December 10, 2010 NMED Hazardous Waste Bureau James Bearzi, Chief 2905 Rodeo Park Drive East, Bldg. 1 Santa Fe, New Mexico 87505

In the Matter of Kirtland Air Force Base (KAFB) Request for a Class 3 Modification for Resource Conservation and Recovery Act (RCRA) Closure Plans for the Former #NM9570024423-Open Burn (OB) and #NM9570024423-Open Detonations (OD) Units

Citizen Action submits the following <u>comments</u> and <u>requests a public hearing</u> for the Class 3 Modifications of two Closure Plans for the Open Burn (OB) and Open Detonation (OD) units at KAFB.

Class 3 modifications substantially alter the facility or its operation (40 CFR 270.42(c)(2)(iii)) and require public hearings in accord with NMAC 20.4.1.900 incorporating Title 40, Code of Federal Regulations (CFR) § 270.42(c)). (See, 40 CFR §§ 124.11-12 and 271.14).

Citizen Action and other public organizations and individuals have previously requested a public hearing for the lack of Closure and Post-Closure Plans for the KAFB OB/OD units as part of the RCRA Permit for KAFB. Citizen Action began requesting a public hearing for the OB/OD Closure Plans as recently as August 18, 2010. In February 2010, KAFB submitted its January 2010 Closure Plans for both the OB and OD units to NMED based on the 1994 OB/OD permits. On Jun 18, 2010 KAFB issued a Notice of the Modification Request for modification of the 1994 OB permit. Citizen Action and other public organizations filed comments and request for a public hearing. The comments were not posted and no public hearing was provided at that time.

On July 15, 2010, NMED issued its Final Order for approval of the April 16, 2007 RCRA Part B Draft Permit application. KAFB decided on August 13, 2010 subsequent to the July 15, 2010 Final Order to close the OD unit. The KAFB request for modification of the July 15, 2010 RCRA Permit requests approval for the OB and OD Closure Plans. The status of the requests and comments by members of the public and organizations made prior to this modification is unknown but should be included as part of this request for Closure Plan approval. <u>Citizen Action incorporates herein by reference all previous communications with the NMED and KAFB regarding any aspect of the KAFB RCRA</u> Part B Permit.

Post-Closure Plans are also required by RCRA regulations at 40 CFR 264.118 but have not been submitted for the EOD units.

STATEMENT OF ISSUES

Issue: Site studies of the EOD provide information that in some instances is contradictory. Existing information demonstrates that the EOD is poorly characterized for both

hydrogeology and the nature and extent of wastes that were disposed of at the EOD site. PR/VSI Preliminary Review/Visual Site Inspection conducted by the US Geological Survey (USGS) studies for the EOD Range were conducted 22 years ago and were limited in scope. USGS concluded that "the hydrology of the area is poorly characterized and may include shallow, unconfirmed alluvial aquifers or multiple confined bedrock aquifers. Depth to groundwater is estimated at 150 ft." (Emphasis supplied).

The data and references that were used to determine the number and locations of boreholes and groundwater monitoring wells must be appropriately set forth by KAFB. The data for characterizing KAFB as a whole has been poor as seen by the inability of KAFB to present the geology for the spill of jet fuel. The School House Mesa Well (See attached Figure 3), as the KAFB well that was used in relation to the EOD, is useless for characterizing the hydrogeology of the EOD. The Sandia National Laboratories' EOD HILL well (See attached Figure 1) is also an unreliable steel screen well for providing data. Data from both the SHMW and the EOD HILL well are unreliable for groundwater monitoring network decision making.

The Sandia National Laboratories' EOD Hill well raises the special issues of characterization of limestone and karst formations beneath the EOD. The limestone and karst formations beneath the EOD Range have not been investigated by KAFB. Karst represents a fast pathway for the travel of contamination to the groundwater in both a lateral and vertical direction. The Sandia National Laboratories' EOD Hill *Well Database Summary Sheet* (Attached Figure 1) states that the EOD Hill Well is located at the top of the hill west of the EOD Range and is completed in a limestone zone. The well Summary Sheet comment describes that the EOD Hill Well is:

"Open Hole 204 ft – Large Fractures Observed in Rock- Open Cavern? –Borehole Video Available"

The EOD site should be characterized for limestone with karst zones such as the open cavern that exist at this geomorphic setting. Limestone present at the EOD setting would be prone to form karst. The location of the EOD Hill well along with all wells including those of Sandia Labs should be provided on an updated Facility Location Map of KAFB. The last facility location map for KAFB is dated December 5, 2005.

The required investigatory exploration and groundwater monitoring for karst formations does not meet RCRA requirements and is wholly inadequate for present decisions regarding placement of the groundwater monitoring network. The first requirement would be for drilling exploratory boreholes to determine the nature of the geologic setting and the extent of features such as the karst zones beneath the EOD Range. The *RCRA Ground-Water Monitoring Technical Enforcement Guidance Document*, U.S. Environmental Protection Agency, PB 87-107751, September 1986, Figure 2-6 p. 65 provides the graphic representation for monitoring required in karst. (See attached Figure 2). The appropriate drilling methodology for limestone would be Air Rotary Under Reamer Casing Advanced or open hole air rotary depending on the strength and competence of the limestone layers.

The groundwater monitoring for the EOD in relation to other facilities has not been considered.

The Explosive Ordinance Disposal (EOD) Range is described as follows in the

Presentation of Proposed Appendix I Phase 2 RFI Work Plan and Long-Term Groundwater Monitoring Plan Site Descriptions (1996) (AR Document #992):

OT-29 - Explosives Ordnance Disposal (EOD) Range (SWMU 6-19)

"The EOD Range is located in the south-central region of Kirtland AFB, southeast of the MWSA and northeast of the Solar Thermal Test Site. The EOD range is a circular, unvegetated area of **38 acres located on a flat**, featureless surface that slopes slightly to the west. The range is an alluvial plain with no surface drainage crossings. The soil is mixed with an asphalt-like material serving as a defoliant. **This site lies east of the Hubble Springs Fault** (USGS, 1993).

