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

Scott C. Clark
Restoration Chief
Air Force Civil Engineering Center
2050 Wyoming Blvd SE, Suite A-126
Kirtland AFB NM 87117-5000

APR 7 2017

RECEIVED
APR 11 2017
NMED
Hazardous Waste
Bureau

Ms. Michelle Hunter
Ground Water Quality Bureau (GWQB)
New Mexico Environment Department
Harold Runnels Building
1190 St. Francis Drive, Room N-2250
Santa Fe NM 87502

Dear Ms. Hunter

Please find attached the Corrective Action Report for Sewer Release of Nitrates at Manhole-13 associated with the Bulk Fuels Facility Spill, Solid Waste Management Unit (SWMU) ST-106/SS-111, April 2017, Kirtland Air Force Base (AFB), New Mexico. This Corrective Action Report describes the corrective actions that are being taken to address nitrate detections in groundwater monitoring wells KAFB-106005, 106009, and 106012R. This report was prepared in accordance 20.6.2.1203.A (6) NMAC, "Notification of Discharge-Removal" and satisfies the requirements in Part 1.27 of the Kirtland AFB 2010 Hazardous Waste Treatment Facility Operating Permit (Permit Number NM9570024423).

If you have any questions or concerns, please contact Mr. Scott Clark at (505) 846-9017 or at scott.clark@us.af.mil or Dr. Adria Bodour at (210) 241-6276 or at adria.bodour.1@us.af.mil.

Sincerely,

SCOTT C. CLARK
Chief, Environmental Restoration

Attachment:
Corrective Action Report for Sewer Release of Nitrates at Manhole-13 affecting Bulk Fuels Facility Groundwater Monitoring Wells KAFB-106005, KAFB-106009, and KAFB-106012R, April 2017.

cc:
NMED (Borrego)
NMED-HWB (Kieling)
NMED-GWQB (Agnew, Pullen)
EPA Region 6 (King, Ellinger)
AFCEC/CZ (Bodour, Clark, O'Grady)
USACE-ABQ District Office (Simpler, Phaneuf, Dreeland; Sanchez; Salazar)
Public Info Repository, AR/IR, and File

KIRTLAND AIR FORCE BASE
ALBUQUERQUE, NEW MEXICO

FINAL – CORRECTIVE ACTION REPORT FOR SEWER RELEASE OF NITRATE AT MANHOLE-13 AFFECTING BULK FUELS FACILITY GROUNDWATER MONITORING WELLS KAFB-106005, KAFB-106009, AND KAFB-106012R

April 2017

377 MSG/CEI
2050 Wyoming Blvd. SE
Kirtland AFB, New Mexico 87117-5270

KIRTLAND AIR FORCE BASE
ALBUQUERQUE, NEW MEXICO

FINAL – CORRECTIVE ACTION REPORT FOR SEWER RELEASE OF NITRATE AT MANHOLE-13 AFFECTING BULK FUELS FACILITY GROUNDWATER MONITORING WELLS KAFB-106005, KAFB-106009, AND KAFB-106012R

ARPIL 2017

Prepared for

New Mexico Environment Department
Ground Water Quality Bureau (GWQB)
1190 St. Francis Drive
Harold Runnels Building, Room N-2250
Santa Fe NM 87502

Prepared by

Air Force Civil Engineer Center (AFCEC)
Environmental Operations Installation Support Team
2050 Wyoming Blvd. SE
Kirtland Air Force Base, NM 87117-5270

NOTICE

This Corrective Action Report was prepared for the New Mexico Environment Department (NMED) by AFCEC Environmental Restoration Program Management (CZRX) and Operations (CZOW) West Region Branches to summarize and address increases in total nitrate in three groundwater monitoring wells associated with the Kirtland Air Force Base (AFB) Bulk Fuels Facility, Solid Waste Management Unit ST-106/SS-111. This work is being performed under the requirements of the Resource Conservation and Recovery Act permit issued to Kirtland AFB, with the NMED serving as the lead regulatory agency. This Corrective Action Report is submitted pursuant to 20.6.2.1203.A(6) New Mexico Administrative Code (NMAC), "Notification of Discharge-Removal" and addresses the activities related to the corrective actions taken.

