



**Michelle Lujan Grisham**  
Governor

**Howie C. Morales**  
Lt. Governor

**NEW MEXICO  
ENVIRONMENT DEPARTMENT**

**Hazardous Waste Bureau**

2905 Rodeo Park Drive East, Building 1  
Santa Fe, New Mexico 87505-6313  
Phone (505) 476-6000 Fax (505) 476-6030  
[www.env.nm.gov](http://www.env.nm.gov)



**James C. Kenney**  
Cabinet Secretary

**Jennifer J. Pruett**  
Deputy Secretary

**CERTIFIED MAIL - RETURN RECEIPT REQUESTED**

December 18, 2019

Timothy J. Davis  
Chief, Environmental Officer  
National Aeronautics and Space Administration  
White Sands Test Facility  
P.O. Box 20  
Las Cruces, NM 88004-0020

Attention of: RE-19-025

**RE: DISAPPROVAL  
MID-PLUME FRACTURE ENHANCEMENT PILOT TEST WORK PLAN  
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
JOHNSON SPACE CENTER WHITE SANDS TEST FACILITY  
DOÑA ANA COUNTY, NEW MEXICO  
EPA ID #NM08800019434  
HWB-NASA-19-003**

Dear Mr. Davis:

The New Mexico Environment Department (NMED) has received the National Aeronautics and Space Administration Johnson Space Center White Sands Test Facility (Permittee) *Mid-Plume Fracture Enhancement Pilot Test Work Plan* (Work Plan) dated February 19, 2019. NMED has completed review of the Work Plan and hereby issues this Disapproval. The following comments must be addressed.

## **COMMENTS**

### **1. Section 1.2, Regulatory Requirements, Pages 1 and 2**

**Permittee Statement:** "There is no specific regulatory requirements for the MPFE [Mid-Plume Fracture Enhancement] pilot test."

**NMED Comment:** The statement contradicts the following Permittee statement "[h]owever, existing regulations, permits, and NMED-approved documents are applicable to the performance of the test." Corrective action and groundwater cleanup at White Sands Test Facility (WSTF) is regulated under the Facility RCRA Hazardous Waste Permit. In addition, the MPFE pilot test is subject to State of New Mexico regulations governing groundwater protection. Remove the statement from the revised Work Plan.

### **2. Section 3.2, Mid-Plume Subsurface Conditions, Pages 6 through 8**

**Permittee Statement:** "This section provides a brief description of the site-wide subsurface conditions as they relate to WSTF and more specifically the Mid-Plume area. Detailed information on site-conditions was provided in the WSTF RFI [RCRA Facility Investigation]."

**NMED Comment:** The Work Plan must provide detailed subsurface geologic, hydrogeologic, and hydrostratigraphic information gathered during the prior Phase I, II, III, IV, and V Mid-Plume Constriction Area (MPCA) Investigations, as well as other pertinent investigations and studies at the MPCA. Discussion of detailed subsurface geologic information and data gathered during prior investigation at the MPCA is critical to understanding the feasibility of the proposed scope of work and must be addressed in the revised Work Plan. All information and data sourced from prior investigations must be referenced and appropriately cited in the revised Work Plan. Additionally, provide a hard copy and electronic copy of the 1998 Giles and Pearson document *Characterization of Hydrostratigraphy and Ground Water Flow on the Southwestern San Andres Mountains Pediment* as a separate reference document with the revised Work Plan.

### **3. Section 3.2.6, Previous Hydrofracturing, Page 9**

**NMED Comment:** Previous hydrofracturing conducted at the MPCA resulted in groundwater contamination as a result of the use of the hydraulic fracturing chemical additives ProSURF-I and ProSURF-II at mid-plume exploration well six (MPE-6). Information provided in NASA's July 31, 2003, *Response to the May 16, 2003 New Mexico Environment Department (NMED) Request for Supplemental Information for the Mid-Plume Constriction Area (Response)*, indicate that ProSURF-I was comprised of toluene (approximately 70% to 90%), petroleum distillates, amidoamines, and other chemicals. The additive ProSURF-II was comprised of isopropyl alcohol (approximately 90%), ethylene glycol, 1,4-dioxane, and other chemicals.