Groundwater depth is estimated at 100 feet and the **water table slopes to the southwest** (USGS, 1993). **The hydraulic gradient is unknown.**

Operations at this site began in 1972 and continue today. The EOD Range has a radius of 2,500 feet, but most of that area is used as a buffer zone. The area is covered with conical-shaped detonation pits, averaging 20 feet across and eight to ten feet deep. The **pits are located as close to the center of the range as possible** in order to maximize the buffer zone. Normally, one detonation pit is operated at a time. Once a pit has been used once or twice, a new pit is dug.

The ordnance destroyed on the EOD Range includes magnesium flares, percussion grenades, ammunition boxes, firearms, explosive waste, confiscated narcotics, outdated and problematic gas cylinders, and chemical wastes. On the northeast edge of the range, there is a burn pit approximately 15 by 40 feet with a depth reaching eight feet (USGS, 1993). In the pit, small arms ammunition and spent flare casings are burned by igniting scrap wood drenched with kerosene (USGS, 1993)." (Emphasis supplied).

Issue: The KAFB Closure Plan does not meet the groundwater monitoring requirements of the July 15, 2010 RCRA Part B Permit (Permit). <u>The KAFB</u> <u>Closure Plan must comply with Section 3.6, 3.6.1 and 3.6.2 of the Permit that was</u> <u>approved on July 15, 2010 by NMED.</u> The proposed Closure Plans seek to narrowly limit the Permit requirements to compliance only with 264.97 (a)(2), (b) and (c) as provided for in 40 CFR 264.98. 40 CFR 264.98 contains a broader set of requirements than only those of 264.97(a)(2), (b) and (c). Open burning and detonation of hazardous waste was conducted at EOD for nearly 40 years without adequate characterization of wastes, groundwater flow rate and direction in the uppermost aquifer and without the installation of a contaminant groundwater monitoring network.

The EOD has two units that include the open detonation pits and the burn site. There should be two separate monitoring networks for studying these discrete locations that both have a long history of use.

Under the provisions of the Permit, KAFB must provide a <u>detection monitoring program</u> as required by 40 C.F.R. §§ 264.91(a)(4) and 264.98 for a detection monitoring system. The groundwater detection system is not limited to only the requirements of 264.97 (a)(2), (b) and (c) as KAFB describes the requirements. 40 CFR 264.98 also includes provisions for a <u>compliance monitoring program</u> where statistically significance evidence

of contamination has been detected. 40 CFR 264.98(f) and (g). Perchlorate contamination has been detected in the School House Mesa Well so as to require compliance monitoring for the EOD site. The Permit requires meeting the standards of 40 C.F.R. §§ 264.91 through 264.100 in lieu of 40 C.F.R. § 264.101 for purposes of detecting, characterizing, and responding to releases to the uppermost aquifer. The groundwater monitoring requirements of §§ 264.91 through 264.100 in lieu of 40 C.F.R. § 264.101 in lieu of 40 C.F.R. § 264.101 in lieu of 40 C.F.R.

Closure Plan Section 1.3 requires: "Installation of four groundwater monitoring wells at the EOD range (one upgradient and three downgradient wells) and eight consecutive quarters of groundwater sampling to determine the presence or absence of groundwater contamination;..."

Closure Plan Section 2.1.1 KAFB asserts at that "In addition, the wells installed at the EOD Range will meet the groundwater monitoring requirements of 40 C.F.R. 264.97(a)(2), (b), and (c)."

Issue: The use of "wells installed" in the plural is completely inaccurate to the present status at the EOD. No RCRA groundwater monitoring network that could detect contaminants at the EOD was installed at any time to the present to comply with the requirements of either 40 C.F.R. §§ 264.97(a)(2), (b), and (c) or 40 CFR 264.601 for the Open Burn and Open Detonation operations at the EOD. The July 15, 2010 RCRA Permit requires that a detection monitoring groundwater well network be conducted for the entire period of operations <u>including closure and post-closure</u>. The provision for post-closure groundwater monitoring has not been addressed by KAFB. KAFB is required to have a post-closure plan as a matter of law. 40 CFR 264.118.

Closure Plan Permit Section 3.6 states:

"3.6. GROUNDWATER MONITORING

The Open Burn Unit and Open Detonation Unit are subject to 40 C.F.R.§ 264.90(d) and the environmental performance standards of 40 C.F.R. § 264.601, which are incorporated herein. The Permittee shall comply with the requirements of 40 C.F.R. §§ 264.91 through 264.100 in lieu of 40 C.F.R. § 264.101 for purposes of detecting, characterizing, and responding to releases to the uppermost aquifer. Groundwater monitoring shall be conducted during the entire period of operations, including the period for closure, to ensure the protection of groundwater. Groundwater monitoring shall also be conducted during post-closure care, if post-closure care is required.

Because groundwater contaminants have not been detected at the Open Burn Unit and Open Detonation Unit in the past, the Permittee shall institute a detection monitoring program as required by 40 C.F.R. §§ 264.91(a)(4) and 264.98. The groundwater monitoring system may cover both the OB and OD Units."

Issue: Groundwater detection monitoring as described by the *RCRA Groundwater Monitoring Technical Enforcement Guidance Document*, September 1986 has not been previously conducted for the EOD units to determine if groundwater contamination is present. No reliable monitoring wells for contaminant detection were installed at the EOD. However, the defective Schoolhouse Mesa Well (SHMW) located to the north, approximately ³/₄ of a mile distant from the EOD has detected perchlorate contamination. (See Figure 1-1 Location of ER Site 20, Schoolhouse Mesa Burn Site http://www.sandia.gov/ltes/NFAs/Site0020.pdf). Although the SHMW area is being separately investigated, the SHMW has in the past been claimed as a downgradient monitoring well for the EOD. (See further discussion below of the SHMW). The finding of perchlorate contamination requires compliance monitoring for the two miscellaneous units under 40 CFR 264.99.

