

Bulk Fuels Facility (BFF)
Public Meeting Summary and Evaluation
12JUL18

Public Meeting: 12 July 2018, 5.30 pm poster session and 6.00 pm public meeting

Attendance: Based on those who signed in, and others known to be at the meeting, there were a total of 72 people at the meeting. Meeting attendees were grouped as follows:

- Project affiliated people- 30
- Stakeholders (elected officials, City of Albuquerque, Water Authority, Sandia National Lab): 12
- Public (new, known, media) – 30

Names on the sign-in sheets were compared against the project mailing list to determine new and returning meeting attendees. Attendees were grouped in terms of community members (or public), project affiliated, and project stakeholder, with these numbers provided in more detail below:

- Twenty-eight people from the community were at the meeting. Of these 28 people, 13 new people or people not on the project information distribution list and 15 known community members attended.
 - o Community groups and neighborhood associations (NAs) represented included La Mesa Community Improvement Association, Elder Homestead, and Citizens Action.
 - o There were 2 media representatives, from the Albuquerque Journal and Albuquerque Report.
- Thirty people affiliated with the project attended the meeting.
 - o Project support: 30
 - AF (including Base, AFCEC, SAF/IEE): 13
 - Contractors: 7
 - USACE: 4
 - USGS: 1
 - NMED: 5
 - o Project Stakeholders: 12
 - State and Local Stakeholders (including City of Albuquerque, Albuquerque Bernalillo County Water Utility Authority, Veterans Administration (VA), Sandia National Lab): 9
 - Elected official representatives (U.S. Senator Martin Heinrich, U.S. Representative Michelle Lujan Grisham, and U.S. Senator Tom Udall): 3

Meeting: Speakers for this meeting were Kate Lynnes (SAF/IEE), Dennis McQuillan (NMED), Tara Kunkel (APTIM), Kent Glover (AFCEC), and Scott Clark (AFCEC). Topics covered included an overview of the 2018 NMED Strategic Plan for the project, and how the strategies were being supported with on-going and upcoming project activities; an update on the source area pilot test; and upcoming project activities. Ms. Kunkel provided an update on the source area in situ bioremediation pilot test and preliminary results from the first two phases. Ms. Lynnes discussed on-going project activities in the neighborhoods, and Mr. Clark provided an overview/refresher of the BFF project. The presentation took about 1 hour and 55 minutes, with the presentations lasting about 1 hour and 11 minutes.

Questions and Answers, Comment Cards: About 40 minutes were devoted to questions/answers and comments. Four evaluation cards were submitted. Ten people who asked questions/made comments. Of the evaluations, three people indicated their questions were answered and the information was provided in easy to understand language. Comments provided were:

- Professional explanations; Thank you for your hard work and dedication on this difficult project. Please keep up the good work!
- Re: easy to understand language: But I've been attending for 15+ years. Seems it's time to change up some things – includes the 2018 Strategic Plan. Can't wait for another field trip and deep dive technical lay group!
- The people who speak [during the QnA] – are they engineers trying to show off what they know? I do not like anyone saying “we”. It does not give these people the right to speak for everyone.
- Too much presentation. Redundant slides. Get to public comments earlier.

The general sub-categories of the questions and answers are provided below, with detailed questions/answers and comments provided after this section

- Organization chart of project and agencies involved;
- Need for independent oversight group;
- Have GAO conduct an audit of the project;
- Need for field validation of modeling;
- Lack of hydraulic containment of EDB plume;
- Back diffusion of EDB;
- Mass balance of leaked fuel;
- Effectiveness of the pump and treat system;
- Rationale for not pumping and treating contaminated groundwater from the source area;
- Need to address residual contaminant sources in environment;
- Review of treatment technology evolution and application to this site;
- Suggestions provided on visual presentation of pilot test data; and
- Public participation: more and better public involvement opportunities and collaboration; record and post public meetings.

Questions and Answers: Public Meeting

Andy: The extraction wells are in the plume but not in the source area. Why are we not extracting out of the source area?

