Albuquerque's "Gulf Coast" Accident
Water, Water Everywhere, but Not a Drop to Drink

An Albuquerque Journal article (3/24/11) about the Kirtland Air Force Base 8,000,000 gallon fuel spill ends by saying that $50 million has been allocated for the "cleanup" effort. The 78 "test" wells included in this cost are not really part of the cleanup plan. Rather, the test wells are to measure the extent of contamination.

Unfortunately, one of the contaminants of aviation fuel used at Kirtland is an exceptionally toxic carcinogen called ethylene dibromide (EDB). EDB is dangerous at extremely small levels (part per trillion) that may be below the limits for detection. EDB has been used in aviation gas since 1925. According to Kirtland, the fuel leak could have begun in the 1960s. As a result, EDB is in the groundwater in amounts that can contaminate and destroy drinking water wells that serve thousands of Albuquerque and military residents.

The EDB and other contaminants are moving northeast toward Albuquerque's municipal drinking wells. Spill contaminants recently showed up in a "sentinel well" at Kathryn Ave. that is over a 1000 ft farther from the prior estimated extent of the fuel spill and closer to municipal wells. This means that the horizontal extent of the plume of contamination is still unknown.

The latest round of well testing in 2010 showed EDB also is in wells that did not have prior detections, including concentrations in wells KAFB-1064, KAFB-10616, and KAFB-3411 that exceeded the EPA's Maximum Contaminant Level for drinking water.[1] The Water Utility Authority has cut well production at Burton and Ridgecrest wells by nearly half, possibly indicating apprehension about suction of the contamination to the wells.

Kirtland took no action for decades to replace its leaking pipes even though the Air Force knew at the time that such leaks were commonplace. The jet fuel plume was discovered in 1999 by a New Mexico Environment Department (NMED) hydrologist in the groundwater bureau that stated the spill was "significant."[2] But neither Kirtland nor NMED moved to make further investigation until 2007.

The public has not been informed by Kirtland or NMED of the extent and dangers of EDB contamination. Ethylene dibromide (EDB) is present in the groundwater in addition to benzene, toluene, ethylbenzene, and xylenes. Unlike the other gasoline contaminants that tend to float on top of the aquifer, once EDB reaches ground water it mixes, is highly mobile and can travel separately from the original spill to where it may not be detected. The hazard associated with EDB can persist indefinitely. The Agency for Toxic Substances and Disease Registry characterizes EDB breakdown in ground water as "hardly at all."[3]

Cancer causing EDB in drinking water can be present in small amounts (parts per trillion) that cannot be detected by testing methods used by the Albuquerque Water Utility Authority. Nevertheless, although below detection limits, the presence of such small amounts of EDB still pose a risk to health and safety. The Environmental Protection Agency views EDB as being so toxic that it set the goal for allowable drinking water contamination at *zero*.[4]

A 2010 report by CH2MHill specifies that "EDB has migrated over greater distances than other potential contaminants of concern." CH2MHill found that "Flow

paths do exist from the Kirtland BFF plume toward production wells Ridgecrest 5 and KAFB-3." Flow paths from the plume to the Burton 5 well are hypothesized due to the large volume of water withdrawn by the Burton well field." As of September 2010 "Existing [monitoring] wells are not available to evaluate the depth of EDB contamination."[5]

Ridgecrest and Burton neighborhoods both have 5 wells each. EDB-contaminated groundwater can enter these shallow and poorly constructed wells in the southeast of Albuquerque. The Ridgecrest 5 well screen begins at a depth of 650 ft and the Burton 5 well at 550 ft. The wells are constructed so that nothing seals off groundwater entering the wells from above those depths. The Veteran's Administration Hospital well screen starts at 590 ft and the nearest Kirtland well starts at 452 ft.

Of new concern is that in the Veterans Hospital drinking water well VA-2 the semi-volatile compound benzo(a)pyrene was detected at a concentration that is above the EPA Maximum Contaminant Level that puts people drinking the water at higher risk for cancer.[6] Kirtland denies knowledge of the source of the benzo(a)pyrene.

