l	4.0	J	0.18	0.5	5	3.8	J	0.18	0.5	5	5.4		0.18	0.5	5
Zinc	µg/l	U		2.6	5	25	2.8	J	2.6	5	25	12	J	2.6	5	25
Aluminum	µg/l	U		35	50	100	51	J	35	50	100	U		35	50	100
Boron	µg/l	47	J	13	100	200	43	J	13	100	200	62	J	13	100	200
Calcium	µg/l	140,000		46	500	1,000	160,000		46	500	1,000	69,000		46	500	1,000
Iron	µg/l	32	J	14	50	100	14	J	14	50	100	19	J	14	50	100
Lithium	µg/l	26	J	5.3	25	50	21	J	5.3	25	50	33	J	5.3	25	50
Magnesium	µg/l	21,000		11	500	1,000	20,000		11	500	1,000	13,000		11	500	1,000

Kirtland Air Force Base
ST-105 Perched Aquifer

LOCATION_CODE		KAFB-0314					KAFB-0506					KAFB-0602				
SAMPLE_NO		KAFB-0314-05062015					KAFB-0506-01212015					KAFB-0602-06012015				
SAMPLE_DATE		6-May-15					21-Jan-15					1-Jun-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Potassium	µg/l	2,400		100	500	1,000	2,000		100	500	1,000	3,200		100	500	1,000
Sodium	µg/l	30,000	B	98	500	1,000	28,000		98	500	1,000	26,000		98	500	1,000
Bromide	µg/l	U		79	500	1,000	2,200		79	500	1,000	360	J	79	500	1,000
Chloride	µg/l	120,000		100	1,000	2,000	68,000		52	500	1,000	38,000		52	500	1,000
Fluoride	µg/l	270		9.9	50	100	290		9.9	50	100	410		9.9	50	100
Sulfate	µg/l	170,000		770	5,000	50,000	330,000		390	2,500	25,000	46,000		77	500	5,000
Nitrate-Nitrite	µg/l	5,400		20	85	100	2,100		20	85	100	17,000		39	170	200
Alkalinity	µg/l	110,000		2,600	10,000	20,000	75,000		2,600	10,000	20,000	130,000		2,600	10,000	20,000
Alkalinity, Bicarbonate	µg/l			—	—	—	—		—	—	—			—	—	—
Alkalinity, Carbonate	µg/l			—	—	—	—		—	—	—			—	—	—
Total Organic Carbon	µg/l	630	J	100	500	1,000	2,200		100	500	1,000	870	J	100	500	1,000
Dissolved Organic Carbon	µg/l	730	J	110	300	1,000	880	J	110	300	1,000	430	J	110	300	1,000
Ammonia Nitrogen	µg/l	U		38	41	250	U		38	41	250	81	J	38	41	250
Kjeldahl Nitrogen	µg/l	U		35	80	250	U		35	80	250	U		35	80	250

Notes:
- µg/L - Micrograms per liter
- DL - Detection Limit
- LOD - Limit of Detection
- LOQ - Limit of Quantification
- U - Not detected at the LOD

Qualifiers:
- B - The indicated compound was found in the associated method blank as well as the laboratory sample.
- J - Estimated value below the lowest calibration point. Confidence correlates with the concentration.
- J3 -The associated batch quality control was outside the established quality control range for precision.
- J4 -The associated batch quality control was outside the established quality control range for accuracy.
- J6 - The sample matrix interfered with the ability to make any accurate determination; spike value is low.
- P1 - Relative percent difference value not applicable for sample concentrations less than 5 times the reporting limit.

Kirtland Air Force Base
ST-105 Perched Aquifer

LOCATION_CODE		KAFB-0608					KAFB-0612					KAFB-0614				
SAMPLE_NO		KAFB-0608-05282015					KAFB-0612-04132015					KAFB-0614-05262015				
SAMPLE_DATE		28-May-15					13-Apr-15					26-May-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Dissolved Solids	µg/l	500,000		2,800	5,000	10,000	520,000		2,800	5,000	10,000	390,000		2,800	5,000	10,000
Antimony	µg/l	0.28	J	0.21	0.5	2	0.56	J	0.21	0.5	2	U		0.21	0.5	2
Arsenic	µg/l	0.68	J	0.25	0.5	2	0.60	J	0.25	0.5	2	0.88	J	0.25	0.5	2
Barium	µg/l	45		0.36	1	5	31		0.36	1	5	170		0.36	1	5
Beryllium	µg/l	U	J4	0.12	0.5	2	U		0.12	0.5	2	U	J4	0.12	0.5	2
Cadmium	µg/l	U		0.16	0.5	1	U		0.16	0.5	1	U		0.16	0.5	1
Chromium	µg/l	14		0.54	1.5	2	3.7		0.54	1.5	2	1.3	J	0.54	1.5	2
Copper	µg/l	1.5	J	0.52	1.5	5	1.2	J	0.52	1.5	5	U		0.52	1.5	5
Cobalt	µg/l	0.40	J	0.26	0.5	2	U		0.26	0.5	2	U		0.26	0.5	2
Lead	µg/l	U		0.24	0.5	2	U		0.24	0.5	2	U		0.24	0.5	2
Manganese	µg/l	U		0.25	0.5	5	U		0.25	0.5	5	0.37	J	0.25	0.5	5
Nickel	µg/l	0.40	J	0.35	1	2	U		0.35	1	2	U		0.35	1	2
Selenium	µg/l	6.9		0.38	1	2	8.8		0.38	1	2	3.6		0.38	1	2
Silver	µg/l	U		0.31	0.5	2	U		0.31	0.5	2	U		0.31	0.5	2
Thallium	µg/l	U		0.19	0.5	2	U		0.19	0.5	2	U		0.19	0.5	2
Vanadium	µg/l	4.4	J	0.18	0.5	5	4.0	J	0.18	0.5	5	5.7		0.18	0.5	5
Zinc	µg/l	U		2.6	5	25	6.5	J	2.6	5	25	U		2.6	5	25
Aluminum	µg/l	U		35	50	100	50	J	35	50	100	44	J	35	50	100
Boron	µg/l	51	J	13	100	200	51	J	13	100	200	76	J	13	100	200
Calcium	µg/l	99,000		46	500	1,000	100,000		46	500	1,000	76,000		46	500	1,000
Iron	µg/l	16	J	14	50	100	240		14	50	100	U		14	50	100
Lithium	µg/l	30	J	5.3	25	50	29	J	5.3	25	50	34	J	5.3	25	50
Magnesium	µg/l	19,000		11	500	1,000	17,000		11	500	1,000	14,000		11	500	1,000

Kirtland Air Force Base
ST-105 Perched Aquifer

LOCATION_CODE		KAFB-0608					KAFB-0612					KAFB-0614				
SAMPLE_NO		KAFB-0608-05282015					KAFB-0612-04132015					KAFB-0614-05262015				
SAMPLE_DATE		28-May-15					13-Apr-15					26-May-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Potassium	µg/l	2,200		100	500	1,000	2,000		100	500	1,000	2,600		100	500	1,000
Sodium	µg/l	26,000		98	500	1,000	28,000		98	500	1,000	26,000		98	500	1,000
Bromide	µg/l	340	J	79	500	1,000	380	J	79	500	1,000	290	J	79	500	1,000
Chloride	µg/l	33,000		52	500	1,000	22,000		52	500	1,000	25,000		52	500	1,000
Fluoride	µg/l	380		9.9	50	100	330		9.9	50	100	400		9.9	50	100
Sulfate	µg/l	110,000		150	1,000	10,000	120,000		150	1,000	10,000	45,000		77	500	5,000
Nitrate-Nitrite	µg/l	30,000		98	430	500	25,000		20	85	100	23,000		98	430	500
Alkalinity	µg/l	120,000		2,600	10,000	20,000	130,000	J6	2,600	10,000	20,000	140,000		2,600	10,000	20,000
Alkalinity, Bicarbonate	µg/l			—	—	—			—	—	—			—	—	—
Alkalinity, Carbonate	µg/l			—	—	—			—	—	—			—	—	—
Total Organic Carbon	µg/l	430	J	100	500	1,000	1,400		100	500	1,000	400	J	100	500	1,000
Dissolved Organic Carbon	µg/l	780	J	110	300	1,000	2,600		110	300	1,000	390	J	110	300	1,000
Ammonia Nitrogen	µg/l	88	J	38	41	250	U		38	41	250	87	J	38	41	250
Kjeldahl Nitrogen	µg/l	U		35	80	250	U		35	80	250	U		35	80	250

Notes:
- µg/L - Micrograms per liter
- DL - Detection Limit
- LOD - Limit of Detection
- LOQ - Limit of Quantification
- U - Not detected at the LOD

Qualifiers:
- B - The indicated compound was found in the associated method blank as well as the laboratory sample.
- J - Estimated value below the lowest calibration point. Confidence correlates with the concentration.
- J3 -The associated batch quality control was outside the established quality control range for precision.
- J4 -The associated batch quality control was outside the established quality control range for accuracy.
- J6 - The sample matrix interfered with the ability to make any accurate determination; spike value is low.
- P1 - Relative percent difference value not applicable for sample concentrations less than 5 times the reporting limit.

Kirtland Air Force Base
ST-105 Perched Aquifer

LOCATION_CODE		KAFB-0619					KAFB-0623					ST105-MW06				
SAMPLE_NO		KAFB-0619-04232015					KAFB-0623-05112015					ST105MW006-01082015				
SAMPLE_DATE		23-Apr-15					11-May-15					8-Jan-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Dissolved Solids	µg/l	280,000		2,800	5,000	10,000	750,000		2,800	5,000	10,000	680,000		2,800	5,000	10,000
Antimony	µg/l	1.8	J	0.21	0.5	2	0.55	J	0.21	0.5	2	U		0.21	0.5	2
Arsenic	µg/l	1.7	J	0.25	0.5	2	0.70	J	0.25	0.5	2	0.50	J	0.25	0.5	2
Barium	µg/l	150		0.36	1	5	93		0.36	1	5	51		0.36	1	5
Beryllium	µg/l	0.13	J	0.12	0.5	2	U		0.12	0.5	2	U		0.12	0.5	2
Cadmium	µg/l	U		0.16	0.5	1	U		0.16	0.5	1	U		0.16	0.5	1
Chromium	µg/l	10		0.54	1.5	2	1.6	J	0.54	1.5	2	2.2		0.54	1.5	2
Copper	µg/l	5.6		0.52	1.5	5	0.79	J	0.52	1.5	5	U		0.52	1.5	5
Cobalt	µg/l	1.3	J	0.26	0.5	2	U		0.26	0.5	2	U		0.26	0.5	2
Lead	µg/l	2.6		0.24	0.5	2	0.25	J	0.24	0.5	2	U		0.24	0.5	2
Manganese	µg/l	72		0.25	0.5	5	1.2	J	0.25	0.5	5	U		0.25	0.5	5
Nickel	µg/l	4.8		0.35	1	2	0.43	J	0.35	1	2	U		0.35	1	2
Selenium	µg/l	2.5		0.38	1	2	7.3		0.38	1	2	8.4		0.38	1	2
Silver	µg/l	U		0.31	0.5	2	U		0.31	0.5	2	U		0.31	0.5	2
Thallium	µg/l	U		0.19	0.5	2	U		0.19	0.5	2	U		0.19	0.5	2
Vanadium	µg/l	9.6		0.18	0.5	5	4.7	J	0.18	0.5	5	3.6	J	0.18	0.5	5
Zinc	µg/l	69		2.6	5	25	U		2.6	5	25	U		2.6	5	25
Aluminum	µg/l	490		35	50	100	U		35	50	100	U		35	50	100
Boron	µg/l	47	J	13	100	200	16	J	13	100	200	63	J	13	100	200
Calcium	µg/l	53,000		46	500	1,000	130,000		46	500	1,000	140,000		46	500	1,000
Iron	µg/l	390		14	50	100	28	J	14	50	100	U		14	50	100
Lithium	µg/l	37	J	5.3	25	50	33	J	5.3	25	50	29	J	5.3	25	50
Magnesium	µg/l	8,400		11	500	1,000	24,000		11	500	1,000	24,000		11	500	1,000

Kirtland Air Force Base
ST-105 Perched Aquifer

LOCATION_CODE		KAFB-0619					KAFB-0623					ST105-MW06				
SAMPLE_NO		KAFB-0619-04232015					KAFB-0623-05112015					ST105MW006-01082015				
SAMPLE_DATE		23-Apr-15					11-May-15					8-Jan-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Potassium	µg/l	3,500		100	500	1,000	2,800		100	500	1,000	2,600		100	500	1,000
Sodium	µg/l	42,000	B	98	500	1,000	25,000		98	500	1,000	26,000		98	500	1,000
Bromide	µg/l	U		79	500	1,000	88	J	79	500	1,000	200	J	79	500	1,000
Chloride	µg/l	12,000		52	500	1,000	28,000		52	500	1,000	35,000		52	500	1,000
Fluoride	µg/l	380		9.9	50	100	320		9.9	50	100	230		9.9	50	100
Sulfate	µg/l	20,000		77	500	5,000	88,000		77	500	5,000	87,000		390	2,500	25,000
Nitrate-Nitrite	µg/l	8,900		20	85	100	63,000		20	85	100	70,000		20	85	100
Alkalinity	µg/l	140,000		2,600	10,000	20,000	120,000		2,600	10,000	20,000	100,000		2,600	10,000	20,000
Alkalinity, Bicarbonate	µg/l			—	—	—			—	—	—	—		—	—	—
Alkalinity, Carbonate	µg/l			—	—	—			—	—	—	—		—	—	—
Total Organic Carbon	µg/l	1,500		100	500	1,000	U		100	500	1,000	340	J	100	500	1,000
Dissolved Organic Carbon	µg/l	1,400		110	300	1,000	620	J	110	300	1,000	570	J	110	300	1,000
Ammonia Nitrogen	µg/l	58	J	38	41	250	52	J	38	41	250	45	J	38	41	250
Kjeldahl Nitrogen	µg/l	U		35	80	250	U		35	80	250	U		35	80	250

Notes:
- µg/L - Micrograms per liter
- DL - Detection Limit
- LOD - Limit of Detection
- LOQ - Limit of Quantification
- U - Not detected at the LOD

Qualifiers:
- B - The indicated compound was found in the associated method blank as well as the laboratory sample.
- J - Estimated value below the lowest calibration point. Confidence correlates with the concentration.
- J3 -The associated batch quality control was outside the established quality control range for precision.
- J4 -The associated batch quality control was outside the established quality control range for accuracy.
- J6 - The sample matrix interfered with the ability to make any accurate determination; spike value is low.
- P1 - Relative percent difference value not applicable for sample concentrations less than 5 times the reporting limit.

Kirtland Air Force Base
ST-105 Perched Aquifer

LOCATION_CODE		ST105-MW10					ST105-MW12					ST105-MW19				
SAMPLE_NO		ST105MW010-12162014					ST105MW012-01072015					ST105MW-19-05112015				
SAMPLE_DATE		16-Dec-14					7-Jan-15					11-May-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Dissolved Solids	µg/l	350,000		2,800	5,000	10,000	280,000		2,800	5,000	10,000	230,000		2,800	5,000	10,000
Antimony	µg/l	U		0.21	0.5	2	U		0.21	0.5	2	0.91	J	0.21	0.5	2
Arsenic	µg/l	0.31	J	0.25	0.5	2	0.62	J	0.25	0.5	2	0.83	J	0.25	0.5	2
Barium	µg/l	53		0.36	1	5	80		0.36	1	5	120		0.36	1	5
Beryllium	µg/l	U	J4J3	0.12	0.5	2	U		0.12	0.5	2	U		0.12	0.5	2
Cadmium	µg/l	U		0.16	0.5	1	U		0.16	0.5	1	U		0.16	0.5	1
Chromium	µg/l	2.4		0.54	1.5	2	2.2		0.54	1.5	2	2.8		0.54	1.5	2
Copper	µg/l	U		0.52	1.5	5	1.0	J	0.52	1.5	5	U		0.52	1.5	5
Cobalt	µg/l	U		0.26	0.5	2	U		0.26	0.5	2	U		0.26	0.5	2
Lead	µg/l	U		0.24	0.5	2	0.33	J	0.24	0.5	2	U		0.24	0.5	2
Manganese	µg/l	1.6	J	0.25	0.5	5	6.9		0.25	0.5	5	1.8	J	0.25	0.5	5
Nickel	µg/l	1.4	J	0.35	1	2	0.47	J	0.35	1	2	U		0.35	1	2
Selenium	µg/l	2.7		0.38	1	2	1.2	J	0.38	1	2	1.2	J	0.38	1	2
Silver	µg/l	U		0.31	0.5	2	U		0.31	0.5	2	U		0.31	0.5	2
Thallium	µg/l	U		0.19	0.5	2	U		0.19	0.5	2	U		0.19	0.5	2
Vanadium	µg/l	4.0	J	0.18	0.5	5	3.3	J	0.18	0.5	5	4.2	J	0.18	0.5	5
Zinc	µg/l	U		2.6	5	25	4.1	J	2.6	5	25	U		2.6	5	25
Aluminum	µg/l	U		180	250	500	430	J	180	250	500	U		35	50	100
Boron	µg/l	U		63	500	1,000	71	J	63	500	1,000	34	J	13	100	200
Calcium	µg/l	63,000		230	2,500	5,000	46,000		230	2,500	5,000	41,000		46	500	1,000
Iron	µg/l	U		70	250	500	690		70	250	500	91	J	14	50	100
Lithium	µg/l	U		26	130	250	41	J	26	130	250	15	J	5.3	25	50
Magnesium	µg/l	12,000		56	2,500	5,000	7,900		56	2,500	5,000	6,000		11	500	1,000

Kirtland Air Force Base
ST-105 Perched Aquifer

LOCATION_CODE		ST105-MW10					ST105-MW12					ST105-MW19				
SAMPLE_NO		ST105MW010-12162014					ST105MW012-01072015					ST105MW-19-05112015				
SAMPLE_DATE		16-Dec-14					7-Jan-15					11-May-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Potassium	µg/l	2,200	J	510	2,500	5,000	3,300	J	510	2,500	5,000	2,200		100	500	1,000
Sodium	µg/l	22,000		490	2,500	5,000	37,000		490	2,500	5,000	22,000		98	500	1,000
Bromide	µg/l	2,900		79	500	1,000	U		79	500	1,000	U		79	500	1,000
Chloride	µg/l	17,000		52	500	1,000	11,000		52	500	1,000	7,400		52	500	1,000
Fluoride	µg/l	310		9.9	50	100	400		9.9	50	100	430		9.9	50	100
Sulfate	µg/l	52,000		77	500	5,000	21,000		77	500	5,000	31,000		77	500	5,000
Nitrate-Nitrite	µg/l	9,800		20	85	100	9,000		20	85	100	4,400		20	85	100
Alkalinity	µg/l	160,000		2,600	10,000	20,000	150,000		2,600	10,000	20,000	120,000		2,600	10,000	20,000
Alkalinity, Bicarbonate	µg/l	160,000		2,600	10,000	20,000	—		—	—	—			—	—	—
Alkalinity, Carbonate	µg/l	U		2,600	10,000	20,000	—		—	—	—			—	—	—
Total Organic Carbon	µg/l	U		100	500	1,000	400	J	100	500	1,000	190	J	100	500	1,000
Dissolved Organic Carbon	µg/l	330	J	110	300	1,000	560	J	110	300	1,000	420	J	110	300	1,000
Ammonia Nitrogen	µg/l	U		38	41	250	U		38	41	250	75	J	38	41	250
Kjeldahl Nitrogen	µg/l	U		35	80	250	U		35	80	250	U		35	80	250

Notes:
- µg/L - Micrograms per liter
- DL - Detection Limit
- LOD - Limit of Detection
- LOQ - Limit of Quantification
- U - Not detected at the LOD

Qualifiers:
- B - The indicated compound was found in the associated method blank as well as the laboratory sample.
- J - Estimated value below the lowest calibration point. Confidence correlates with the concentration.
- J3 -The associated batch quality control was outside the established quality control range for precision.
- J4 -The associated batch quality control was outside the established quality control range for accuracy.
- J6 - The sample matrix interfered with the ability to make any accurate determination; spike value is low.
- P1 - Relative percent difference value not applicable for sample concentrations less than 5 times the reporting limit.

