



DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS 377TH AIR BASE WING (AFMC)



April 29, 2015

Mr. L. Wayne Bitner  
Chief, Environmental Restoration  
2000 Wyoming Blvd SE  
Kirtland AFB NM 87117-5600

Ms. Rebecca Cook and Mr. Bart Faris  
Pollution Prevention Section and Remediation Oversight Section  
Groundwater Quality Bureau (GWQB)  
New Mexico Environment Department (NMED)  
1190 St Francis Drive  
Santa Fe, New Mexico 87502

Dear Ms. Cook and Mr. Faris,

This letter requests temporary permission from the pollution prevention section of the NMED GWQB to combine treated water from the Kirtland Air Force Base (KAFB) Bulk Fuels Facility (BFF) spill site (Solid Waste Management Unit [SWMU] SS-111) with water from the remedial action at SWMU ST-105 to discharge to the irrigation source Golf Course Main Pond (GCMP) for the KAFB Tijeras Arroyo Golf Course (**Attachment 1**). In addition, this letter requests permission from the remediation oversight section of the NMED GWQB to reduce the amount of water to be discharged from well KAFB-7 at ST-105. All Golf Course irrigation water will continue to be below the New Mexico Water Quality Control Commission (NMWQCC) standards and Environmental Protection Agency maximum contaminant levels (MCLs).

Current irrigation is under a discharge plan exemption dated June 7, 2002. Extraction wells KAFB-7, KAFB-0602, KAFB-0610, and KAFB-1589 (the golf course production well RG-1589-S-4) are discharging water to the GCMP for irrigation at the KAFB Golf Course. Although KAFB-0609 was originally included in the discharge exemption plan, this well had to be abandoned in 2013 and is no longer usable for extraction.

One of the objectives under the Stage 2 Abatement Program for nitrate-contaminated groundwater, overseen by the remediation oversight section of the NMED GWQB, is to monitor and evaluate groundwater withdrawal and land application to KAFB Tijeras Arroyo Golf Course. **Attachment 2** includes the historical nitrate concentrations for extraction wells KAFB-7, KAFB-0602, KAFB-0609, KAFB-0610, and the GCMP. Nitrate concentrations for KAFB-0602, KAFB-0609, and KAFB-0610 exceeded the NMWQCC standard of 10 milligrams per liter (mg/L). However, nitrate concentrations at KAFB-7 have been below regulatory standards for the past seven years. Additionally, the nitrate concentrations collected from the GCMP are below the 10 mg/L standard for nitrate because KAFB-7 has effectively diluted the higher nitrate contaminated extraction wells pumped to the GCMP.

It is proposed that treated water produced from well KAFB-106228 from the BFF dissolved ethylene dibromide (EDB) plume be discharged to the 15" pipeline which currently conveys extracted water from KAFB-7 to the GCMP. The wells proposed, including individual well information and total nitrogen loading rates at the KAFB Golf Course, for this temporary permission are listed in **Attachment 3**. Since 2003, total nitrogen loading rates for irrigation on the KAFB Golf Course have not exceeded the 200 pounds per acre per year as set forth in New Mexico Administrative Code (NMAC) 20.6.2.3109.

KAFB4286



Specifically, water produced from the extraction well KAFB-106228 containing EDB will be treated using granular activated carbon (GAC) beds to assure removal of EDB below the 0.05 µg/L MCL standard. The temporary and permanent pump and treat systems will be monitored upon initial startup to ensure that breakthrough does not occur from the GAC beds. Operation, sampling, and monitoring of the temporary and permanent pump and treat systems will be performed in accordance with the RCRA permit No. NM9570024423, the applicable requirements in 20.6.2 NMAC, and the groundwater discharge permit DP-1770 along with the monitoring and contingency plans for DP-1770, which are scheduled to be delivered to the NMED GWQB on May 15, 2015. Furthermore, notice of intent to discharge is included in **Attachment 4**.

Based on analytical results from the last eight sampling quarters from the closest well cluster to the extraction well KAFB-106228, it is anticipated that water extracted from well KAFB-106228 will have nitrate concentrations below 1 mg/L. The water quality from the temporary and permanent pump and treat system will be similar, if not better than KAFB-7. Therefore, it is proposed that extraction rates at KAFB-7 be reduced to accommodate production at KAFB-106228 upon startup. As production rates increase at KAFB-106228, extraction at KAFB-7 will be further adjusted to accommodate. In addition, nitrate concentrations at the GCMP will continue to be monitored to ensure that loading rates do not exceed 200 pounds per acre per year standard.

