ENTERED

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

Colonel Eric H. Froehlich
377 ABW/CC
2000 Wyoming Blvd SE
Kirtland AFB NM 87117-5000

MAR 0 8 2017

RECEIVED
MAR 08 2017
NMED
Hazardous Waste Bureau

Mr. John Kieling, Bureau Chief
Hazardous Waste Bureau (HWB)
New Mexico Environment Department (NMED)
2905 Rodeo Park Drive East, Building 1
Santa Fe NM 87505-6303

Dear Mr. Kieling

Please find attached the Borehole Abandonment Activities Report which addresses abandonment activities performed at the original KAFB-106MW2 borehole location and subsequent activities relating to the abandonment. Abandonment activities were performed at the Kirtland Air Force Base Bulk Fuels Facility site. The Report also includes the original well plugging plan that was submitted and approved by the Office of the State Engineer on 10 February 2017 and the revised plugging plan submitted to the New Mexico Environment Department. This document is being submitted to address the email received from the New Mexico Environment Department on 1 March 2017 regarding borehole abandonment.

Once the proposed abandonment of the remaining 87 feet of the borehole has been approved, abandonment will be completed and a well plugging report will be submitted to the Office of the State Engineer and to the New Mexico Environment Department, if they desire, documenting the deviation from the plugging plan and the actual material that was used during abandonment.

Please contact Mr. Scott Clark at 505-846-9017 or at scott.clark@us.af.mil if you have any questions.

Sincerely

ERIC H. FROEHLICH, Colonel, USAF
Commander

2 Attachments:
1. Original OSE Plugging Plan with Approval with Conditions Letter
2. Revised Plugging Plan from Drilling Subcontractor

cc:
NMED-HWB (Agnew), letter/hard copy
NMED-GWQB (Hunter), letter/hard copy
SAF-IEE (Lynnes), electronic
AFCEC/CZ (Bodour, Clark), electronic
USACE-Omaha District Office (Ellender), electronic
USACE-ABQ District Office (Simpler, Phaneuf), electronic
Public Info Repository, Administrative Record/Information Repository, and File, letter/hard copy

KAFB4491

40 CFR 270.11
DOCUMENT CERTIFICATION
MARCH 2017

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.

ERIC H. FROEHLICH, Colonel, USAF
Commander, 377th Air Base Wing

This document has been approved for public release.

KIRTLAND AIR FORCE BASE
377th Air Base Wing Public Affairs

March 8, 2017

Subject: Borehole Abandonment Activities Report,
Performed as part of the construction effort for the Ethylene Dibromide In Situ Biodegradation Pilot Test.
Bulk Fuels Facility, Kirtland Air Force Base, New Mexico

This Borehole Abandonment Activity Report has been prepared by CB&I Federal Services LLC (CB&I) for the U.S. Army Corps of Engineers (USACE), Omaha District, under Contract No. W9128F-12-D-0003, Task Order 0025 to address borehole abandonment at the original KAFB-106MW2 location. The activities described in this Report were performed at the Kirtland Air Force Base (AFB) Bulk Fuels Facility (BFF) site.

The original borehole KAFB-106MW2 was evaluated and determined to have a large vertical deviation after drilling (approximately 85.35 degrees at the bottom of the borehole). The deviation was measured and evaluated while the drive casing was in the borehole prior to any well installation activities. It was determined that the deviation was too great for successful well installation and that the borehole should be abandoned.

No well infrastructure was placed in the original borehole for KAFB-106MW2, and the borehole contained only the 11 ¾ inch drive casing. Depth to water was measured at approximately 475 feet below ground surface (bgs) in the borehole for KAFB-106MW2. This depth was likely slightly elevated compared to site background due to recent drilling activities and the fact that the drive casing extended below the water table, which can cause artificial elevation within the casing.

No future borehole or well abandonment activities, for boreholes or wells that cross the water table, shall be performed without a plan approved by the New Mexico Environment Department and the Office of the State Engineer (OSE) in accordance with Section 6.5.17.10 of the Hazardous Waste Treatment Facility Operating Permit (Environmental Protection Agency identification number NM9570024423) and Section 19.27.4 of the New Mexico Administrative Code.