Kirtland Air Force Base
ST-105 Perched Aquifer

LOCATION_CODE		ST105-MW20					ST105-MW21					ST105-MW22				
SAMPLE_NO		ST105MW-20-05132015					ST105MW-021-05212015					ST105MW-022-06022015				
SAMPLE_DATE		13-May-15					21-May-15					2-Jun-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Dissolved Solids	µg/l	500,000		2,800	5,000	10,000	460,000		2,800	5,000	10,000	390,000		2,800	5,000	10,000
Antimony	µg/l	U		0.21	0.5	2	U		0.21	0.5	2	0.70	J	0.21	0.5	2
Arsenic	µg/l	0.57	J	0.25	0.5	2	0.79	J	0.25	0.5	2	1.7	J	0.25	0.5	2
Barium	µg/l	34		0.36	1	5	210		0.36	1	5	120		0.36	1	5
Beryllium	µg/l	U		0.12	0.5	2	U		0.12	0.5	2	U		0.12	0.5	2
Cadmium	µg/l	U		0.16	0.5	1	U		0.16	0.5	1	U		0.16	0.5	1
Chromium	µg/l	1.2	J	0.54	1.5	2	1.2	J	0.54	1.5	2	1.1	J	0.54	1.5	2
Copper	µg/l	0.62	J	0.52	1.5	5	U		0.52	1.5	5	U		0.52	1.5	5
Cobalt	µg/l	U		0.26	0.5	2	U		0.26	0.5	2	U		0.26	0.5	2
Lead	µg/l	U		0.24	0.5	2	0.3	J	0.24	0.5	2	0.25	J	0.24	0.5	2
Manganese	µg/l	0.49	J	0.25	0.5	5	7.6		0.25	0.5	5	0.26	J	0.25	0.5	5
Nickel	µg/l	U		0.35	1	2	U		0.35	1	2	U		0.35	1	2
Selenium	µg/l	5.8		0.38	1	2	3.4		0.38	1	2	2.5		0.38	1	2
Silver	µg/l	U		0.31	0.5	2	U		0.31	0.5	2	U		0.31	0.5	2
Thallium	µg/l	U		0.19	0.5	2	U		0.19	0.5	2	U		0.19	0.5	2
Vanadium	µg/l	3.3	J	0.18	0.5	5	4.6	J	0.18	0.5	5	5.4		0.18	0.5	5
Zinc	µg/l	U		2.6	5	25	4.1	J	2.6	5	25	U		2.6	5	25
Aluminum	µg/l	U		35	50	100	300		35	50	100	U		35	50	100
Boron	µg/l	97	J	13	100	200	58	J	13	100	200	66	J	13	100	200
Calcium	µg/l	120,000		46	500	1,000	74,000		46	500	1,000	56,000		46	500	1,000
Iron	µg/l	U		14	50	100	160		14	50	100	68	J	14	50	100
Lithium	µg/l	21	J	5.3	25	50	30	J	5.3	25	50	44	J	5.3	25	50
Magnesium	µg/l	13,000		11	500	1,000	15,000		11	500	1,000	12,000		11	500	1,000

Kirtland Air Force Base
ST-105 Perched Aquifer

LOCATION_CODE		ST105-MW20					ST105-MW21					ST105-MW22				
SAMPLE_NO		ST105MW-20-05132015					ST105MW-021-05212015					ST105MW-022-06022015				
SAMPLE_DATE		13-May-15					21-May-15					2-Jun-15				
SAMPLE_TYPE		Field Original					Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Potassium	µg/l	1,900		100	500	1,000	2,700		100	500	1,000	6,900		100	500	1,000
Sodium	µg/l	28,000		98	500	1,000	24,000		98	500	1,000	29,000		98	500	1,000
Bromide	µg/l	280	J	79	500	1,000	380	J	79	500	1,000	U		79	500	1,000
Chloride	µg/l	55,000		52	500	1,000	32,000		52	500	1,000	22,000		52	500	1,000
Fluoride	µg/l	200		9.9	50	100	400		9.9	50	100	460		9.9	50	100
Sulfate	µg/l	130,000		770	5,000	50,000	20,000		77	500	5,000	33,000		77	500	5,000
Nitrate-Nitrite	µg/l	5,600		20	85	100	26,000		98	430	500	13,000		39	170	200
Alkalinity	µg/l	140,000		2,600	10,000	20,000	140,000		2,600	10,000	20,000	140,000		2,600	10,000	20,000
Alkalinity, Bicarbonate	µg/l			—	—	—			—	—	—			—	—	—
Alkalinity, Carbonate	µg/l			—	—	—			—	—	—			—	—	—
Total Organic Carbon	µg/l	140	JP1	100	500	1,000	920	J	100	500	1,000	150	J	100	500	1,000
Dissolved Organic Carbon	µg/l	800	J	110	300	1,000	280	J	110	300	1,000	1,000		110	300	1,000
Ammonia Nitrogen	µg/l	78	J	38	41	250	99	J	38	41	250	77	J	38	41	250
Kjeldahl Nitrogen	µg/l	U	J6J3	35	80	250	U		35	80	250	U		35	80	250

Notes:
- µg/L - Micrograms per liter
- DL - Detection Limit
- LOD - Limit of Detection
- LOQ - Limit of Quantification
- U - Not detected at the LOD

Qualifiers:
- B - The indicated compound was found in the associated method blank as well as the laboratory sample.
- J - Estimated value below the lowest calibration point. Confidence correlates with the concentration.
- J3 -The associated batch quality control was outside the established quality control range for precision.
- J4 -The associated batch quality control was outside the established quality control range for accuracy.
- J6 - The sample matrix interfered with the ability to make any accurate determination; spike value is low.
- P1 - Relative percent difference value not applicable for sample concentrations less than 5 times the reporting limit.

Kirtland Air Force Base
ST-105 Perched Aquifer

LOCATION_CODE		TJA-2					TJA-5				
SAMPLE_NO		TJA-2-04202015					TJA-5-05272015				
SAMPLE_DATE		20-Apr-15					27-May-15				
SAMPLE_TYPE		Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Dissolved Solids	µg/l	420,000		2,800	5,000	10,000	460,000		2,800	5,000	10,000
Antimony	µg/l	U		0.21	0.5	2	U		0.21	0.5	2
Arsenic	µg/l	0.69	J	0.25	0.5	2	0.76	J	0.25	0.5	2
Barium	µg/l	44		0.36	1	5	53		0.36	1	5
Beryllium	µg/l	U		0.12	0.5	2	U	J4	0.12	0.5	2
Cadmium	µg/l	U		0.16	0.5	1	U		0.16	0.5	1
Chromium	µg/l	1.2	J	0.54	1.5	2	3.3		0.54	1.5	2
Copper	µg/l	U		0.52	1.5	5	U		0.52	1.5	5
Cobalt	µg/l	U		0.26	0.5	2	U		0.26	0.5	2
Lead	µg/l	U		0.24	0.5	2	U		0.24	0.5	2
Manganese	µg/l	0.41	J	0.25	0.5	5	1.5	J	0.25	0.5	5
Nickel	µg/l	5.0		0.35	1	2	U		0.35	1	2
Selenium	µg/l	3.9		0.38	1	2	4.6		0.38	1	2
Silver	µg/l	U		0.31	0.5	2	U		0.31	0.5	2
Thallium	µg/l	U		0.19	0.5	2	U		0.19	0.5	2
Vanadium	µg/l	4.5	J	0.18	0.5	5	5.5		0.18	0.5	5
Zinc	µg/l	U		2.6	5	25	U		2.6	5	25
Aluminum	µg/l	350		35	50	100	73	J	35	50	100
Boron	µg/l	46	J	13	100	200	53	J	13	100	200
Calcium	µg/l	85,000		46	500	1,000	91,000		46	500	1,000
Iron	µg/l	47	J	14	50	100	U		14	50	100
Lithium	µg/l	21	J	5.3	25	50	24	J	5.3	25	50
Magnesium	µg/l	12,000		11	500	1,000	15,000		11	500	1,000

Kirtland Air Force Base
ST-105 Perched Aquifer

LOCATION_CODE		TJA-2					TJA-5				
SAMPLE_NO		TJA-2-04202015					TJA-5-05272015				
SAMPLE_DATE		20-Apr-15					27-May-15				
SAMPLE_TYPE		Field Original					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Potassium	µg/l	1,700		100	500	1,000	2,000		100	500	1,000
Sodium	µg/l	22,000	B	98	500	1,000	24,000		98	500	1,000
Bromide	µg/l	300	J	79	500	1,000	320	J	79	500	1,000
Chloride	µg/l	67,000		52	500	1,000	28,000		52	500	1,000
Fluoride	µg/l	280		9.9	50	100	340		9.9	50	100
Sulfate	µg/l	58,000		77	500	5,000	77,000		77	500	5,000
Nitrate-Nitrite	µg/l	9,600		20	85	100	26,000		98	430	500
Alkalinity	µg/l	120,000		2,600	10,000	20,000	110,000		2,600	10,000	20,000
Alkalinity, Bicarbonate	µg/l			—	—	—			—	—	—
Alkalinity, Carbonate	µg/l			—	—	—			—	—	—
Total Organic Carbon	µg/l	1,100		100	500	1,000	U		100	500	1,000
Dissolved Organic Carbon	µg/l	580	J	110	300	1,000	440	J	110	300	1,000
Ammonia Nitrogen	µg/l	U		38	41	250	100	J	38	41	250
Kjeldahl Nitrogen	µg/l	U		35	80	250	U		35	80	250

Notes:
- µg/L - Micrograms per liter
- DL - Detection Limit
- LOD - Limit of Detection
- LOQ - Limit of Quantification
- U - Not detected at the LOD

Qualifiers:
- B - The indicated compound was found in the associated method blank as well as the laboratory sample.
- J - Estimated value below the lowest calibration point. Confidence correlates with the concentration.
- J3 -The associated batch quality control was outside the established quality control range for precision.
- J4 -The associated batch quality control was outside the established quality control range for accuracy.
- J6 - The sample matrix interfered with the ability to make any accurate determination; spike value is low.
- P1 - Relative percent difference value not applicable for sample concentrations less than 5 times the reporting limit.

Kirtland Air Force Base
ST-105 Equipment and Field Blanks

LOCATION_CODE		KAFB-0518					ST105-MW15					KAFB-0614				
SAMPLE_NO		EB-KAFB-0518-12292014					EB-ST105MW-015-04152015					EB-KAFB-0614-05262015				
SAMPLE_DATE		29-Dec-14					15-Apr-15					26-May-15				
SAMPLE_TYPE		Equipment Blank					Equipment Blank					Equipment Blank				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Dissolved Solids	µg/l	4,000	JT8	2,800	5,000	10,000	U		2,800	5,000	10,000	U	T4	2,800	5,000	10,000
Antimony	µg/l	U		0.21	0.5	2	0.48	J	0.21	0.5	2	U		0.21	0.5	2
Arsenic	µg/l	U		0.25	0.5	2	0.82	J	0.25	0.5	2	U		0.25	0.5	2
Barium	µg/l	U		0.36	1	5	U		0.36	1	5	U		0.36	1	5
Beryllium	µg/l	U		0.12	0.5	2	U		0.12	0.5	2	U	J4	0.12	0.5	2
Cadmium	µg/l	U		0.16	0.5	1	U		0.16	0.5	1	U		0.16	0.5	1
Chromium	µg/l	U		0.54	1.5	2	0.88	J	0.54	1.5	2	0.63	J	0.54	1.5	2
Copper	µg/l	0.77	J	0.52	1.5	5	1.9	J	0.52	1.5	5	20		0.52	1.5	5
Cobalt	µg/l	U		0.26	0.5	2	U		0.26	0.5	2	U		0.26	0.5	2
Lead	µg/l	U		0.24	0.5	2	U		0.24	0.5	2	1.4	J	0.24	0.5	2
Manganese	µg/l	0.65	J	0.25	0.5	5	0.72	J	0.25	0.5	5	0.50	J	0.25	0.5	5
Nickel	µg/l	1.4	J	0.35	1	2	U		0.35	1	2	U		0.35	1	2
Selenium	µg/l	U		0.38	1	2	U		0.38	1	2	U		0.38	1	2
Silver	µg/l	0.38	J	0.31	0.5	2	U		0.31	0.5	2	U		0.31	0.5	2
Thallium	µg/l	U		0.19	0.5	2	U		0.19	0.5	2	U		0.19	0.5	2
Vanadium	µg/l	U		0.18	0.5	5	0.36	J	0.18	0.5	5	0.28	J	0.18	0.5	5
Zinc	µg/l	U		2.6	5	25	U		2.6	5	25	5.7	J	2.6	5	25
Aluminum	µg/l	U		180	250	500	U		35	50	100	U		35	50	100
Boron	µg/l	110	J	63	500	1,000	79	J	13	100	200	93	J	13	100	200
Calcium	µg/l	U		230	2,500	5,000	59	J	46	500	1,000	U		46	500	1,000
Iron	µg/l	75	J	70	250	500	U		14	50	100	U		14	50	100
Lithium	µg/l	U		26	130	250	U		5.3	25	50	U		5.3	25	50
Magnesium	µg/l	U		56	2,500	5,000	58	J	11	500	1,000	U		11	500	1,000

Kirtland Air Force Base
ST-105 Equipment and Field Blanks

LOCATION_CODE		KAFB-0518					ST105-MW15					KAFB-0614				
SAMPLE_NO		EB-KAFB-0518-12292014					EB-ST105MW-015-04152015					EB-KAFB-0614-05262015				
SAMPLE_DATE		29-Dec-14					15-Apr-15					26-May-15				
SAMPLE_TYPE		Equipment Blank					Equipment Blank					Equipment Blank				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Potassium	µg/l	U		510	2,500	5,000	U		100	500	1,000	U		100	500	1,000
Sodium	µg/l	U		490	2,500	5,000	120	J	98	500	1,000	120	J	98	500	1,000
Bromide	µg/l	U		79	500	1,000	U		79	500	1,000	100	J	79	500	1,000
Chloride	µg/l	370	J	52	500	1,000	U		52	500	1,000	120	J	52	500	1,000
Fluoride	µg/l	U		9.9	50	100	U		9.9	50	100	U		9.9	50	100
Sulfate	µg/l	370	J	77	500	5,000	U		77	500	5,000	U		77	500	5,000
Nitrate-Nitrite	µg/l	U		20	85	100	U		20	85	100	U		20	85	100
Alkalinity	µg/l	U		2,600	10,000	20,000	U		2,600	10,000	20,000	U		2,600	10,000	20,000
Alkalinity, Bicarbonate	µg/l	—		—	—	—			—	—	—			—	—	—
Alkalinity, Carbonate	µg/l	—		—	—	—			—	—	—			—	—	—
Total Organic Carbon	µg/l	240	J	100	500	1,000	U		100	500	1,000	U		100	500	1,000
Dissolved Organic Carbon	µg/l	U		110	300	1,000	2700		110	300	1,000	120	J	110	300	1,000
Ammonia Nitrogen	µg/l	U		38	41	250	U		38	41	250	99	J	38	41	250
Kjeldahl Nitrogen	µg/l	U		35	80	250	U		35	80	250	U		35	80	250

Notes:
- µg/L - Micrograms per liter
- DL - Detection Limit
- LOD - Limit of Detection
- LOQ - Limit of Quantification
- U - Not detected at the LOD

Qualifiers:
- B - The indicated compound was found in the associated method blank as well as the laboratory sample.
- J - Estimated value below the lowest calibration point. Confidence correlates with the concentration.
- J3 -The associated batch quality control was outside the established quality control range for precision.
- J4 -The associated batch quality control was outside the established quality control range for accuracy.
- J6 - The sample matrix interfered with the ability to make any accurate determination; spike value is low.
- P1 - Relative percent difference value not applicable for sample concentrations less than 5 times the reporting limit.