Although only 13-gallons of ProSURF-I and 7-gallons of ProSURF-II were reported to have been injected into the aquifer with hydraulic fracture fluids, concentrations of chemicals of concern (COCs) found to be directly attributable to the additives were detected at MPE-6 and at surrounding groundwater monitoring and MPE wells during subsequent interim measures cleanup and sampling. COCs detected in groundwater during interim measures sampling included total petroleum hydrocarbons (TPH) diesel range organics (DRO), acetone, acetophenone, benzene, benzyl alcohol, di-N-butyl phthalate, 2,4-dimethylphenol, ethylbenzene, 4,7-methano-1H-indene, 2-methylphenol, m+p-cresol, naphthalene, 2-propanol, tetrahydrofuran, toluene, m+p-xylene, o-xylenes, methyl isobutyl ketone, ethanol, and various tentatively identified alcohols, acids, and hydrocarbons. Based on groundwater sample analysis data collected following the 2003 contamination release, there appears to be significant potential for further contamination of the aquifer resulting from the use of hydraulic fracturing chemicals and additives.

Additionally, the conclusions of NASA's July 31, 2003 *Phase IV Mid-Plume Constriction Area Investigation Report* (Phase IV Report) documenting prior hydraulic fracturing project work at the MPCA provided with the Response indicated that measurable rhyolite bedrock fracture propagation due to use of hydraulic fracturing technology only occurred at one exploration well (MPE-8). Chemical analytical data collected during the investigation also indicated that characteristic WSTF groundwater contamination appeared to be confined to a specific set of MPCA structural conduits that were believed to be complex. The Phase IV Report conclusions also indicated that well MPE-6, a well targeted for the currently proposed MPFE pilot test, was believed to be located in an area intersecting, or near, bedrock structures that do not interconnect with contaminated groundwater fracture pathways. It was also reported that hydrofracturing fluids may have been extruded through the cement well seal at MPE-6 into the deep alluvial vadose zone as a result of unsuccessful hydraulic fracture advancement and an inadequate well grout seal. This suggests that hydraulic fracturing is not a suitable or reliable technology for use in igneous bedrock such as MPCA rhyolites and may result in rupture of well grout seals at locations where fractures cannot be advanced within the surrounding bedrock. This may potentially result in additional contamination to the aquifer and the vadose zone at WSTF. Additionally, the reported well grout seal rupture damage and hydraulic fracture fluid release at MPE-6 renders the well unsuitable for use during the current MPFE pilot test and as a potential Mid-Plume Interception and Treatment System (MPITS) extraction well. Based on this information, a work plan for abandonment of well MPE-6 and installation of a replacement well would need to be submitted and approved by NMED prior to initiation of the MPFE pilot test.

Given the limited success of prior hydraulic fracturing at the MPCA, the reported complex nature of the MPCA bedrock aquifer, the potential for additional aquifer contamination due to the injection of typical hydraulic fracturing chemicals and additives into surround bedrock and the aquifer, and the potential for well grout seal failure, the risks associated

with the use of hydraulic fracturing technology at WSTF appear to outweigh any potential benefits. However, in support of the proposed scope of work, the Work Plan must be revised to address the following:

- a. Provide a detailed discussion of WSTF aquifer contamination as a result of prior use of hydraulic fracturing technology.
- b. Discuss the contaminant migration pathway issues observed and reported in the Phase IV Report due to the lack of significant intercommunication between wells MPE-6 and MPE-3.
- c. Provide a detailed discussion of the reported well seal rupture at MPE-6. Identify any other well where grout seal rupture was believed to have occurred during the previous hydraulic fracturing project at the MPCA.
- d. Provide a detailed discussion of any observed limitations to the use of hydraulic fracturing technology in the bedrock aquifer at WSTF based on the results of prior project work.
- e. Provide a detailed discussion of insights gained from issues encountered during prior hydraulic fracturing at the MPCA and how this information has been applied to the currently proposed scope of work.
- f. Address and discuss the potential risks and benefits associated with pursuing additional hydraulic fracturing project work at the MPCA and provide adequate justification for continued use of hydraulic fracturing technology at WSTF based on experience gathered during prior investigation and hydraulic fracturing project work at the MPCA.
- g. Discuss the rationale for selection of kerfing and hydraulic fracturing technology rather than other currently available remediation system extraction enhancement options, such as additional extraction well installation at identified MPCA productive contamination migration pathway areas. Revise the Work Plan accordingly.

All supporting information, documents, and data must be appropriately referenced and cited in the revised Work Plan.