The toxicity, size and costs of groundwater cleanup have been underestimated by Kirtland AFB. One need only compare the aviation gasoline leak containing EDB at another Air Force site. In 1972, on the Massachusetts Military Reservation (MMR), located on western Cape Cod, a much smaller pipeline leak of 70,000 gallons of aviation fuel cost over $35,000,000 for clean up (1998 dollars). This system required 25 ground water extraction wells, a treatment plant, and 23 injection wells. At another MMR location, a little more than 5 ounces of EDB from only 150 gallons of leaded automotive gasoline contaminated 1.2 billion gallons of water.[7] Concentrations of EDB in aviation gasoline were ~0.600 g/L,[8] (a little more than 2 grams per gallon). KAFB has not provided the amount of EDB that might be contained in the 8,000,000 gallons of fuel spilled. Millions of grams of EDB may be present in the Kirtland fuel spill. Kirtland's water infrastructure capacity is around 2 billion gallons per year.

The Kirtland Spill fuel spill is 110 times larger than the MRR leak.

Kirtland has proposed a questionable pump and treat system to extract vapor from the groundwater with later injection of the wastewater back into the aquifer. It may be impossible in a reasonable time frame for the use of the pump-and-treat system at Kirtland to clean up the enormous fuel spill to the safe drinking water standards.[9]

There are unanswered questions about pump and treat effectiveness, safety and costs.[10] In February 2011 several community groups complained to EPA Region 6 that decisions for cleanup strategies are being made before the public can review them.[11] No formal studies have been done to insure that the injection wells will not disperse contaminants over a wider area at Kirtland. There are no hydrological studies of what would be the impacts on nearby seeps and springs. Kirtland has not identified the number of other contaminant plumes that could be affected by the injection plan.

Kirtland has hundreds of areas that remain contaminated. Rather than requiring cleanup of these sites, the New Mexico Environment Department often allowed the dumps to be placed on *No Further Action* status without gaining careful knowledge of the amounts and types of contaminants from groundwater monitoring wells. There are several former large dumps where drums of toxic contaminants and radioactive wastes

were disposed of that were not monitored and/or had defective monitoring wells.[12] Perchlorate contamination is present at the poorly monitored Explosive Ordinance Depot where Kirtland annually openly burned and detonated hundreds of thousands of tons of Sandia rocket wastes.[13]

Kirtland's unlined dumps often contain dozens of organic solvents that are above Albuquerque's aquifer.[14] Some dumps contained for example, radioactive isotopes such as Cesium-137, Plutonium-239 along with irradiated animal carcasses placed in plastic bags in dirt trenches.[15] Decisions for leaving wastes in place have been made on computer modeling results instead of requiring accurate water quality data from a reliable network of monitoring wells.

Using well monitoring data that NMED, EPA and Sandia Labs knew was from defective wells, NMED decided to leave some 1,500,000 cu ft of radioactive and mixed hazardous waste leaking into Albuquerque's drinking water aquifer at Sandia's Mixed Waste Landfill located on Kirtland. The dump is near the Mesa del Sol residential development for 100,000 people. NMED sued Citizen Action when it requested a technical report that NMED kept secret showing the dirt cover design for the dump would fail and that Sandia's computer modeling for contaminant movement was worthless. Nevertheless, NMED allowed a dirt cover to be installed instead of requiring excavation of the wastes that contain long-lived radionuclides such as Plutonium-239, Americium-241 and dangerous solvents. According to the EPA Office of Inspector General, EPA Region 6 is withholding a report that agreed with concerns about the dump's defective monitoring wells and dirt cover remedy by stamping it "Confidential."[16]

Kirtland's proposed spending of $50 million is window dressing to prevent community panic. One can envision future land use conflict between the Albuquerque's growing need for pristine water and Kirtland and Sandia's groundwater usage. Contamination of the aquifer may leave the water resource in short supply that is necessary for the massive urban growth already permitted and being planned for future Albuquerque. Allowing more housing tracts to border Kirtland will create additional water delivery problems in a contaminated setting.