We appreciate your attention to this matter. Please contact Mr. L. Wayne Bitner at 505.853.3484 or at ludie.bitner@us.af.mil or Mr. Scott C. Clark at 505.846.9017 or at scott.clark@us.af.mil if you have any questions.

Sincerely,



L. Wayne Bitner  
Chief, Environmental Restoration

cc:

NMED-EHD (Roberts)  
NMED (McQuillan, Longmire)  
NMED-HWB (Kieling, Cobrain, McDonald)  
NMED-GWQB (Bustamante, Huddleson)  
NMED-PSTB (Reuter)  
NMED-OGC (Kendall)  
U.S.EPA Region 6 (King, Ellinger)  
AFCEC-CZRX (Bodour)  
USACE-ABQ District Office (Simpler, McBee, Phaneuf)  
Public Info Repository (Central New Mexico Community College), Administrative Record/Information Repository (AR/IR), and File

**ATTACHMENT 1**



**Legend**

- Proposed Extraction Well
- Existing Extraction Well
- Proposed Permanent Influent Piping (below ground)
- - - Proposed Permanent Underground Discharge Piping (where routing does not follow temporary)
- - - Proposed Temporary Discharge Pipeline (above ground HDPE with underground road crossings)
- Pipe from KAFB-7
- Influent Pipe
- Temporary Treatment System Area
- Permanent Groundwater Treatment System
- Tijeras Arroyo Golf Course



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, IGP, swisstopo, and the GIS User Community

Revision Date: 04/24/15

0 1,000 2,000 4,000  
Feet  
1 inch = 2,000 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

PERMIT APPLICATION  
KIRTLAND AIR FORCE BASE, NEW MEXICO

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ATTACHMENT 1

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GROUNDWATER TREATMENT  
SYSTEM DISCHARGE TO  
TIJERAS ARROYO GOLF COURSE

**ATTACHMENT 2**

**Attachment 2  
Nitrate Analytical Data per Well (mg/L)**

| <b>Report Year</b> | <b>Actual Sample Date</b> | <b>Golf Course Main Pond<sup>1</sup></b> | <b>KAFB-7<sup>1</sup></b> | <b>KAFB-0602<sup>2</sup></b> | <b>KAFB-0609</b> | <b>KAFB-0610</b> |
|--------------------|---------------------------|--|---------------------------|------------------------------|------------------|------------------|
| 2002               | 10/1/01                   | NS                                       | NS                        | 18                           | 13               | 17               |
| 2002               | 7/1/02                    | NS                                       | 23.5                      | 16.2                         | 12.8             | 17.5             |
| 2003               | 1/23/03                   | 13.4                                     | 14.6                      | 15.9                         | 12               | 17.1             |
| 2003               | 7/1/03                    | 12.6                                     | 13.2                      | 16                           | 13               | 17               |
| 2004               | 1/1/04                    | 10.7                                     | 8.3                       | 16                           | 13               | 18               |
| 2004               | 7/1/04                    | 9.9                                      | 10.5                      | 16                           | 20               | 18               |
| 2005               | 1/1/05                    | 9.8                                      | 1.8                       | 16                           | 13.2             | 17.4             |
| 2005               | 6/1/05                    | 5.9                                      | 11.3                      | 15.3                         | 19.8             | 16.7             |
| 2006               | 1/1/06                    | 9.1                                      | 8.4                       | 15.6                         | 19.1             | 17               |
| 2006               | 7/1/06                    | 5.6                                      | 7.9                       | 15                           | NS               | 16               |
| 2007               | 1/1/07                    | 6.5                                      | 1.2                       | 18                           | 20               | 17               |
| 2008               | 9/1/07                    | 6.68                                     | 7.97                      | 16.3                         | NS               | NS               |
| 2009               | 9/1/08                    | 5.99                                     | 5.24                      | 18.3                         | NS               | NS               |
| 2010               | 10/1/09                   | 5.1                                      | 3.7                       | 15                           | NS               | NS               |
| 2011               | 10/1/10                   | 5.1                                      | 5.5                       | 16                           | 15               | 17               |
| 2012               | 11/1/11                   | 4.34                                     | 1.85                      | 16.9                         | NS               | NS               |
| 2014               | 5/1/14                    | 3.055                                    | 0.94                      | NS                           | NS               | NS               |

