DEPARTMENT OF THE ARMY
FORT WINGATE DEPOT ACTIVITY P.O.
BOX 268
FORT WINGATE, NM 87316

February 7, 2018

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

RE: New Mexico Environment Department Approval with Modifications, HWB-FWDA-17-008, Final Groundwater Monitoring Northern Area Background Well Installation Letter Work Plan, Fort Wingate Depot Activity, McKinley County, New Mexico

Dear Mr. Kieling:

This letter is in reply to the New Mexico Environment Department (NMED) Approval with Modifications letter dated January 29, 2018, reference number HWB-FWDA-17-008, regarding the *Final Fort Wingate Depot Activity Groundwater Monitoring Northern Area Background Well Installation Letter Work Plan*. The following are the Army's responses to comments received from NMED in the letter.

Comments:

1) **The Permittee's Responses to Comments 1 and 2 of the Approval with Modifications**
Permittee Statement: "Steel casing will be advanced continuously to total depth during drilling operations to seal off each water-bearing zone as encountered. The pull-back installation method will be used to set the well."
"Rigid PVC will be used in the well construction for groundwater monitoring wells at FWDA."

NMED Comment: In the Permittee's response to Comment 1, steel casing is proposed. In the Permittee's response to Comment 2, rigid PVC is proposed as a well construction material. It is not clear whether the "pull-back" installation method here refers to the telescoping method and steel casing will be retracted, and PVC casing is installed afterwards. Clarify whether steel or rigid PVC is used as a well construction material and provide more detail on the proposed "pull-back" installation method in a response letter.

Army Response:
The steel casing described the January 8, 2018 response to Comment 1 of the Approval with Modification letter dated December 8, 2017 is temporary steel conductor casing only. The final well installation will contain only rigid PVC well casing, protected by an above-ground monument.

In sonic drilling, a core barrel on a set length of drill string, typically a 'run' of 10 to 20 feet, is first advanced into the ground using sonic frequencies. Temporary steel conductor casing is then immediately advanced to the currently drilled depth around the core barrel and its drill

string. This temporary casing seals off water-bearing zones if encountered in that 'run' to prevent downhole sample contamination. The temporary casing also holds the boring walls open to prevent collapse of the boring.

Lengths of drill string for the core barrel and temporary steel casing sections are alternately added and advanced until total depth of the boring is reached.

Pull-back monitoring well installation can be described as follows. The core barrel and drill string are first removed from the boring, leaving the temporary steel casing in place. Lengths of slotted PVC screen and solid PVC riser, equal to the total depth of the boring plus any well stick up above ground surface, are screwed together and placed into the boring inside of the temporary steel casing. The Colorado-sand filter pack will be emplaced into the annulus between the temporary casing and slotted PVC well screen, from total depth to 2 feet above the top of the slotted screen. The temporary steel casing is then slowly retracted from the boring just the length of the PVC well screen, which exposes the filter pack and slotted PVC well screen to the bedrock water bearing zone.

Bentonite chips or pellets are then emplaced into the annulus between the solid PVC riser and the temporary steel casing, directly on top of the filter pack, and hydrated with clean, contaminant-free water. The temporary steel casing will again be retracted just the length of the bentonite seal. The sonic frequencies generated during retraction help the hydrated bentonite to settle into the annulus and knit together with the natural material of the boring walls to form a good seal. Bentonite also adheres to the solid PVC riser material well, forming a good seal.

A tremie pipe is used to emplace neat cement grout above the bentonite well seal. Neat cement grout is mixed according to the specifications provided by the New Mexico Office of the State Engineer, with 5% bentonite powder, and 6.5 gallons of water per standard 94-pound sack of Portland cement. The temporary steel well casing is slowly retracted from the well at the same rate as the neat cement grout is tremie pumped into the annulus between the PVC well casing and the natural material of the borehole, so that water from water bearing zones is never allowed to free flow into the borehole. Water bearing zones are always sealed by either the temporary steel well casing or sealed by emplaced neat cement grout as the temporary casing is retracted.

2) The Permittee's Response to Comment 2 of the Approval with Modifications

Permittee Statement: "Rigid PVC does not contain this additive [bis(2-ethylhexyl) phthalate]."

NMED Comment: If the Permittee elects to use rigid PVC as a well construction material, provide a Material Safety Data Sheet (MSDS) indicating that the PVC material contains no bis(2-ethylhexyl) phthalate or any plasticizers with the response letter. The proposed rigid PVC material must meet National Sanitary Foundation (NSF) Standard 14 type Well Casing.

Army Response:

The requested Material Safety Data Sheet is attached to this response letter. The PVC well screens and casings that will be used to install these bedrock background wells are manufactured by Monoflex. They conform to ASTM F-480, "Standard Specification for Thermoplastic Well Casing Pipe and Couplings Made in Standard Dimension Rations (SDR), SCH 40 and SCH 80." The PVC materials used to produce the raw PVC pipe meet ASTM Standard D-1784, "Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds for PVC Normal Impact, Type I Grade (1120), cell classification 12545-B." The finished schedule 40 PVC pipe meets the standards of ASTM Standard D-1785, "Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120." Both the raw material and finished raw pipe are approved by the National Sanitation Foundation (NSF) for use in potable water applications, and in compliance with 19.27.4.29 B. New Mexico Administrative Code (NMAC), Well Drilling – General Requirements, Materials.