Kirtland Air Force Base
ST-105 Equipment and Field Blanks

LOCATION_CODE		ST105-MW23					ST105-MW17				
SAMPLE_NO		FB-ST105MW-023-05062015					FB-ST105MW-017-05292015				
SAMPLE_DATE		6-May-15					29-May-15				
SAMPLE_TYPE		Field Blank					Field Blank				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Dissolved Solids	µg/l	8,000	J	2,800	5,000	10,000	U	T4	2,800	5,000	10,000
Antimony	µg/l	U		0.21	0.5	2	U		0.21	0.5	2
Arsenic	µg/l	0.71	J	0.25	0.5	2	1.1	J	0.25	0.5	2
Barium	µg/l	U		0.36	1	5	0.68	J	0.36	1	5
Beryllium	µg/l	U		0.12	0.5	2	U	J4	0.12	0.5	2
Cadmium	µg/l	U		0.16	0.5	1	U		0.16	0.5	1
Chromium	µg/l	U		0.54	1.5	2	U		0.54	1.5	2
Copper	µg/l	1.6	J	0.52	1.5	5	2.2	J	0.52	1.5	5
Cobalt	µg/l	U		0.26	0.5	2	U		0.26	0.5	2
Lead	µg/l	U		0.24	0.5	2	0.30	J	0.24	0.5	2
Manganese	µg/l	U		0.25	0.5	5	U		0.25	0.5	5
Nickel	µg/l	U		0.35	1	2	U		0.35	1	2
Selenium	µg/l	U		0.38	1	2	U		0.38	1	2
Silver	µg/l	U		0.31	0.5	2	U		0.31	0.5	2
Thallium	µg/l	U		0.19	0.5	2	U		0.19	0.5	2
Vanadium	µg/l	0.36	J	0.18	0.5	5	0.33	J	0.18	0.5	5
Zinc	µg/l	U		2.6	5	25	U		2.6	5	25
Aluminum	µg/l	U		35	50	100	U		35	50	100
Boron	µg/l	87	J	13	100	200	110	J	13	100	200
Calcium	µg/l	U		46	500	1,000	110	J	46	500	1,000
Iron	µg/l	U		14	50	100	U		14	50	100
Lithium	µg/l	U		5.3	25	50	U		5.3	25	50
Magnesium	µg/l	13	J	11	500	1,000	U		11	500	1,000

Kirtland Air Force Base
ST-105 Equipment and Field Blanks

LOCATION_CODE		ST105-MW23					ST105-MW17				
SAMPLE_NO		FB-ST105MW-023-05062015					FB-ST105MW-017-05292015				
SAMPLE_DATE		6-May-15					29-May-15				
SAMPLE_TYPE		Field Blank					Field Blank				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Potassium	µg/l	U		100	500	1,000	U		100	500	1,000
Sodium	µg/l	250	J	98	500	1,000	110	J	98	500	1,000
Bromide	µg/l	U		79	500	1,000	U		79	500	1,000
Chloride	µg/l	180	J	52	500	1,000	5700		52	500	1,000
Fluoride	µg/l	18	J	9.9	50	100	51	J	9.9	50	100
Sulfate	µg/l	U		77	500	5,000	U		77	500	5,000
Nitrate-Nitrite	µg/l	30	J	20	85	100	29	J	20	85	100
Alkalinity	µg/l	U		2,600	10,000	20,000	U		2,600	10,000	20,000
Alkalinity, Bicarbonate	µg/l			—	—	—			—	—	—
Alkalinity, Carbonate	µg/l			—	—	—			—	—	—
Total Organic Carbon	µg/l	U		100	500	1,000	U		100	500	1,000
Dissolved Organic Carbon	µg/l	U		110	300	1,000	160	J	110	300	1,000
Ammonia Nitrogen	µg/l	U		38	41	250	76	J	38	41	250
Kjeldahl Nitrogen	µg/l	U		35	80	250	U		35	80	250

Notes:
- µg/L - Micrograms per liter
- DL - Detection Limit
- LOD - Limit of Detection
- LOQ - Limit of Quantification
- U - Not detected at the LOD

Qualifiers:
- B - The indicated compound was found in the associated method blank as well as the laboratory sample.
- J - Estimated value below the lowest calibration point. Confidence correlates with the concentration.
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- J4 -The associated batch quality control was outside the established quality control range for accuracy.
- J6 - The sample matrix interfered with the ability to make any accurate determination; spike value is low.
- P1 - Relative percent difference value not applicable for sample concentrations less than 5 times the reporting limit.

Kirtland Air Force Base
ST-105 Field Duplicates

LOCATION_CODE		KAFB-0621					KAFB-0621					KAFB-1007R				
SAMPLE_NO		KAFB-0621-04142015					FD-KAFB-0621-04142015					KAFB-1007R-01152015				
SAMPLE_DATE		14-Apr-15					14-Apr-15					15-Jan-15				
SAMPLE_TYPE		Field Original					Field Duplicate					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Dissolved Solids	µg/l	350,000		2,800	5,000	10,000	350,000		2,800	5,000	10,000	260,000		2,800	5,000	10,000
Antimony	µg/l	0.60	J	0.21	0.5	2	0.76	J	0.21	0.5	2	U		0.21	0.5	2
Arsenic	µg/l	1.3	J	0.25	0.5	2	0.44	J	0.25	0.5	2	1.3	J	0.25	0.5	2
Barium	µg/l	100		0.36	1	5	100		0.36	1	5	83		0.36	1	5
Beryllium	µg/l	U		0.12	0.5	2	U		0.12	0.5	2	0.89	J	0.12	0.5	2
Cadmium	µg/l	U		0.16	0.5	1	U		0.16	0.5	1	U		0.16	0.5	1
Chromium	µg/l	1.2	J	0.54	1.5	2	1.1	J	0.54	1.5	2	4.6		0.54	1.5	2
Copper	µg/l	U		0.52	1.5	5	U		0.52	1.5	5	U		0.52	1.5	5
Cobalt	µg/l	U		0.26	0.5	2	U		0.26	0.5	2	U		0.26	0.5	2
Lead	µg/l	U		0.24	0.5	2	U		0.24	0.5	2	U		0.24	0.5	2
Manganese	µg/l	0.80	J	0.25	0.5	5	0.82	J	0.25	0.5	5	1.5	J	0.25	0.5	5
Nickel	µg/l	U		0.35	1	2	U		0.35	1	2	U		0.35	1	2
Selenium	µg/l	3.6		0.38	1	2	3.6		0.38	1	2	1.4	J	0.38	1	2
Silver	µg/l	U		0.31	0.5	2	U		0.31	0.5	2	U		0.31	0.5	2
Thallium	µg/l	U		0.19	0.5	2	U		0.19	0.5	2	U		0.19	0.5	2
Vanadium	µg/l	4.1	J	0.18	0.5	5	4.2	J	0.18	0.5	5	9.4		0.18	0.5	5
Zinc	µg/l	12	J	2.6	5	25	11	J	2.6	5	25	U		2.6	5	25
Aluminum	µg/l	U		35	50	100	U		35	50	100	61	J	35	50	100
Boron	µg/l	64	J	13	100	200	57	J	13	100	200	52	J	13	100	200
Calcium	µg/l	76,000		46	500	1,000	76,000		46	500	1,000	47,000		46	500	1,000
Iron	µg/l	180		14	50	100	200		14	50	100	48	J	14	50	100
Lithium	µg/l	27	J	5.3	25	50	27	J	5.3	25	50	32	J	5.3	25	50
Magnesium	µg/l	12,000		11	500	1,000	12,000		11	500	1,000	11,000		11	500	1,000

Kirtland Air Force Base
ST-105 Field Duplicates

LOCATION_CODE		KAFB-0621					KAFB-0621					KAFB-1007R				
SAMPLE_NO		KAFB-0621-04142015					FD-KAFB-0621-04142015					KAFB-1007R-01152015				
SAMPLE_DATE		14-Apr-15					14-Apr-15					15-Jan-15				
SAMPLE_TYPE		Field Original					Field Duplicate					Field Original				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Potassium	µg/l	2,100		100	500	1,000	2,100		100	500	1,000	3,800		100	500	1,000
Sodium	µg/l	27,000		98	500	1,000	27,000		98	500	1,000	22,000		98	500	1,000
Bromide	µg/l	400	J	79	500	1,000	400	J	79	500	1,000	U		79	500	1,000
Chloride	µg/l	33,000		52	500	1,000	32,000		52	500	1,000	11,000		52	500	1,000
Fluoride	µg/l	450		9.9	50	100	440		9.9	50	100	410		9.9	50	100
Sulfate	µg/l	53,000		77	500	5,000	53,000		77	500	5,000	40,000		77	500	5,000
Nitrate-Nitrite	µg/l	11,000		20	85	100	11,000		20	85	100	8,800		20	85	100
Alkalinity	µg/l	140,000		2,600	10,000	20,000	140,000		2,600	10,000	20,000	120,000		2,600	10,000	20,000
Alkalinity, Bicarbonate	µg/l			—	—	—			—	—	—	—		—	—	—
Alkalinity, Carbonate	µg/l			—	—	—			—	—	—	—		—	—	—
Total Organic Carbon	µg/l	1,200		100	500	1,000	970	J	100	500	1,000	210	J	100	500	1,000
Dissolved Organic Carbon	µg/l	2,400		110	300	1,000	2,200		110	300	1,000	110	J	110	300	1,000
Ammonia Nitrogen	µg/l	U		38	41	250	U		38	41	250	U		38	41	250
Kjeldahl Nitrogen	µg/l	U		35	80	250	U		35	80	250	U		35	80	250

Notes:
- µg/L - Micrograms per liter
- DL - Detection Limit
- LOD - Limit of Detection
- LOQ - Limit of Quantification
- U - Not detected at the LOD

Qualifiers:
- B - The indicated compound was found in the associated method blank as well as the laboratory sample.
- J - Estimated value below the lowest calibration point. Confidence correlates with the concentration.
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- J4 -The associated batch quality control was outside the established quality control range for accuracy.
- J6 - The sample matrix interfered with the ability to make any accurate determination; spike value is low.
- P1 - Relative percent difference value not applicable for sample concentrations less than 5 times the reporting limit.

Kirtland Air Force Base
ST-105 Field Duplicates

LOCATION_CODE		KAFB-1007R					ST105-MW09					ST105-MW09				
SAMPLE_NO		KAFB-1007R-01152015-FD					ST105MW009-01082015					ST105MW009-01082015-FD				
SAMPLE_DATE		15-Jan-15					8-Jan-15					8-Jan-15				
SAMPLE_TYPE		Field Duplicate					Field Original					Field Duplicate				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Dissolved Solids	µg/l	260,000		2,800	5,000	10,000	530,000		2,800	5,000	10,000	520,000		2,800	5,000	10,000
Antimony	µg/l	U		0.21	0.5	2	0.25	J	0.21	0.5	2	U		0.21	0.5	2
Arsenic	µg/l	1.3	J	0.25	0.5	2	0.47	J	0.25	0.5	2	0.47	J	0.25	0.5	2
Barium	µg/l	83		0.36	1	5	130		0.36	1	5	130		0.36	1	5
Beryllium	µg/l	0.57	J	0.12	0.5	2	U		0.12	0.5	2	U		0.12	0.5	2
Cadmium	µg/l	U		0.16	0.5	1	U		0.16	0.5	1	U		0.16	0.5	1
Chromium	µg/l	4.3		0.54	1.5	2	1.0	J	0.54	1.5	2	1.0	J	0.54	1.5	2
Copper	µg/l	U		0.52	1.5	5	0.65	J	0.52	1.5	5	U		0.52	1.5	5
Cobalt	µg/l	U		0.26	0.5	2	U		0.26	0.5	2	U		0.26	0.5	2
Lead	µg/l	U		0.24	0.5	2	U		0.24	0.5	2	U		0.24	0.5	2
Manganese	µg/l	1.6	J	0.25	0.5	5	0.49	J	0.25	0.5	5	0.35	J	0.25	0.5	5
Nickel	µg/l	U		0.35	1	2	U		0.35	1	2	U		0.35	1	2
Selenium	µg/l	1.4	J	0.38	1	2	12		0.38	1	2	11		0.38	1	2
Silver	µg/l	U		0.31	0.5	2	0.40	J	0.31	0.5	2	U		0.31	0.5	2
Thallium	µg/l	U		0.19	0.5	2	0.27	J	0.19	0.5	2	U		0.19	0.5	2
Vanadium	µg/l	9.3		0.18	0.5	5	3.2	J	0.18	0.5	5	3.2	J	0.18	0.5	5
Zinc	µg/l	U		2.6	5	25	U		2.6	5	25	U		2.6	5	25
Aluminum	µg/l	U		35	50	100	43	J	35	50	100	U		35	50	100
Boron	µg/l	50	J	13	100	200	70	J	13	100	200	50	J	13	100	200
Calcium	µg/l	47,000		46	500	1,000	110,000		46	500	1,000	110,000		46	500	1,000
Iron	µg/l	66	J	14	50	100	U		14	50	100	U		14	50	100
Lithium	µg/l	31	J	5.3	25	50	28	J	5.3	25	50	26	J	5.3	25	50
Magnesium	µg/l	11,000		11	500	1,000	18,000		11	500	1,000	18,000		11	500	1,000

Kirtland Air Force Base
ST-105 Field Duplicates

LOCATION_CODE		KAFB-1007R					ST105-MW09					ST105-MW09				
SAMPLE_NO		KAFB-1007R-01152015-FD					ST105MW009-01082015					ST105MW009-01082015-FD				
SAMPLE_DATE		15-Jan-15					8-Jan-15					8-Jan-15				
SAMPLE_TYPE		Field Duplicate					Field Original					Field Duplicate				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Potassium	µg/l	3,800		100	500	1,000	2,300		100	500	1,000	2,300		100	500	1,000
Sodium	µg/l	22,000		98	500	1,000	28,000		98	500	1,000	28,000		98	500	1,000
Bromide	µg/l	U		79	500	1,000	830	J	79	500	1,000	840	J	79	500	1,000
Chloride	µg/l	11,000		52	500	1,000	110,000		260	2,500	5,000	110,000		260	2,500	5,000
Fluoride	µg/l	410		9.9	50	100	280		9.9	50	100	280		9.9	50	100
Sulfate	µg/l	40,000		77	500	5,000	100,000		390	2,500	25,000	100,000		390	2,500	25,000
Nitrate-Nitrite	µg/l	8,900		20	85	100	10,000		20	85	100	10,000		20	85	100
Alkalinity	µg/l	120,000		2,600	10,000	20,000	99,000		2,600	10,000	20,000	100,000		2,600	10,000	20,000
Alkalinity, Bicarbonate	µg/l	—		—	—	—	—		—	—	—	—		—	—	—
Alkalinity, Carbonate	µg/l	—		—	—	—	—		—	—	—	—		—	—	—
Total Organic Carbon	µg/l	130	J	100	500	1,000	380	J	100	500	1,000	150	J	100	500	1,000
Dissolved Organic Carbon	µg/l	110	J	110	300	1,000	660	JP1	110	300	1,000	520	J	110	300	1,000
Ammonia Nitrogen	µg/l	U		38	41	250	U		38	41	250	U		38	41	250
Kjeldahl Nitrogen	µg/l	U		35	80	250	U		35	80	250	U		35	80	250

Notes:
- µg/L - Micrograms per liter
- DL - Detection Limit
- LOD - Limit of Detection
- LOQ - Limit of Quantification
- U - Not detected at the LOD

Qualifiers:
- B - The indicated compound was found in the associated method blank as well as the laboratory sample.
- J - Estimated value below the lowest calibration point. Confidence correlates with the concentration.
- J3 -The associated batch quality control was outside the established quality control range for precision.
- J4 -The associated batch quality control was outside the established quality control range for accuracy.
- J6 - The sample matrix interfered with the ability to make any accurate determination; spike value is low.
- P1 - Relative percent difference value not applicable for sample concentrations less than 5 times the reporting limit.