(Dennis) The original plan was to attack the plume at the distal end which is closest to the drinking (water) wells and to pull that contamination away from those wells and back toward the source area, to pull it on to Base and collapse the plume. We were going after the EDB, which is the only contaminant at that end of the plume, in that area. That is a really good question – how are we going to attack the contamination in the source area? The bioremediation provides some promise in how we are going to do that. It involves a different plan of attack. The really heavy contamination in the source area is not moving toward a well, we wanted to go in and the community was demanding at the time, that we go after the EDB that was closest to the drinking water wells. And that was the plan for the pump and treat as an interim measure. Eventually the Air Force will have to go and cleanup the groundwater in the source area as required by state and federal law.

(Kate) Pump and treat systems are, I know Dave and Eric have asked why we selected a pump and treat interim measure for treating the EDB plume, 1. We recognized the need and community concern about going after the plume. When you're looking at other options for addressing groundwater contamination, we're in an urbanized area, it's 500 feet down, we can't do slurry walls, we have a very dilute plume and a lot of the techniques used to remediate groundwater didn't work here. Given these factors, a pump and treat system seemed to be the best option given all these things particularly when we wanted to get hydraulic control and stop it from moving forward. But when you have smeared contamination like we showed you in those cross-sections closer to the source area, one of the things about a pump and treat system when you have contamination spread out like that, you can actually move contamination around. One of the reason we're drilling the cores and getting that data is so we have a better idea of the distribution of those contaminants and see what types of technologies really work. Kate remembers back in the day EPA would direct the installation of pump and treat systems for everything which made some problems worse and that's the last thing anyone wants to do. We need these cores and additional data to figure out what to do in the more contaminated area and the high concentration plume located on the Base. But we listened to our community and we're catching it near the Ridgecrest wells, we wanted to stop that forward movement. The cores are going to give us a lot of information to figure out what to do in the source area.

Dennis Domralski: Just to clarify, we've been pumping and treating for three years but in reality we don't know how effective it is yet. Am I correct?

(Kate) Actually, the tip of the plume that sitting up around that one extraction well, we have valid monitoring wells around there that do not have submerged screens. So we know that the plume capture, the target capture that Kent mentioned, is real. We have hard data that confirms that since we have wells that were not submerged when the water table went up. But as Dennis mentioned, in the middle area where the other two extraction wells are, where you're seeing that gap, we're pretty certain of that but we do have submerged screens there. So, that means that we don't have a data point for concentration right at the water table, we have a lot below that in the vertical column but we don't have that one. So that's why we're putting in those additional six wells. We are seeing the capture and we do know around that tip one (extraction well) that it's not dilution, we have valid wells out there and we know what it's doing (contamination is being captured) and it's behaving how we designed it to behave. But it does take time.

But overall, you're still trying to figure out if what you've designed is working as designed.

(Kate) Yes, so far it appears to be. But as Kent mentioned, we were directed by NMED to do that six-step plume capture analysis and we are starting on that now for the first round of that because we have enough data to feed it. When we come back in November, we are going to have the consultant who did that show exactly where we're at with the plume capture. What we take from that is that we will compare the analysis with the real data as shown in that flow diagram. Remember we just brought the fourth extraction well online in early-mid February that's at the base of the dissolved phase EDB plume, just at Ridgecrest and San Pedro. So, again unfortunately I know it seems to take a long time but as Kent said, it just does. We want to see how that well is working because it's unique – it's to stop the continual dissolving of the EDB and feeding into the off-site EDB plume. The plume capture analysis will be an iterative process that will be done at least twice a year – we'll do the same plume capture analysis and compare it to our data. This process will allow us to see if we still have the data needed to do the analysis, and if not, how many and where additional wells will be installed.

(Dennis) Quick summary: (referring to the EDB footprint figure) Here's the plume before the pump and treat extraction started; the community at the time demanded that we do something about the migration of this plume. The plume was 7,000 feet long, with a drinking water well and other drinking water wells to the north. The extraction system was designed by the State, Air Force, the Water Utility had their expert on it, and we met in the Mayor's office and launched this and everybody was on board with it. Here's the plume today. Your answer is we don't know for sure but there is no benzene out here, and no hydrocarbons, it's only EDB at very low levels but it is the most potent, toxic constituent of fuel. This is the very strong evidence that we presented that we're beginning to collapse the plume.