#### **4. Section 4.0, Investigation Activities, Page 9**

**NMED Comment:** Section 4.0 only provides a generalized discussion of the proposed kerfing, hydraulic fracturing, and slurry recovery process activities. Additional information must be provided in the revised Work Plan as follows:

- a. The revised Work Plan must include separate detailed section information specific to kerfing, hydraulic fracture fluid injection, and the slurry recovery processes. The individual sections must provide detailed process information, such as the actual compositions of kerfing and hydraulic fracture slurry and additives to be used; anticipated kerfing and hydraulic fracture slurry volumes, injection rates, and pressures; anticipated kerf dimensions; specifications for fracture proppant materials to be used; information on all slurry dispersants to be used; information on equipment to be used; step-by-step kerfing, hydraulic fracturing, and slurry recovery process procedures to be used; and all other pertinent kerfing, hydraulic fracturing, and slurry recovery process information. Revise the Work Plan accordingly.
- b. The revised Work Plan must include a proposed program of monitoring during the kerfing and hydraulic fracturing phase of the proposed scope of work, such as surrounding piezometer monitoring, fluid injection and fracture propagation subsurface pressure monitoring, and information pertaining to respective data collection and equipment. All data collected during kerfing and hydraulic fracturing phases of the project must be included and discussed in the MPFE pilot test report. Revise the Work Plan accordingly.
- c. The revised Work Plan must include a detailed section discussing the installation and design of the temporary infrastructure at MPFE pilot test target wells proposed to connect the wells to the MPITS that was briefly noted in Section 1.3, Approach and Implementation. Revise the Work Plan accordingly.
- d. Pilot test kerfing and hydraulic fracturing well MPE-13 has been proposed at an area adjacent to tightly grouped MPITS extraction wells (MPE-1, MPE-8, and MPE-9) that are critical to groundwater contamination cleanup at WSTF. Based on information provided in the Work Plan, the extraction wells are located well within the anticipated 50 to 100-foot pilot test radius of influence. Currently, there is concern that kerf advancement and hydraulic fracturing at the MPE-13 pilot test location may result in damage to MPITS extraction wells MPE-1, MPE-8, and MPE-9. Therefore, the revised Work Plan must address the potential for damage to the MPITS and extraction wells as a result of proposed kerfing and hydraulic fracturing at the pilot test location. If, after thorough evaluation, the Permittee has determined that kerfing and hydraulic fracturing may result in damage to the MPITS extraction wells, the pilot test must not be conducted. Revise the Work Plan accordingly.
- e. The revised Work Plan must also address the potential for unexpected migration of contamination as a result of hydraulic fracturing at the MPCA that may potentially be detrimental to remediation efforts at WSTF, such as induced downward migration of COCs with a high specific gravity (e.g., trichloroethylene,

tetrachloroethylene, and dense non-aqueous phase liquids) or migration of contaminants to uncontaminated groundwater migration pathways or confined to semiconfined portions of the MPCA aquifer. Revise the Work Plan accordingly.

#### 5. Section 4.1.1, Kerfing Process, Pages 9 and 10

**Permittee Statement:** “Over the years, the principles of fracture initiation and propagation have been investigated in the context of both petroleum reservoirs and site remediation. Selected methods to create fractures in overburden formations were developed in the 1980s and 1990s during EPA-funded research at the University of Cincinnati by Dr. Larry Murdock and Bill Slack. Kerfing at WSTF will be performed by FRx founded in 1994 by the researchers for the purpose of bringing hydraulic fracturing methods to the environmental remediation market. FRx has solely practiced controlled hydraulic fracturing since its founding.”

**NMED Comment:** Based on the Permittee’s statement, kerfing technology has only been utilized in overburden (assumed unconsolidated soils) by FRx, not in a geologically complex bedrock environment. Clarify if kerfing technology has been successfully tested and used in an igneous bedrock environment by FRx. If so, revise the section to provide additional discussion supporting the feasibility of kerfing technology use in WSTF rhyolitic bedrock based on prior research, studies, and contractor project work. Appropriately reference and cite all supporting information sourced from prior research, studies, and project work in the revised section discussion. Revise the Work Plan accordingly.

Additionally, provide information on how the anticipated estimated hydraulic fracture radius (50 to 100 feet) was calculated for MPCA rhyolitic bedrock. Revise the Work Plan accordingly.