The geologic and hydrologic conditions of the Schoolhouse Mesa Well (SHMW) are basically unknown with no available lithologic log. The SHMW was also claimed as the groundwater monitoring well for Sandia National Laboratories Schoolhouse Mesa Burn Site Operable Unit 1334 which was approximately 100 ft south of the Schoolhouse Building. <u>http://www.sandia.gov/ltes/NFAs/Site0020.pdf</u> Sandia National Laboratories *Proposal for Administrative No Further Action Environmental Restoration Site 20, Schoolhouse Mesa Burn Site Operable Unit 1334* (August 1994) (p.1-2):

This inactive site is located on alluvial deposits correlated to the Tesajo-Millett stony sandy loams (IT May 1994), with permeabilities ranging from 0.6 to 20.0 inches per hour (USDA 1977). The geologic conditions at ER Site are expected to be similar to those measured at the Schoolhouse well (approximately 100 ft northwest of the site). A lithologic log for the School House Mesa Well is unavailable, but the well is thought to be completed in clastic rocks of the Sandia Formation. (IT May 1994). When the Schoolhouse well was video surveyed in 1990, the depth to groundwater was approximately 100 ft.

Issue: There is poor characterization of the EOD for groundwater monitoring purposes as described above:

"The EOD range is a circular, unvegetated **area of 38 acres** located on a **flat**, featureless surface that **slopes slightly to the west**. The range is an **alluvial plain with no surface drainage crossings**. The soil is mixed with an asphalt-like material serving as a defoliant. This site lies east of the Hubble Springs Fault (USGS, 1993). Groundwater depth is estimated at 100 feet and the water table slopes to the southwest (USGS, 1993). The hydraulic gradient is unknown."

Issue: The actual area used for Open Detonations is not accurately provided. The EOD area with a 2500 ft radius is in contradiction to the figure of 38 acres for the EOD. An area with a 2500 ft radius would give an area of operation for the EOD of approximately 450 acres.

Issue: What is the defoliant that was used and the potential for ground water contamination?

Issue: What is the nature and volume of the chemical waste disposed of at the EOD site from 1972 forward?

Issue: Eight consecutive quarters of groundwater sampling are insufficient particularly if a preliminary exploratory phase has not been accomplished to:

- characterize waste constituents that may have migrated through the soil,
- determine hydrologic and geologic characteristics of the EOD unit and the surrounding area,
- provide background wells in sufficient number to determine background water quality, and
- determine the quantity and direction of groundwater flow.

Issue: In detection monitoring, data on each hazardous constituent specified in the permit will be collected from background wells and wells at the compliance point(s). 40 CFR 264.98(d) and 264.97(g).

Issue: The KAFB proposal for only four groundwater monitoring wells at the large 38 acre EOD site is too sparse to meet the determinations and minimal requirements of 264.97(a)(2), (b), and (c). The installation of the four groundwater monitoring wells must satisfy 264.97(a)(2) to **"Represent the quality of ground water passing the point of compliance."**

1. The large 38 acre area of the EOD unit may require more than four groundwater monitoring wells.

2. The full EOD has not been characterized to know the direction of the flow of groundwater at the water table and in the uppermost aquifer. There may be two physically separate zones of saturation as exists for the Sandia National Laboratories' Mixed Waste Landfill. Karst is present but not fully mapped. The basic hydrology of the site has not been characterized. For the early detection of contamination there must be monitoring at the water table.

3. The EOD has not been characterized to know how many wells are necessary to monitor the uppermost aquifer and any perched zones that may exist and where the monitoring wells should be placed.

4. "The hydraulic gradient [of the EOD] is unknown." The hydraulic gradient of the EOD must be first determined.

5. The location, direction and flow of the "uppermost aquifer" as defined by RCRA must be located. The definitions at 40 CFR 260.10 provide the following:

"Aquifer means a geologic formation, group of formations, or part of a formation capable of yielding a significant amount of ground water to wells or springs."

"Uppermost aquifer means the geologic formation nearest the natural ground surface that is an aquifer, as well as lower aquifers that are hydraulically interconnected with this aquifer within the facility's property boundary."

Issues: The location of the uppermost aquifer and any perched zones of saturation and karst formations that may exist have not been determined for the EOD. The hydraulic gradient is unknown at the EOD. The actual direction and gradient of flow of groundwater at the water table and also at the uppermost aquifer must be determined. The uppermost aquifer may be a different zone with separate properties from the zone at the water table as is the hydrogeologic setting at the Mixed Waste Landfill. **Issue:** The location of earthquake faults in proximity to the EOD has not been adequately characterized.

Issue: Groundwater monitoring described by 40 CFR 264.601(a)(1)-(9) and (b)(1)-(11) is not provided for by the Closure Plans previous to determining the necessary number of monitoring wells. 40 CFR 264.601(b) describes that <u>monitoring of the uppermost aquifer at the compliance point</u> must be performed:

264.601(b) If a facility contains more than one regulated unit, separate ground-water monitoring systems are not required for each regulated unit provided that provisions for sampling the ground water in the **uppermost aquifer** will enable detection and measurement at the **compliance point** of hazardous constituents from the regulated units that have entered the ground water in the uppermost aquifer. (Emphasis supplied).

Issue: The investigation of the following factors must provided for the Closure Plan to accomplish the environmental performance standards of 40 CFR 264.601(a)(1)-(9) and (b)(1)-(11). The Closure Plan must set forth how the factors will be accomplished *before determination is made for the number and placement of groundwater monitoring wells* that may be necessary to monitor the uppermost aquifer.