Unknown (microphone wasn't working): You said 5,000 tons of dirt had been removed. How is the excavated soil being treated and can we go to the site and see it being treated?

The excavated soil was taken to a licensed, offsite facility, basically a land-farming facility near Belen. They have a permit from NMED to aerate and land-farm it, and use it as a landfill cover. We did not manage that excavated soil on-base but sent it to a licensed facility. The soil met the permit requirements for chemical concentrations which is why it was accepted at this facility.

Eric Nuttall: On the plume you've shown, and it is good it's going down like that, it would still be helpful and in most places they attempt to do a mass balance. You know how much mass of EDB you've pulled out and you can estimate from the data you've got, it's not perfect but certainly there are computer programs and other things that will help you estimate how much EDB mass is in the plume. The observation between those two numbers will help you in some sense justify that reduction and so I recommend giving that some serious thought because that is what is normally done.

For Tara's site, it would be useful to use star and radar plots (are you familiar with those?) to show you're not getting dilution. Those star and radar plots are a great way to communicate that you really are getting a reduction and you can put a variety of things on there including your carbonate buildup, lactate decrease, a whole spectrum of things.

For Ken, one of the important things we've observed at other sites where you've actually applied plume capture such as Beth Paige on Long Island, the plume went underneath your pumping towards the well. It went down 750 ft over time and so it's important to not only have a model, because it was modeled in that situation, but it then went to every water purveyors' well and contaminated wells downstream. So it would be beneficial if you had a field validation of your modeling. Now, I know that you do levels and

concentration changes and such, but I'm thinking something more robust like tracers, etc. That would be useful.

(Dennis) Thanks Eric, we'll talk offline about the mass balance. We'll know a lot more when we core the LNAPL.

Back diffusion in that toe – since you have the cores, many sites you have to have five core volumes in order to get the EDB out of the tighter zones, which Ken would understand. So that's an important concept you can measure to get a first-cut estimate in the laboratory of how much back diffusion of EDB or rebound. We don't have any numbers on that at the moment and it's important, it's not just capture but it stands to the other questions of how much progress you're really making.

(Dennis) That's an excellent point. What Dr. Nuttall's talking about is the amount of EDB adsorbed to the soil, or in the pores and clay lenses that you have.

Or in the clay lenses you have because it is heterogeneous.

(Kate) Part of the issue with that Eric is you're absolutely right that in the source area that's one of the reasons why we're looking at, we want that information. But keep in mind, the area where we have our extraction wells, where the pump and treat is, there's just that dissolved phase EDB at very low concentrations, there's not any of the NAPL or smeared source. That's all south of Ridgecrest and where we're doing this pump and treat and the capture zone, we don't have those kinds of concentrations or distribution of contaminants. It's pretty much solidly in very low concentrations and dissolved phase with nothing above it.

But since it is in such low concentrations and you do have clay lenses, you can have back diffusion. It's heterogeneous so it's the diffusion of the EDB into those smaller pores and the potential rebound. We don't if there's rebound or not, and that would be nice to know.

(Kate) The cores don't go all the way out to the distal end of the plume. **(Nuttall) Do you have any cores out in the true EDB portion?** (Dennis) In the dissolved phase, no. We're going to be coring the source area, but out in the dissolved phase, we're going to have an aqueous phase and the adsorb phase. We know that the fine-grained materials will act as a reservoir for EDB and as you do pump and treat, you need to have time to allow that to desorb. That's why this process of extracting it is going to take years to accomplish. We have some promising results now that could very well be the first evidence of plume collapse but getting the stuff off the soil is going to be hard.

Dave McCoy (Citizens Action): One of the good things that's happened, I believe Dennis made a Technical Working Group summary from January 10, 2018 regarding plume capture analysis, we think that's good that you're beginning to do that. We would suggest some improvement that we'd like to talk with you about some time. However, that's seven months old and he only got that by doing a public records request. I'm always concerned about the information flow because real public participation can't take place unless there's timely information and that's been problematic for several years. The announcement of this meeting was a problem. It wasn't done by the Air Force very well, and on Friday, the New Mexico Environment Department sent a notice out to its listserv but that's only four business days notification.