Kirtland Air Force Base
ST-105 Field Duplicates

LOCATION_CODE		KAFB-0623					KAFB-0623				
SAMPLE_NO		KAFB-0623-05112015					FD-KAFB-0623-05112015				
SAMPLE_DATE		11-May-15					11-May-15				
SAMPLE_TYPE		Field Original					Field Duplicate				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Dissolved Solids	µg/l	750,000		2,800	5,000	10,000	730,000		2,800	5,000	10,000
Antimony	µg/l	0.55	J	0.21	0.5	2	0.78	J	0.21	0.5	2
Arsenic	µg/l	0.70	J	0.25	0.5	2	1.5	J	0.25	0.5	2
Barium	µg/l	93		0.36	1	5	94		0.36	1	5
Beryllium	µg/l	U		0.12	0.5	2	U		0.12	0.5	2
Cadmium	µg/l	U		0.16	0.5	1	U		0.16	0.5	1
Chromium	µg/l	1.6	J	0.54	1.5	2	1.3	J	0.54	1.5	2
Copper	µg/l	0.79	J	0.52	1.5	5	U		0.52	1.5	5
Cobalt	µg/l	U		0.26	0.5	2	U		0.26	0.5	2
Lead	µg/l	0.25	J	0.24	0.5	2	U		0.24	0.5	2
Manganese	µg/l	1.2	J	0.25	0.5	5	0.60	J	0.25	0.5	5
Nickel	µg/l	0.43	J	0.35	1	2	U		0.35	1	2
Selenium	µg/l	7.3		0.38	1	2	6.9		0.38	1	2
Silver	µg/l	U		0.31	0.5	2	U		0.31	0.5	2
Thallium	µg/l	U		0.19	0.5	2	U		0.19	0.5	2
Vanadium	µg/l	4.7	J	0.18	0.5	5	4.5	J	0.18	0.5	5
Zinc	µg/l	U		2.6	5	25	U		2.6	5	25
Aluminum	µg/l	U		35	50	100	41	J	35	50	100
Boron	µg/l	16	J	13	100	200	44	J	13	100	200
Calcium	µg/l	130,000		46	500	1,000	130,000		46	500	1,000
Iron	µg/l	28	J	14	50	100	U		14	50	100
Lithium	µg/l	33	J	5.3	25	50	32	J	5.3	25	50
Magnesium	µg/l	24,000		11	500	1,000	25,000		11	500	1,000

Kirtland Air Force Base
ST-105 Field Duplicates

LOCATION_CODE		KAFB-0623					KAFB-0623				
SAMPLE_NO		KAFB-0623-05112015					FD-KAFB-0623-05112015				
SAMPLE_DATE		11-May-15					11-May-15				
SAMPLE_TYPE		Field Original					Field Duplicate				
Parameter	Units	Results	Qualifier	DL	LOD	LOQ	Results	Qualifier	DL	LOD	LOQ
Potassium	µg/l	2,800		100	500	1,000	2,800		100	500	1,000
Sodium	µg/l	25,000		98	500	1,000	26,000		98	500	1,000
Bromide	µg/l	88	J	79	500	1,000	91	J	79	500	1,000
Chloride	µg/l	28,000		52	500	1,000	28,000		52	500	1,000
Fluoride	µg/l	320		9.9	50	100	320		9.9	50	100
Sulfate	µg/l	88,000		77	500	5,000	88,000		77	500	5,000
Nitrate-Nitrite	µg/l	63,000		20	85	100	63,000		20	85	100
Alkalinity	µg/l	120,000		2,600	10,000	20,000	120,000		2,600	10,000	20,000
Alkalinity, Bicarbonate	µg/l			—	—	—			—	—	—
Alkalinity, Carbonate	µg/l			—	—	—			—	—	—
Total Organic Carbon	µg/l	U		100	500	1,000	29,000		100	500	1,000
Dissolved Organic Carbon	µg/l	620	J	110	300	1,000	280	J	110	300	1,000
Ammonia Nitrogen	µg/l	52	J	38	41	250	70	J	38	41	250
Kjeldahl Nitrogen	µg/l	U		35	80	250	U		35	80	250

Notes:
- µg/L - Micrograms per liter
- DL - Detection Limit
- LOD - Limit of Detection
- LOQ - Limit of Quantification
- U - Not detected at the LOD

Qualifiers:
- B - The indicated compound was found in the associated method blank as well as the laboratory sample.
- J - Estimated value below the lowest calibration point. Confidence correlates with the concentration.
- J3 -The associated batch quality control was outside the established quality control range for precision.
- J4 -The associated batch quality control was outside the established quality control range for accuracy.
- J6 - The sample matrix interfered with the ability to make any accurate determination; spike value is low.
- P1 - Relative percent difference value not applicable for sample concentrations less than 5 times the reporting limit.

APPENDIX B

Analytical Laboratory Reports (provided electronically)

SDG:	L759295		
Sample Numbers:	KAFB-0611-04132015, KAFB-0612-04132015, KAFB-0621-04142015, FD-KAFB-0621-04142015, KAFB-0620-04142015		
Sample Date:	4/13/2015, 4/14/2015		
Analytical Date:	4/22/2015		
Analyses:	Alkalinity	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample L759295-01	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Unacceptable - Sample L759295-02 recovered below control limits (76%/77%, with limits of 80-120%)	J,m	KAFB-0612-04132015

SDG:	L759936		
Sample Numbers:	ST105MW-015-04152015, EB-ST105MW-0515-04152015, KAFB-0312-04162015		
Sample Date:	4/15/2015, 4/16/2015		
Analytical Date:	4/23/2015		
Analyses:	Alkalinity	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L760297		
Sample Numbers:	KAFB-0311-04172015		
Sample Date:	4/17/2015		
Analytical Date:	4/23/2015		
Analyses:	Alkalinity	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L760616		
Sample Numbers:	KAFB-0904-4202015, TJA-2-04202015		
Sample Date:	4/20/2015		
Analytical Date:	4/29/2015		
Analyses:	Alkalinity	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L761381		
Sample Numbers:	KAFB-0619-04232015, KAFB-0618-04232015, KAFB-0624-04232015		
Sample Date:	4/23/2015		
Analytical Date:	5/6/2015		
Analyses:	Alkalinity	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample L761381-02	N/A	None

SDG:	L763520		
Sample Numbers:	KAFB-0307-05052015, ST105MW-023-05062015, FB-ST105MW-023-05062015, KAFB-0314-0562015		
Sample Date:	5/5/2015, 5/6/2015		
Analytical Date:	5/14/2015		
Analyses:	Alkalinity	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample L763520-01	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L763800		
Sample Numbers:	KAFB-0315-05072015		
Sample Date:	5/7/2015		
Analytical Date:	5/18/2015		
Analyses:	Alkalinity	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L764630		
Sample Numbers:	KAFB-0623-05112015, FD-KAFB-0623-05112015, ST105MW-19-05112015		
Sample Date:	5/11/2015		
Analytical Date:	5/18/2015		
Analyses:	Alkalinity	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L765321		
Sample Numbers:	KAFB-0615-05132015, ST105MW-20-05132015		
Sample Date:	5/13/2015		
Analytical Date:	5/21/2015		
Analyses:	Alkalinity	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L765719		
Sample Numbers:	ST105MW-24-05152015		
Sample Date:	5/15/2015		
Analytical Date:	5/22/2015		
Analyses:	Alkalinity	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Unacceptable - Sample L765719-01 recovered below control limits (79% in the MS, with limits of 80-120%)	J,m	KAFB-0612-04132015

SDG:	L766126		
Sample Numbers:	KAFB-2629-05182015, KAFB-2628-05182015, KAFB-0617-05192015		
Sample Date:	5/18/2015, 5/19/2015		
Analytical Date:	5/22/2015, 5/27/2015		
Analyses:	Alkalinity	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples L766426-02, L766426-03	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample L766426-01	N/A	None

SDG:	L766725		
Sample Numbers:	KAFB-0616-05202015, ST105MW-021-05212015		
Sample Date:	5/20/2015, 5/21/2015		
Analytical Date:	5/28/2015		
Analyses:	Alkalinity	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L767607		
Sample Numbers:	KAFB-0614-05262015, EB-KAFB-0614-05262015, TJA-5-05272015, ST105MW-018-05212015		
Sample Date:	5/26/2015, 5/27/2015		
Analytical Date:	6/1/2015		
Analyses:	Alkalinity	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L768216		
Sample Numbers:	TJA-4-05282015, KAFB-0608-05282015, ST105MW-017-05292015, FB-ST105MW-017-0529015		
Sample Date:	5/28/2015, 5/29/2015		
Analytical Date:	6/4/2015		
Analyses:	Alkalinity	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L768768		
Sample Numbers:	KAFB-0613-06012015, KAFB-0602-06012015, ST105MW-022-06022015, KAFB-0625-06022015		
Sample Date:	6/1/2015, 6/2/2015		
Analytical Date:	6/8/2015		
Analyses:	Alkalinity	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L759295		
Sample Numbers:	KAFB-0611-04132015, KAFB-0612-04132015, KAFB-0621-04142015, FD-KAFB-0621-04142015, KAFB-0620-04142015		
Sample Date:	4/13/2015, 4/14/2015		
Analytical Date:	4/20/2015		
Analyses:	Anions Analysis (Bromide, Chloride, Fluoride, Sulfate)	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable - Sample L759295-01 (Bromide, Chloride, Fluoride, Sulfate); Sample L759295-02 (Chloride, Fluoride, Sulfate)	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Samples not from this SDG	N/A	None

SDG:	L759936		
Sample Numbers:	ST105MW-015-04152015, EB-ST105MW-0515-04152015, KAFB-0312-04162015		
Sample Date:	4/15/2015, 4/16/2015		
Analytical Date:	4/20/2015		
Analyses:	Anions Analysis (Bromide, Chloride, Fluoride, Sulfate)	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L760297		
Sample Numbers:	KAFB-0311-04172015		
Sample Date:	4/17/2015		
Analytical Date:	4/20/2015		
Analyses:	Anions Analysis (Bromide, Chloride, Fluoride, Sulfate)	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L760616		
Sample Numbers:	KAFB-0904-4202015, TJA-2-04202015		
Sample Date:	4/20/2015		
Analytical Date:	4/28/2015		
Analyses:	Anions Analysis (Bromide, Chloride, Fluoride, Sulfate)	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Unacceptable - Samples not from this SDG, no qualification necessary	N/A	None

SDG:	L761381		
Sample Numbers:	KAFB-0619-04232015, KAFB-0618-04232015, KAFB-0624-04232015		
Sample Date:	4/23/2015		
Analytical Date:	5/7/2015		
Analyses:	Anions Analysis (Bromide, Chloride, Fluoride, Sulfate)	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample L761381-02	N/A	None

SDG:	L763520		
Sample Numbers:	KAFB-0307-05052015, ST105MW-023-05062015, FB-ST105MW-023-05062015, KAFB-0314-0562015		
Sample Date:	5/5/2015, 5/6/2015		
Analytical Date:	5/11/2015		
Analyses:	Anions Analysis (Bromide, Chloride, Fluoride, Sulfate)	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample L763520-03	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Samples not from this SDG	N/A	None

SDG:	L763800		
Sample Numbers:	KAFB-0315-05072015		
Sample Date:	5/7/2015		
Analytical Date:	5/18/2015		
Analyses:	Anions Analysis (Bromide, Chloride, Fluoride, Sulfate)	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L764630		
Sample Numbers:	KAFB-0623-05112015, FD-KAFB-0623-05112015, ST105MW-19-05112015		
Sample Date:	5/11/2015		
Analytical Date:	5/18/2015		
Analyses:	Anions Analysis (Bromide, Chloride, Fluoride, Sulfate)	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L765321		
Sample Numbers:	KAFB-0615-05132015, ST105MW-20-05132015		
Sample Date:	5/13/2015		
Analytical Date:	5/19/2015		
Analyses:	Anions Analysis (Bromide, Chloride, Fluoride, Sulfate)	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L765719		
Sample Numbers:	ST105MW-24-05152015		
Sample Date:	5/15/2015		
Analytical Date:	5/19/2015		
Analyses:	Anions Analysis (Bromide, Chloride, Fluoride, Sulfate)	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Unacceptable - Sample L765719-01 recovered below control limits for bromide (78%/78%, with limits of 80-120%)	J,m	KAFB-0612-04132015

SDG:	L766126		
Sample Numbers:	KAFB-2629-05182015, KAFB-2628-05182015, KAFB-0617-05192015		
Sample Date:	5/18/2015, 5/19/2015		
Analytical Date:	5/20/2015		
Analyses:	Anions Analysis (Bromide, Chloride, Fluoride, Sulfate)	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Samples not from this SDG	N/A	None

SDG:	L766725		
Sample Numbers:	KAFB-0616-05202015, ST105MW-021-05212015		
Sample Date:	5/20/2015, 5/21/2015		
Analytical Date:	6/2/2015		
Analyses:	Anions Analysis (Bromide, Chloride, Fluoride, Sulfate)	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample L766725-01	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L767607		
Sample Numbers:	KAFB-0614-05262015, EB-KAFB-0614-05262015, TJA-5-05272015, ST105MW-018-05212015		
Sample Date:	5/26/2015, 5/27/2015		
Analytical Date:	6/5/2015		
Analyses:	Anions Analysis (Bromide, Chloride, Fluoride, Sulfate)	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample L767606-01	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L768216		
Sample Numbers:	TJA-4-05282015, KAFB-0608-05282015, ST105MW-017-05292015, FB-ST105MW-017-0529015		
Sample Date:	5/28/2015, 5/29/2015		
Analytical Date:	6/5/2015		
Analyses:	Anions Analysis (Bromide, Chloride, Fluoride, Sulfate)	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Unacceptable - Samples not from this SDG, no qualification necessary	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample L768216-03	N/A	None

SDG:	L768768		
Sample Numbers:	KAFB-0613-06012015, KAFB-0602-06012015, ST105MW-022-06022015, KAFB-0625-06022015		
Sample Date:	6/1/2015, 6/2/2015		
Analytical Date:	6/10/2015		
Analyses:	Anions Analysis (Bromide, Chloride, Fluoride, Sulfate)	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L759295		
Sample Numbers:	KAFB-0611-04132015, KAFB-0612-04132015, KAFB-0621-04142015, FD-KAFB-0621-04142015, KAFB-0620-04142015		
Sample Date:	4/13/2015, 4/14/2015		
Analytical Date:	4/22/2015		
Analyses:	Ammonia Nitrogen	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample L759295-01	N/A	None

SDG:	L759936		
Sample Numbers:	ST105MW-015-04152015, EB-ST105MW-0515-04152015, KAFB-0312-04162015		
Sample Date:	4/15/2015, 4/16/2015		
Analytical Date:	4/28/2015		
Analyses:	Ammonia Nitrogen	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Samples not from this SDG	N/A	None

SDG:	L760297		
Sample Numbers:	KAFB-0311-04172015		
Sample Date:	4/17/2015		
Analytical Date:	4/27/2015		
Analyses:	Ammonia Nitrogen	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Samples not from this SDG	N/A	None

SDG:	L760616		
Sample Numbers:	KAFB-0904-4202015, TJA-2-04202015		
Sample Date:	4/20/2015		
Analytical Date:	4/30/2015		
Analyses:	Ammonia Nitrogen	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Samples not from this SDG	N/A	None

SDG:	L761381		
Sample Numbers:	KAFB-0619-04232015, KAFB-0618-04232015, KAFB-0624-04232015		
Sample Date:	4/23/2015		
Analytical Date:	5/4/2015, 5/5/2015		
Analyses:	Ammonia Nitrogen	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Samples L761381-01 and L761381-02	N/A	None

SDG:	L763520		
Sample Numbers:	KAFB-0307-05052015, ST105MW-023-05062015, FB-ST105MW-023-05062015, KAFB-0314-0562015		
Sample Date:	5/5/2015, 5/6/2015		
Analytical Date:	5/12/2015		
Analyses:	Ammonia Nitrogen	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L763800		
Sample Numbers:	KAFB-0315-05072015		
Sample Date:	5/7/2015		
Analytical Date:	5/12/2015		
Analyses:	Ammonia Nitrogen	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample L763800-01	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L764630		
Sample Numbers:	KAFB-0623-05112015, FD-KAFB-0623-05112015, ST105MW-19-05112015		
Sample Date:	5/11/2015		
Analytical Date:	5/19/2015		
Analyses:	Ammonia Nitrogen	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	Ammonia nitrogen detection, no qualification as MB detection <LOD	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L765321		
Sample Numbers:	KAFB-0615-05132015, ST105MW-20-05132015		
Sample Date:	5/13/2015		
Analytical Date:	5/21/2015		
Analyses:	Ammonia Nitrogen	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	Ammonia nitrogen detected	U,z	KAFB-0615-05132015 ST105MW-20-05132015
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample L765321-01	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample L765321-02	N/A	None

SDG:	L765719		
Sample Numbers:	ST105MW-24-05152015		
Sample Date:	5/15/2015		
Analytical Date:	5/22/2015		
Analyses:	Ammonia Nitrogen	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	Ammonia nitrogen detected	U,z	KAFB-0612-04132015
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample L765719-01	N/A	None

SDG:	L766126		
Sample Numbers:	KAFB-2629-05182015, KAFB-2628-05182015, KAFB-0617-05192015		
Sample Date:	5/18/2015, 5/19/2015		
Analytical Date:	5/29/2015		
Analyses:	Ammonia Nitrogen	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	Ammonia nitrogen detected	U,z	KAFB-2629-05182015 KAFB-2628-05182015 KAFB-0617-05192015
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L766725		
Sample Numbers:	KAFB-0616-05202015, ST105MW-021-05212015		
Sample Date:	5/20/2015, 5/21/2015		
Analytical Date:	6/1/2015		
Analyses:	Ammonia Nitrogen	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	Ammonia nitrogen detected	U,z	KAFB-0616-05202015 ST105MW-021-05212015
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample L766725-01	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L767607		
Sample Numbers:	KAFB-0614-05262015, EB-KAFB-0614-05262015, TJA-5-05272015, ST105MW-018-05212015		
Sample Date:	5/26/2015, 5/27/2015		
Analytical Date:	6/3/2015		
Analyses:	Ammonia Nitrogen	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	Ammonia nitrogen detected	U,z	KAFB-0614-05262015 EB-KAFB-0614-05262015 TJA-5-05272015 ST105MW-018-05212015
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L768216		
Sample Numbers:	TJA-4-05282015, KAFB-0608-05282015, ST105MW-017-05292015, FB-ST105MW-017-0529015		
Sample Date:	5/28/2015, 5/29/2015		
Analytical Date:	6/4/2015		
Analyses:	Ammonia Nitrogen	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	Ammonia nitrogen detected	U,z	TJA-4-05282015 KAFB-0608-05282015 ST105MW-017-05292015 FB-ST105MW-017-0529015
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L768768		
Sample Numbers:	KAFB-0613-06012015, KAFB-0602-06012015, ST105MW-022-06022015, KAFB-0625-06022015		
Sample Date:	6/1/2015, 6/2/2015		
Analytical Date:	6/9/2015		
Analyses:	Ammonia Nitrogen	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	Ammonia nitrogen detected	U,z	KAFB-0613-06012015 KAFB-0602-06012015 ST105MW-022-06022015 KAFB-0625-06022015
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample L768768-01	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L759295		
Sample Numbers:	KAFB-0611-04132015, KAFB-0612-04132015, KAFB-0621-04142015, FD-KAFB-0621-04142015, KAFB-0620-04142015		
Sample Date:	4/13/2015, 4/14/2015		
Analytical Date:	4/18/2015		
Analyses:	Dissolved Organic Carbon	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable - L759295-03	N/A	None