Especially important to meet the environmental performance standards are 264.601(a): (1) The volume and physical and chemical characteristics of the waste in the unit, including its potential for migration through soil, liners, or other containing structures;

(2) The hydrologic and geologic characteristics of the unit and the surrounding area;

(3) The existing quality of ground water, including other sources of

contamination and their cumulative impact on the ground water;

(4) The quantity and direction of ground-water flow;

Especially important to prevent adverse releases is knowledge for the factors of 264.601(b):

(b) Prevention of any releases that may have adverse effects on human health or the environment due to migration of waste constituents in surface water, or wetlands or on the soil surface considering:

(1) The volume and physical and chemical characteristics of the waste in the unit;

(2) The effectiveness and reliability of containing, confining, and collecting systems and structures in preventing migration;

(3) The hydrologic characteristics of the unit and the surrounding area, including the topography of the land around the unit;

(4) The patterns of precipitation in the region;

(5) The quantity, quality, and direction of ground-water flow;

(6) The proximity of the unit to surface waters;

(7) The current and potential uses of nearby surface waters and any

water quality standards established for those surface waters;

(8) The existing quality of surface waters and surface soils, including other sources of contamination and their cumulative impact on surface waters and surface soils;

(9) The patterns of land use in the region;

(10) The potential for health risks caused by human exposure to waste constituents; and

(11) The potential for damage to domestic animals, wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents.

Issues: Perched zones must be investigated along with the physical setting at the water table for the regional zone of saturation, whether there is contamination in the perched zones and in the regional zones of saturation beneath the entire site, not just at the boundaries of the site which is too large to be limited to only the boundaries.

264.601(c) provides further:

(c) All monitoring wells must be cased in a manner that maintains the integrity of the monitoring-well bore hole. This casing must be screened or perforated and packed with gravel or sand, where necessary, to enable collection of ground-water samples. The annular space (i.e., the space between the bore hole and well casing) above the sampling depth must be sealed to prevent contamination of samples and the ground water.

Issue: For consistency, NMED should impose the standards for groundwater monitoring at KAFB that are contained in Sections VIII through IX of the April 29, 2004 Compliance Order on Consent for Sandia National Laboratories.

Issue: No monitoring well is installed at the EOD site that meets the casing requirement. See discussion below for the School House Mesa Well.

Issue: Hollow stem auger drilling with continuous core sampling with a wire line retrieval system for taking the core barrel in and out of the lead auger is the drilling method that should be used. This provides continuous core while drilling and also forms the borehole for installing the well. This is also the most affordable drilling method. This method will also avoid damage to the fine-grained alluvial sediments if they are present and the sealing of the fine-grained alluvial strata as compared to the air rotary casing hammer (ARCH) method.

Issue: Well screens must be no longer than the EPA recommended length of 10 ft.

Issue: Care must be taken during drilling operations to accurately identify the water table.

Issue: Organic drilling fluids and Bentonite clay must not be used in drilling the boreholes.

Issue: Stainless steel well casing and screens must not be used because of corrosion that can hide knowledge of contamination.

Specific Permit Sections

1. **1.10 Survey Plat and Post-Closure Requirements** "In the event that closure performance standards cannot be achieved for the OB Unit, a postclosure plan will be submitted to the Department for review and approval."

Issue: A post-closure plan for the Open Burn/Open Detonation Units must be provided now to discuss contingencies if the OB/OD units cannot be clean closed.

Issue: "The owner or operator of a hazardous waste disposal unit must have a written post-closure plan." CFR 264.118. The plan must be submitted with the permit application, in accordance with 270.14(b), and approved by the Secretary as part of the permit issuance procedures under part 124. In accordance with 270.32 the approved post closure plan will become a condition of any RCRA permit issued.

2. 1.4 Maximum Extent of Operations and Maximum Waste Inventory

Issue: The OB and OD Closure Plans do not provide for protection of the public and environment as required by 40 CFR 264.111. The Closure Plans *do not contain* an estimate of *the maximum inventory of hazardous waste ever on site during the facility's active life* since operations began in 1972. There is *no description of steps such as groundwater monitoring or leachate collection* that may be necessary to comply with the closure standards. Section 3 of the Closure Plans is *silent as to how compliance will be made for management of waste* in accord with 264.112.

40 CFR 264.112(b)(3) provides:

"The content of the Closure Plans must include (3) An estimate of the maximum inventory of hazardous wastes ever on-site over the active life of the facility and a detailed description of the methods to be used during partial closures and final closure, including, but not limited to, methods for removing, transporting, treating, storing, or disposing of all hazardous wastes, and identification of the type(s) of the off-site hazardous waste management units to be used, if applicable;"

3. "For perchlorate, Kirtland AFB will apply the Office of the Under Secretary of Defense *Perchlorate Release Management Policy*, 22 April 2009."

Issue: Proposed or adopted US EPA, NMED or Water Quality Control Commission standards for Perchlorate contamination should be met, whichever standard is more conservative. The standards should be set forth rather than merely referring to the Department of Defense document *Perchlorate Release Management Policy*.

4. "An alternative demonstration of decontamination may be proposed and justified at the time of final closure of the OB Unit, as circumstances indicate. The Secretary of

the NMED will evaluate the proposed alternative in accordance with standards and guidance then in effect and, if approved incorporate the alternative into the Closure Plan."

Issue: Any alternatives that are to be provided for the Closure Plans must be previously set forth by the NMED Secretary and presented to the public for review and comment prior to adoption of this Closure Plan.

5. 2.2.1 Installation of New Monitoring Wells

"The OB Unit is subject to the environmental performance standards of 40 C.F.R. § 264.601. As such, groundwater monitoring will be conducted as part of closure activities to demonstrate that operations have not impacted groundwater. Four monitoring wells, one upgradient and three downgradient of the EOD Range, will be installed. The location of the proposed monitoring wells is presented in Figure 2-1. These proposed monitoring wells are the same wells as those proposed in the closure plan for the collocated OD Unit."

"Kirtland will submit a work plan which will include a monitoring well installation plan in accordance with the schedule in Table 1-1. At a minimum, the discussion pertaining to the installation of four monitoring wells at the EOD Range will address:

- □ Well locations,
- □ Drilling specifications,
- \Box Well construction specifications,
- □ Well development procedures,
- □ A schedule for implementation and completion of the well installations; and
- □ Preparation and submittal of a well completion report.