Completed Borehole Abandonment Activities

Borehole abandonment commenced on January 30, 2017 after verbal communication with the OSE prior to submittal of a plugging plan or approval of that plan.

Several 20-foot sticks of 11 ¾ inch drive casing were removed from the borehole and the native formation was allowed to collapse into the borehole from a depth of 557 feet bgs to approximately 500 feet bgs.

The planned borehole abandonment material was a 1 to 1 ratio by weight of Portland cement and sand slurry containing 6 gallons of water per 94 pound bag of cement (9-sack cement/sand slurry). This material was ordered from a concrete/cement supply company by the drilling subcontractor and premixed off site. Upon delivery of the pre-mixed material in a cement truck, the drilling subcontractor and contractor personnel asked the driver if the correct material had been mixed and delivered. Both parties were told yes by the concrete/cement company. A tremie pipe was placed to 500 feet bgs and was used to pump the material to approximately 450 feet bgs. It was observed that the material seemed dense and difficult to tremie. The narrow tremie pipe was then removed and the material was placed from 450 feet to approximately 87 feet bgs (depth measured after settling) using the drive casing as the tremie pipe. The drive casing was incrementally removed as the cement/sand slurry was placed. The theoretical volume of sealant required for the 11 ¾ inch borehole from a depth of 500 feet was calculated to be approximately 13 cubic yards. The actual volume recorded during grouting activities was 13 cubic yards, bringing the cement/sand slurry up to 87 feet bgs. From the total borehole depth of 557 to 500 feet bgs, native formation backfilled the bottom of the borehole as the drive casing was removed, that volume was approximately 1.6 cubic yards.

Since the theoretical amount of cement/sand slurry did not exceed the actual amount placed down hole and the depth where placement of sealing started was 500 feet bgs, no bridging of material occurred in the borehole.

Later that day, after borehole abandonment had commenced to approximately 87 feet bgs, it was discovered that the material that had been delivered and placed in the borehole was a 2-sack cement/sand slurry (flowable fill material) containing approximately 1 gallon of water per 6.2 pounds of cement. The concrete/cement company had misheard the order placed by the drilling subcontractor and mixed and delivered the wrong material to the site. The material had been difficult to tremie into the borehole due to the high sand content of the mix.

The original borehole plugging plan was submitted to the OSE on February 6, 2017 and reflected the incorrect material placed. The OSE provided approval with modifications on February 10, 2017 stating that the correct material should be placed in accordance with NMAC 19.27.4.30.C.1. The OSE approval and original plugging plan are included as Attachment 1. The drilling subcontractor contacted the OSE on February 14, 2017 and discussed the improper material that was used to backfill and was informed by the OSE to use an approved material for plugging the top 87 feet of the borehole. The plugging plan was then revised to reflect the material that should have been used for abandonment, included as Attachment 2.

After abandonment is complete, a well plugging report will be submitted to the OSE within 20 days after completion of well abandonment activities documenting the deviation from the plugging plan and the actual material that had been placed in the borehole.

Additional Borehole Abandonment Activities that have not been performed

Abandonment of the original borehole KAFB-106MW2 is not complete pending approval of material to be placed from approximately 87 feet bgs to 2 feet bgs. The following mix is proposed for this depth interval: a 95-97% Type I/II Portland cement and 3-5% bentonite grout mix with 6 gallons of water per 94 pounds of cement with an additional 1.5 to 2.5 gallons of water added for the bentonite volume.

The cement slurry discussed above is proposed to be placed via tremie pipe. The theoretical volume used to fill this interval is approximately 3.5 cubic yards (over estimate based on potential loose formation in this zone) providing that the borehole has not accumulated native formation above the sealant that was originally placed to 87 feet bgs.

From a depth of two feet to ground surface, the borehole is proposed to be filled with native soil from the surface of the site. The borehole is located in an undeveloped area of Kirtland AFB and the native soil will be reseeded at the end of construction activities.