#### 6. Section 4.1.2, Kerfing and Hydraulic Fracturing Materials and Emplacement, Page 10

**Permittee Statement:** “The slurry proposed for the MPCA fracture enhancement will not contain constituents capable of exceeding primary drinking water standards and only a few constituents capable of temporarily exceeding secondary drinking water standards (e.g., sodium). The fluids used to perform the kerfing and hydraulic fracturing will have nearly identical composition including water, guar bean flour (<11% by weight), sodium tetraborate (<0.1 % by weight), and an enzyme (LEB-H, Rantec Corporation; 0.05% by weight).”

**NMED Comment:** The Permittee’s statement indicates that a level of contamination and/or chemical alteration of the aquifer at the MPCA is anticipated as a result of kerfing and hydraulic fracturing. Use of environmental remediation technology that results in additional contamination or permanent detrimental chemical alteration of the aquifer and/or vadose

zone at WSTF is not acceptable. Provide a detailed discussion of all chemicals of concern (COCs) and materials to be used and released to the aquifer during kerfing and hydraulic fracturing at the MPCA. Discuss in detail the expected effects of the release of identified COCs to the aquifer as a result of proposed kerfing and hydraulic fracturing project work at the MPCA. Additionally, provide safety data sheets (SDSs) for all chemicals, additives, viscosifiers, gellant breakers, enzymes, and other kerfing and hydraulic fracturing materials to be used during the MPFE pilot test. All respective SDSs must be provided in an appendix of the revised Work Plan.

The Work Plan must also be revised to include a suite of initial baseline and post-hydraulic fracturing groundwater sample collection at select MPCA exploration and extraction wells and surrounding groundwater monitoring wells. The groundwater samples must be analyzed for COCs identified in association with kerfing and hydraulic fracturing chemicals as well as COCs and water quality parameters reported under the current WSTF groundwater monitoring program (i.e., volatile organic compounds, semi-volatile organic compounds, nitrosamines, bromacil, 1,4-dioxane, TPH DRO, metals, nitrate/nitrite, perchlorate, sulfate, chloride, fluoride, alkalinity, and total dissolved solids). Revise the Work Plan accordingly.

The Permittee must ensure and provide supporting evidence in the Work Plan that additional contamination of the aquifer will not occur as a result of proposed kerfing and hydraulic fracturing at the MPCA. If, after thorough reevaluation of the proposed scope of work, the Permittee cannot ensure that this can be achieved, then the Permittee must not conduct the MPFE pilot test.

#### **7. Section 4.1.3, Kerfing Locations, Pages 10 and 11**

**NMED Comment:** The Permittee's primary criteria given for the selection of target wells for MPFE was the location of the wells relative to elevated concentrations of TCE and NDMA and the anticipated hydrogeologic intercommunication of the pilot test target wells. However, prior Phase IV Report conclusions indicated that MPE-6, a MPFE pilot test target well, is likely located near bedrock structures that do not interconnect with contaminated groundwater fracture pathways. Additionally, a fault identified between adjoining well MPE-3 and MPE-6 at the proposed pilot test location is believed to be a potentially isolating structure preventing intercommunication between the two wells. This was evidenced in the Phase IV Report by observed significant differences in static water level and significantly different contaminant concentration trends at each well. Based on the conclusions of the prior investigation, the kerfing location selection criteria have not been completely met for the MPE-3/MPE-6 pilot test location. Reevaluate subsurface geologic structure and hydrogeology at each pilot test location with respect to detailed geologic structure, hydrogeology, hydrostratigraphy, and contaminant concentration data collected during prior MPCA investigations at proposed pilot test locations. An actual pilot test location

evaluation and supporting information must be provided in the revised Work Plan as proof that the site selection criteria have been met, that hydraulic fracturing at each location will result in a significant increase in contaminant remediation yield, and that it is suitable for use at each pilot test location. Revise the Work Plan accordingly.