SDG:	L759936		
Sample Numbers:	ST105MW-015-04152015, EB-ST105MW-0515-04152015, KAFB-0312-04162015		
Sample Date:	4/15/2015, 4/16/2015		
Analytical Date:	4/18/2015		
Analyses:	Dissolved Organic Carbon	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Unacceptable - Sample received improperly preserved	R	EB-ST105MW-015-04152015
Holding Time:	Unacceptable - Sample received outside method required holding time	R	EB-ST105MW-015-04152015
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L760297		
Sample Numbers:	KAFB-0311-04172015		
Sample Date:	4/17/2015		
Analytical Date:	4/23/2015		
Analyses:	Dissolved Organic Carbon	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample L760297-01	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L760616		
Sample Numbers:	KAFB-0904-4202015, TJA-2-04202015		
Sample Date:	4/20/2015		
Analytical Date:	4/23/2015		
Analyses:	Dissolved Organic Carbon	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L761381		
Sample Numbers:	KAFB-0619-04232015, KAFB-0618-04232015, KAFB-0624-04232015		
Sample Date:	4/23/2015		
Analytical Date:	4/27/2015		
Analyses:	Dissolved Organic Carbon	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable - Sample L761381-01	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable - Sample L761381-02	N/A	None

SDG:	L763520		
Sample Numbers:	KAFB-0307-05052015, ST105MW-023-05062015, FB-ST105MW-023-05062015, KAFB-0314-0562015		
Sample Date:	5/5/2015, 5/6/2015		
Analytical Date:	5/8/2015		
Analyses:	Dissolved Organic Carbon	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable - Sample L763520-01	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable - Sample L763520-02	N/A	None

SDG:	L763800		
Sample Numbers:	KAFB-0315-05072015		
Sample Date:	5/7/2015		
Analytical Date:	5/8/2015		
Analyses:	Dissolved Organic Carbon	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Field Duplicate	Unacceptable	J,f	KAFB-023-05112015 FD-KAFB-0623-05112015
Sample Duplicate	Acceptable -Sample not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L764630		
Sample Numbers:	KAFB-0623-05112015, FD-KAFB-0623-05112015, ST105MW-19-05112015		
Sample Date:	5/11/2015		
Analytical Date:	5/19/2015		
Analyses:	Dissolved Organic Carbon	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample L764630-03	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L765321		
Sample Numbers:	KAFB-0615-05132015, ST105MW-20-05132015		
Sample Date:	5/13/2015		
Analytical Date:	5/19/2015		
Analyses:	Dissolved Organic Carbon	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L765719		
Sample Numbers:	ST105MW-24-05152015		
Sample Date:	5/15/2015		
Analytical Date:	5/19/2015		
Analyses:	Dissolved Organic Carbon	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample L765719-01	N/A	None

SDG:	L766126		
Sample Numbers:	KAFB-2629-05182015, KAFB-2628-05182015, KAFB-0617-05192015		
Sample Date:	5/18/2015, 5/19/2015		
Analytical Date:	5/30/2015		
Analyses:	Dissolved Organic Carbon	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample L766126-02	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L766725		
Sample Numbers:	KAFB-0616-05202015, ST105MW-021-05212015		
Sample Date:	5/20/2015, 5/21/2015		
Analytical Date:	5/30/2015		
Analyses:	Dissolved Organic Carbon	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample L766725-02	N/A	None

SDG:	L767607		
Sample Numbers:	KAFB-0614-05262015, EB-KAFB-0614-05262015, TJA-5-05272015, ST105MW-018-05212015		
Sample Date:	5/26/2015, 5/27/2015		
Analytical Date:	5/30/2015		
Analyses:	Dissolved Organic Carbon	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Unacceptable - Sample received improperly preserved	R	KAFB-0614-05262015 EB-KAFB-0614-05262015
Holding Time:	Unacceptable - Sample received outside method required holding time	R	KAFB-0614-05262015 EB-KAFB-0614-05262015
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L768216		
Sample Numbers:	TJA-4-05282015, KAFB-0608-05282015, ST105MW-017-05292015, FB-ST105MW-017-0529015		
Sample Date:	5/28/2015, 5/29/2015		
Analytical Date:	6/3/2015		
Analyses:	Dissolved Organic Carbon	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Unacceptable - Sample received improperly preserved	R	TJA-4-05282015 KAFB-0608-05282015
Holding Time:	Unacceptable - Sample received outside method required holding time	R	TJA-4-05282015 KAFB-0608-05282015
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample L738216-01	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample L768216-04	N/A	None

SDG:	L768768		
Sample Numbers:	KAFB-0613-06012015, KAFB-0602-06012015, ST105MW-022-06022015, KAFB-0625-06022015		
Sample Date:	6/1/2015, 6/2/2015		
Analytical Date:	6/5/2015		
Analyses:	Dissolved Organic Carbon	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample L768768-01	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample L768768-04	N/A	None

SDG:	L759295		
Sample Numbers:	KAFB-0611-04132015, KAFB-0612-04132015, KAFB-0621-04142015, FD-KAFB-0621-04142015, KAFB-0620-04142015		
Sample Date:	4/13/2015, 4/14/2015		
Analytical Date:	4/17/2015		
Analyses:	Total Dissolved Solids	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None

SDG:	L759936		
Sample Numbers:	ST105MW-015-04152015, EB-ST105MW-0515-04152015, KAFB-0312-04162015		
Sample Date:	4/15/2015, 4/16/2015		
Analytical Date:	4/22/2015		
Analyses:	Total Dissolved Solids	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample not from this SDG	N/A	None

SDG:	L760297		
Sample Numbers:	KAFB-0311-04172015		
Sample Date:	4/17/2015		
Analytical Date:	4/27/2015		
Analyses:	Total Dissolved Solids	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample not from this SDG	N/A	None

SDG:	L760616		
Sample Numbers:	KAFB-0904-4202015, TJA-2-04202015		
Sample Date:	4/20/2015		
Analytical Date:	4/27/2015		
Analyses:	Total Dissolved Solids	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None

SDG:	L761381		
Sample Numbers:	KAFB-0619-04232015, KAFB-0618-04232015, KAFB-0624-04232015		
Sample Date:	4/23/2015		
Analytical Date:	5/1/2015		
Analyses:	Total Dissolved Solids	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample not from this SDG	N/A	None

SDG:	L763520		
Sample Numbers:	KAFB-0307-05052015, ST105MW-023-05062015, FB-ST105MW-023-05062015, KAFB-0314-0562015		
Sample Date:	5/5/2015, 5/6/2015		
Analytical Date:	5/12/2015		
Analyses:	Total Dissolved Solids	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	TDS detection, no qualification as MB detection <LOD	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample not from this SDG	N/A	None

SDG:	L763800		
Sample Numbers:	KAFB-0315-05072015		
Sample Date:	5/7/2015		
Analytical Date:	5/14/2015		
Analyses:	Total Dissolved Solids	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample not from this SDG	N/A	None

SDG:	L764630		
Sample Numbers:	KAFB-0623-05112015, FD-KAFB-0623-05112015, ST105MW-19-05112015		
Sample Date:	5/11/2015		
Analytical Date:	5/18/2015		
Analyses:	Total Dissolved Solids	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample not from this SDG	N/A	None

SDG:	L765321		
Sample Numbers:	KAFB-0615-05132015, ST105MW-20-05132015		
Sample Date:	5/13/2015		
Analytical Date:	5/20/2015		
Analyses:	Total Dissolved Solids	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample not from this SDG	N/A	None

SDG:	L765719		
Sample Numbers:	ST105MW-24-05152015		
Sample Date:	5/15/2015		
Analytical Date:	5/21/2015		
Analyses:	Total Dissolved Solids	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample not from this SDG	N/A	None

SDG:	L766126		
Sample Numbers:	KAFB-2629-05182015, KAFB-2628-05182015, KAFB-0617-05192015		
Sample Date:	5/18/2015, 5/19/2015		
Analytical Date:	5/22/2015		
Analyses:	Total Dissolved Solids	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample L766126-03	N/A	None

SDG:	L766725		
Sample Numbers:	KAFB-0616-05202015, ST105MW-021-05212015		
Sample Date:	5/20/2015, 5/21/2015		
Analytical Date:	5/28/2015		
Analyses:	Total Dissolved Solids	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None

SDG:	L767607		
Sample Numbers:	KAFB-0614-05262015, EB-KAFB-0614-05262015, TJA-5-05272015, ST105MW-018-05212015		
Sample Date:	5/26/2015, 5/27/2015		
Analytical Date:	6/3/2015		
Analyses:	Total Dissolved Solids	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None

SDG:	L768216		
Sample Numbers:	TJA-4-05282015, KAFB-0608-05282015, ST105MW-017-05292015, FB-ST105MW-017-0529015		
Sample Date:	5/28/2015, 5/29/2015		
Analytical Date:	6/3/2015		
Analyses:	Total Dissolved Solids	Flag	Affected Samples
Completeness:	Final residue exceeded method criteria of 200 mg.	J,O	FB-ST105MW-017-05292015
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None

SDG:	L768768		
Sample Numbers:	KAFB-0613-06012015, KAFB-0602-06012015, ST105MW-022-06022015, KAFB-0625-06022015		
Sample Date:	6/1/2015, 6/2/2015		
Analytical Date:	6/5/2015		
Analyses:	Total Dissolved Solids	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample L768768-02	N/A	None

SDG:	L759295		
Sample Numbers:	KAFB-0611-04132015, KAFB-0612-04132015, KAFB-0621-04142015, FD-KAFB-0621-04142015, KAFB-0620-04142015		
Sample Date:	4/13/2015, 4/14/2015		
Analytical Date:	4/23/2015		
Analyses:	Total Kjeldahl Nitrogen	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable - Sample L759295-01	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable - Sample L759295-01	N/A	None

SDG:	L759936		
Sample Numbers:	ST105MW-015-04152015, EB-ST105MW-0515-04152015, KAFB-0312-04162015		
Sample Date:	4/15/2015, 4/16/2015		
Analytical Date:	4/24/2015		
Analyses:	Total Kjeldahl Nitrogen	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable - Sample not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Unacceptable - Sample not from this SDG, no qualification necessary	N/A	None

SDG:	L760616		
Sample Numbers:	KAFB-0904-4202015, TJA-2-04202015		
Sample Date:	4/20/2015		
Analytical Date:	4/27/2015		
Analyses:	Total Kjeldahl Nitrogen	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable - Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable - Sample not from this SDG	N/A	None

SDG:	L760616		
Sample Numbers:	KAFB-0904-4202015, TJA-2-04202015		
Sample Date:	4/20/2015		
Analytical Date:	4/27/2015		
Analyses:	Total Kjeldahl Nitrogen	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable - Sample not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	N/A	N/A	None

SDG:	L761381		
Sample Numbers:	KAFB-0619-04232015, KAFB-0618-04232015, KAFB-0624-04232015		
Sample Date:	4/23/2015		
Analytical Date:	5/4/2015, 5/7/2015		
Analyses:	Total Kjeldahl Nitrogen	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable - Sample L761381-02	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Samples not from this SDG	N/A	None

SDG:	L763520		
Sample Numbers:	KAFB-0307-05052015, ST105MW-023-05062015, FB-ST105MW-023-05062015, KAFB-0314-0562015		
Sample Date:	5/5/2015, 5/6/2015		
Analytical Date:	5/13/2015		
Analyses:	Total Kjeldahl Nitrogen	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable - Sample L763520-04	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L763800		
Sample Numbers:	KAFB-0315-05072015		
Sample Date:	5/7/2015		
Analytical Date:	5/18/2015		
Analyses:	Total Kjeldahl Nitrogen	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	Total Kjeldahl Nitrogen detected	U,z	KAFB-0315-05072015
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	N/A	N/A	None

SDG:	L764630		
Sample Numbers:	KAFB-0623-05112015, FD-KAFB-0623-05112015, ST105MW-19-05112015		
Sample Date:	5/11/2015		
Analytical Date:	5/20/2015		
Analyses:	Total Kjeldahl Nitrogen	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	N/A	N/A	None

SDG:	L765321		
Sample Numbers:	KAFB-0615-05132015, ST105MW-20-05132015		
Sample Date:	5/13/2015		
Analytical Date:	5/21/2015		
Analyses:	Total Kjeldahl Nitrogen	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Unacceptable - Sample L765321-02 recovered below control limits (87.2%/71%, with limits of 90-110%) and the RPD was outside control limits (20.5%, with a limit of 20%)	UJ,m,d	ST105MW-20-05132015

SDG:	L765719		
Sample Numbers:	ST105MW-24-05152015		
Sample Date:	5/15/2015		
Analytical Date:	5/21/2015		
Analyses:	Total Kjeldahl Nitrogen	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	Total Kjeldahl nitrogen detected, no qualification as associated sample results reported as ND	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample L765719-01	N/A	None

SDG:	L766126		
Sample Numbers:	KAFB-2629-05182015, KAFB-2628-05182015, KAFB-0617-05192015		
Sample Date:	5/18/2015, 5/19/2015		
Analytical Date:	5/28/2015		
Analyses:	Total Kjeldahl Nitrogen	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	Total Kjeldahl nitrogen detected	U,z	KAFB-2628-05182015
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Unacceptable - Sample L766126-01 recovered below control limits (80.8%/76.4%, with limits of 90-110%)	UJ,m	KAFB-0617-05192015

SDG:	L766126		
Sample Numbers:	KAFB-2629-05182015, KAFB-2628-05182015, KAFB-0617-05192015		
Sample Date:	5/18/2015, 5/19/2015		
Analytical Date:	6/1/2015		
Analyses:	Total Kjeldahl Nitrogen	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L767607		
Sample Numbers:	KAFB-0614-05262015, EB-KAFB-0614-05262015, TJA-5-05272015, ST105MW-018-05212015		
Sample Date:	5/26/2015, 5/27/2015		
Analytical Date:	6/4/2015		
Analyses:	Total Kjeldahl Nitrogen	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L768216		
Sample Numbers:	TJA-4-05282015, KAFB-0608-05282015, ST105MW-017-05292015, FB-ST105MW-017-0529015		
Sample Date:	5/28/2015, 5/29/2015		
Analytical Date:	6/5/2015		
Analyses:	Total Kjeldahl Nitrogen	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample L768216-04	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Unacceptable - Samples not from this SDG, no qualification necessary	N/A	None

SDG:	L768768		
Sample Numbers:	KAFB-0613-06012015, KAFB-0602-06012015, ST105MW-022-06022015, KAFB-0625-06022015		
Sample Date:	6/1/2015, 6/2/2015		
Analytical Date:	6/10/2015		
Analyses:	Total Kjeldahl Nitrogen	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Unacceptable - Samples not from this SDG, no qualification necessary	N/A	None

SDG:	L759295		
Sample Numbers:	KAFB-0611-04132015, KAFB-0612-04132015, KAFB-0621-04142015, FD-KAFB-0621-04142015, KAFB-0620-04142015		
Sample Date:	4/13/2015, 4/14/2015		
Analytical Date:	4/24/2015		
Analyses:	Nitrate/Nitrite Analysis	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable - Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable - Sample not from this SDG	N/A	None

SDG:	L759936		
Sample Numbers:	ST105MW-015-04152015, EB-ST105MW-0515-04152015, KAFB-0312-04162015		
Sample Date:	4/15/2015, 4/16/2015		
Analytical Date:	4/27/2015		
Analyses:	Nitrate/Nitrite Analysis	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable - Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable - Sample not from this SDG	N/A	None

SDG:	L760297		
Sample Numbers:	KAFB-0311-04172015		
Sample Date:	4/17/2015		
Analytical Date:	4/27/2015		
Analyses:	Nitrate/Nitrite Analysis	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable - Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable - Sample not from this SDG	N/A	None

SDG:	L760616		
Sample Numbers:	KAFB-0904-4202015, TJA-2-04202015		
Sample Date:	4/20/2015		
Analytical Date:	5/1/2015		
Analyses:	Nitrate/Nitrite Analysis	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable - Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Unacceptable - Sample not from this SDG, no qualification necessary	N/A	None

SDG:	L761381		
Sample Numbers:	KAFB-0619-04232015, KAFB-0618-04232015, KAFB-0624-04232015		
Sample Date:	4/23/2015		
Analytical Date:	5/4/2015		
Analyses:	Nitrate/Nitrite Analysis	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable - Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable - Sample not from this SDG	N/A	None

SDG:	L763520		
Sample Numbers:	KAFB-0307-05052015, ST105MW-023-05062015, FB-ST105MW-023-05062015, KAFB-0314-0562015		
Sample Date:	5/5/2015, 5/6/2015		
Analytical Date:	5/15/2015		
Analyses:	Nitrate/Nitrite Analysis	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable - Samples L763520-02, L763520-04	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable - Sample not from this SDG	N/A	None

SDG:	L763800		
Sample Numbers:	KAFB-0315-05072015		
Sample Date:	5/7/2015		
Analytical Date:	5/15/2015		
Analyses:	Nitrate/Nitrite Analysis	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable - Sample L763800-01	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable - Sample not from this SDG	N/A	None

SDG:	L764630		
Sample Numbers:	KAFB-0623-05112015, FD-KAFB-0623-05112015, ST105MW-19-05112015		
Sample Date:	5/11/2015		
Analytical Date:	5/18/2015		
Analyses:	Nitrate/Nitrite Analysis	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable - Sample L764630-01	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable - Sample not from this SDG	N/A	None

SDG:	L765321		
Sample Numbers:	KAFB-0615-05132015, ST105MW-20-05132015		
Sample Date:	5/13/2015		
Analytical Date:	5/22/2015		
Analyses:	Nitrate/Nitrite Analysis	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable - Sample L765321-02	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable - Sample not from this SDG	N/A	None

SDG:	L765719		
Sample Numbers:	ST105MW-24-05152015		
Sample Date:	5/15/2015		
Analytical Date:	5/27/2015		
Analyses:	Nitrate/Nitrite Analysis	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable - Sample L765719-01	N/A	None

SDG:	L766126		
Sample Numbers:	KAFB-2629-05182015, KAFB-2628-05182015, KAFB-0617-05192015		
Sample Date:	5/18/2015, 5/19/2015		
Analytical Date:	5/28/2015		
Analyses:	Nitrate/Nitrite Analysis	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable - Sample L766126-03	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Unacceptable - Samples not from this SDG, no qualification necessary	N/A	None