40 CFR 270.11
DOCUMENT CERTIFICATION

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

SCOTT C. CLARK
Chief, Environmental Restoration

4-7-2017
Date

This document has been approved for public release.

Bethana Zuch
KIRTLAND AIR FORCE BASE
377th Air Base Wing Public Affairs

4/10/17
Date

PREFACE

This Corrective Action Report for Sewer release at Kirtland AFB Manhole-13 describes the corrective actions that are being taken to address total nitrate detections in groundwater monitoring wells KAFB-106005, 106009, and 106012R. This report was prepared in accordance 20.6.2.1203.A (6) NMAC, "Notification of Discharge-Removal" and satisfies the requirements in Part 1.27 of the Kirtland AFB 2010 Hazardous Waste Treatment Facility Operating Permit (Permit Number NM9570024423).

The Environmental Restoration Section Chief is Mr. Scott Clark of Kirtland AFB. This report was prepared by Scott Clark, Holly O'Grady, AFCEC/CZOW; and Dr. Adria Bodour, AFCEC/CZRX.

CONTENTS

Section **Page**

APPENDIX

FIGURES

Figure

ACRONYMS AND ABBREVIATIONS

AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
BFF	Bulk Fuels Facility
CZRX	Environmental Restoration Program Management West Region Branch
CZOW	Environmental Operations West Region Branch
ft	feet
MH-13	manhole-13
MCL	maximum contaminant level
mg/L	milligrams per liter
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
Rd	Road
SWMU	Solid Waste Management Unit

EXECUTIVE SUMMARY

This Corrective Action Report will describe activities to address a leaking sewer causing increased nitrate concentrations associated with three Bulk Fuels Facility (BFF) groundwater monitoring wells, Solid Waste Management Unit ST-106/SS-111, Kirtland Air Force Base (AFB), New Mexico. Nitrate concentrations have shown an increase from sampling results at the following wells: KAFB-106005, KAFB-106009, and KAFB-106012R. Only one well, KAFB-106009, had samples taken that exceeded the maximum contaminant levels (MCL) for total nitrate of 10 milligrams per liter (mg/L).

Upon investigation, manhole-13 (MH-13) was found to have been compromised with tree roots invading the bottom of the manhole structure and causing leakage of sewer water. To address the sewer leak, MH-13 and approximately 10-20 feet (ft) of connective piping will be fully removed and replaced. Sampling of affected BFF groundwater monitoring wells KAFB-106005, KAFB-106009, and KAFB-106012R will continue on a quarterly basis until concentrations demonstrate reduction of total nitrate below MCL of 10 mg/L.

1. INTRODUCTION

BFF quarterly reports showed a trend of increasing concentrations of total nitrate in groundwater monitoring wells, which prompted investigation of sewer lines near impacted wells (Figure 1).

1.1 Description of the Release

Groundwater monitoring wells KAFB-106005, KAFB-106009, and KAFB-106012R have shown total nitrate concentrations that continued to increase with time. As a result, base maintenance contractor camera inspected the main pipeline parallel to Randolph Road (Rd) (approximately 700 ft of line) and was unable to find any issues with this line. A further investigation was performed to find the source of nitrate increases in BFF wells by inspecting manholes along Randolph Rd. It was discovered in March 2017 that MH-13 was in a state of disrepair as a result of tree roots that had compromised the bottom of the manhole structure (Appendix A). Additionally, the pipelines associated with MH-13 were inspected and determined not to be compromised (Appendix A).

1.2 Increasing Concentrations Trends in Groundwater Monitoring Wells

An evaluation was performed to determine the sources of elevated nitrate, chloride, sulfate, sodium, and potassium concentrations in samples from groundwater monitoring wells KAFB-106005, KAFB-106009, and KAFB-106012R. Concentrations of these five analytes have displayed increasing concentrations in quarterly samples obtained from 2014-2016. The total nitrate concentrations have been increasing in all three groundwater-monitoring locations with KAFB-106009, exceeding the NMAC 20.6.2.3103 MCL of 10 mg/L (Figure 2). The groundwater gradient from MH-13 flows towards KAFB-106009.