"In addition, the wells installed at the EOD Range will meet the groundwater monitoring requirements of 40 C.F.R. §§ 264.97(a)(2), (b), and (c). Within 30 days of completion of well installation, Kirtland AFB will submit a well completion report to NMED for approval. Groundwater monitoring wells will be properly plugged and abandoned in accordance with all regulations and NMED guidance, provided groundwater contamination has not occurred. If groundwater contamination has occurred, these monitoring wells will be maintained for the purpose of implementing corrective action. Wells will not be plugged and abandoned until NMED has approved clean closure of the OD unit and the collocated OB unit."

Issue: Figure 2-1 has not been provided in the Closure Plan. The necessary exploratory steps to determine the number and location of groundwater monitoring wells for the uppermost aquifer at the EOD site must first be accomplished.

Issues: Groundwater contamination (perchlorate) is present at SHMW.

Issue: 40 CFR 270.42 Appendix I C Groundwater monitoring requires that NMED present the plans for groundwater monitoring to the public for review and comment previous to approval.

The public is entitled to review and comment on any proposed detection or compliance monitoring well installation plan under the requirements 40 CFR 270.42 Appendix I, Classification of Permit Modification, C. 1-8. Groundwater Monitoring. The SHMW was used as a contaminant detection well for the EOD. The defective SHMW has been used for this purpose in monitoring reports submitted to the NMED. The groundwater samples from the SHMW are contaminated with Perchlorate as described in a letter of concern dated November 26, 2008 from NMED Secretary Ron Curry to the EPA Administrator:

"At Kirtland Air Force Base, data collected in 2006 showed perchlorate levels in monitoring well KAFB-2622 at 8.4 μ g/L, and in monitoring well KAFB-2624 at 11.0 μ g/L. Data collected in 2008 showed perchlorate in the "School House Mesa Well" at 5.19 μ g/L. Yet very little groundwater monitoring data has been obtained for perchlorate at Kirtland."

The fact that perchlorate is detected in the monitoring well used for the two EOD units now requires the implementation of a compliance monitoring program at the EOD units because the perchlorate is statistically significant evidence of contamination. The implementation of compliance monitoring is a Class 3 permit modification as per 40 CFR 270.42 Appendix I C.7.a.- Compliance monitoring program. The implementation of Compliance Monitoring under 40 CFR 264.99 is required based on the detection of perchlorate contamination in the assigned downgradient monitoring well, the School House Mesa Well. The defective monitoring well may be masking higher levels of Perchlorate and other contamination than what is measured in the water produced from the well. (Citizen Action October 6, 2009 letter to NMED Secretary Curry).

6. 2.2.2 Mesa Schoolhouse Well

The Mesa Schoolhouse Well, a Department of Energy/National Nuclear Surety Administration (DOE/NNSA) well authorized under Kirtland AFB permit #PERM/0-K1-91-0010 is currently being monitored for groundwater contamination as part of the July 1995 OB Unit's sampling and analysis plan. Once the new proposed monitoring wells are installed and operational, sampling will discontinue at the Mesa Schoolhouse Well.

Issue: KAFB does not have an adequate groundwater monitoring well network to determine the hydrological characteristics of KAFB as a whole or for the individual hazardous waste disposal units, Solid Waste Management Units, Areas of Concern, and Regulated Units. No sampling and analysis plan has been in effect at the EOD.

The Schoolhouse Mesa well. *Groundwater monitoring is required by RCRA for Closure and Post-Closure Plans.* Yet, there is only one former supply well, known as the School House Mesa Well that is nearly a century old and cannot furnish reliable and representative water samples. As Citizen Action provided to you in our letter of October 6, 2009, (incorporated herein by reference) there is no reliable and representative groundwater monitoring being conducted at the Explosive Ordinance Depot range that meets the requirements of any portion of 40 CFR 264.91-.100 or 40 CFR 264.601. Nevertheless, groundwater monitoring that has been performed at the School House Mesa Well indicates statistically significant evidence of perchlorate levels that require **compliance monitoring** to be implemented at the OB and OD site. (40 CFR 264.98(g)). The School House Mesa Well (SHMW), constructed in the early 1900s as a *supply well*, does not meet the requirements for reliable monitoring although the well monitoring data is currently being offered as such by KAFB and accepted by NMED.

• The SHMW is claimed by KAFB to be an <u>upgradient</u> monitoring well. The topography for the regional landscape predicts that the groundwater flow is to the west. The SHMW is thus at a northern location that is <u>cross gradient</u> to the flow of the

groundwater and is in the wrong location to serve as an upgradient well. Maps for the School House Mesa Well do not give the indication for groundwater flow direction. The direction of flow of groundwater may not have been adequately investigated.

- The SHMW does not meet requirements as a contaminant detection monitoring well for the EOD, although NMED has improperly accepted the water quality data for that purpose.
- The School House Mesa Well (SHMW) is nearly 3/4 of a mile to the north of the EOD range is cross-gradient to the westward direction of groundwater travel, and is not at the Point of Compliance for the EOD. (40 CFR 264.95).
- The NMED has made a mistake to accept the SHMW as a monitoring well and any data from it for the EOD Range.
- The SHMW does show perchlorate contamination and this requires the immediate installation of a reliable monitoring well at the location of the SHMW. The SHMW is required to be plugged and abandoned.
- The June 2007 written sampling report for the SHMW cites turbidity as 5 (five) times higher than the EPA Drinking Water Standard. The high turbidity ranges presented in many other sampling events prevent reliable and representative sampling by the SHMW well. The quality control program requires accurate sampling be collected which cannot be accomplished given the age, location and turbidity levels of the SHMW.
- The June 2007 sampling reports that iron was nearly 8 (eight) times above the EPA Drinking Water Standard. High iron values possibly indicate corrosion of the well screen, a plume of contaminants or, a compromised well chemistry within the sampling zone of the well. Turbidity may be adding to the high iron values.
- Perchlorate would be an expected contaminant at the EOD where explosives and tens of thousands of rocket motors from Sandia National Laboratories have been openly burned or detonated. Perchlorate is a known contaminant from munitions and rocket motors. The finding of statistically significant evidence of perchlorate contamination in the SHMW as the monitoring well for the EOD requires detection monitoring and compliance monitoring for groundwater at the EOD.