**8. Section 4.1.5, Kerfing Well Installation, Pages 11 and 12**

**NMED Comment:** The following Section 4.1.5 comments must be addressed in the revised Work Plan:

- a. The Permittee states “[a] generalized cross-section showing the conceptual kerfing well is provided in Figure 1.3.” Subsurface cross-section information depicting proposed kerfing wells was provided on Figure 3.2, MPCA Hydrogeology (Cross-Section B-B’). Correct the figure reference discrepancy. Revise the Work Plan accordingly.
- b. The Work Plan proposes a pilot test well grout mixture comprised of a standard mix of Portland cement and no more than 5% (by weight) bentonite. Provide empirical supporting information in the revised Work Plan that demonstrates that the well grout mixture will cure to adequate strength to withstand anticipated kerfing and hydraulic fracturing pressures. In support of the proposed grout mixture design, include information on anticipated grout mixture strength, necessary grout mixture curing specifications, anticipated volume of grout to be used at each pilot test well, anticipated kerfing and hydraulic fracture pressures, the sequence of procedures to be used to ensure adequate grout seal installation at each pilot test well, grouting equipment to be used, and quality control/assurance measures to be used during well grout installation. Revise the Work Plan accordingly.
- c. The Work Plan only indicates 4-inch blank steel casing will be installed at each pilot test well. The Permittee must ensure that the steel casing grade is rated to withstand the pressures exerted during kerfing and hydraulic fracturing. Provide more detailed steel well casing specifications in the section. Revise the Work Plan accordingly.
- d. The revised Work Plan must include a proposed program of quality assurance and control testing to ensure well grout materials are of sufficient quality to withstand proposed perforation, kerfing, and hydraulic fracturing fluid pressures (e.g., in-situ pressure testing, cement bond logging, downhole video logging, geophysical logging, and ex-situ laboratory materials testing). All testing results and data must be included and discussed in the MPFE pilot test report. Revise the Work Plan accordingly.



- e. Section 4.3.2.3, Continued Well Capacity and Aquifer Testing, indicates that kerfing well abandonment and plugging will be considered as one of the options following a one-year evaluation period. Section 4.1.5 must also include information on all potential options for kerfing pilot test well use during the proposed one-year evaluation period. The Permittee must clarify if the potential use of the two kerfing wells (designated as MPE-12 and MPE-13) as extraction wells is being considered. If so, address the viability of the kerfing wells as extraction wells based on the widely spaced casing perforations (25 to 50-foot kerf interval spacing) and the proposed 4-inch well casing diameter. Revise the Work Plan accordingly.

#### 9. Section 4.2.1, Kerfing and Hydraulic Fracturing Fluid Volumes, Page 12

**Permittee Statement:** “Samples will be collected from the container fluids to see if the discharge qualifies for a “No Longer Contained-In Determination” (disposal on-site) or whether the fluids have to be disposed of at an approved off-site treatment facility.”

**NMED Comment:** The Permittee has proposed to remove approximately 8,688-gallons of development water following the completion of hydraulic fracturing at each kerfing well. Based on this estimate, a total of 17,376-gallons of well development fluids will be generated. The NMED Hazardous Waste Bureau can provide a “No Longer Contained in Determination” for any qualifying accumulated well development water; however, in the absence of appropriate discharge permitting, well development water must be disposed of at an appropriate off-site disposal facility. Provide additional information regarding the proposed “on-site” disposal of well development water in the discussion or remove the reference from the statement. Additionally, as provided in other NASA work plans, provide a Waste Management Plan (WMP) in the revised Work Plan as an additional appendix. The WMP must provide detailed information on all waste to be generated, proposed waste characterization and sampling, waste management, and waste disposal. Revise the Work Plan accordingly.

#### 10. Section 4.2.2, Mid-Plume Extraction Well Development, Page 13

**NMED Comment:** The Permittee must ensure supporting evidence such as chemical analytical data and water quality parameter data that demonstrates adequate development of pilot test wells is regularly collected. All supporting data and sample analysis results must be included and discussed in the MPFE pilot test report. Provide additional information on planned data collection during well development activities in the discussion. Revise the Work Plan accordingly.

**11. Section 4.3.2.1, Pre-Kerfing and Hydraulic Fracturing Well Capacity/Aquifer Testing and Development, Pages 13 and 14**

**Permittee Statement:** “The second day will be spent pumping the well at a constant rate for at least the time necessary to achieve a pseudo-steady state drawdown, or a maximum of 8-hours, while aquifer responses are measured at nearby monitoring wells.”

**NMED Comment:** Provide specific information on which nearby monitoring wells will be used to collect aquifer testing data. Additionally, ensure that the proposed aquifer test duration and methods will result in the collection of data representative of anticipated pre-kerfing and hydraulic fracturing aquifer conditions. Revise the Work Plan accordingly.