The public was asked to make comments on the 2018 NMED Strategic Plan and many people did. Now, on June 11, 2018, there was a little meeting held about the responses to the public comments, but the people who made the comments were not invited to that. This is supposed to be a collaborative process, you always put all these different groups up on that front page but the members of the public didn't get

included in that. So, I got information about what those responses were, and those should have been furnished to the public, they should have been posted on the website. So that's a problem.

There's still not an adequate organization chart. I saw that there's a small organization chart about four layers down on the NMED website, but what we've been asking for in the strategy comments is an organization chart that encompasses the different agencies, the people involved, and the different positions in those different agencies, and how the interactions and how business flows – and that doesn't exist. So we think that should be in place.

The next thing is we still want to see an independent oversight group to look at this entire program. I see you're ready to cut me off, don't cut me off. We want to see a Government Accountability Office audit of this project – where the money's gone, what it's gone for, what it was intended to go for, how much is in the kitty – that needs to be done. I'm asking the senators office to ask the GAO to do that.

When are you going to do the things we're talking about here – adequate notice, adequate information flow. By the way, one of the things I got out of that Freedom of Information or public records thing, was uncertainty in hydraulic containment of the Bulk Fuels Facility ethylene dibromide plume. Now that's technical information about the EPA business that Kent talked about that we should have had in our hands seven months ago. But I have to file a records request in order to get that information.

(Dennis) We met with the parties who are regulated entities either under Hazardous Waste law or the Safe Drinking Water Act to review our responses to the public comments. That will be posted, as stated in my slides, along with the final version of the plan in a week or so. We do value the comments we got, and I do think it led to extensive improvement on the final Strategic Plan.

Bob Kunkel: I come to these things to support someone that's important to me. But what's sad is, this meeting is a reflection of our country right now – we don't work together as a team, we have an axe to grind, and I'm better than you. This is like 3-year old kids. Get up, state your point, and move out smartly. This is ridiculous.

(Unknown) It seems like this process costs a lot of money and it's taxpayer money to clean up a fuel spill that's been going on. What I see is that we're just trying to clean up something's that continuing to leak and cause contamination and we're not doing anything to stop the source. We're just going to spend a lot of money sucking out of these extraction wells and it's just going to keep flowing. Are we going to do this for 100 years?

(Kate) No, sir. I understand how frustrating environmental project are, and how long they take to remediate. But, as Dennis and Scott went over, we have been doing multiple things – in addition to the pump and treat, which as Dennis mentioned, was something that included Dave, the City, the Congressional delegation, Nancy, Charlie, the Mayor said to get after that thing, we don't want it to move anymore. So that's part of the cleanup. But as Scott mentioned, taking out the contaminated soil in the source area, after we removed the failed piping, was a way of not only mitigating any contamination that could affect our employees working in the Bulk Fuels area, but it also took away some of the source. It was down to 20 feet, compared to when you look at a risk assessment, you only have to go down to 10 feet so we went to double the depth. In addition, that soil vapor extraction system has removed, as both Scott and Dennis mentioned, about 775,000 equivalent gallons of fuel from the system in the source area and the vadose zone, as well as the bioslurping that's part of that total. We never had a lot of free product where you have fuel floating on top of the water but that bioslurping was designed basically to suck that up, turn it into vapor and clean it in the same system that we use for the soil vapor extraction. We have done a lot of cleanup in the source area. The bioventing is

going to continue that process; the cores are going to give us data on how to target future remediation; the work that Tara's doing is going to help us figure out how to get to that ethylene dibromide because as Dennis and Tara mentioned, bacteria don't like ethylene dibromide very much so to find a way to have nature help us, to engineer a way by feeding nature to help us, we can go after that. Then, lastly, the fourth extraction well I mentioned that was at the foot or base of the plume, by Ridgecrest and San Pedro, that's designed to stop EDB that's dissolving and continuing to feed that offsite plume. So we really are going after it, and in her experience, there isn't this much work done on interim measures – you wait until you get to the remedy stage. Yes, it's taxpayer dollars and yes we try to spend our money wisely but we have done a lot of interim measure cleanup work that frankly isn't common on a project like this in her experience. It shows we have really tried to listen to our community and regulator and do the right thing.