Attachment 1

STATE OF NEW MEXICO
OFFICE OF THE STATE ENGINEER

DISTRICT 1

TOM BLAINE, P.E.
NEW MEXICO STATE ENGINEER

5550 San Antonio Drive, N.E.
Albuquerque, NM 87109 (505) 383-4000

February 10, 2017

File No.: RG-1579 POD327-328

Kirtland Air Force Base
Attn: Wayne Bitner, Chief, Environmental Restoration
AFCEC/Kirtland AFB IST; Bldg 20685
2050 Wyoming Blvd, SE
Kirtland AFB, NM 87117-5270

Greetings:

Enclosed is the Well Plugging Plans of Operations, which has been approved subject to the Conditions of Approval, attached hereto.

Sincerely,

Christopher Burrus
Water Resource Specialist
Albuquerque, OSE, District 1

Enclosures as stated

c: WRAB

WELL PLUGGING PLAN OF OPERATIONS

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

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

II. GENERAL / WELL OWNERSHIP:

Existing Office of the State Engineer POD Number (Well Number) for well to be plugged: RG-1579 PODs 327-328

Name of well owner: Kirtland Air Force Base

Mailing address: Chief Environmental Restoration, 377 MSG/CEANR, 2050 Wyoming Blvd. SE

City: Kirtland AFB State: New Mexico Zip code: 87117

Phone number: 505-846-9017 E-mail: scott.clark@us.af.mil

III. WELL DRILLER INFORMATION:

Well Driller contracted to provide plugging services: Cascade Drilling L.P.

New Mexico Well Driller License No.: WD-1210 Expiration Date: 10/31/17

IV. WELL INFORMATION:

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

1) GPS Well Location: Latitude: 35 deg, 3 min, 1.05 sec
Longitude: -106 deg, 34 min, 39.71 sec, NAD 83

2017 FEB 6 PM 8:11
STATE ENGINEER OFFICE ALBUQUERQUE, NEW MEXICO

2) Reason(s) for plugging well: A gyroscopic borehole tool was used prior to well installation to determine the degree of borehole deviation. During testing, it was determined that the bottom of the borehole was deviated 26.35 feet. The deviation results measured at PODs 327 and 328 (nested monitoring well) are too large for successful well installation. The only infrastructure in the borehole is the 11-3/4-inch overdrive casing, which will be removed during borehole abandonment.

3) Was well used for any type of monitoring program? No If yes, please use section VII of this form to detail what hydrogeologic parameters were monitored. If the well was used to monitor contaminated or poor quality water, authorization from the New Mexico Environment Department may be required prior to plugging.

4) Does the well tap brackish, saline, or otherwise poor quality water? No If yes, provide additional detail, including analytical results and/or laboratory report(s):

5) Static water level: 475 feet below land surface

6) Depth of the well: 557 feet below land surface

7) Inside diameter of innermost casing: 11-3/4 inches.

8) Casing material: Stainless steel overdrive casing. Casing will be removed during abandonment.

9) The well was constructed with:

N/A an open-hole production interval, state the open interval: _____

N/A a well screen or perforated pipe, state the screened interval(s): _____

10) What annular interval surrounding the artesian casing of this well is cement-grouted? N/A

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

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

V. DESCRIPTION OF PLANNED WELL PLUGGING:

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

1) Describe the method by which cement grout shall be placed in the well, or describe requested plugging methodology proposed for the well: The 11-3/4-inch casing will be pulled up and native soil will be allowed to backfill the borehole until the top of groundwater is reached (475 feet bgs). A cement-sand slurry will be pumped downhole to approximately 40 feet bgs as the overdrive casing is progressively pulled upward throughout grouting. Upon reaching 40 feet bgs, a bentonite slurry will be pumped in place to approximately 2 feet bgs, and remaining overdrive casing will be removed. Native soil will cover the top 2 feet of the borehole, as it is located in an undeveloped area containing only native vegetation.

2) Will well head be cut-off below land surface after plugging? No; well installation activities were not initiated.

_____

VI. PLUGGING AND SEALING MATERIALS:

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

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

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

3) Theoretical volume of grout required to plug the well to land surface: 13 cubic yards (2555 gallons)

4) Type of Cement proposed: Portland-based cement-sand slurry

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

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

_____ mixed on site

7) Grout additives requested, and percent by dry weight relative to cement: _____

8) Additional notes and calculations: ~~NMDOT Flowable Fill #2 will be used to abandon well. Mix will include 1 gallon of water per 6.2 pounds of cement~~ CB 2/10/17 Not an approved variant. SEE Conditions of approval for Alternative plugging.