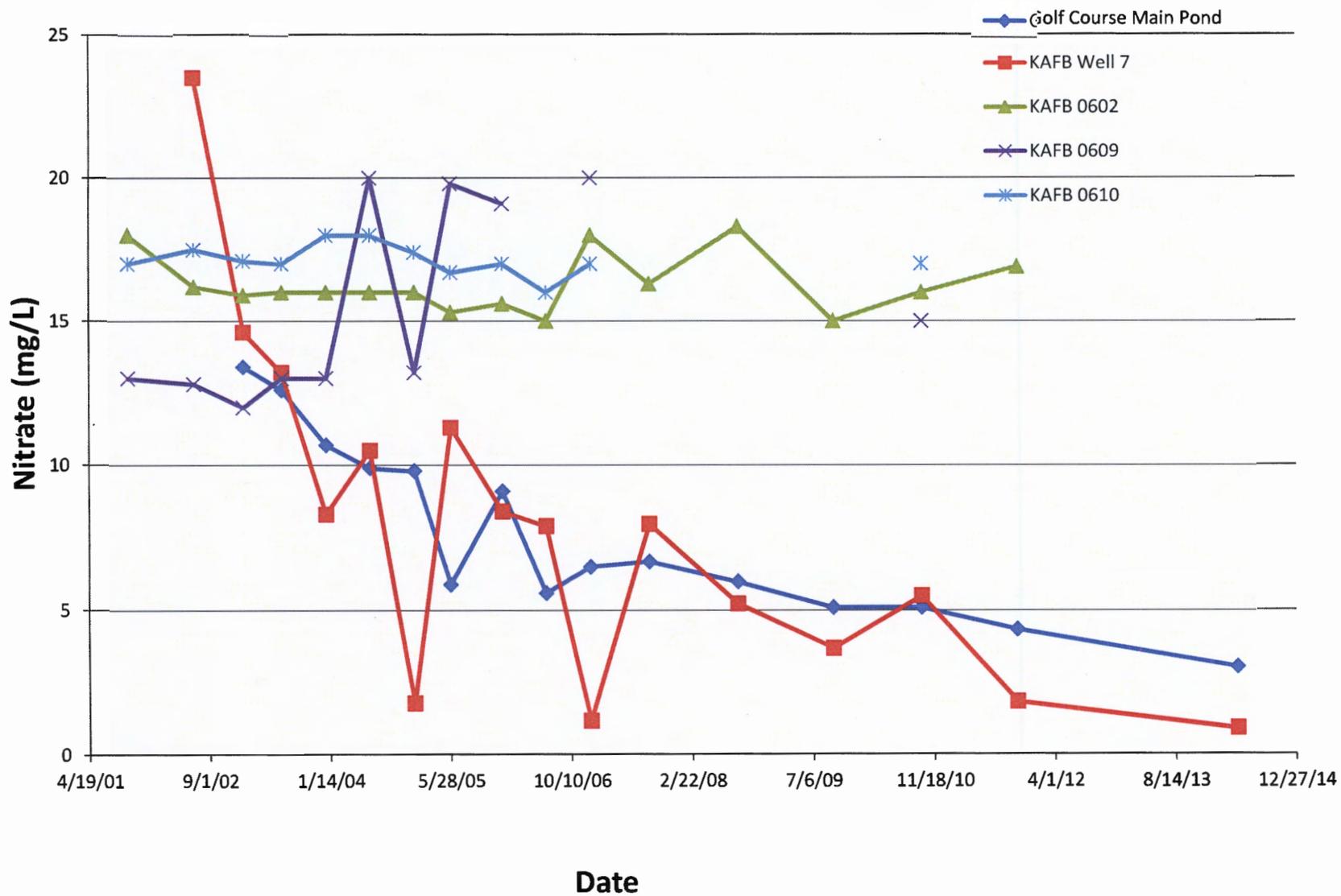
NS - Not Sampled

<sup>1</sup>The Golf Course Main Pond and KAFB-7 were sampled on a separate schedule in years 2007 through 2010. In 2007 they were sampled on September 14, in 2008 they were sampled on September 15, in 2009 they were sampled on the date shown above, and in 2010 they were sampled on October 22.

<sup>2</sup>KAFB-0602 was sampled on a separate schedule in years 2008 through 2012. This well was sampled on March 5, 2008, March 19, 2009, March 15, 2011, and March 12, 2012