7. 2.3.2 Liquid Sampling

"Groundwater samples will be collected from four newly installed groundwater monitoring wells at the EOD range. Eight consecutive quarters of groundwater monitoring will be conducted initially, following installation of the wells. Groundwater samples will be obtained using methods approved by the NMED within eight hours of the completion of well purging. The samples will be analyzed for the parameters listed in Tables 2-1, 2-2 and 2-3, which include all of hazardous constituents of the hazardous wastes that were treated at the OB Unit.

"Groundwater in monitoring wells with low recharge rates and that purge dry shall be sampled when the water level in the well has recovered sufficiently to collect the required samples. A low-flow bladder pump will be utilized. Groundwater samples intended for metals analysis will be submitted to the laboratory for analyses of total metals; the samples will not be filtered in the field or laboratory.

"Glass tubes will be used to sample liquids. The primary advantage to using this type of sampling device is that the tube can be disposed of after each sample is collected, thus eliminating cross contamination. Alternatively, a Coliwasa sampler may be used to sample liquids."

Issue: 40 CFR 264.601. KAFB has not conducted sufficient characterization of the hydrologic and geologic characteristics of the unit and the surrounding area.

Issue: The sampling method of purge to dry must not be used. It is contrary to standard industry practices. Low flow valves can be installed on Bennett pumps.

Issue: Both filtered and unfiltered samples must be taken.

8. 3.1 Waste Management

Issue: The Closure Plan must set forth methods for removing, transporting, treating, storing, or disposing of all hazardous wastes, and identification of the type(s) of the off-site hazardous waste management units to be used. 40 CFR 264.112(b)(3).

9. 3.2 Waste Characterization

Characterization of the liquid waste and excavated soil generated during the closure of the OB Unit will be based upon the results of sampling and analysis.

Issue: Characterization is also to be based on the estimate of the maximum inventory of hazardous waste ever on site during the facility's active life.

10. 3.3 Waste Disposal

All wastes from closure activities determined to be hazardous will be managed in accordance with the Hazardous Waste Management Regulations from the time of generation. Hazardous wastes will be shipped off-site for treatment and disposal at a permitted RCRA facility.

Issue: Describe available RCRA off-site treatment and disposal locations.

Issue: If the surface is flat without drainage patterns, the precipitation is flowing directly to the groundwater from the ground surface.

Q: Are there areas across the EOD site where explosive operations were concentrated. Are there areas where few or no operations were performed?

Recommendations

Put in four wells at the boundary of the site for perched zones, flow direction, and flow rate. Then put a few wells on the site near where there were concentrations of explosions along with wells down gradient from those where there no operations. The hydraulic properties of the wells should be measured to know if they are located in the uppermost aquifer.

A phased approach could be used. Gain information about flow system at the water table. If there is no contamination across the large site and the strata at the water table are relatively permeable, that would probably be sufficient. However, if the strata are fine-grained, then there would still need to be characterization in what would be the productive zone. The site needs basic characterization in anticipation of a long term monitoring. How much characterization is necessary is according to whether there is contamination to groundwater. That will require wells within the boundaries of the 38 acre site. The wells inside the site should be installed close to regions of high number of explosive operations but within "clean" zones.

In addition to the RCRA regulations contained in 40 CFR 264, KAFB must be in compliance with the New Mexico Water Quality Commission (WQC) regulations for protection of all groundwater across the 38 acre site. The WQC regulations present the requirement for groundwater monitoring across the EOD site because the regulations do not limit protection to only the compliance point. Under the WQC regulations at NMAC 20.6.2 DEFINITIONS:

"ground water" means interstitial water which occurs in saturated earth material and which is capable of entering a well in sufficient amounts to be utilized as a water supply;"

The purpose of the WQC regulations in pertinent part "is to protect all ground water of the state of New Mexico which has an existing concentration of 10,000 mg/l or less TDS, for present and potential future use as domestic and agricultural water supply ..."

NMAC 20.6.2.3101 PURPOSE:

A. The purpose of Sections 20.6.2.3000 through 20.6.2.3114 NMAC controlling discharges onto or below the surface of the ground is to protect all ground water of the state of New Mexico which has an existing concentration of 10,000 mg/l or less TDS, for present and potential future use as domestic and agricultural water supply, and to protect those segments of surface waters which are gaining because of ground water inflow, for uses designated in the New Mexico Water Quality Standards. Sections 20.6.2.3000 through 20.6.2.3114 NMAC are written so that in general:

(1) if the existing concentration of any water contaminant in ground water is in conformance with the standard of 20.6.2.3103 NMAC, degradation of the ground water up to the limit of the standard will be allowed; and

(2) if the existing concentration of any water contaminant in ground water exceeds the standard of Section 20.6.2.3103 NMAC, no degradation of the ground water beyond the existing concentration will be allowed.

B. Ground water standards are numbers that represent the pH range and maximum concentrations of water contaminants in the ground water which still allow for the present and future use of ground water resources.

C. The standards are not intended as maximum ranges and concentrations for use, and nothing herein contained shall be construed as limiting the use of waters containing higher ranges and concentrations.

[2-18-77; 20.6.2.3101 NMAC - Rn, 20 NMAC 6.2.III.3101, 1-15-01]

Issue: KAFB must present whether groundwater at the EOD site is suitable for present and potential future use as domestic and agricultural water supply. Discharges would be from the explosions and open burning that occurred at the EOD. Leachate from precipitation would be present at the EOD site where no liners or leachate collection system were used.

Issue: EOD Tables must take into consideration that the US Environmental Protection Agency is developing stricter regulations for four chemical compounds: tetrachloroethylene, trichloroethylene (Tables 2-2; 2-4), acrylamide and epichlorohydrin. All four compounds can cause cancer. Trichloroethylene is proposed for reduction by a magnitude of 10 from the standards currently cited in Tables 2-2 and 2-4. The new rules will issue next year. KAFB must identify the dumping or contamination of Trichloroethylene at the EOD site. <u>http://edocket.access.gpo.gov/2010/pdf/2010-6624.pdf</u>

US EPA is also developing standards for perchlorate in drinking water. NMED currently has standards. KAFB must consider the both the EPA, NMED and WQCC standards for screening and drinking water contamination.

