Testimony to Science, Technology and Communications Committee

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Introduction

Good afternoon. My name is Bruce Thomson. I am pleased to be invited to testify before this Committee on an issue of great professional and personal interest. I will briefly summarize my professional qualifications and my involvement, as well as my personal interest in the Kirtland Air Force Base fuel plume.

I am the Director of the Water Resources Program and a Professor of Civil Engineering at the University of New Mexico. I have degrees in Civil Engineering and Environmental Science and Engineering, and I am a Licensed Professional Engineer in the State of New Mexico. My research, teaching and consulting activities are principally in the areas of ground water hydrology, and water chemistry and treatment.

I have extensive experience with ground water resources in New Mexico and especially in Albuquerque. I was one of the original members of the New Mexico Leaking Underground Storage Tank (LUST) Committee (now called the Petroleum Storage Tank Committee) formed under the Ground Water Protection Act, and served on this committee from 1988 to 1999. I was one of the original members of the Albuquerque-Bernalillo County-Water Utility Authority Ground Water Protection Advisory Board (now the Water Quality Protection Advisory Board). I served on this Board from 1998 to 2009. I was its first Chairman and was serving in this capacity when the leak at the Kirtland Air Force Base (KAFB) bulk fuels loading facility was discovered. I was Vice-Chair in 2008 when KAFB notified the City and Bernalillo County that contaminants had reached ground water. I have recently been appointed as the Civilian Co-Chair of the KAFB Citizen Advisory Board.

Most importantly, I am a resident of the southeast Heights neighborhood in Albuquerque. The way the Albuquerque Bernalillo County Water Utility Authority distribution system operates, when the Authority is using ground water as its source of supply my neighborhood receives its water from the Burton & Ridgecrest well fields. These are the wells that are threatened by the KAFB fuel plume so my neighbors, my family, and I are the residents that are most at risk to exposure from contamination at this site.

My intent in presenting this testimony is to briefly discuss my observations about the fuel plume then use this as a foundation for making three recommendations regarding administration of the remedial investigation and remediation process. Though I would be delighted to go into detail about the hydrology and chemistry of the fuel plume and alternative remediation strategies, I have tried to limit my comments to those that are of interest and are relevant to your Committee.

I want to make it clear that the opinions and observations expressed in this testimony are strictly my own. I do not represent KAFB, the Southeast Heights Neighborhood Association, UNM, or any other organizations or stakeholders that might be impacted by this plume.

Observations Regarding the Fuel Plume

There is much misinformation that has been disseminated about the plume which has led to mistrust among the various parties. It would be easy to spend the rest of this session reviewing history, identifying errors in the process, assigning blame and arguing about how much fuel was lost. This is mostly irrelevant to seeking a path forward which is where I think our energy should be directed. However, I would like to take the opportunity of this public forum to revisit the causes for the tension between the Air Force, the regulators, and the stakeholders as it helps set the stage for my recommendations.

When the leak was first discovered there was considerable effort by the Air Force to minimize its magnitude and the threat it posed to the community and its water supply. This was unfortunate and led to considerable distrust between the regulators (NMED), the stakeholders (City, County, Water Utility Authority and the local residents), and the Air Force. Though relationships have greatly improved in the last three years, a considerable amount of mistrust and tension still lingers and has complicated the relationship between the local governments, including the Authority, and the Air Force.

More recently there have been numerous claims about the risk that contaminants in the plume pose to the community by a couple of activist groups. In my opinion most of these claims are greatly exaggerated and have served to alarm the local community which complicates the relationship between the Base and its neighbors. In my view this plume presents a very real threat that needs to be addressed promptly.

However, the presence of contaminants in the soil and ground water at KAFB and their subsequent migration to the northeast does not constitute an emergency that requires immediate and hasty action. There are at least seven factors that reduce the immediacy of the threat:

1. The aquifer is highly anisotropic. This means that ground water flows horizontally much more readily than vertically. This is in part why the plume is located at the top of the water table. Contaminants have been detected in some of the deepest monitoring wells which are 80 to 100 ft below the top of the water table, but are at concentrations that are orders of magnitude below those at the top of the water table. When detected, most are at concentrations below the drinking water standard.

2. Contaminants are moving very slowly through the aquifer. While the location of the front edge of the contaminant plume is not established, it appears that the contaminants have moved a total distance of approximately 4,000 ft in 30 or more years. It is vitally important to determine the maximum extent of the plume to confirm that this observation is correct.