VII. ADDITIONAL INFORMATION: List additional information below, or on separate sheet(s): Well Records for PODs 327 and 328 have not been submitted to the OSE. The deviation was discovered prior to well installation activities. The approved permit to drill a well with no consumptive use is attached.

VIII. SIGNATURE:

I, ~~DAWN A. NICKELL, COLONEL, USAF, 377 ABW VICE COMMANDER~~, say that I have carefully read the foregoing Well Plugging Plan of Operations and any attachments, which are a part hereof; that I am familiar with the rules and regulations of the State Engineer pertaining to the plugging of wells and will comply with them, and that each and all of the statements in the Well Plugging Plan of Operations and attachments are true to the best of my knowledge and belief.

FEB 03 2017

Signature of Applicant Date

2017 FEB -6 PM 8:11
STATE ENGINEER OFFICE
ALBUQUERQUE, NEW MEXICO

IX. ACTION OF THE STATE ENGINEER:

This Well Plugging Plan of Operations is:

✓ Approved subject to the attached conditions.
_____ Not approved for the reasons provided on the attached letter.

Witness my hand and official seal this 10 day of February, 2017

~~Scott A. Verhines, State Engineer~~
Tom Blaine, P.E.
State Engineer

By: _____

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

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)			40
Bottom of proposed interval of grout placement (ft bgl)			475
Theoretical volume of grout required per interval (gallons)			2555
Proposed cement grout mix gallons of water per 94-lb. sack of Portland cement			Flowable Fill mix will include 1 gallon of water per 6.2 pounds of cement
Mixed on-site or batch-mixed and delivered?			Batch-mixed and delivered
Grout additive 1 requested			
Additive 1 percent by dry weight relative to cement			
Grout additive 2 requested			
Additive 2 percent by dry weight relative to cement			

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

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgl)			2
Bottom of proposed sealant of grout placement (ft bgl)			40
Theoretical volume of sealant required per interval (gallons)			223
Proposed abandonment sealant (manufacturer and trade name)			Bentonite slurry

STATE OF NEW MEXICO
OFFICE OF THE STATE ENGINEER

DISTRICT 1

TOM BLAINE, P.E.
NEW MEXICO STATE ENGINEER

5550 San Antonio Drive, N.E.
Albuquerque, NM 87109 (505) 383-4000

Materials submitted by Kirtland Air Force Base (KAFB) identify one 12-inch Outer Diameter (OD) borehole drilled with an 11.75-inch Inner Diameter (ID) casing to a depth of 557-feet below ground surface (bgs) that deviated from a functional vertical path by 26.35-feet. Depth to water was measured at 475-feet bgs. KAFB request the abandonment of the borehole to re-drill the permitted Point of Diversion (POD) under permit RG-1579 POD327 and POD328. Cascade Drilling L.P., a New Mexico licensed driller (WD-1210), will perform the plugging.

The applicant proposes to plug the borehole using the casing, 12-inch Outer Diameter (OD), as a tremie for the transportation of materials to accomplish the plugging in four (4) distinct intervals as follows:

- Interval 1 — 475-feet bgs to 557-feet bgs is within the water bearing zone and expected to be filled with flowing native subsurface soil from the saturated area of the borehole during the tremie/casing withdraw,
- Interval 2 — 40-feet bgs to 475-feet bgs, is expected to be sealed with a cement and sand mixture,
- Interval 3 — 2-feet bgs to 40-feet bgs, filled with a bentonite slurry, and
- Interval 4 — The remaining 2-feet to surface will be filled with clean native soil.