Please see next page for graphic

### Nitrate Concentrations per Well



**ATTACHMENT 3**

**Attachment 3**  
**Table 1. Well Operational Data**

| Well                              | KAFB-0602 | KAFB-0609   | KAFB-0610 | RG1589-S-4<br>(Golf Course Production Well/KAFB-1598) | KAFB-7    | KAFB-106228  |
|-----------------------------------|-----------|---|-----------|---|-----------|--|
| Total Depth (ft bgs)              | 457       | 336   | 353       | 445   | 950       | 545 (proposed)   |
| Aquifer                           | Perched   | Perched   | Perched   | Perched   | Regional  | Regional   |
| Associated                        | ST-105    | ST-105  | ST-105    | ST-105  | ST-105    | Bulk Fuels Facility Spill (SS-111)   |
| Status                            | Active    | Inactive. This well was abandoned in 2013 and is no longer usable | Active    | Active  | Active    | Proposed. This well will begin extraction and treatment of EDB contaminated water by June 30, 2015 |
| Yearly Extraction Rates (gallons) | 2003      | 2,470,000   | 490,000   | 1,450,000   | 0         | 131,385,000  |
|                                   | 2004      | 2,790,000   | 1,160,000 | 1,930,000   | 740,000   | 116,775,000  |
|                                   | 2005      | 2,740,000   | 482,000   | 2,870,000   | 1,690,000 | 61,853,000   |
|                                   | 2006      | 2,270,000   | 0         | 2,220,000   | 1,470,000 | 118,613,000  |
|                                   | 2007      | 2,930,000   | 0         | 2,780,000   | 1,540,000 | 108,820,000  |
|                                   | 2008      | 1,410,000   | 0         | 1,680,000   | 0         | 145,482,000  |
|                                   | 2009      | 880,000   | 921,000   | 1,310,000   | 1,080,000 | 133,275,000  |
|                                   | 2010      | 2,020,000   | 1,720,000 | 968,000   | 2,290,000 | 128,782,000  |
|                                   | 2011      | 1,760,000   | 1,110,000 | 1,690,000   | 2,040,000 | 156,684,000  |
|                                   | 2012      | 1,280,000   | 410,000   | 1,040,000   | 1,010,000 | 141,801,000  |
|                                   | 2013      | 818,000   | 650,000   | 1,790,000   | 1,260,000 | 129,002,000  |
|                                   | 2014      | 2,230,000   | 0         | 0   | 2,990,000 | 117,850,000  |

This well will be operational by June 30, 2015 and is expected to produce a maximum of 52,560,000 gallons per year

**Table 2. Nitrate Loading Calculations**

| Year | Total Water Produced per Year (From Wells Listed Above gallons/year) | Metered Water Used to Irrigate the Golf Course (gallons/year) | Total Nitrogen Concentration at the GCMP (mg/L) | Total Nitrogen Concentration at the GCMP (lbs/gallon) | Total Nitrogen in Water Used to Irrigate the Golf Course (lbs/year) | Total Nitrogen Loading Rate Calculated from Metered Water irrigated to Golf Course (lbs/acre/year) <sup>4,5</sup> |
|------|--|---|---|---|---|---|
| 2003 | 135,795,000  | 135,790,350   | 13.3  | 0.000111  | 15061   | 120   |
| 2004 | 123,395,000  | 125,637,800   | 10.7  | 0.000089  | 11167   | 89  |
| 2005 | 69,635,000   | 119,125,700   | 8.5   | 0.000071  | 8481  | 68  |
| 2006 | 124,573,000  | 141,980,643   | 7.9   | 0.000066  | 9301  | 74  |
| 2007 | 116,070,000  | 142,239,420   | 7.8   | 0.000065  | 9200  | 74  |
| 2008 | 148,572,000  | 205,578,267   | 6.4   | 0.000053  | 10946   | 88  |
| 2009 | 137,466,000  | 86,924,000  | 6.1   | 0.000051  | 4418  | 35  |
| 2010 | 135,780,000  | 92,929,000  | 5.5   | 0.000046  | 4281  | 34  |
| 2011 | 163,284,000  | 74,691,000  | 4.7   | 0.000039  | 2924  | 23  |
| 2012 | 145,541,000  | 62,945,867 <sup>1</sup>                                       | 4.7   | 0.000039  | 2464  | 20  |
| 2013 | 133,520,000  | 0 <sup>2</sup>  | 0   | 0.000000  | 0   | 0   |
| 2014 | 123,070,000  | 78,195,000 <sup>3</sup>                                       | 3.2   | 0.000026  | 1697  | 14  |

<sup>1</sup> The metered water rate for July through December of 2012 is estimated based on extraction rates from previous months

<sup>2</sup> No data are available for 2013

<sup>3</sup> The metered water rate for each month in 2014 was estimated by averaging the rates for the same month from the previous three years

<sup>4</sup> Calculated nitrate loading rates differ slightly from those reported in the *Stage 2 Abatement Program Fifth Annual Groundwater Monitoring Report, June 2012*. Metering data were not available for all months. For those months conservative metered rates were estimated based on data from previous months and years.