In Figure 2, KAFB-106009 had exceeded the MCL for total nitrate in third quarter (Q3) 2014 and continued to rise reaching maximum total nitrate concentration of 25.3 mg/L in second quarter (Q2) 2016. Additionally, KAFB-106005 and KAFB-106012R have seen increasing total nitrate concentrations (Figure 2) but have not exceeded the total nitrate of 10 mg/L MCL. KAFB-106005 and KAFB-106012R maximum nitrate were 2.3 mg/L in Q2 2016 and 6.4 mg/L in Q3 2016, respectively. It is important to note that KAFB-106012 was abandoned in 2014 and replaced by KAFB-106012R well as a result of damage to the original well and quarterly samples were not collected from first quarter (Q1) 2013 through Q1 2014.

The observed increases in nitrate, chloride, sulfate, sodium, and potassium concentrations at these wells are consistent with an impact from a leaking sewage line. A positive correlation is observed between nitrate and chloride at KAFB-106005 and KAFB-106009, suggesting that both analytes have a common source. The increasing concentrations of these five analytes are not related to the BFF fuel leak. BFF leak influenced the groundwater composition, but these changes included decreasing in nitrate and sulfate concentrations, and generally do not affect chloride, sodium, or potassium concentrations.

2. CORRECTIVE ACTIONS

The increase in total nitrate appears to have come from MH-13, which is close proximity of KAFB-106009 (approximately 140 ft). Kirtland AFB Civil Engineering base maintenance contractor started an investigation of the sewer line closest to the nitrate impacted BFF groundwater monitoring wells. It was decided that the main sewer line paralleling Randolph Rd should be investigated with a camera for the potential sewer leak. The investigation found no leak in this main sewer line along Randolph Rd.

Due to the continued observation of increasing total nitrate in BFF groundwater wells, AFCEC decided to expand the sewer line investigations using assistance from the U.S. Army Corps of Engineers. This lead to an investigation of manholes near the nitrate influenced BFF groundwater monitoring wells. During this investigation, MH-13 was found full of water and debris (Appendix A). After removal of the debris for MH-13, it was discovered that there were tree roots growing into the bottom of the cinder block in MH-13 (Appendix A). In addition, there are three sewer lines (two 8 inch and one 4 inch), approximately 12 years old, that feed into MH-13 from two unoccupied buildings. The camera investigations showed that there were no other leaks from the sewer lines (i.e., two 8 inch and one 4 inch), and that the suspected sewer leak is coming from MH-13 and the probable source of increasing total nitrate in the three BFF groundwater monitoring wells (Appendix A). The MH-13 is approximately 80 ft from KAFB-106005, 140 ft from KAFB-106009, and 570 ft from KAFB-106012R (Figure 1).

A work order has been submitted to Kirtland AFB Civil Engineering base maintenance contractor to completely replace MH-13 and about 10-20 ft of connecting pipe in all three directions. This action will inhibit further tree root invasions into the manhole structure. BFF groundwater monitoring program will continued sampling KAFB-106005, KAFB-106009, and KAFB-106012R wells to demonstrate reduction of total nitrate below the MCL of 10 mg/L.

2.1 Summary and Recommendation

Based on the sewer line inspections, and the location of MH-13 in proximity to the three affected BFF groundwater wells, it is believed that the increase in total nitrate is coming from MH-13. No other potential nitrate sources were found during the sewer line and manhole inspections.

During the time of investigation, the top half of MH-13 had been reconstructed, and the bottom half of the manhole was still the original structure. It is unknown why the top half was reconstructed. Thus, in order to ensure that tree roots do not invade the manhole structure or sewer lines in the near future, the entire manhole structure will removed and replaced, along with 10-20 ft of connecting pipe. The target date for replacement of manhole is July 2017.