Permittee: Kirtland Air Force Base
c/o Chief Environmental Restoration
2050 Wyoming Blvd, SE
Kirtland Air Force Base, NM 87117

Approximate coordinates: Latitude: 35° 03' 1.05" N, Longitude: 106° 34' 39.71" W

SPECIFIC PLUGGING CONDITIONS OF APPROVAL FOR WELL (RG-1579 POD327 AND POD328), RIO GRANDE UNDERGROUND BASIN LOCATED IN SECTION 36, TOWNSHIP 10 NORTH, RANGE 3 EAST

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

2. **Measurement of the current static water level in the well prior to initiation of plugging IS REQUIRED, and shall be recorded on line II.7. of the Plugging Record.**

3. Theoretical volume of sealant required for abandonment of the 12-inch OD casing is approximately 5.8752 gallons per vertical foot. The reported depth of 557-feet was obtained from the plugging plan, and the theoretical volume of sealant necessary to plug the well is 3,873 gallons total.

4. **Plugging by use of Type I/II Portland Cement** is authorized as a sealant. Fundamental water demand for Type I/II Portland neat cement grout is 5.2 gallons per 94 lb/sack cement. The American Water Works Association (AWWA) Standard A100-06 allows up to 6.0 gallons water per sack (a less viscous mix), which may be used if necessary to aid placement of the slurry in well. NMAC 19.27.4.30.C.1 specifies **placement of sealant by use of tremie pipe**. When a tremie is used for grout/chip/pellet placement, it shall extend to near the total depth of the borehole/well at the initiation of plugging. The tremie shall be incrementally removed to retain the tremie bottom a limited distance above the top of the rising column of chips or pellets throughout the plugging process. Pumping the chips or pellets down the tremie with fresh water is allowed.

   Alternative plugging by use of Type I/II Portland and Sand Mixture is also authorized. The American Water Works Association (AWWA) Standard A100-06 and NMOSE, allows up to 1 part by weight of sand to 1 part cement with no more than 6 gallons of water per 94 lb sack of cement, may be used if necessary to aid placement of the slurry in well. NMAC 19.27.4.30.C.1 specifies **placement of sealant by use of tremie pipe**. When a tremie is used for grout/chip/pellet placement, it shall extend to near the total depth of the borehole/well at the initiation of plugging. The tremie shall be incrementally removed to retain the tremie bottom a limited distance above the top of the rising column of chips or pellets throughout the plugging process.

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

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

7. A Well Plugging Report itemizing actual abandonment process and materials used shall be filed with the State Engineer (NMOSE, 5550 San Antonio Dr. N.E., Albuquerque, NM 87109), within 20 days after completion of well plugging. Please attach a copy of these plugging conditions.

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

Witness my hand and seal this 10 day of February, 2017.

Tom Blaine P.E., State Engineer

By: _____

Christopher Burrus
Water Resource Specialist
District 1
Albuquerque, New Mexico

Attachment 2

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

FEB 2 2 2017

Colonel Dawn A. Nickell
377 ABW/CV
2000 Wyoming Blvd SE
Kirtland AFB NM 87117-5000

Mr. John Kieling, Bureau Chief
Hazardous Waste Bureau (HWB)
New Mexico Environment Department (NMED)
2905 Rodeo Park Drive East, Building 1
Santa Fe NM 87505-6303

Dear Mr. Kieling

Kirtland Air Force Base is submitting herein one revised "Well Plugging Plan of Operations" for one borehole that would have contained the two nested wells (KAFB-106MW2-S and KAFB-106MW2-I). Kirtland AFB is proposing to plug and abandon the borehole, which had no well infrastructure installed, due to a borehole deviation measurement of 26.35 feet. The deviation measured at the borehole was too large for successful well installation, thus the overdrive casing will be removed and the borehole grouted using a Portland cement-sand slurry.

If you have any questions or concerns, please contact Mr. Scott Clark at (505) 846-9017 or at scott.clark@us.af.mil.

Sincerely,

DAWN A. NICKELL, Colonel, USAF
Vice Commander

cc:
NMED-RPD (McQuillan), letter/hard copy
NMED-GWQB (Agnew, Pullen, Hunter), letter/hard copy
EPA Region 6 (King, Ellinger), electronic
SAF-IEE (Lynnes), electronic
AFCEC/CZ (Bodour, Clark), electronic
USACE-Omaha District Office (Ellender), electronic
USACE-ABQ District Office (Simpler, Phaneuf), electronic
Public Info Repository, Administrative Record/Information Repository, and File, letter/hard copy

WELL PLUGGING PLAN OF OPERATIONS

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

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

II. GENERAL / WELL OWNERSHIP:

Existing Office of the State Engineer POD Number (Well Number) for well to be plugged: RG-1579 PODs 327-328

Name of well owner: Kirtland Air Force Base

Mailing address: Chief Environmental Restoration. 377 MSG/CEANR, 2050 Wyoming Blvd. SE

City: Kirtland AFB State: New Mexico Zip code: 87117

Phone number: 505-846-9017 E-mail: scott.clark@us.af.mil

III. WELL DRILLER INFORMATION:

Well Driller contracted to provide plugging services: Cascade drilling, L.P.