<sup>5</sup> The irrigated area at the Tijeras Arroyo Golf Course is 125 acres. This area was used to determine loading rates.

**ATTACHMENT 4**



**1. Name and mailing address of person proposing to discharge:**

Wayne Bitner  
2050 WYOMING BLVD SE  
KIRTLAND AFB, NM 87117  
Email: [ludie.bitner@us.af.mil](mailto:ludie.bitner@us.af.mil)

Work Phone: 505-853-3484  
Cell/Home Phone: N/A  
Fax: 505 853-1647

**2. Name of facility:**

KIRTLAND AFB, New Mexico

**3. Physical location of discharge (if applicable, give street address, township, range, section, distance from closest town or landmark, directions to facility, location map):**

Tijeras Arroyo Golf Course off of Pennsylvania Street SE on Kirtland Air Force Base (KAFB) (location shown in Attachment 1)

**4. Type of operation generating the discharge (e.g., truck wash, food processing plant, restaurant, etc.):**

Extracted ethylene dibromide (EDB) contaminated groundwater from the KAFB Bulk Fuels Facility (BFF) spill site SS-111 will be treated on-base using a temporary pump and treat system. This treated water will be combined with extracted nitrate contaminated groundwater under a Stage 2 nitrate abatement program for site ST-105, and will be discharged to the Golf Course Main Pond that irrigates the KAFB Tijeras Arroyo Golf Course.

**5. Source(s) of the discharge. Describe how the wastewater, sludge, or other discharges processed and/or disposed at your facility are generated. Identify all sources. Attach additional pages if needed:**

Water from groundwater extraction at BFF will be generated by proposed well KAFB-106228, which is scheduled to be operational by June 30, 2015. Extracted groundwater will be treated through granular activated carbon (GAC) and then pumped through the existing 15" piping that goes into the Golf Course Main Pond. Additionally, extracted groundwater from wells KAFB-7, KAFB-0602, KAFB-0610, and KAFB-1589 (the golf course production well) are pumped into Golf Course Main Pond under a Stage 2 nitrate abatement program.

**6. Expected contaminants in the discharge (e.g., nitrate-nitrogen, metals, organic compounds, salts, etc.) Include estimated concentration if known, and copies of results of laboratory analyses, if available:**

Extracted groundwater from BFF will be treated through GAC to drinking water standards before being discharged into the 15" pipeline. The source water is expected to contain EDB above regulatory maximum contaminant level (i.e., 0.05 µg/L EDB); however, this contaminant will be removed by the GAC adsorbers. Extracted groundwater from the Stage 2 nitrate abatement program wells will include nitrate above New Mexico Water Quality Control Commission (NMWQCC) standard (i.e., 10 mg/L), but is diluted to below standard at the KAFB Golf Course Main Pond. Additionally, the loading rates of total nitrogen are below NMWQCC standard (i.e., 200 pounds per acre per year) to irrigated on the KAFB Golf Course.

**7. Describe all components of wastewater processing, treatment, storage, and disposal system (e.g., grease interceptor, lagoon, septic tank/leachfield, etc.) Include sizes, site layout map, plans and specifications, etc. if available:**

The temporary pump and treat system will have three 3,000 lbs GAC adsorbers while the permanent pump and treat system will have two 20,000 lbs GAC adsorbers to treat extracted EDB contaminated groundwater below 0.05 µg/L MCLs. The remediation system will be equipped with a containment system and fail safes that will shut down the system in the event of a leak.

**8. Estimated maximum daily discharge volume in gallons per day (or other units):**

Approximately 144,000 gallons per day will be extracted, treated, and discharged to Golf Course Main Pond from proposed well KAFB-106228. In addition, a maximum of 450,000 gallons per day will be extracted and discharged to Golf Course Main Pond from the Stage 2 nitrate abatement program wells KAFB-7, KAFB-0602, KAFB-0610, and KAFB-1589.



**9. Estimated depth to ground water (ft):**

The depth to groundwater for KAFB-106228 is approximately 460 feet (ft) below ground surface (bgs). The depth to groundwater for KAFB-7 is approximately 494 ft bgs, KAFB-0602 is approximately 317 ft bgs, KAFB-0610 is approximately 294.5 ft bgs, and KAFB-1589 is approximately 300 ft bgs.

**Signature:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Printed name:** \_\_\_\_\_

**Title:** \_\_\_\_\_

**Please return this form to:**

NMED Ground Water Quality Bureau  
P.O. Box 5469  
Santa Fe, New Mexico 87502-5469

Telephone: 505-827-2900  
Fax: 505-827-2965