EOD Tables list 2,4- Dinitrotoluene (2,4-DNT) [Tables 2-2, 2-3 and 2-6] and 2,6-Dinitrotoluene (2,6-DNT) [Tables 2-2, 2-3 and 2-6].

Issue: The exceedance for uranium and gross alpha at EOD have not been investigated by KAFB. Appendix E Final Complex Transformation SPEIS Additional Project Details October 2008 at p. E-10 and E-11

(<u>http://www.complextransformationspeis.com/Appendix%20E_Final.pdf</u>) reports that Uranium was detected above the EPA Maximum Contaminant Level at the EOD:

"Exceedances for uranium and corrected gross alpha were detected above the recently established MCL at EOD Hill (SNL/NM 2007). Corrected gross alpha accounts for natural uranium levels in the surrounding environment."

The statements do not provide adequate knowledge of the groundwater contamination that may exist at the EOD from anthropogenic sources. There needs to be accurate knowledge of contamination even if from natural sources that may be a danger to public health and what the contribution of anthropogenic sources may be. Gross alpha should not be used as to whether a chemical is a contaminant of concern (COC). When gross alpha is above the MCL that requires the need for accurate analysis for each COC that can contribute to gross alpha.

Appendix E at Table E.4-1—ER Project Groundwater Monitoring Results from Calendar Year 2006 reports <u>exceedance for TCE</u>. KAFB should identify 1). which of these exceedances are due to KAFB activities and 2). whether any of these TCE exceedances are detected from EOD operations:

Table E.4-1

Trichloroethene (TCE) MCL = 5 μ g/L 15.3 μ g/L November/December 2005 15.8 μ g/L January/February/March 2006 14.9 μ g/L May 2006 12.9 μ g/L August/ September 2006 5.37 μ g/L May 2006 5.81 μ g/L (dup) November/December 2005 6.34 μ g/L August/September 2006 5.07 μ g/L October/ November 2005 7.61 μ g/L October/ November 2005 7.85 μ g/L January/ February 2006 6.73 μ g/L April/ May 2006 7.87 μ g/L July/August 2006 The KAFB RCRA CA [Corrective Action] Quarterly Report (stamped 1494 001) (January 31, 2002) <u>https://kirtlandafb.tlisolutions.net/PDFS/14/1494.PDF</u> lists EOD Corrective Action units. KAFB should explain what was disposed of in Corrective Action Unit numbers 6-19 OT-029 EOD Range. KAFB should provide information as to whether the EOD Range OT-029 continued to carry out any of the operations that were formerly at the DP-101 Old EOD Disposal Pits. KAFB must identify the RCRA listed wastes such as chemicals, metals, etc. disposed of at the Old EOD Disposal Pits that may have been also disposed of at the EOD.

An alternate site name of the Old Burn Pit is identified as an alias name for the EOD. KAFB should describe if the Old Burn Pit had any operational differences from the Open Burn unit described by the Closure Plan. Other Aliases that may have differed in operation should be described for the nature and extent of the wastes disposed of at each location.

Source: https://kirtlandafb.tlisolutions.net/PDFS/27/2735.PDF "KIRTLAND AIR FORCE BASE Environmental Restoration Program Draft ERP [Environmental Restoration Program] Site-Specific Summaries February 2005 (Administrative Record # 2735)

"3.1.8 SWMU 6-19, EOD Range (OT-029) OT-029 ERP ID SWMU 6-19, EOD Range (OT-029) <u>Alias Comment</u> SWMU 6-19 Hazardous Waste Permit Site 8 USGS ID Old Burn Pit Alternate site name OT-029 ERP ID EOD Subpart X Open HWMU ID (Hazardous Waste Burn (OB) Treatment Permit) Unit

"SWMU 6-19, EOD Range (OT-029), is located at the northeast edge of the EOD Range in the southeastern region of Kirtland AFB, southeast of the MWSA and north of the SOR (Figure 3-1-8). OT-029 was an old burn pit approximately 15 ft x 40 ft with a depth reaching 8 ft. In the pit, small arms ammunition and spent flare casings were burned by igniting scrap wood that had been drenched with kerosene.

"Operations at the EOD Range began in 1972 and are currently ongoing. The EOD Range has a radius of 2,500 ft, but most of that area is used as a buffer zone. The area is covered with detonation pits that are conical in shape and average 20 ft across and 8 to 10 ft deep. The pits are located as close to the center of the range as possible in order to maximize the buffer zone. Normally, one detonation pit was operated at a time. Once a pit was used once or twice, a new pit was dug. The ordnance material destroyed in the EOD Range has included magnesium flares, percussion grenades, ammunition boxes, firearms, explosive waste, confiscated narcotics and weapons, and outdated and problematic gas cylinders. The detonation pit area, or EOD Subpart X Open Detonation (OD) Treatment Unit, is regulated as an operating hazardous waste management unit under permit NM957002423-OD. A closure plan will be implemented upon completion of activities at the detonation pits.

"In 1996, a new bunker and thermal treatment unit (burn pit) were constructed at the EOD Range. The new burn pit was constructed approximately 20 fl from OT-029. During the construction of the new burn pit, contaminated soil was stabilized and removed from OT-029, which was then filled with clean soil.

"The new burn pit, or EOD Subpart X Open Burn (OB) Treatment Unit, is regulated as an operating hazardous waste management unit under permit NM9570024423-OB. A closure plan will be implemented upon completion of activities at the new burn pit.

"Positioned in Hydrogeologic Region 3, the hydrology of the area is poorly characterized and may include shallow, unconfirmed alluvial aquifers or multiple confined bedrock aquifers. Depth to groundwater is estimated at 150 ft.