New Mexico Well Driller License No.: WD-1210 Expiration Date: 10/31/17

IV. WELL INFORMATION:

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

1) GPS Well Location: Latitude: 35 deg, 3 min, 1.05 sec
Longitude: -106 deg, 34 min, 39.71 sec, NAD 83

2) Reason(s) for plugging well: A gyroscopic survey tool was used prior to well installation to determine the degrees of borehole deviation.During testing it was determined the bottom of the borehole was deviated 26.35 feet. The results measured at PODs 327 and 328 (nested monitoring well) are too large for successful well installation. The only infrastructure in the borehole is the 11 3/4" overdrive casing, which will be removed during borehole abandonment.

3) Was well used for any type of monitoring program or environmental assessment? No If yes, please use section VII of this form to detail what hydrogeologic parameters were monitored. If the well was used to monitor contaminated or poor quality water, authorization from the New Mexico Environment Department may be required prior to plugging.

4) Does the well tap brackish, saline, or otherwise poor quality water? No If yes, provide additional detail, including analytical results and/or laboratory report(s): _____

5) Static water level: 475 feet below land surface / feet above land surface (circle one)

6) Depth of the well: 557 feet

Trn. No

7) Inside diameter of innermost casing: 11 3/4" inches.

8) Casing material: Steel drive casing, casing will be removed during abandonment.

9) The well was constructed with:

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

NA a well screen or perforated pipe, state the screened interval(s): _____

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

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

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

V. DESCRIPTION OF PLANNED WELL PLUGGING:

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

1) Describe the method by which cement grout shall be placed in the well, or describe requested plugging methodology proposed for the well: Tremie Pipe will be placed to 500' in the hole and grout (9 sack cement sand slurry) will be pumped until 450' or 25' above the water table. The tremie then removed and grout pumped inside the 11 3/4" drive casing as the casing is removed allowing the grout to displace the casing. This will be completed until aproximately 87' bgs at which time a cement grout will be pumped to 2' bgs. Native soil will be placed to surface.

2) Will well head be cut-off below land surface after plugging? No well installation activities were initiated so no well exists.

VI. PLUGGING AND SEALING MATERIALS:

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

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

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

3) Theoretical volume of grout required to plug the well to land surface: 13 cubic yards (2,555 gallons)

4) Type of Cement proposed: 9 sack portland cement sand slurry (9 sack of Portland cement per cubic yard)

5) Proposed cement grout mix: 6 (six) gallons of water per 94 pound sack of Portland cement.

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

_____ mixed on site

Trn. No

7) Grout additives requested, and percent by dry weight relative to cement: Please see attached letter.

8) Additional notes and calculations: No well records for PODs 327 and 328 have been submitted as no well has been installed.

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

VIII. SIGNATURE:

I, DAWN A. NICKELL, COLONEL, USAF, 377 ABW VICE COMMANDER, say that I have carefully read the foregoing Well Plugging Plan of Operations and any attachments, which are a part hereof; that I am familiar with the rules and regulations of the State Engineer pertaining to the plugging of wells and will comply with them, and that each and all of the statements in the Well Plugging Plan of Operations and attachments are true to the best of my knowledge and belief.

Dawn Nickell — Signature of Applicant

22 Feb 17 — Date

IX. ACTION OF THE STATE ENGINEER:

This Well Plugging Plan of Operations is:

_____ Approved subject to the attached conditions.
_____ Not approved for the reasons provided on the attached letter.

Witness my hand and official seal this _____ day of _____, _____

Tom Blaine P.E., New Mexico State Engineer

By: _____

Trn. No

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

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

Trn. No

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

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

Trn. No