3. Water level data from monitoring wells show that the horizontal hydraulic gradient is small and uniform in the direction of the nearest municipal well. There is no evidence that the

contaminant migration rate is accelerating as one approaches this well. In other words, data from the KAFB monitoring wells show that the cone of depression due to pumping from Ridgecrest No. 5 does not appear to extend to the surface in the vicinity of the plume.

4. The top of the screened interval of the Ridgecrest No. 5 well is approximately 150 ft below the top of the water table, but as noted previously, the contaminants are confined to the top 100 ft of the aquifer.

5. Ridgecrest No. 5 has roughly 620 ft of well screen, thus it draws water from an uncontaminated region of the aquifer extending from about 150 below the water table to 770 ft below the water table. Therefore, if any contaminants from the top of the water table do reach the well they will be diluted by a large volume of uncontaminated ground water. While dilution is not a very appealing solution to a ground water problem it is a very common approach to addressing environmental problems including such familiar examples as blending of water from different sources to meet arsenic standards and dilution of wastewater to protect the aquatic environment of streams and lakes.

6. Since start up of the San Juan Chama surface drinking water project in December 2008 the ground water table has been rising throughout the city. Monitoring well data from the KAFB wells and from USGS monitoring wells show that there is a general upward flow of ground water which will further act to prevent contaminants from migrating deeper into the aquifer. The rising water table however will increase the difficulty of remediating the plume as it inundates unsaturated contaminated soils.

7. An aggressive monitoring program of production wells in the southeast heights has been implemented by the Authority in part funded by KAFB that has not detected any evidence of contamination from the fuel plume.

I don't want to minimize the threat posed by the KAFB fuel plume – it is very real and the public and our representatives must remain vigilant. At the same time the technical community must adopt and pursue an aggressive schedule of plume characterization that will lead to an effective remediation strategy. However, I can think of no credible scenario by which contaminants will suddenly appear in the public water supply at problematic concentrations. Furthermore, if contaminants are detected in the water supply there are a number of strategies that can be quickly implemented to address the problem. We must act without delay but there is time to develop strategies that will assure that the problem is not exacerbated by poorly conceived actions.

Suggestions

Let me now turn to some of the regulatory, management, and/or institutional gaps that I think this Committee and representatives of the Air Force, the regulators and local government should consider.

Legal & Regulatory Considerations: One of my early frustrations was the apparent lack of authority of the New Mexico Environment Department. Because KAFB is a federal facility they are not subject to many state environmental regulations. When the leak was first detected it was

handled by the Petroleum Storage Tank Bureau and subsequently the Ground Water Bureau. It is not clear that either had any significant jurisdiction over a federal facility because Congress has not expressly waived the federal government's immunity from state jurisdiction under state groundwater statutes.. EPA does have authority over federal facilities in many respects, however, there are no federal ground water standards. To the best of my knowledge they have played a very small role in the management of this fuel plume. It was not until NMED asserted its authority under the Resource Conservation and Recovery Act (RCRA) and the corresponding NM Hazardous Waste Act in 2010 did it appear that this agency found the regulatory influence that was needed to encourage more attention by the Air Force to the problem.

It is not reasonable to expect any changes in either state or national legislation on this issue. Furthermore I'm not sure it's needed. It appears that the NMED has determined that its jurisdiction under the Hazardous Waste Act provides sufficient authority for it to effectively administer the investigation and remediation of this site. I consider this to fall into the category of "lessons learned." It is unfortunate that it took many years to identify this authority. I would encourage NMED legal and administrative staff who are much more familiar with the legislation, regulations and process than I am to revisit the history of this situation to determine if there is a need for revision to be certain that a clear regulatory path to address a problem of this nature is available in the future.

Risk Assessment: There is a large amount of fear by the public as well as a high degree of mistrust of the Air Force and its contractors. As discussed previously, I believe these are the result of: 1) the Air Force's reluctance to fully address the problem early on, 2) past Air Force resistance to comply with NMED requirements,and 3) misinformation that has been distributed by some activist groups who have what I perceive to be an alarmist agenda. I believe that there is a need for an independent analysis of the situation and a quantitative assessment of the threat the fuel plume poses to the public. A group of professors from UNM, including me, hosted a public education meeting on this topic with over 100 people in attendance that was very well received but we do not have the time or the resources to do more than discuss the general nature of the threat.

The Agency for Toxic Substances and Disease Registry (ATSDR), an independent agency with the US Department of Health and Human Services and affiliated with the Centers for Disease Control and Prevention (CDC), attended an early public meeting and committed to conducting a health risk assessment that would include at least one public meeting. However, it is not clear that they will be able to follow through on this commitment in a meaningful manner.