**12. Section 4.3.2.2, Post-Kerfing and Hydraulic Fracturing Well Capacity/Aquifer Testing and Development, Page 14**

**Permittee Statement:** “The evaluation at each MPE well will include an 8-hour pumping test to establish the sustainable flow and to monitor aquifer response at nearby monitoring wells.”

**NMED Comment:** Provide specific information on which pilot test location wells and nearby monitoring wells will be used to collect aquifer testing data. Additionally, ensure that the proposed aquifer test duration and methods will result in the collection of data representative of anticipated post-kerfing and hydraulic fracturing aquifer conditions. Revise the Work Plan accordingly.

**13. Section 4.3.2.3, Continued Well Capacity and Aquifer Testing, Page 14**

**Permittee Statement:** “Supplemental aquifer testing data will be collected over the year following the completion of post-kerfing and hydraulic fracturing evaluation.”

**NMED Comment:** The revised Work Plan must provide detailed information on all post-hydraulic fracture aquifer testing and sampling to be conducted during the one-year evaluation period. The revised Work Plan must also provide specific information on all monitoring, exploration, and extraction wells proposed for use during all aquifer testing phases, the intended use of the each well (e.g., pumping and/or data collection well) during aquifer testing, and how respective data will be collected at each well. Additionally, provide detailed information on all groundwater sample collection planned for the extended aquifer testing period. Revise the Work Plan accordingly.

**14. Section 4.3.3, Groundwater Parameter Field Measurements, Page 15**

**Permittee Statement:** “Groundwater indicator parameters may be measured at other times during the pilot test for engineering or other well evaluation purposes such as turbidity monitoring during step test performance.”

**NMED Comment:** Representative water quality indicator parameters must be collected during all phases of the pilot test at regular intervals. The collected data must be recorded in field notes or logs for the duration of the pilot test and aquifer testing. At a minimum, turbidity, pH, temperature, dissolved oxygen, oxidation-reduction potential, and conductivity must be collected. The revised Work Plan must clearly specify when water quality measurements will be collected and at what locations the data will be collected during pilot testing, well development, and aquifer testing phases of the proposed scope of work. Revise the Work Plan accordingly.

**15. Section 4.3.4, Chemical Analytical Data, Page 15**

**NMED Comment:** The revised Work Plan must include detailed information on all groundwater chemical analytical data to be collected during the MPFE pilot test. This must include detailed information on proposed sampling locations, quantity of samples to be collected at each location, respective sample analysis, and all respective quality control sampling. Revise the Work Plan accordingly.

**16. Figure 3.2, MPCA Hydrogeology (Cross-Section B-B'), Page 31**

**NMED Comment:** The figure legend indicates that the stratigraphic unit ( $T_{VRT}$ ) depicted below mapped alluvium represents Tertiary Cemented Alluvium. Other Work Plan information and available well log information indicates rhyolitic and volcanic tuff bedrock underlies Quaternary and Tertiary alluvium at the MPCA. Resolve the discrepancy in the revised Work Plan.

**17. Table 4.1, Estimates for Kerfing Fluids, Hydraulic Fracturing Fluid, and Well Development Volumes, Page 37**

**NMED Comment:** To support the anticipated remediation system yield estimates provided on Table 4.1, discuss the anticipated improvements in pilot test well yields as a result of the proposed hydraulic fracturing in the revised Work Plan text. Provide information on how the enhanced well yield estimates presented on Table 4.1 were calculated. Revise the Work Plan accordingly.

Mr. Davis  
December 18, 2019  
Page 12

The Permittee must submit a revised Work Plan that addresses all of the comments contained in this letter. In addition, the Permittee must include a response letter that identifies where NMED's comments were addressed. The Permittee must also submit an electronic redline-strikeout version of the revised Work Plan showing where all changes were made to the Work Plan. The revised Work Plan must be submitted to NMED no later than **May 29, 2020**.

If you have any questions regarding this letter, please contact Gabriel Acevedo at (505) 476-6043.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Dave Cobrain', written in a cursive style.

Dave Cobrain  
Acting Chief  
Hazardous Waste Bureau

cc: B. Wear, NMED HWB  
G. Acevedo, NMED HWB  
L. King, EPA 6LCRRC  
M. Zigmond, NASA WSTF

File: NASA 2019 and Reading