(Dennis) I just want to make sure and that you understand that the leakage is not on-going; the lead was stopped in 1999 when it was discovered. It started probably in the 50s or 60s and it was stopped in 1999, so when we refer to the "source area", we are not referring to an on-going leakage or discharge of fuel – that would be against the law. We are talking about the area where the fuel had leaked into the soil, the 500 feet of sediment that has residual contamination and the heavy contamination in the groundwater.

(Kate) And we have a state of the art, brand new fueling system with piping that is either above-ground or in inspectable line sumps with every kind of meter, bell and whistle you can imagine so the source of the leak in the old piping that was built in the mid-50s, we didn't have the technology or knowledge we have now. The new system we have now is designed to never allow that to happen again.

Eric Nuttall: I interrupted Dennis when he was talking. With regard to the pump and treat in the petroleum zone, that oil's been there a long time and pump and treat may not do any good at all. He thinks the concepts that Tara's doing, if we can get the EDB out of there while it's anaerobic which is important, then what normally happens with the petroleum when it may not be mobile at all, but it's certainly subject to aerobic degradation which can be enhanced just like you did with the oxygen. There's all kinds of in situ chemical oxidation techniques to accelerate the degradation of the petroleum chemically and biologically.

All of the complex sites, which this is, needs multiple technologies from the get-go, if you will. And during the evolution of its cleanup it's going to see changes in technology, and there are a number of technologies that can even be applied to the EDB toe such as plume stop from regeneration (a biological amendment that involves carbon injection to stop the EDB and then biologically degrade it). This has been quite successful and is a product that has only been out for a few years. So technology is evolving and you will have continuous evolution of technologies and that's true of all the complex sites in the US and they all follow that pattern.

(Dennis) Thank you for underscoring Strategy 3, use of multiple technologies.

(Unknown): the fuel that's still on top of the water and in the soil, is EDB still dissolving from that into the water? And if so, do we know how fast?

(Dennis) We have residual oil and occasionally we see a couple of inches of product on top of the water table inside monitoring wells. And yes, that is still an on-going source of dissolved phase. In line with what Strategy 3 says and with what Eric just very eloquently underscored, what works on dissolved phase in the distal end will not work in the source area.

Erin Englebrecht, City of ABQ Environmental Health Dept, Community Liaison and longtime resident of SE Heights: Regarding Phase 2 results, there's a comment about VOC constituents remain at higher and steady concentrations indicating little dilution. I never really felt any resolve or information as to how that will be taken care of, so please explain that a little bit more.

One comment: I would like to see any recording or type of notes of this meeting to be posted. I've been coming off and on for about four years, mainly as a resident and interested party. I don't know if you're doing that at all and if so, please point us to a place where this information is located, but if not, I highly recommend you record and document these meetings so the public is aware of what is being said and gone over in these meetings.

(Dennis/Katy) The minutes will be posted. Allison and Kate developed the summaries of the Technical Working Groups and we're going to continue that.

I mean these meetings because sometimes people cannot attend and they want to know. Questions are being brought up over and over again so it's nice to have that documentation and understand for the community to get that feedback and what was covered when they weren't able to attend.

(Tara) The pilot test was designed to specifically go after the EDB and as Dennis talked about, EDB can biodegrade under anaerobic conditions. The groundwater in the pilot test area is anaerobic so there's no free oxygen available there. That's why we chose that site, to specifically target the EDB. And you're correct, there are other VOC constituents there – there's benzene and toluene and other things that came out of that original fuel. These other hydrogen molecules, as they are called, don't biodegrade readily under anaerobic conditions. So, once we've treated EDB in this area, I don't want to go out on a limb about what the Air Force might have to say, those constituents will need to be targeted using a slightly different method, which might involve aerobic degradation.

(Kate) That meshes really well with what Eric just said and fits in with the Strategic Plan. You have to use things simultaneously and sequentially, we have to target individual compounds with technologies that work, and then once we take care of those, we then need to look at the rest of it. Drilling these cores, again, will give us really good information about the residual. Eric also made a good point, a lot of these materials have weathered over time and changed characteristics.