I have encouraged the USAF to remind the ATSDR of their commitment. I believe that a completing a formal Health Risk Assessment is important at this site because of the large number of people that are threatened and the relative complexity of the hydrogeology. While I personally believe that the immediate threat is very low, I have not performed a quantitative assessment. Neither has anyone else.

I encourage KAFB and the NMED to jointly request a thorough Health Risk Assessment of the KAFB fuel plume at the earliest possible date. If this cannot be accomplished I suggest that funds be provided to contract with an independent organization to perform this analysis. Perhaps

one of the NM universities could do the work. It is important that this analysis be done with unquestioned independence so I suggest that the contract be awarded and managed by the NMED.

Seat at the Table for the ABCWUA: In my experience, most cases involving environmental contamination involve three parties: 1) the person or organization responsible for the release (i.e. the Responsible Party), 2) the regulatory agency and 3) the local stakeholders. The local stakeholders usually consist of neighbors and local government. Their role is limited to providing review and comment on remedial investigations and remediation strategies. This has been the case with the KAFB fuel plume. In the last few years the USAF has done a good job of keeping the public informed of their investigations and activities regarding the plume.

However, in contrast to most other Superfund and fuel spill sites in New Mexico, there is a fourth player with a very strong interest in this site, the Albuquerque Bernalillo County Water Utility Authority. The Authority has the most direct responsibility for protecting the residents of the southeast heights from drinking water contamination and their wells are directly in the line of movement of the contaminant plume. Equally important, the Authority has the technical expertise and financial resources to provide independent analysis of proposed strategies, as well as knowledge of its water supply and wastewater collection system. This expertise and knowledge should be used to contribute to the solution of the problems related to the KAFB fuel plume.

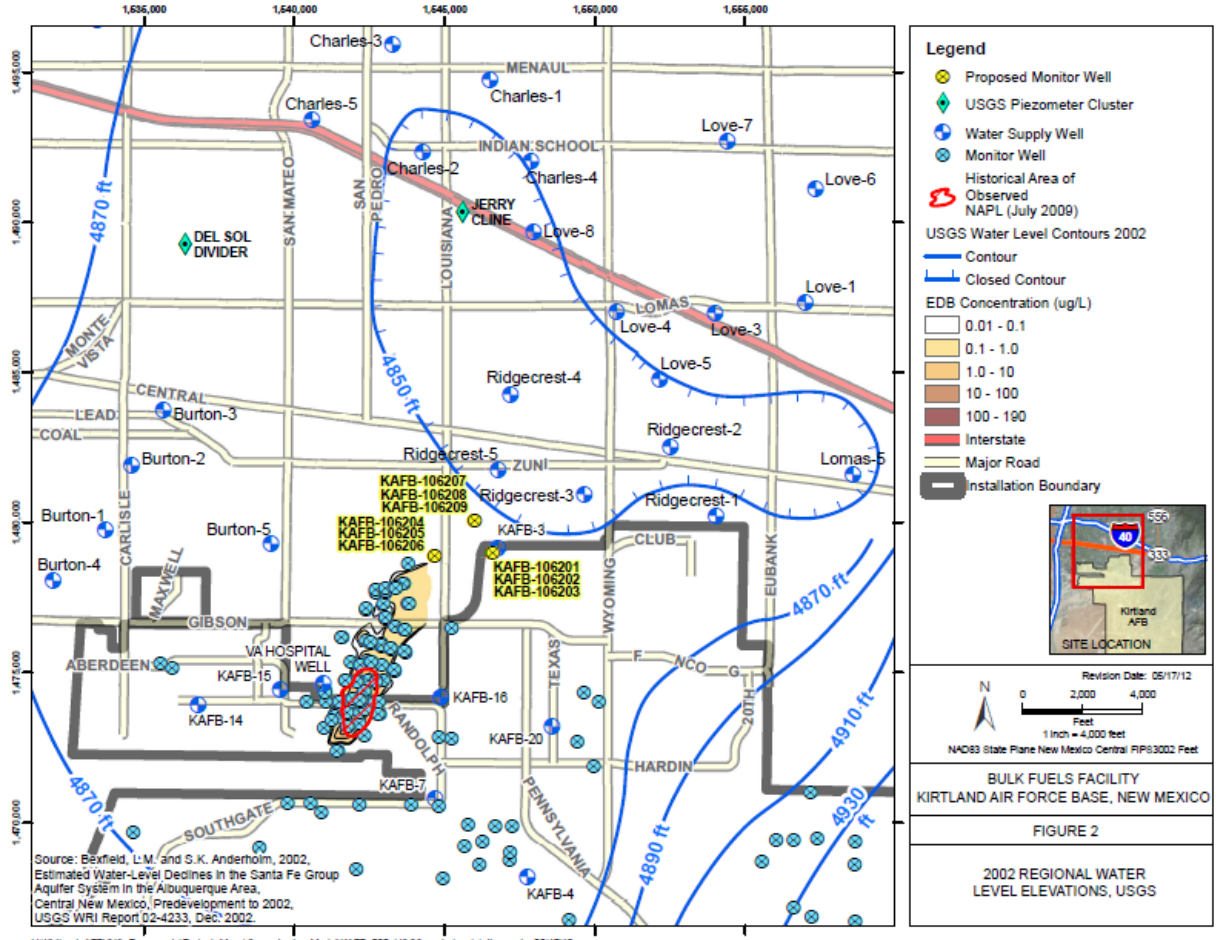
It is my understanding that currently the Authority does not have a formal role in the decision making process regarding the fuel plume, but I think it should. I make this recommendation with a bit of hesitation because there has been a considerable amount of tension between the Air Force and the Authority in the past. However, I believe that both organizations are sincerely dedicated to protecting the public and remediating the fuel plume as quickly as possible. I would hope that they can work together as equal partners to address this problem