SDG:	L766725		
Sample Numbers:	KAFB-0616-05202015, ST105MW-021-05212015		
Sample Date:	5/20/2015, 5/21/2015		
Analytical Date:	6/1/2015		
Analyses:	Nitrate/Nitrite Analysis	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Unacceptable - Samples not from this SDG, no qualification necessary	N/A	None

SDG:	L767607		
Sample Numbers:	KAFB-0614-05262015, EB-KAFB-0614-05262015, TJA-5-05272015, ST105MW-018-05212015		
Sample Date:	5/26/2015, 5/27/2015		
Analytical Date:	6/5/2015		
Analyses:	Nitrate/Nitrite Analysis	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample L767606-01	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample L767606-02	N/A	None

SDG:	L768216		
Sample Numbers:	TJA-4-05282015, KAFB-0608-05282015, ST105MW-017-05292015, FB-ST105MW-017-0529015		
Sample Date:	5/28/2015, 5/29/2015		
Analytical Date:	6/8/2015		
Analyses:	Nitrate/Nitrite Analysis	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L768768		
Sample Numbers:	KAFB-0613-06012015, KAFB-0602-06012015, ST105MW-022-06022015, KAFB-0625-06022015		
Sample Date:	6/1/2015, 6/2/2015		
Analytical Date:	6/11/2015		
Analyses:	Nitrate/Nitrite Analysis	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L759295		
Sample Numbers:	KAFB-0611-04132015, KAFB-0612-04132015, KAFB-0621-04142015, FD-KAFB-0621-04142015, KAFB-0620-04142015		
Sample Date:	4/13/2015, 4/14/2015		
Analytical Date:	4/17/2015		
Analyses:	Total Organic Carbon	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable - Sample L759295-02	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable - Sample L759295-03	N/A	None

SDG:	L759936		
Sample Numbers:	ST105MW-015-04152015, EB-ST105MW-0515-04152015, KAFB-0312-04162015		
Sample Date:	4/15/2015, 4/16/2015		
Analytical Date:	4/20/2015		
Analyses:	Total Organic Carbon	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable - Sample L759936-02	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable - Sample not from this SDG	N/A	None

SDG:	L760297		
Sample Numbers:	KAFB-0311-04172015		
Sample Date:	4/17/2015		
Analytical Date:	4/20/2015		
Analyses:	Total Organic Carbon	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable - Samples L760297-01	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable - Sample not from this SDG	N/A	None

SDG:	L760616		
Sample Numbers:	KAFB-0904-4202015, TJA-2-04202015		
Sample Date:	4/20/2015		
Analytical Date:	4/23/2015		
Analyses:	Total Organic Carbon	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable - Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable - Sample not from this SDG	N/A	None

SDG:	L761381		
Sample Numbers:	KAFB-0619-04232015, KAFB-0618-04232015, KAFB-0624-04232015		
Sample Date:	4/23/2015		
Analytical Date:	4/27/2015		
Analyses:	Total Organic Carbon	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable - Sample L761381-01	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable - Sample L761381-02	N/A	None

SDG:	L763520		
Sample Numbers:	KAFB-0307-05052015, ST105MW-023-05062015, FB-ST105MW-023-05062015, KAFB-0314-0562015		
Sample Date:	5/5/2015, 5/6/2015		
Analytical Date:	5/8/2015		
Analyses:	Total Organic Carbon	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable - Sample L763495-04	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L763800		
Sample Numbers:	KAFB-0315-05072015		
Sample Date:	5/7/2015		
Analytical Date:	5/10/2015		
Analyses:	Total Organic Carbon	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L764630		
Sample Numbers:	KAFB-0623-05112015, FD-KAFB-0623-05112015, ST105MW-19-05112015		
Sample Date:	5/11/2015		
Analytical Date:	5/14/2015		
Analyses:	Total Organic Carbon	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L765321		
Sample Numbers:	KAFB-0615-05132015, ST105MW-20-05132015		
Sample Date:	5/13/2015		
Analytical Date:	5/18/2015		
Analyses:	Total Organic Carbon	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample L765321-02	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L765719		
Sample Numbers:	ST105MW-24-05152015		
Sample Date:	5/15/2015		
Analytical Date:	5/22/2015		
Analyses:	Total Organic Carbon	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable - Sample L765719-01	N/A	None

SDG:	L766126		
Sample Numbers:	KAFB-2629-05182015, KAFB-2628-05182015, KAFB-0617-05192015		
Sample Date:	5/18/2015, 5/19/2015		
Analytical Date:	5/27/2015		
Analyses:	Total Organic Carbon	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L766725		
Sample Numbers:	KAFB-0616-05202015, ST105MW-021-05212015		
Sample Date:	5/20/2015, 5/21/2015		
Analytical Date:	5/30/2015		
Analyses:	Total Organic Carbon	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample L766725-01	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample L766725-02	N/A	None

SDG:	L767607		
Sample Numbers:	KAFB-0614-05262015, EB-KAFB-0614-05262015, TJA-5-05272015, ST105MW-018-05212015		
Sample Date:	5/26/2015, 5/27/2015		
Analytical Date:	6/1/2015		
Analyses:	Total Organic Carbon	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L768216		
Sample Numbers:	TJA-4-05282015, KAFB-0608-05282015, ST105MW-017-05292015, FB-ST105MW-017-0529015		
Sample Date:	5/28/2015, 5/29/2015		
Analytical Date:	6/2/2015		
Analyses:	Total Organic Carbon	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample L768216-04	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L768768		
Sample Numbers:	KAFB-0613-06012015, KAFB-0602-06012015, ST105MW-022-06022015, KAFB-0625-06022015		
Sample Date:	6/1/2015, 6/2/2015		
Analytical Date:	6/4/2015		
Analyses:	Total Organic Carbon	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	ND - Acceptable	N/A	None
LCS Recovery	Acceptable	N/A	None
LCS/LCSD	Acceptable	N/A	None
Sample Duplicate	Acceptable -Sample L768768-04	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	Acceptable -Sample not from this SDG	N/A	None

SDG:	L759295		
Sample Numbers:	KAFB-0611-04132015, KAFB-0612-04132015, KAFB-0621-04142015, FD-KAFB-0621-04142015, KAFB-0620-04142015		
Sample Date:	4/13/2015, 4/14/2015		
Analytical Date:	6010B - 4/22/2015; 6020 - 4/20/2015		
Analyses:	Metals	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	6010B - ND - Acceptable 6020 - Antimony detected	U, z	KAFB-0611-04132015, KAFB-0612-04132015, KAFB-0621-04142015, FD-KAFB-0621-04142015, KAFB-0620-04142015
LCS Recovery	6010B - Acceptable 6020 - Acceptable	N/A	None
LCS/LCSD	6010B - Acceptable 6020 - Acceptable	N/A	None
Serial Dilution	6010B - Acceptable - Sample L759295-01 6020 - Acceptable - Sample L759295-01	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	6010B - Acceptable - Sample L759295-01 6020 - Acceptable - Sample L759295-01	N/A	None
Post Digest Spike	N/A	N/A	None

SDG:	L759936		
Sample Numbers:	ST105MW-015-04152015, EB-ST105MW-0515-04152015, KAFB-0312-04162015		
Sample Date:	4/15/2015, 4/16/2015		
Analytical Date:	6010B - 4/22/2015; 6020 - 4/23/2015		
Analyses:	Metals	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	6010B - ND - Acceptable 6020 - ND - Acceptable	N/A	None
LCS Recovery	6010B - Acceptable 6020 - Acceptable	N/A	None
LCS/LCSD	6010B - Acceptable 6020 - Acceptable	N/A	None
Serial Dilution	6010B - Acceptable 6020 - Acceptable - Sample not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	6010B - Acceptable 6020 - Acceptable - Sample not from this SDG	N/A	None
Post Digest Spike	N/A	N/A	None

SDG:	L760297		
Sample Numbers:	KAFB-0311-04172015		
Sample Date:	4/17/2015		
Analytical Date:	6010B - 4/22/2015; 6020 - 4/23/2015		
Analyses:	Metals	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	6010B - ND - Acceptable 6020 - ND - Acceptable	N/A	None
LCS Recovery	6010B - Acceptable 6020 - Acceptable	N/A	None
LCS/LCSD	6010B - Acceptable 6020 - Acceptable	N/A	None
Serial Dilution	6010B - Acceptable - Sample not from this SDG 6020 - Acceptable - Sample not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	6010B - Acceptable - Sample not from this SDG 6020 - Acceptable - Sample not from this SDG	N/A	None
Post Digest Spike	N/A	N/A	None

SDG:	L760616		
Sample Numbers:	KAFB-0904-4202015, TJA-2-04202015		
Sample Date:	4/20/2015		
Analytical Date:	6010B - 4/29/2015; 6020 - 4/23/2015		
Analyses:	Metals	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	6010B - Sodium detection, no qualification as associated sample results >5x MB contamination 6020 - ND - Acceptable	N/A	None
LCS Recovery	6010B - Acceptable 6020 - Acceptable	N/A	None
LCS/LCSD	6010B - Acceptable 6020 - Acceptable	N/A	None
Serial Dilution	6010B - Acceptable - Sample not from this SDG 6020 - Acceptable - Sample L760616-02	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	6010B - Unacceptable - Sample not from this SDG, no qualification necessary 6020 - Acceptable - Sample L760616-02	N/A	None
Post Digest Spike	N/A	N/A	None

SDG:	L761381		
Sample Numbers:	KAFB-0619-04232015, KAFB-0618-04232015, KAFB-0624-04232015		
Sample Date:	4/23/2015		
Analytical Date:	6010B - 4/29/2015; 6020 - 5/4/2015		
Analyses:	Metals	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	6010B - Sodium detection, no qualification as associated sample results >5x MB contamination 6020 - ND - Acceptable	N/A	None
LCS Recovery	6010B - Acceptable 6020 - Acceptable	N/A	None
LCS/LCSD	6010B - Acceptable 6020 - Acceptable	N/A	None
Serial Dilution	6010B - Acceptable - Sample L761381-02 6020 - Acceptable - Sample L761381-02	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	6010B - Unacceptable - Sample L761381-02 recovered above control limits for calcium (130%/133%, with limits of 75-125%) 6020 - Acceptable - Sample L761381-02	J, m	KAFB-0618-04232015
Post Digest Spike	N/A	N/A	None

SDG:	L763520		
Sample Numbers:	KAFB-0307-05052015, ST105MW-023-05062015, FB-ST105MW-023-05062015, KAFB-0314-0562015		
Sample Date:	5/5/2015, 5/6/2015		
Analytical Date:	6010B - 5/14/2015; 6020 - 5/15/2015		
Analyses:	Metals	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	6010B - Sodium detected 6020 - Zinc detected	U,z	6010B - FB-ST105MW-023-05062015 6020 - KAFB-0307-05052015
LCS Recovery	6010B - Acceptable 6020 - Acceptable	N/A	None
LCS/LCSD	6010B - Acceptable 6020 - Acceptable	N/A	None
Serial Dilution	6010B - Acceptable - Sample not from this SDG 6020 - Acceptable - Sample not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	6010B - Acceptable - Sample not from this SDG 6020 - Acceptable - Sample not from this SDG	N/A	None
Post Digest Spike	N/A	N/A	None

SDG:	L763800		
Sample Numbers:	KAFB-0315-05072015		
Sample Date:	5/7/2015		
Analytical Date:	6010B - 5/18/2015; 6020 - 5/14/2015		
Analyses:	Metals	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	6010B - Sodium detection, no qualification as associated sample results >5x MB contamination 6020 - Barium detection, no qualification as associated sample results >5x MB contamination	N/A	None
LCS Recovery	6010B - Acceptable 6020 - Acceptable	N/A	None
LCS/LCSD	6010B - Acceptable 6020 - Acceptable	N/A	None
Serial Dilution	6010B - Acceptable - Sample not from this SDG 6020 - Acceptable - Sample not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	6010B - Unacceptable - Samples not from this SDG, no qualification necessary 6020 - Acceptable - Samples not from this SDG	N/A	None
Post Digest Spike	N/A	N/A	None

SDG:	L764630		
Sample Numbers:	KAFB-0623-05112015, FD-KAFB-0623-05112015, ST105MW-19-05112015		
Sample Date:	5/11/2015		
Analytical Date:	6010B - 5/18/2015, 5/19/2015, 5/20/2015, 5/22/2015; 6020 - 5/15/2015		
Analyses:	Metals	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	6010B - Magnesium detected 6020 - Antimony detected	U,z	KAFB-0623-05112015 FD-KAFB-0623-05112015 ST105MW-19-05112015
LCS Recovery	6010B - Acceptable 6020 - Acceptable	N/A	None
LCS/LCSD	6010B - Acceptable 6020 - Acceptable	N/A	None
Serial Dilution	6010B - Acceptable - Sample not from this SDG 6020 - Acceptable - Sample not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	6010B - Unacceptable - Samples not from this SDG, no qualification necessary 6020 - Acceptable - Samples not from this SDG	N/A	None
Post Digest Spike	6010B - Unacceptable - Samples not from this SDG, no qualification necessary	N/A	None

SDG:	L765321		
Sample Numbers:	KAFB-0615-05132015, ST105MW-20-05132015		
Sample Date:	5/13/2015		
Analytical Date:	6010B - 5/22/2015; 6020 - 5/21/2015		
Analyses:	Metals	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	6010B - ND - Acceptable 6020 - ND - Acceptable	N/A	None
LCS Recovery	6010B - Acceptable 6020 - Acceptable	N/A	None
LCS/LCSD	6010B - Acceptable 6020 - Acceptable	N/A	None
Serial Dilution	6010B - Unacceptable - Samples not from this SDG, no qualification necessary 6020 - Unacceptable - Samples not from this SDG, no qualification necessary	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	6010B - Unacceptable - Samples not from this SDG, no qualification necessary 6020 - Acceptable - Samples not from this SDG	N/A	None
Post Digest Spike	6010B - Unacceptable - Samples not from this SDG, no qualification necessary	N/A	None

SDG:	L765719		
Sample Numbers:	ST105MW-24-05152015		
Sample Date:	5/15/2015		
Analytical Date:	6010B - 5/27/2015; 6020 - 5/21/2015		
Analyses:	Metals	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	6010B - ND - Acceptable 6020 - ND - Acceptable	N/A	None
LCS Recovery	6010B - Acceptable 6020 - Acceptable	N/A	None
LCS/LCSD	6010B - Acceptable 6020 - Acceptable	N/A	None
Serial Dilution	6010B - Acceptable - Sample L765719-01 6020 - Acceptable - Sample L765719-01	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	6010B - Acceptable - Sample L765719-01 6020 - Acceptable - Sample L765719-01	N/A	None
Post Digest Spike	N/A	N/A	None

SDG:	L766126		
Sample Numbers:	KAFB-2629-05182015, KAFB-2628-05182015, KAFB-0617-05192015		
Sample Date:	5/18/2015, 5/19/2015		
Analytical Date:	6010B - 5/27/2015; 6020 - 5/21/2015		
Analyses:	Metals	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	6010B - ND - Acceptable 6020 - ND - Acceptable	N/A	None
LCS Recovery	6010B - Acceptable 6020 - Acceptable	N/A	None
LCS/LCSD	6010B - Acceptable 6020 - Acceptable	N/A	None
Serial Dilution	6010B - Unacceptable - Samples not from this SDG, no qualification necessary 6020 - Unacceptable - Samples not from this SDG, no qualification necessary	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	6010B - Acceptable - Samples not from this SDG 6020 - Acceptable - Samples not from this SDG	N/A	None
Post Digest Spike	N/A	N/A	None

SDG:	L766725		
Sample Numbers:	KAFB-0616-05202015, ST105MW-021-05212015		
Sample Date:	5/20/2015, 5/21/2015		
Analytical Date:	6010B - 5/29/2015, 5/31/2015; 6020 - 6/1/2015, 6/2/2015		
Analyses:	Metals	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	6010B - ND - Acceptable 6020 - ND - Acceptable	N/A	None
LCS Recovery	6010B - Acceptable 6020 - Acceptable	N/A	None
LCS/LCSD	6010B - Acceptable 6020 - Acceptable	N/A	None
Serial Dilution	6010B - Unacceptable - Samples not from this SDG, no qualification necessary 6020 - Unacceptable - Samples not from this SDG, no qualification necessary	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	6010B - Unacceptable - Samples not from this SDG, no qualification necessary 6020 - Acceptable - Samples not from this SDG	N/A	None
Post Digest Spike	N/A	N/A	None

SDG:	L767607		
Sample Numbers:	KAFB-0614-05262015, EB-KAFB-0614-05262015, TJA-5-05272015, ST105MW-018-05212015		
Sample Date:	5/26/2015, 5/27/2015		
Analytical Date:	6010B - 6/4/2015, 6/5/2015; 6020 - 6/3/2015		
Analyses:	Metals	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	6010B - ND - Acceptable 6020 - ND - Acceptable	N/A	None
LCS Recovery	6010B - Acceptable 6020 - Acceptable	N/A	None
LCS/LCSD	6010B - Acceptable 66020 - Unacceptable - Beryllium recovered above acceptance criteria. As all associated results ND, data qualification not required.	N/A	None
Serial Dilution	6010B - Acceptable -Sample L767606-01 6020 - Acceptable - Samples not from this SDG	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	6010B - Acceptable -Sample L767606-01 6020 - Acceptable - Samples not from this SDG	N/A	None
Post Digest Spike	N/A	N/A	None

SDG:	L768216		
Sample Numbers:	TJA-4-05282015, KAFB-0608-05282015, ST105MW-017-05292015, FB-ST105MW-017-0529015		
Sample Date:	5/28/2015, 5/29/2015		
Analytical Date:	6010B - 6/4/2015, 6/5/2015; 6020 - 6/3/2015		
Analyses:	Metals	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	6010B - ND - Acceptable 6020 - ND - Acceptable	N/A	None
LCS Recovery	6010B - Acceptable 6020 - Acceptable	N/A	None
LCS/LCSD	6010B - Acceptable 6020 - Unacceptable - Beryllium recovered above acceptance criteria. As all associated results ND, data qualification not required.	N/A	None
Serial Dilution	6010B - Acceptable -Samples not from this SDG 6020 - Acceptable - Sample L768216-04	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	6010B - Acceptable -Samples not from this SDG 6020 - Acceptable - Sample L768216-04	N/A	None
Post Digest Spike	N/A	N/A	None