Albuquerque should begin to consider asking the Air Force for reparations for decontamination by reverse osmosis, development of new distribution lines, water supply wells and cleanup of contaminated dumps that were not properly investigated. Albuquerque should consider limiting or halting growth of residential projects that will create a demand for water that cannot be provided. The loss of municipal wells does not include the damage to property, loss of property value and medical costs that may be incurred by existing members of our community.

The ugly truth is that Kirtland has caused an environmental catastrophe and destroyed the most productive portion of Albuquerque's drinking water aquifer.

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[1] Quarterly Remediation And Site Investigation Report
For the Bulk Fuels Facility Spill October 2010 through December 2010

[2] Albuquerque Journal August 5, 2000 Section E, *Kirtland Jet Fuel Spill 'Significant'*

[3] *The Potential for Ground Water Contamination by*

the Gasoline Lead Scavengers Ethylene Dibromide and 1,2-Dichloroethane http://info.ngwa.org/GWOL/pdf/041879375.pdf p.81-82.

[4] http://www.epa.gov/nrmrl/pubs/600r08107/600r08107.html

[5] http://www.nmenv.state.nm.us/hwb/documents/KAFB_9-7-2010_Transpor_Velocity_-_Travel_Time_Report.pdf

[6] See footnote 6, p.5-20

[7] As of June 2003, the plume treatment system removed 127 kg of benzene and 61 kg of EDB from the ground water. This is more than 98% of the cleanup goal, based on estimates of benzene and EDB in the plume (MMR 2003c). The ground water treatment system is scheduled to operate until 2012.

[8] http://info.ngwa.org/gwol/pdf/041879375.pdf p.78

[9] The National Academies of Science http://www.nap.edu/openbook.php?record_id=2311&page=80

[10] http://www.gnest.org/journal/Vol3_No1/voudrias.pdf. "With the exception of water-soluble contaminants occupying relatively small parts of relatively homogeneous and water-permeable geologic media, the remediation of groundwater contaminated by hazardous waste using P&T is, for all practical purposes, impossible and prohibitively expensive."

[11] Letter on file with Citizen Action.

[12] https://kirtlandafb.tlisolutions.net/main.aspx

[13] http://www.radfreenm.org/pages/Legal/lg-2009oct28a.doc p. 5-- 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 µg/L, and in monitoring well KAFB-2624 at 11.0 µg/L. Data collected in 2008 showed perchlorate in the "School House Mesa Well" at 5.19 µg/L. Yet very little groundwater monitoring data has been obtained for perchlorate at Kirtland."

[14] https://kirtlandafb.tlisolutions.net/PDFS/30/3037.PDF Landfill-001. "Interviews conducted during previous investigations implied that the landfill contained general refuse, construction and demolition debris, and, possibly, hazardous waste that included chemical drums, oil-soaked insulation, and numerous 5-gallon cans containing unspecified liquids. Photographs taken in 1971 showed numerous 55-gallon drums at this site. These materials were buried at depths ranging from 10 feet (ft) to 30 ft over approximately 49 acres. The estimated volume of the landfill was approximately 603,000 cubic yards (cy)."

https://kirtlandafb.tlisolutions.net/PDFS/31/3127.PDF. Landfill-02 "... metals, total petroleum hydrocarbon, semi-volatile organic compounds (SVOCs), and volatile organic compounds (VOCs) have been detected in soil samples, some at concentrations exceeding applicable action levels."

https://kirtlandafb.tlisolutions.net/PDFS/30/3025.PDF LF-008 LF-008 covers a total area of 65 acres and contains an estimated waste volume of 2,346,000 cubic yards. It is 3 combined landfills. "The city of Albuquerque and Kirtland AFB jointly operated Landfill 4 from 1964 to 1969 as a general refuse landfill, although no written records are available that confirm the type of refuse disposed." [H]azardous materials such as arsenic, chromium, lead, benzene, and xylene were disposed…"

[15] https://kirtlandafb.tlisolutions.net/PDFS/32/3209.PDF
[16] http://www.epa.gov/oig/reports/2010/20100414-10-P-0100.pdf