3) **The Permittee's Response to Comment 2 of the Approval with Modifications**

Permittee Statement: "The detection of bis (2-ethylhexyl) phthalate in groundwater monitoring water samples is potentially due to flexible clear tube used to collect groundwater via low flow sampling, or as a laboratory contaminant."

NMED Comment: Flexible tubing manufactured without bis (2-ethylhexyl) phthalate is commercially available. In the response letter, propose to use materials that contain no bis (2-ethylhexyl) phthalate. In addition, if the source of bis (2-ethylhexyl) phthalate is attributed to laboratory contamination, reference the appropriate laboratory blank detections. The Permittee must direct the laboratory to take steps to eliminate such laboratory contamination. The Permittee may need to switch laboratories if their laboratory is unable to adequately control the contamination. Provide a measure to control laboratory contamination in the response letter.

Army Response:

While bis (2-ethylhexyl) phthalate is a common laboratory contaminant, detections in FWDA groundwater monitoring laboratory control samples are not systemic. Additional actions to control blank contamination are not required in the absence of a discernable pattern of laboratory contamination. Likewise, detections of bis (2-ethylhexyl) phthalate in normal field samples at FWDA are generally not systemic, except for the detections in TMW18 which have been previously discussed in FWDA Groundwater Periodic Monitoring Reports. The Army will continue to ensure that project-required laboratory certifications and method validations are current, and the results of the third-party data validation will be reviewed after each event to ensure there is no pattern of systemic blank contamination.
Bis (2-ethylhexyl) phthalate-free materials will be selected for future groundwater monitoring activities, including monitoring well installation. Sampling data will be monitored for analyte detections during future sampling events.

4) Figure 3, Schematic of Proposed Well Construction

NMED Comment: Double-cased wells should be constructed for bedrock groundwater monitoring since interconnection of two or more aquifers exists and well construction may cause cross-contamination. The proposed construction in Figure 3 depicts a single-cased well. Revise Figure 3 as necessary. If the Permittee does not believe that single-cased wells would be susceptible to cross-contamination, provide a justification in the response letter. Even though sand filter pack is segregated from the upper aquifer by bentonite seal, the aquitard that separates the saturated zones in some areas may not have sufficient thickness to prevent cross-contamination.

Army Response:

The four proposed and approved bedrock background monitoring well locations were specifically selected because they were located upgradient of site related contamination. Both shallow alluvium and deeper bedrock water bearing zones at these locations are expected to be free of contamination, so cross-contamination between zones is unlikely.

In the event contamination is present at the selected monitoring well locations, the methodology of sonic drilling is very effective at preventing cross-contamination between multiple water bearing zones. Alternating advancement of the core barrel on its drill string and the temporary conductor casing, as described in the Comment 1 response in this letter, seals water-bearing zones as they are encountered, and before the boring is drilled further. Deeper water-bearing zones will not be exposed to overlying water-bearing zones, so cross-contamination through downhole mixing is unlikely. Cross-contamination during well installation is also improbable, because seals and grout are emplaced at the same rate the temporary casing is retracted from the boring, and multiple saturated zones are never open to each other in the boring at the same time.

Finally, the thickness of the aquitard separating saturated zones at the selected monitoring well locations is unknown. Sonic drills operate with minimal disturbance to the surrounding geology. The sonic frequency resonance generated by the drill head causes fluidization of the rock or soil material, which reduces friction on the core barrel or temporary conductor casing as it advances into the boring. This method will not produce extensive fractures or compromise potentially thin aquitards between saturated zones.

The proposed and approved locations, as well as the selected drilling method and well installation, are sufficient to prevent cross-contamination in a single-cased bedrock background monitoring well. It is not necessary to install double-cased monitoring wells, therefore Figure 3 has not been revised from the version submitted to NMED on January 8, 2018.

If you have questions or require further information, please call me at (505) 721-9770.

Sincerely,

PATTERSON.MARK.C.1229214493

Digitally signed by PATTERSON.MARK.C.1229214493
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=PATTERSON.MARK.C.1229214493
Date: 2018.02.08 15:04:52 -05'00'

Mark Patterson
BRAC Environmental Coordinator

Enclosures

CF:
D Cobrain, NMED HWB
B Wear, NMED HWB
M Suzuki, NMED HWB
M Patterson, FWDA BEC
S Smith, USACE SWT
Saqib Khan, USACE SWT
Admin Record, OH /NM

Material Safety Data Sheet

FINISHED PROFILE, BAR STOCK,DUCT, ANGLE, JOINING STRIP,
and PIPE MADE FROM RIGID PVC and CPVC THERMOPLASTIC

SECTION I

Manufacturer's Name	Telephol')e Number	Address
Harvel Plastics, Inc.	(610) 252-7355 FAX: (610) 253-4436	P.O. Box 757, Easton, PA 18044-0757
Chemical Family	Formula	Trade Designation
Ethene, chloro- (homopolymer and chlorinated)	.Mixture of PVC or CPVC polymer with functional additives.	
Chemical Name/Synonyms	NFPA 7041	HMIS2
Polyvinyl chloride, PVC and chlorinated polyvinyl chloride, CPVC.	Health: 2 Flammability: 1 Reactivity: 0 Special: None	Health: 0 Flammability: 1 Reactivity: 0

Hazard Code Key: 0 = Insignificant; 1 = Slight; 2 = Moderate 3 = High; 4 = Extreme
1National Fire Protection Ass'n. 2National Paint and Coatings Ass'n.