"3.1.8.2 Investigation Summary

PR/VSI (1988) [Preliminary Review/Visual Site Inspection] A PR/VSI was conducted at this site in April 1988. This investigation was conducted as part of the process for approving the Hazardous Waste Permit application for Kirtland AFB. The investigation included a review of available data and a visual inspection of the site. The investigation found that an RFI was warranted at 0T-029.

"Phase II, Stage 2 RI (1988-1990) The USGS collected soil samples from two soil borings power-augered to a depth of 25 ft bgs and a sample of ash from the burn pit. No contaminants were detected in the soil. The ash contained copper, zinc, and chromium above background levels.

"Phase II, Stage 2A RFI (1991-1993) Two soil samples were collected from one hand-auger location. TRPH [Total Recoverable Petroleum Hydrocarbon] contamination was detected at high levels (11,400 and 6,530 mg/kg at depths of 1 and 4 ft, respectively).

"RRE Study (1995)

A relative risk evaluation study was conducted in 1995. The study focused on the type, level, and location of contaminants, migration pathways, and potential for exposure to contaminants by humans and/or ecological receptors. The sites received high, medium or low relative risk rankings. OT-029 was ranked as a medium relative risk site. Based on the results of the ranking study, this site was reassigned from Appendix I to Appendix II of the Hazardous Waste Permit. Nature and Extent of Contamination

"Elevated concentrations of TRPH [Total Recoverable Petroleum Hydrocarbons] were detected at depths up to 4 ft bgs during the RFI. Impacted soils were then stabilized and removed from the site in 1996.

Source: http://www.nmenv.state.nm.us/hwb/kafb/KAFB_NFA_Fact_Sheet-Statement_of_Basis_(4-11-2007).pdf

"Additionally, Kirtland AFB is requesting that NMED administratively remove the Active Explosive Ordnance Disposal (EOD) Range (OT-29) from Table A and place it on Table B as a "SWMU not requiring corrective action at this time". Site OT-29 is the active Base EOD range and is regulated under Subpart X of the Kirtland AFB RCRA permit. A Statement of Basis for this administrative action is not provided for OT-29."

Issue: The above investigations were too limited in scope and sampling to make any risk assessment or determination. The studies did not include groundwater monitoring and state that the "hydrology of the area is poorly characterized.".

Respectfully submitted,

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FIGURE 1

		W	ELL DAT	ABASE SU	MMAF	RY SHEET	•			
Project Name:	EOD HILL			Geo Location:		TOP OF HILL V	V OF EOD RANG	E		
ER ADS #:	NA			Well Completion	Date:					
Mell Name:	EOD			Completion Zon	e:	LIMESTONE				
r Name:	SNL			Formation of Co	mpletion:	PALEOZOIC				
Date Drilling Started	:			Well Comments						
Drilling Contractor:				weil Comment:	OPEN HO	VERN? - BOREF	HOLE VIDEO AVA	AILABLE	DINROC	ЈК -
Drilling Method:										
Borehole Depth:	217				WATER L		ED ON 12-17-90 \	VATER L	EVEL	
Casing Depth:	204				IS PROTI	ECTIVE CASING	i			
Survey Data					_	Comple	etion Data Measu	red Depth	s	
Survey Date:	01-JAN-1993	2					(FBGS)			
Surveyed By:						Casing Stie	ckup:			
						Interval	S	art	Stor	、
State Plane 0	Coordinates				CASI	NG		с. С)'	2041
(X) Easting:	426599.27				STEE	L	I.D.	6"		
(Y) Northing:	1448039.9									
						Interval	S	art	Stop)
Surveyed Elevati	ons (FAMSL)				BORE	EHOLE		C	ľ	217'
Protective Casing:		5829.61								
Top of Inper Well C	esina:	5927.02			SCRE	EN	SI	art 204	Stop '	217'
, of the weat of	panig.	5627.05								
Concrete Pad:										
Ground Surface:		5826.03								
Calculated Depths	and Elevations									
Initial Water Eleva (FAMSL)	tion:	5684								
Initial Depth To W (FBGS)	ater:	145.61								
Last measured wa asured on 25	ater level was 5-SEP-1997		FASL							
Date Updated:		Date Printed:								
14-MAR-00		12-JAN-2004								

FIGURE 2

Monitoring Well Placement and Screen Lengths in A Karst Geologic Setting







Figure 3

roject Name: OLD S	CHOOL HOUSE		Geo Location:	SW OF COYOTE SPE	RC OFF DEMO	LRD		
R ADS #: 1334			Weil Completion Date:					
School School	House Well		Completion Zone:	GRANITE				
/ Name: SNL			Formation of Completion:	PALEOZOIC SANDIA	FORMATION			
Pate Drilling Started:			Well Comment: Outstan	U & CROWA 183 TO 107	LET WOTER			
milling Contractor:			MEASUR	ED ON 12/17/90				
Prilling Method:			20221102		000000000000	-	Secon	
Borehole Depth: 109 8			CASING	VAULT-WE MEASURED	VENT POINT I	S PROT	ECTIV	
Casing Depth: 109.8								
Nurvey fints				Contalation Fr	in Measured f	Halfie		
Survey Date: 01-JAN	1982				((HGS)			
Surveyed By:		8		Cesing Stickup:	1.82			
State Plane Coordinates				lmervai Ewol E	Start	x	Stop	
VI Etuble: 431771 /	18			ENVER .		0.		191
Y) Northing: 1451215	82							
and the second sec				Interval	Start		Stop	
Surveyed Elevations (FAMISL			CAS	NG	2000 C	0.	1000	109
AND DESCRIPTION OF A			STEL	Ð.	1.D.	6.		
Protective Casing:	5794.41			1000000	37120.007 H			
of Inner Well Casing:	5753.66		SCR	interval EEN	Start	83'	Stop	103
Concrete Pad:	5791.84							
Fround Surface:	5796.3							
-); }							
Calculated Depths and Elward Initial Water Elevation: (FAMSL)	912 5093.85							
Initial Depth To Water: (FBGS)	95.70							
Last measured water level wa saured on 23-3EP-1897		FASL						
Date Updated:	Date Printed:							
14-MAR-00	12-JAN-2004							