Dave McCoy: I wanted to address this collaborative process a little further. If the public makes comments and you make responses, and we don't know what your responses are, that's not collaborative. If there's information that's given out at technical working groups, it's really critical information or critical issues and we're not able to get that information, that's not collaborative. One of the things that's concerned me when I got these records back on the public records request, is that apparently the Water Utility Authority is feeling left out of this collaborative process and I believe they were talking about having their name removed from the opening sheet. This is something that he finds very disturbing because the Water Utility Authority is a major player and representative of the consuming public. So obviously there's some fences that need to be mended. I appreciate what you're doing, I'm just trying to get you to go a little further with this process so it's really transparent, and I think we've lacked that transparency.

(Dennis) We're always trying to meet you halfway. There was a misunderstanding between NMED and the Water Utility on the draft Strategic Plan, we addressed that in the March meeting and further addressed when we public the response to comments. I think you can see that the Strategic Plan is substantially changed as a result of the process we had which was very beneficial.

(Unknown) The person that came up from the City – I suggest you invite GovTV to record this. The City of Albuquerque has a tv channel. Also, I've come to this process and have asked how much fuel has been spilled, and no one has a clue. Besides that, we have a problem in this state with an organized religious sect who thought it could solve the problem itself and they hid behind the façade of God. Here, we have the Air Force hiding behind the façade of country. And you know, just because you name those two things and hide behind them, you have to be accountable to us. You've been very not forthcoming about information, about how much, what exactly is going on and it's terrible. This is costing everybody a lot of money, and it's not costing the Air Force, it's costing people who don't work for the Air Force, people are taxed and we are in a drought and this state and city's water source is very iffy. There are 600,000 people here in the state and if something should happen to that water, it's going to make New Orleans and places that like that look like nothing. People in Flint relied on the government to tell them the truth and they got poisoned. People wake up and hold these people's feet to the fire, I've been coming here now for years and we're talking hypothetically still. It's terrible.

(Scott) I just want to make one point – we understand that we're the Air Force and we're behind the fence and it's always a little bit odd to hear but we did have the open house and allowed the general public to come in. I just want to [issue] an open invitation, on the slides are our contact information. If you are here and actually care enough to show up on a Thursday night and want to know what's going on, and you want to show up and get a tour of the treatment system, it's an open door. I'm really busy, I'd be happy, even on my time off (I know my bosses here are going "no, not on your time off) and show you the treatment system, I have no problem doing that at all. I think it really does help. We show this stuff on slides and it's conceptual and all that. But if you go and talk to us and see the treatment system, we can outline where everything is, it really sticks a lot better, so it's an open door. Also to any groups out there that want to know what's going, want to come out and take a tour – it's an open door. We're happy to have you.

(Kate) I'll extend that invitation, I'm sure Col. Gibbs, Col. Alvarez would do the same. One other thing, we've always struggled with not having an estimate of the volume of fuel that was released because of the nature of the type of leak. We've described this before – we had these two vacuum pipes, and they were not built deep enough or with what's called engineered fill, which includes smooth rocks. We had pointy rocks. So what would happen was a railcars would come, the suction would pull, the pipes would vibrate and eventually four holes were worn into the bottom of the pipe. And you wonder how in the world we could lose that much fuel and not know it. It doesn't seem to make any common sense. But think about when you're pulling on a straw and when you stop sucking on a straw when you have a milkshake, and you take the straw and you hold it over a piece of paper towel, and the stuff that's left coating that straw on the inside is what drips out. That's what happened here. So it wasn't the volume in each railcar, it wasn't a massive leak at a bad weld, it was every time the railcars would pull away after the aboveground tank was full, whatever was coating those pipes would drip through those holes. So, there was really no technology to detect that, it wasn't the major kind of failure that would make you wonder where did that fuel go. But we've talk a lot with NMED, we've talked with our contractor, we've talked with the Corps, and we've said it's going to have a lot of caveats in it because we know that 24 million gallon number is not real. And Dennis talked about this in the last meeting. The Phase 1 RFI, when we submit the final version of it late this summer, it will have a caveated and we'll walk you through how we got the number, of between five and six million gallons. It does have a lot of "if you assume this" because you have to understand that back in the mid 50s, 60s, and 70s, we don't have all the records just like most of you probably don't have in your homes. We did our best and we tried to calculate it and when that Phase 1 RFI report is submitted, it will have an estimate.