SDG:	L768768		
Sample Numbers:	KAFB-0613-06012015, KAFB-0602-06012015, ST105MW-022-06022015, KAFB-0625-06022015		
Sample Date:	6/1/2015, 6/2/2015		
Analytical Date:	6010B - 6/5/2015; 6020 - 6/5/2015		
Analyses:	Metals	Flag	Affected Samples
Completeness:	All samples analyzed as requested.	N/A	None
Sample Preservation:	Acceptable	N/A	None
Holding Time:	Acceptable	N/A	None
Method Blank:	6010B - ND - Acceptable 6020 - ND - Acceptable	N/A	None
LCS Recovery	6010B - Acceptable 6020 - Acceptable	N/A	None
LCS/LCSD	6010B - Acceptable 6020 - Acceptable	N/A	None
Serial Dilution	6010B - Acceptable -Sample L768768-01 6020 - Acceptable - Sample L768768-02	N/A	None
MS Recovery	N/A	N/A	None
MS/MSD:	6010B - Unacceptable - Sample L768768-01 recovered above control limits for calcium (54%/66%, with limits of 75-125%) and sodium (MS at 73%, with limits of 75-125%) 6020 - Acceptable - Sample L738768-02	J,m	KAFB-0613-06012015
Post Digest Spike	6010B - Acceptable -Sample L768768-01	N/A	None

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APPENDIX C

Validation Reports

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URS

Memorandum

Date: September 14, 2015

To: Richard Wells

From: Katie Abbott

Subject: **ST-105 Nitrate/Nitrite LTM**

This report summarizes the validation of analytical data for 65 primary monitoring well samples, two field duplicates, two equipment blanks, and two field blanks collected in support of the second sampling event of the fiscal year 2015 annual groundwater monitoring conducted at the ST-105 nitrate impacted wells at Kirtland Air Force Base (AFB). The samples were collected between April 13, 2015 and June 1, 2015, as part of a larger, overall effort to sample all wells associated with the ST-105 site. The sample identification numbers and sample collection dates are summarized on Table 1. The samples were analyzed for alkalinity by U.S. Environmental Protection Agency (EPA) Method 2320, anions by SW-846 Method 9056, ammonia nitrogen by EPA Method 350.1, dissolve organic carbon by EPA Method 5310, total dissolved solids by EPA Method 2540, total Kjeldahl nitrogen by EPA Method 351.2, nitrate/nitrite by EPA Method 353.2, total organic carbon by SW-846 Method 9060A, and metals by SW-846 Methods 6010B and 6020.The laboratory analyses were performed by ESC Lab Sciences located in Mount Juliet, Tennessee operating under U.S. Department of Defense Environmental Laboratory Accreditation Program certification 1461.01.

The following comments refer to the laboratory's performance in meeting the quality assurance and control specifications outlined in the analytical methods and the general principles given in the U.S. Environmental Protection Agency document: *National Functional Guidelines for Inorganic Superfund Data Review* (January 2010) and *National Functional Guidelines for Superfund Organic Methods Data Review* (June 2008). In addition, the data were reviewed in accordance with the Quality Assurance/ Quality Control objectives outlined in the project document, *ST-105 – Nitrate Contaminated Groundwater Quality Assurance Project Plan (QAPP)* (May 2014), the requirements of the Department of Defense (DoD) Quality Systems Manual (QSM) Version 4.2 (June 2003), and evaluation of laboratory criteria, as applicable. The qualifiers used to identify data that did not meet the criteria set forth in the previously referenced documents are listed in Appendix A.

A list of the data review parameters is given in Sections 2.0 thru 10.0. A preceding "►" signifies areas where issues were raised during the course of the verification review, and should be considered to determine any impact on data quality and usability.

1.0 EXECUTIVE SUMMARY

The following table summarizes the data qualified, as described below.

Sample ID	Qualified Analyte	Qualifier	Reason Code	Reference Section
KAFB-0612-04132015	Alkalinity	J	m	2.9
ST105MW-24-05152015	Alkalinity	J	m	2.9
ST105MW-24-05152015	Bromide	J	m	3.9
KAFB-0615-05132015 ST105MW-20-05132015 ST105MW-24-05152015	Ammonia Nitrogen	U	z	4.3
KAFB-2629-05182015 KAFB-2628-05182015 KAFB-0617-05192015	Ammonia Nitrogen	U	z	4.3
KAFB-0616-05202015 ST105MW-021-05212015	Ammonia Nitrogen	U	z	4.3
KAFB-0614-05262015 EB-KAFB-0614-05262015 TJA-5-05272015 ST105MW-018-05212015	Ammonia Nitrogen	U	z	4.3
TJA-4-05282015 KAFB-0608-05282015 ST105MW-017-05292015 FB-ST105MW-017-0529015	Ammonia Nitrogen	U	z	4.3
KAFB-0613-06012015 KAFB-0602-06012015 ST105MW-022-06022015 KAFB-0625-06022015	Ammonia Nitrogen	U	z	4.3
EB-ST105MW-015-04152015	Dissolved Organic Carbon	R		5.2
KAFB-0614-05262015 EB-KAFB-0614-05262015	Dissolved Organic Carbon	R		5.2
TJA-4-05282015 KAFB-0608-05282015	Dissolved Organic Carbon	R		5.2
KAFB-0623-05112015 FD-KAFB-0623-05112015	Dissolved Organic Carbon	J	f	5.8
FB-ST105MW-017-05292015	Total Dissolved Solids	J	O	6.1
KAFB-0315-05072015	Kjeldahl Nitrogen	U	z	7.3
KAFB-2628-05182015	Kjeldahl Nitrogen	U	z	7.3
ST105MW-20-05132015	Kjeldahl Nitrogen	UJ	m,d	7.9
KAFB-0617-05192015	Kjeldahl Nitrogen	UJ	m	7.9
KAFB-0611-04132015 KAFB-0612-04132015 KAFB-0621-04142015 FD-KAFB-0612-04142015 KAFB-0620-04142015	Antimony	U	z	10.3
FB-ST105MW-023-05062015	Sodium	U	z	10.3

Sample ID	Qualified Analyte	Qualifier	Reason Code	Reference Section
KAFB-0307-05052015	Zinc	U	z	10.3
KAFB-0623-05112015 FD-KAFB-0623-05112015 ST105MW-19-05112015	Antimony	U	z	10.3
KAFB-0618-04232015	Calcium Sodium	J	m	10.9
KAFB-0613-06012015	Calcium	J	m	10.9
Note: Explanation of qualifiers and reason codes are given in Appendix A.				

With the above-noted exception, the data are acceptable in all areas of review and are useable for their intended purpose. A total of 1,420 analytical results were generated in support of the investigation with five results rejected due to exceeding the method holding time, and improper preservation; therefore, the analytical completeness for this data group is >97%.

All SDGS

Perchlorate by Method 6850 was requested on the chain of custody (COC) for most of the samples submitted. As the laboratory did not perform this analysis, and data was not included in the data packages, perchlorate results could not be evaluated.

All quality control samples (matrix spikes/matrix spike duplicates, field blanks, equipment blanks, and field duplicates) were performed at the quality assurance project plan (QAPP) frequency of one per twenty samples.

Results between the detection limit and limit of quantitation were qualified as estimated (J) by the laboratory. Further qualification was not considered necessary.

L768768

Sample **KAFB-0602-06012015** was incorrectly listed on the COC as **KAFB-0608-06012015**. The laboratory was instructed to correctly log the sample as **KAFB-0602-06012015** and further action was not required.

2.0 ALKALINITY

►Data Completeness
Sample Preservation and Holding Times
Method Blank
Equipment Blank
Field Blank
Laboratory Control Sample/Laboratory Control Laboratory Duplicate (LCS/LSCD)
Laboratory Duplicate
Field Duplicate
►Matrix Spike/Matrix Spike Duplicate (MS/MSD)

2.1 Data Completeness

The analyses were performed as requested on the COC Records.

Alkalinity was requested by Method 310.2 on the COC, but was performed by Method 2320 by the laboratory. As the laboratory performed the equivalent method, further action was not considered necessary.

2.2 Sample Preservation and Holding Times

All samples were properly preserved and were analyzed within the prescribed holding times.

2.3 Method Blank

The associated method blanks were reported as non-detect for the analyte of interest.

2.4 Equipment Blank

The associated equipment blank was reported as non-detect for the analyte of interest.

2.5 Field Blank

The associated field blank was reported as non-detect for the analyte of interest.

2.6 LCS/LCSD

The LCS percent recoveries were within the acceptance criteria, demonstrating acceptable analytical accuracy. The relative percent differences (RPDs) for the LCSDs were also within the acceptance criteria, demonstrating acceptable analytical precision.

2.7 Laboratory Duplicate

The comparison between results of the laboratory duplicate pair met the criteria listed below.

- When both the sample and duplicate values are >5x the limit of quantitation (LOQ) acceptable sampling and analytical precision is indicated by an RPD between the results of ≤20% for water samples.
- Where the result for one or both analytes of the laboratory duplicate pair is <5xLOQ, satisfactory precision is indicated if the absolute difference between the laboratory duplicate results is <2xLOQ for water samples.

2.8 Field Duplicate

The comparison between results of the field duplicate pair met the criteria listed below.

- When both the sample and duplicate values are >5x the LOQ acceptable sampling and analytical precision is indicated by an RPD between the results of ≤20% for water samples.
- Where the result for one or both analytes of the field duplicate pair is <5xLOQ, satisfactory precision is indicated if the absolute difference between the field duplicate results is <2xLOQ for water samples.

2.9 MS/MSD

The MS/MSD performed on sample **KAFB-0612-04132015** in SDG L759295 recovered outside the acceptance criteria of 80 to 120% for alkalinity, with recoveries of 76% and 77%. The associated alkalinity result for sample **KAFB-0612-04132015** was qualified as estimated (**J,m**).

The MS performed on sample **ST105MW-24-05152015** in SDG L765719 recovered outside the acceptance criteria of 80 to 120% for alkalinity, with a recovery of 79% The associated alkalinity result for sample **ST105MW-24-05152015** was qualified as estimated (**J,m**).

All associated RPDs were within acceptance limits.

3.0 ANIONS (BROMIDE, CHLORIDE, FLUORATE, AND SULFATE)

►Data Completeness
Sample Preservation and Holding Times
Method Blank
Equipment Blank
►Field Blank
LCS/LCSD
Laboratory Duplicate
►MS/MSD

3.1 Data Completeness

The analyses were performed as requested on the COC Records.

Anions was requested by Method 300.0 on the COC, but was performed by Method 9056 by the laboratory. As the laboratory performed the equivalent method, further action was not considered necessary.

3.2 Sample Preservation and Holding Times

All samples were properly preserved and were analyzed within the prescribed holding times.

3.3 Method Blank

The associated method blanks were reported as non-detect for the analytes of interest.

3.4 Equipment Blank

The associated equipment blank was reported as non-detect for the analytes of interest.

3.5 Field Blank

Chloride and fluoride were detected in the field blank samples at concentrations > limit of detection (LOD). Field blank detections will be evaluated in the annual report; therefore, further action was not necessary.

3.6 LCS/LCSD

The LCS percent recoveries were within the acceptance criteria, demonstrating acceptable analytical accuracy. The RPDs for the LCSDs were also within the acceptance criteria, demonstrating acceptable analytical precision.

3.7 Laboratory Duplicate

The comparison between results of the laboratory duplicate pair met the criteria listed below.

- When both the sample and duplicate values are >5x the LOQ acceptable sampling and analytical precision is indicated by an RPD between the results of ≤20% for water samples.
- Where the result for one or both analytes of the laboratory duplicate pair is <5xLOQ, satisfactory precision is indicated if the absolute difference between the laboratory duplicate results is <2xLOQ for water samples.

3.8 Field Duplicate

The comparison between results of the field duplicate pair met the criteria listed below.

- When both the sample and duplicate values are >5x the LOQ acceptable sampling and analytical precision is indicated by an RPD between the results of ≤20% for water samples.
- Where the result for one or both analytes of the field duplicate pair is <5xLOQ, satisfactory precision is indicated if the absolute difference between the field duplicate results is <2xLOQ for water samples.

3.9 MS/MSD

The MS/MSD performed on sample **ST105MW-24-05152015** in SDG L765719 recovered outside the acceptance criteria of 80 to 120% for bromide, with recoveries of 78% and 78%. The associated bromide result for sample **ST105MW-24-05152015** was qualified as estimated (**J,m**).

All associated RPDs were within acceptance limits.

4.0 AMMONIA NITROGEN

Data Completeness
Sample Preservation and Holding Times
►Method Blank
Equipment Blank
►Field Blank
LCS/LCSD
Laboratory Duplicate
MS/MSD

4.1 Data Completeness

The analyses were performed as requested on the COC Records.

4.2 Sample Preservation and Holding Times

All samples were properly preserved and were analyzed within the prescribed holding times.

4.3 Method Blank

In SDG L765321, ammonia nitrogen was detected in the method blank at a concentration of 74 µg/L. As the potential bias was considered to be high, the associated ammonia nitrogen results reported as detected at concentrations <5x the concentration of the method blank contamination were qualified as non-detect (**U, z**).

In SDG L765719, ammonia nitrogen was detected in the method blank at a concentration of 68 µg/L. As the potential bias was considered to be high, and the associated zinc result for sample **ST105MW-24-**

05152015 was reported as detected at a concentration <5x the concentration of the method blank contamination, the associated result was qualified as non-detect (**U, z**).

In SDG L766126, ammonia nitrogen was detected in the method blank at a concentration of 79 µg/L. As the potential bias was considered to be high, the associated ammonia nitrogen results reported as detected at concentrations <5x the concentration of the method blank contamination were qualified as non-detect (**U, z**).

In SDG L766725, ammonia nitrogen was detected in the method blank at a concentration of 86 µg/L. As the potential bias was considered to be high, the associated ammonia nitrogen results reported as detected at concentrations <5x the concentration of the method blank contamination were qualified as non-detect (**U, z**).

In SDG L767607, ammonia nitrogen was detected in the method blank at a concentration of 82 µg/L. As the potential bias was considered to be high, the associated ammonia nitrogen results reported as detected at concentrations <5x the concentration of the method blank contamination were qualified as non-detect (**U, z**).

In SDG L768216, ammonia nitrogen was detected in the method blank at a concentration of 68 µg/L. As the potential bias was considered to be high, the associated ammonia nitrogen results reported as detected at concentrations <5x the concentration of the method blank contamination were qualified as non-detect (**U, z**).

In SDG L768768, ammonia nitrogen was detected in the method blank at a concentration of 77 µg/L. As the potential bias was considered to be high, the associated ammonia nitrogen results reported as detected at concentrations <5x the concentration of the method blank contamination were qualified as non-detect (**U, z**).

4.4 Equipment Blank

The associated equipment blank was reported as non-detect for the analyte of interest.

4.5 Field Blank

Ammonia nitrogen was detected in the field blank samples at a concentration >LOD. Field blank detections will be evaluated in the annual report; therefore, further action was not necessary.

4.6 LCS/LCSD

The LCS percent recoveries were within the acceptance criteria, demonstrating acceptable analytical accuracy. The RPDs for the LCSDs were also within the acceptance criteria, demonstrating acceptable analytical precision.

4.7 Laboratory Duplicate

The comparison between results of the laboratory duplicate pair met the criteria listed below.

- When both the sample and duplicate values are >5x the LOQ acceptable sampling and analytical precision is indicated by an RPD between the results of ≤20% for water samples.

- Where the result for one or both analytes of the laboratory duplicate pair is <5xLOQ, satisfactory precision is indicated if the absolute difference between the laboratory duplicate results is <2xLOQ for water samples.

4.8 Field Duplicate

The comparison between results of the field duplicate pair met the criteria listed below.

- When both the sample and duplicate values are >5x the LOQ acceptable sampling and analytical precision is indicated by an RPD between the results of ≤20% for water samples.
- Where the result for one or both analytes of the field duplicate pair is <5xLOQ, satisfactory precision is indicated if the absolute difference between the field duplicate results is <2xLOQ for water samples.

4.9 MS/MSD

The MS percent recoveries and RPDs for all SDGs were within the acceptance criteria, demonstrating acceptable analytical accuracy.

5.0 DISSOLVED ORGANIC CARBON

►Data Completeness
►Sample Preservation and Holding Times
Method Blank
►Equipment Blank
Field Blank
LCS/LCSD
Laboratory Duplicate
►Field Duplicate
MS/MSD

5.1 Data Completeness

The analyses were performed as requested on the COC Records.

Dissolved organic carbon was requested by Method 9060A on the COC, but was performed by Method 5310 by the laboratory. As the laboratory performed the equivalent method, further action was not considered necessary.

5.2 Sample Preservation and Holding Times

With the exception noted below, all samples were properly preserved.

In SDG L759936, sample **EB-ST105MW-015-04152015** exceeded the 2 hour holding time requirement for unpreserved samples. The associated dissolved organic carbon result for sample **EB-ST105MW-015-04152015** was qualified as unusable (**R**) per the QAPP as preservation requirements and holding time criteria were not met.

In SDG L737607, samples **KAFB-0614-05262015** and **EB-KAFB-0614-05262015** exceeded the 2 hour holding time requirement for unpreserved samples. The associated dissolved organic carbon results for samples **KAFB-0614-05262015** and **EB-KAFB-0614-05262015** were qualified as unusable (**R**) per the QAPP as preservation and holding time requirements were not met.

In SDG L768216, samples **TJA-4-05282015** and **KAFB-0608-05282015** exceeded the 2 hour holding time requirement for unpreserved samples. The associated dissolved organic carbon results for samples **TJA-4-05282015** and **KAFB-0608-05282015** were qualified as unusable (**R**) per the QAPP as preservation and holding time requirements were not met.