SECTION II–HAZARDOUS INGREDIENTS

All ingredients are bound-up in the manufacturing process and are not expected to create any hazard ih handling or use. Finished goods (e.g., rigid pipe, bar stock, duct, angle, joining strip, or profile) are inert.

SECTION III-PHYSICAL DATA (Typical data, not specifications)

Boiling Point	Melting Point	Specific Gravity (H_20 = 1)
Not applicable (NA)	NA	1.35-1.55
Soh.ibility in Water	%Volatile by Weight	Vapor Density (Air= 1)
insoluble	NA	NA
Vapor Pressure (mm Hg)	pH	Particle Size
NA	NA	NA

Appearance and Odor
Rigid pipe, bar stock, duct, angle, joining strip, or profile. No odor.

SECTION IV-FIRE AND EXPLOSION HAZARD DATA

Flashpoint	Ignition Temperature	Flammable Limits in Air
Not applicable to solid products	PVC:>730°F(>388°C) CPVC: >830°F (>433°C)	(%by volume) Lower: NA Upper: NA

Extinguishing Media
Water. ABC dry chemical. AFFF. Protein type air foams. Carbon Dioxide may be ineffective on larger fires due to a lack of cooling capacity which may result in reignition.

Special Firefighting Procedure
Wear positive pressure self-contained breathing apparatus (SCBA). Personnel not having suitable respiratory protection must leave the area to prevent significant exposure to toxic combustion gases from any source. In enclosed or poorly ventilated areas, wear SCBA during cleanup immediately after a fire as well as during the attack phase of firefighting operations.

Unusual}=ire and Explosion Hazards

Material Safety Data Sheet (continued)

SECTION VII-SPILL OR LEAK PROCEDURE

Steps to be taken in case material is released .or spilled. Material is inert. Place into a container for reuse or disposal.

Waste Disposal Method

Dispose of waste in accordance with federal, state and local regulations. For waste disposal purposes these products are not defined or designated as hazardous by current provisions of the Federal Resources Conservation and Recovery Act (RCRA) 40CFR261.

SECTION VIII-SPECIAL PROTECTION INFORMATION

Ventilation

Provide efficient exhaust at all operations capable of creating fumes or vapors. Cutting or sawing, machining, heat welding, thermofolding and other operations involving heat sufficient to result in degradation should be examined to ensure adequate ventilation.

Respiratory Protection

Not normaiiy required.

-If overheating results in decomposition resulting in smoke or fumes, a NIOSH/MSHA approved combination high efficiency particulate filter with organic vapor cartridge can be used. Gross decomposition may require the use of a positive pressure self-contained breathing apparatus.

Protective Equipment

Wear safety glasses.

SECTION IX-SPECIAL PRECAUTIONS

-Certain operations, such as the installation of piping systems, may require the use of solvent cements. The user must obtain and comply with all safety precautions recommended by solvent cement manufacturers. See Pages 64 thru 68 for solvent cementing guidelines. - Avoid continued or prolonged breathing vapors produced by overheating.

SECTION X-TRANSPORTATION

. For domestic transportation purposes, these products are not defined or designated as a hazardous material by the U.S. Department of Transportation under Title 49 of the Code of Federal Regulations, 1983 Edition.

- DOT Proper Shipping Name: Not applicable
- DOT Hazard Class: Not hazardous
- DOT Label: None required
- UN/NA Haz11rd No.: Not applicable

USER'S RESPONSIBILITY

A bulletin such as this cannot bexpected to cover all possible individual situations. As the user has the responsibility to provide a safe workplace, all aspects of anindividuaj operation should be examined to determine if, or where, precautions, in addition to those described herein, are required. Any health hazard and safety information contained herein should be passed on to your customers or employees, as the case may be. Harvel Plastics must rely on the user to utilize the information we have supplied to develop work practice guidelines and employee instructional_programs for the individual operation.

DISCLAIMER OF LIABILITY

As the conditions or methods of use are beyond our control, we do not assume any responsibility and expressly disclaim any liability for any use of this material. Information contained herein is believed to be true and accurate but all statements or suggestions are made without warranty, expressed or implied, regarding accuracy of the information; the hazards connected with the use of the material or the results to be obtained from the use thereof. Compliance with all applicable federal, state and local laws and regulations remains the responsibility of the user.

ASTM Test Methods

C 177-85 Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Proper-

D 696-79 · Test Method for Coefficient of Linear Thermal Expansion of Plastics, 08.01,14.01