Concluding Remarks

The KAFB fuel plume presents a difficult challenge that requires collaboration and cooperation by the Air Force, the NMED, local government, and the Water Utility Authority. Due to the magnitude of the release and the depth to ground water the problems are challenging, but there are solutions and they are feasible. The NMED and its contractors have extensive experience with remediation of contamination from fuel spills. Technologies have been developed and widely implemented that can remove the contaminants that are present at this site. The remedy won't be quick or cheap but in my opinion there is a high degree of certainty that it will be successful.

A considerable amount of information about the fuel plume has been developed in the last couple of years. I believe that the Air Force has demonstrated a sincere commitment to characterizing the plume and developing a remediation strategy. More importantly I blieve that the NMED and the Air Force have developed a pretty good working relationship that is restoring some of the trust that was lost in years past. I think it is now important to increase the participation of the Water Utility Authority.

While the fuel plume at KAFB poses a clear risk to the public, due to the hydrologic conditions of the site and the nature of contaminant migration in soil and ground water the likelihood of a sudden and catastrophic appearance of contamination in the public water supply is very small. Therefore, we have a bit of time to characterize the risk and develop a remediation strategy that will remediate the site safely and as quickly as possible. I want to emphasize that while conditions at this site do not pose an emergency, delays in implementing a remediation process should not be allowed. Continued vigilance must be practiced by all and the results of this attention must be communicated to the public.