All other samples were analyzed within the prescribed holding times. As all other dissolved organic carbon samples were received at the laboratory field filtered and acidified, those samples met the 28 day holding time requirement for preserved samples, and data qualification was not considered necessary.

5.3 Method Blank

The associated method blanks were reported as non-detect for the analyte of interest.

5.4 Equipment Blank

As the dissolved organic carbon results from the equipment blanks were qualified as unusable, an equipment blank was not evaluated for this sampling event.

5.5 Field Blank

The associated field blank was reported as non-detect for the analyte of interest.

5.6 LCS/LCSD

The LCS percent recoveries were within the acceptance criteria, demonstrating acceptable analytical accuracy. The RPDs for the LCSDs were also within the acceptance criteria, demonstrating acceptable analytical precision.

5.7 Laboratory Duplicate

The comparison between results of the laboratory duplicate pair met the criteria listed below.

- When both the sample and duplicate values are >5x the LOQ acceptable sampling and analytical precision is indicated by an RPD between the results of ≤20% for water samples.
- Where the result for one or both analytes of the laboratory duplicate pair is <5xLOQ, satisfactory precision is indicated if the absolute difference between the laboratory duplicate results is <2xLOQ for water samples.

5.8 Field Duplicate

With one exception, the comparison between results of the field duplicate pair met the criteria listed below.

- When both the sample and duplicate values are >5x the LOQ acceptable sampling and analytical precision is indicated by an RPD between the results of ≤20% for water samples.
- Where the result for one or both analytes of the field duplicate pair is <5xLOQ, satisfactory precision is indicated if the absolute difference between the field duplicate results is <2xLOQ for water samples.

In SDG L764630, the RPD for dissolved organic carbon results between the sample **KAFB-0623-05112015** (620 µg/L) and the associated field duplicate, **FD-KAFB-0623-05112015** (280 µg/L), was

outside control limits. The associated results for samples **KAFB-0623-05112015** and **FD-KAFB-0623-05112015** were qualified as estimated (**J,f**).

5.9 MS/MSD

The MS percent recoveries and RPDs for all SDGs were within the acceptance criteria, demonstrating acceptable analytical accuracy.

6.0 TOTAL DISSOLVED SOLIDS

►Data Completeness
Sample Preservation and Holding Times
Method Blank
Equipment Blank
Field Blank
LCS/LCSD
Laboratory Duplicate
Field Duplicate

6.1 Data Completeness

The analyses were performed as requested on the COC Records.

Total dissolved solids was requested by Method 160.1on the COC, but was performed by Method 2540 by the laboratory. As the laboratory performed the equivalent method, further action was not considered necessary.

The laboratory noted in SDG L768216 that the total dissolved solids result for sample **FB-ST105MW-017-05292015** was determined based on a final residue greater than 200 milligrams. As the method requires the sample volume to yield between 2.5 and 200 milligrams, and the result exceeded this requirement, the associated total dissolved solids result for sample **FB-ST105MW-017-05292015** was qualified as estimated (**J,O**)

6.2 Sample Preservation and Holding Times

All samples were properly preserved and were analyzed within the prescribed holding times.

6.3 Method Blank

Total dissolved solids was reported as detected in the method blank associated with data package L763520 at a concentration >DL and <LOD. Per the QAPP, only detections >LOD are considered for evaluation; therefore, qualification due to these detections was not applicable.

The associated method blanks were reported as non-detect for the analyte of interest.

6.4 Equipment Blank

The associated equipment blank was reported as non-detect for the analyte of interest.

6.5 Field Blank

The associated field blank was reported as non-detect for the analyte of interest.

6.6 LCS/LCSD

The LCS percent recoveries were within the acceptance criteria, demonstrating acceptable analytical accuracy. The RPDs for the LCSDs were also within the acceptance criteria, demonstrating acceptable analytical precision.

6.7 Laboratory Duplicate

The comparison between results of the laboratory duplicate pair met the criteria listed below.

- When both the sample and duplicate values are >5x the LOQ acceptable sampling and analytical precision is indicated by an RPD between the results of ≤20% for water samples.
- Where the result for one or both analytes of the laboratory duplicate pair is <5xLOQ, satisfactory precision is indicated if the absolute difference between the laboratory duplicate results is <2xLOQ for water samples.

6.8 Field Duplicate

The comparison between results of the field duplicate pair met the criteria listed below.

- When both the sample and duplicate values are >5x the LOQ acceptable sampling and analytical precision is indicated by an RPD between the results of ≤20% for water samples.
- Where the result for one or both analytes of the field duplicate pair is <5xLOQ, satisfactory precision is indicated if the absolute difference between the field duplicate results is <2xLOQ for water samples.

7.0 TOTAL KJELDAHL NITROGEN

►Data Completeness
Sample Preservation and Holding Times
►Method Blank
Equipment Blank
Field Blank
LCS/LCSD
Laboratory Duplicate
Field Duplicate
►MS/MSD

7.1 Data Completeness

The analyses were performed as requested on the COC Records.

Total Kjeldahl nitrogen was requested by Method 352.1 on the COC, but was performed by Method 351.2 by the laboratory. As the laboratory performed the equivalent method, further action was not considered necessary.

7.2 Sample Preservation and Holding Times

All samples were properly preserved and were analyzed within the prescribed holding times.

7.3 Method Blank

In SDG L763800, total Kjeldahl nitrogen was detected in the method blank at a concentration of 216 µg/L. As the potential bias was considered to be high, and the associated total Kjeldahl nitrogen result for sample **KAFB-0315-05072015** was reported as detected at a concentration <5x the concentration of the method blank contamination, the associated result was qualified as non-detect (**U,z**).

In SDG L765719, total Kjeldahl nitrogen was detected in the method blank at a concentration of 90.9 µg/L. As the associated total Kjeldahl nitrogen result was reported as detected at a concentration >5x the concentration of the blank contamination, data qualification was not considered necessary.

In SDG L766126, total Kjeldahl nitrogen was detected in the method blank at a concentration of 216 µg/L. As the potential bias was considered to be high, and the associated total Kjeldahl nitrogen result for sample **KAFB-2628-05182015** was reported as detected at a concentration <5x the concentration of the method blank contamination, the associated result was qualified as non-detect (**U,z**).

7.4 Equipment Blank

The associated equipment blank was reported as non-detect for the analyte of interest.

7.5 Field Blank

The associated field blank was reported as non-detect for the analyte of interest.

7.6 LCS/LCSD

The LCS percent recoveries were within the acceptance criteria, demonstrating acceptable analytical accuracy. The RPDs for the LCSDs were also within the acceptance criteria, demonstrating acceptable analytical precision.

7.7 Laboratory Duplicate

The comparison between results of the laboratory duplicate pair met the criteria listed below.

- When both the sample and duplicate values are >5x the LOQ acceptable sampling and analytical precision is indicated by an RPD between the results of ≤20% for water samples.
- Where the result for one or both analytes of the laboratory duplicate pair is <5xLOQ, satisfactory precision is indicated if the absolute difference between the laboratory duplicate results is <2xLOQ for water samples.

7.8 Field Duplicate

The comparison between results of the field duplicate pair met the criteria listed below.

- When both the sample and duplicate values are >5x the LOQ acceptable sampling and analytical precision is indicated by an RPD between the results of ≤20% for water samples.
- Where the result for one or both analytes of the field duplicate pair is <5xLOQ, satisfactory precision is indicated if the absolute difference between the field duplicate results is <2xLOQ for water samples.

7.9 MS/MSD

The MS/MSD performed on sample **ST105MW-20-05132015** in SDG L765321 recovered outside the acceptance criteria of 90 to 110% for total Kjeldahl nitrogen, with recoveries of 87.2% and 71%. In addition, the RPD was outside acceptance criteria of 20% with a recovery of 20.5%. The associated total Kjeldahl nitrogen result for sample **ST105MW-20-05132015** was qualified as estimated (**UJ,m,d**).

The MS/MSD performed on sample **KAFB-0617-05192015** in SDG L766126 recovered outside the acceptance criteria of 90 to 110% for total Kjeldahl nitrogen, with recoveries of 80.8% and 76.4%. The associated total Kjeldahl nitrogen result for sample **KAFB-0617-05192015** was qualified as estimated (**UJ,m**).

With the exception noted above, the associated RPDs were within acceptance limits.

8.0 NITRATE/NITRITE

Data Completeness
Sample Preservation and Holding Times
Method Blank
Equipment Blank
Field Blank
LCS/LCSD
Laboratory Duplicate
Field Duplicate
MS/MSD

8.1 Data Completeness

The analyses were performed as requested on the COC Records.

8.2 Sample Preservation and Holding Times

All samples were properly preserved and were analyzed within the prescribed holding times.

8.3 Method Blank

The associated method blanks were reported as non-detect for the analyte of interest.

8.4 Equipment Blank

The associated equipment blank was reported as non-detect for the analyte of interest.

8.5 Field Blank

The associated field blank was reported as non-detect for the analyte of interest.

8.6 LCS/LCSD

The LCS percent recoveries were within the acceptance criteria, demonstrating acceptable analytical accuracy. The RPDs for the LCSDs were also within the acceptance criteria, demonstrating acceptable analytical precision.

8.7 Laboratory Duplicate

The comparison between results of the laboratory duplicate pair met the criteria listed below.

- When both the sample and duplicate values are >5x the LOQ acceptable sampling and analytical precision is indicated by an RPD between the results of ≤20% for water samples.
- Where the result for one or both analytes of the laboratory duplicate pair is <5xLOQ, satisfactory precision is indicated if the absolute difference between the laboratory duplicate results is <2xLOQ for water samples.

8.8 Field Duplicate

The comparison between results of the field duplicate pair met the criteria listed below.

- When both the sample and duplicate values are >5x the LOQ acceptable sampling and analytical precision is indicated by an RPD between the results of ≤20% for water samples.
- Where the result for one or both analytes of the field duplicate pair is <5xLOQ, satisfactory precision is indicated if the absolute difference between the field duplicate results is <2xLOQ for water samples.

8.9 MS/MSD

The MS percent recoveries and RPDs for all SDGs were within the acceptance criteria, demonstrating acceptable analytical accuracy.

9.0 TOTAL ORGANIC CARBON

Data Completeness
Sample Preservation and Holding Times
Method Blank
Equipment Blank
Field Blank
LCS/LCSD
Laboratory Duplicate
Field Duplicate
MS/MSD

9.1 Data Completeness

The analyses were performed as requested on the COC Records.

9.2 Sample Preservation and Holding Times

All samples were properly preserved and were analyzed within the prescribed holding times.

9.3 Method Blank

The associated method blanks were reported as non-detect for the analyte of interest.

9.4 Equipment Blank

The associated equipment blank was reported as non-detect for the analyte of interest.

9.5 Field Blank

The associated field blank was reported as non-detect for the analyte of interest.

9.6 LCS/LCSD

The LCS percent recoveries were within the acceptance criteria, demonstrating acceptable analytical accuracy. The RPDs for the LCSDs were also within the acceptance criteria, demonstrating acceptable analytical precision.

9.7 Laboratory Duplicate

The comparison between results of the laboratory duplicate pair met the criteria listed below.

- When both the sample and duplicate values are >5x the LOQ acceptable sampling and analytical precision is indicated by an RPD between the results of ≤20% for water samples.
- Where the result for one or both analytes of the laboratory duplicate pair is <5xLOQ, satisfactory precision is indicated if the absolute difference between the laboratory duplicate results is <2xLOQ for water samples.

9.8 Field Duplicate

The comparison between results of the field duplicate pair met the criteria listed below.

- When both the sample and duplicate values are >5x the LOQ acceptable sampling and analytical precision is indicated by an RPD between the results of ≤20% for water samples.
- Where the result for one or both analytes of the field duplicate pair is <5xLOQ, satisfactory precision is indicated if the absolute difference between the field duplicate results is <2xLOQ for water samples.

9.9 MS/MSD

The MS percent recoveries and RPDs for all SDGs were within the acceptance criteria, demonstrating acceptable analytical accuracy.

10.0 METALS

Data Completeness
Sample Preservation and Holding Times
►Method Blank
►Equipment Blank
►Field Blank
►LCS/LCSD
Field Duplicate
Serial Dilution
►MS/MSD

10.1 Data Completeness

The analyses were performed as requested on the COC Records.

10.2 Sample Preservation and Holding Times

All samples were properly preserved and were analyzed within the prescribed holding times.

10.3 Method Blank

Several analytes were reported as detected in the method blanks at concentrations <LOD. Per the QAPP, only detections >LOD are considered for evaluation; therefore, qualification due to these detections was not applicable.

In SDG L759295, antimony was detected in the method blank at a concentration of 0.606 µg/L. As the potential bias was considered to be high, the associated antimony results reported as detected at concentrations <5x the concentration of the method blank contamination were qualified as non-detect (**U, z**).

In SDG L760616, sodium was detected in the method blank at a concentration of 502 µg/L. As the associated sodium results were reported as detected at concentrations >5x the concentration of the blank contamination, data qualification was not considered necessary.

In SDG L761381, sodium was detected in the method blank at a concentration of 502 µg/L. As the associated sodium results were reported as detected at concentrations >5x the concentration of the blank contamination, data qualification was not considered necessary.

In SDG L763520, sodium was detected in the method blank at a concentration of 564 µg/L. As the potential bias was considered to be high, and the associated sodium result for sample **FB-ST105MW-023-05062015** was reported as detected at a concentration <5x the concentration of the method blank contamination, the associated result was qualified as non-detect (**U, z**).

In SDG L763520, zinc was detected in the method blank at a concentration of 11 µg/L. As the potential bias was considered to be high, and the associated zinc result for sample **KAFB-0307-05052015** was reported as detected at a concentration <5x the concentration of the method blank contamination, the associated result was qualified as non-detect (**U, z**).

In SDG L763800, sodium was detected in the method blank at a concentration of 631 µg/L. As the associated sodium results were reported as detected at concentrations >5x the concentration of the blank contamination, data qualification was not considered necessary.

In SDG L763800, barium was detected in the method blank at a concentration of 1.67 µg/L. As the associated barium results were reported as detected at concentrations >5x the concentration of the blank contamination, data qualification was not considered necessary.

In SDG L764630, magnesium was detected in the method blank at a concentration of 527 µg/L. As the associated magnesium results were reported as detected at concentrations >5x the concentration of the blank contamination, data qualification was not considered necessary.

In SDG L764630, antimony was detected in the method blank at a concentration of 0.576 µg/L. As the potential bias was considered to be high, the associated antimony results reported as detected at concentrations <5x the concentration of the method blank contamination were qualified as non-detect (**U, z**).

10.4 Equipment Blank

Several analytes were detected in the equipment blank samples at concentrations >LOD. Equipment blank detections will be evaluated in the annual report; therefore, further action was not necessary.

10.5 Field Blank

Several analytes were detected in the field blank samples at concentrations >LOD. Field blank detections will be evaluated in the annual report; therefore, further action was not necessary.

10.6 LCS/LCSD

The LCSD performed in SDG L767607 recovered outside the acceptance criteria of 80 to 120% for beryllium, with a recovery of 121%. As the potential bias was considered to be high, and the associated samples were reported as non-detect, data qualification was not considered necessary.

The LCSD performed in SDG L768216 recovered outside the acceptance criteria of 80 to 120% for beryllium, with a recovery of 121%. As the potential bias was considered to be high, and the associated samples were reported as non-detect, data qualification was not considered necessary.

10.7 Field Duplicate

The comparison between results of the field duplicate pair met the criteria listed below.

- When both the sample and duplicate values are >5x the LOQ acceptable sampling and analytical precision is indicated by an RPD between the results of ≤20% for water samples.
- Where the result for one or both analytes of the field duplicate pair is <5xLOQ, satisfactory precision is indicated if the absolute difference between the field duplicate results is <2xLOQ for water samples.

10.8 Serial Dilution

Consistent with the method, only the results that were greater than 50 times their respective detection limits were appropriate for comparing to the serial dilution evaluation criterion. All percent differences between the original sample results and the results obtained from the sample-diluted 1:5 were ≤10%.

10.9 MS/MSD

The MS/MSD performed on sample **KAFB-0618-04232015** in SDG L761381 recovered outside the acceptance criteria of 75 to 125% for calcium, with recoveries of 130% and 133%, and sodium, with recoveries of 132% and 129%. As the sodium result for sample **KAFB-0618-04232015** was greater than four times the concentration of the spike added, the MS/MSD results were not considered to be a representative measure of accuracy; therefore, data qualification was not considered necessary. The associated calcium result for sample **KAFB-0618-04232015** was qualified as estimated (**J,m**).

The MS/MSD performed on sample **KAFB-0613-06012015** in SDG L768768 recovered outside the acceptance criteria of 75 to 125% for calcium, with recoveries of 54% and 66%, and sodium, with an MS recovery of 73%. The associated calcium and sodium results for sample **KAFB-0613-06012015** were qualified as estimated (**J,m**).

All associated RPDs were within acceptance limits.

Appendix A

Data Validation Qualifier Definitions and Interpretation Key Assigned by URS' Data Review Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte 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 numerical value represents its approximate concentration.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit 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 sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

REASON CODE DEFINITIONS

a	Analytical sequence deficiency or omission.
b	Gross compound breakdown (4,4'-DDT/Endrin).
c	Calibration failure; poor or unstable response.
d	Laboratory duplicate imprecision.
e	Laboratory duplicate control sample imprecision.
f	Field duplicate imprecision.
g	Poor chromatography.
h	Holding time violation.
i	Internal standard failure.
j	Poor mass spectrographic performance.
k	Serial dilution imprecision.
l	Laboratory control sample recovery failure.
m	Matrix spike/matrix spike duplicate recovery failure.
n	Interference check sample recovery failure.
o	Calibration blank contamination (metals/inorganics only).
p	Preparation blank contamination (metals/inorganics only).
q	Quantitation outside of linear range.
r	Linearity failure in initial calibration.
s	Surrogate spike recovery failure (organics only).
t	Instrument tuning failure.
u	No confirmation column present (GC organics only).
w	Retention time (RT) outside of RT window.
x	Equipment blank contamination.
y	Trip blank contamination.
z	Method blank contamination.
Q	Other.