APPENDIX A

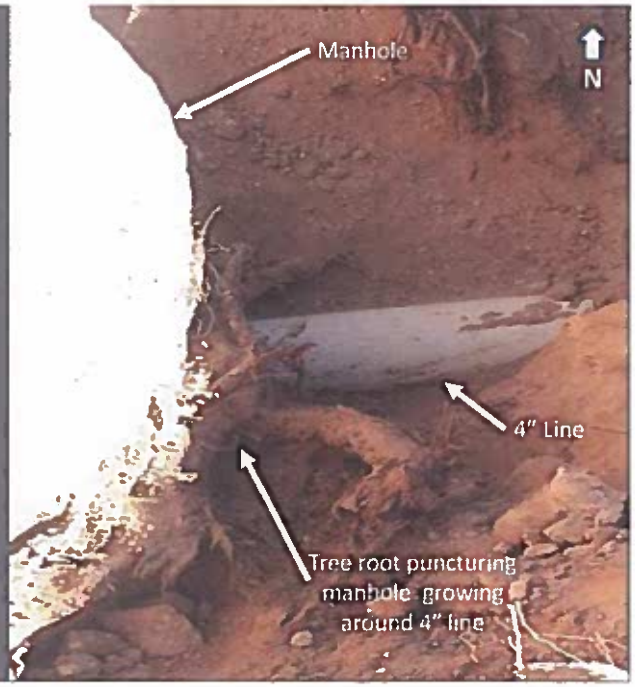
PHOTOGRAPHS


Manhole 13
First Look Inside
8" Line
N
8" Line
Old manhole bottom
New manhole top
4" Line


Manhole 13
Material removed from manhole.

Manhole 13

View of roots growing into the manhole from the outside of the manhole (about 6' bgs).



Inside 4" Line

Image is from video inspection looking upstream (south) 1.1' from the manhole.


Inside 8" Line
Image is from video inspection looking upstream (southeast) 6' from the manhole.
High Water Mark
USMH: UNKNOWN
DSMH: 1
6.0 ft
0

FIGURES

Figure 1: Location of Sewer Lines, Manholes, and Groundwater Monitoring Wells

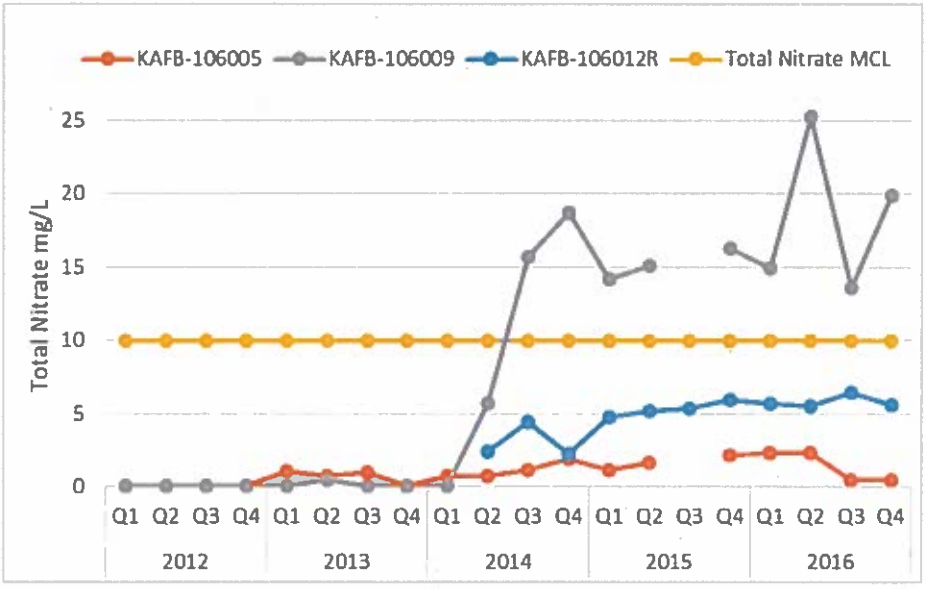


Figure 2: Total Nitrate Concentrations in BFF Groundwater Monitoring Wells KAFB-106005, KAFB-106009, and KAFB-106102R