Legend
Proposed Monitor Well
USGS Piezometer Cluster
Water Supply Well
Monitor Well
Historical Area of Observed NAPL (July 2009)
USGS Water Level Contours 2002
Contour
Closed Contour
EDB Concentration (ug/L)
0.01 - 0.1
0.1 - 1.0
1.0 - 10
10 - 100
100 - 190
Interstate
Major Road
Installation Boundary
SITE LOCATION
Revision Date: 05/17/12
Feet
1 inch = 4,000 feet
NAD83 State Plane New Mexico Central FIPS3002 Feet
BULK FUELS FACILITY
KIRTLAND AIR FORCE BASE, NEW MEXICO
FIGURE 2
2002 REGIONAL WATER LEVEL ELEVATIONS, USGS
Source: Bexfield, L.M. and S.K. Anderholm, 2002, Estimated Water-Level Declines in the Santa Fe Group Aquifer System in the Albuquerque Area, Central New Mexico, Predevelopment to 2002, USGS WRI Report 02-4233, Dec. 2002.
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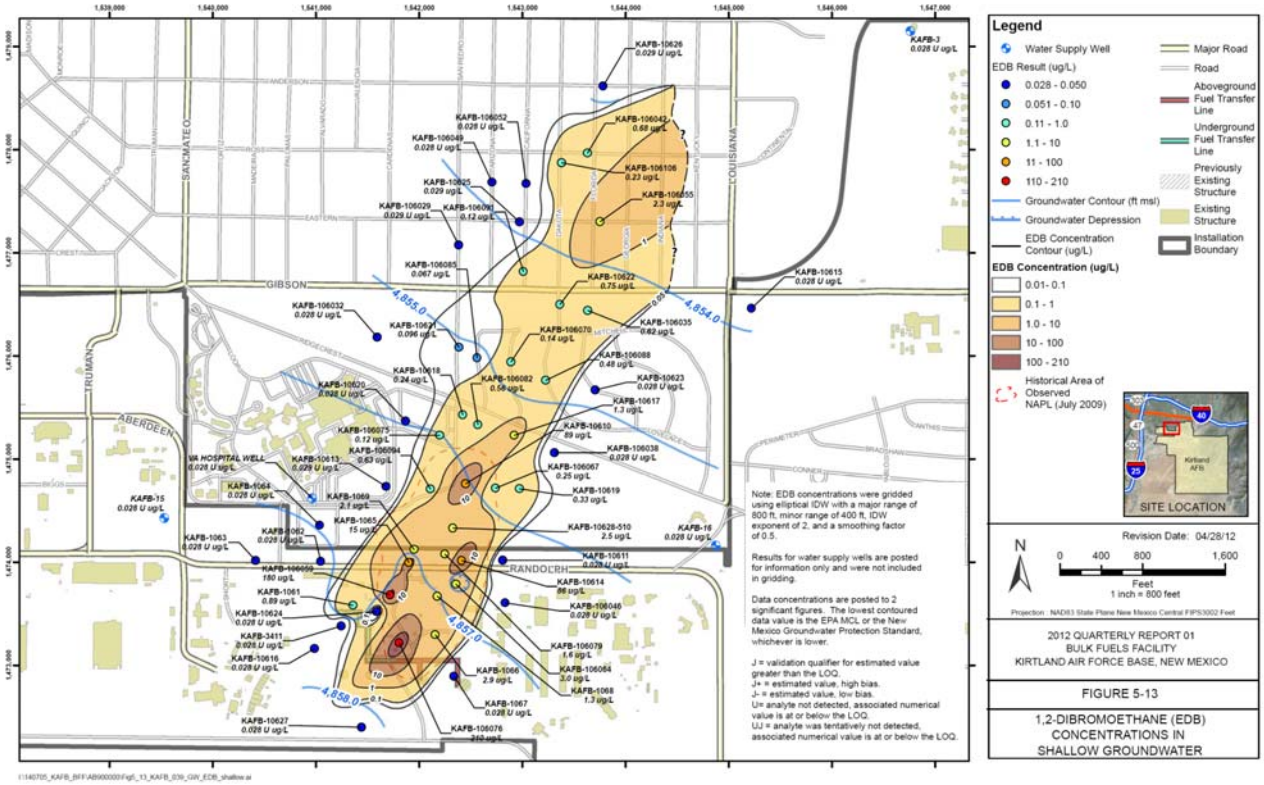
Legend
Water Supply Well
EDB Result (ug/L)
0.028 - 0.050
0.051 - 0.10
0.11 - 1.0
1.1 - 10
11 - 100
110 - 210
Groundwater Contour (ft msl)
Groundwater Depression
EDB Concentration Contour (ug/L)
EDB Concentration (ug/L)
0.01- 0.1
0.1 - 1
1.0 - 10
10 - 100
100 - 210
Historical Area of Observed NAPL (July 2009)
Major Road
Road
Aboveground Fuel Transfer Line
Underground Fuel Transfer Line
Previously Existing Structure
Existing Structure
Installation Boundary
SITE LOCATION
Revision Date: 04/28/12
Feet
1 inch = 800 feet
Projection: NAD83 State Plane New Mexico Central FIPS3002 Feet
2012 QUARTERLY REPORT 01
BULK FUELS FACILITY
KIRTLAND AIR FORCE BASE, NEW MEXICO
FIGURE 5-13
1,2-DIBROMOETHANE (EDB) CONCENTRATIONS IN SHALLOW GROUNDWATER
Note: EDB concentrations were gridded using elliptical IDW with a major range of 800 ft, minor range of 400 ft, IDW exponent of 2, and a smoothing factor of 0.5.
Results for water supply wells are posted for information only and were not included in gridding.
Data concentrations are posted to 2 significant figures. The lowest contoured data value is the EPA MCL or the New Mexico Groundwater Protection Standard, whichever is lower.
J = validation qualifier for estimated value greater than the LOQ.
J+ = estimated value, high bias.
J- = estimated value, low bias.
U= analyte not detected, associated numerical value is at or below the LOQ.
UJ = analyte was tentatively not detected, associated numerical value is at or below the LOQ.