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PUBLIC MEETING

PROPOSED REMEDIAL ACTIONS PLANS (PRAPs)
OPERABLE UNIT 21, SITE 73 and OPERABLE UNIT 10, SITE 35
MARINE CORPS BASE CAMP LEJEUNE

APRIL 21, 2009
COASTAL CAROLINA COMMUNITY COLLEGE
444 WESTERN BOULEVARD
JACKSONVILLE, NORTH CAROLINA 28546

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MEETING MODERATOR - MR. ROBERT LOWDER
IR PROGRAM MANAGER
MCB CAMP LEJEUNE EMD/EQB
BUILDING 12, POST LANE (ROOM 236)
CAMP LEJEUNE, NORTH CAROLINA
28542-0004

PRESENTER - MR. MATTHEW LOUTH
CH2M HILL
4824 PARKWAY PLAZA BOULEVARD
SUITE 200
CHARLOTTE, NORTH CAROLINA 28217

COURT REPORTER - BOBBIE G. NEWMAN

CAROLINA COURT REPORTERS, INC.
105 Oakmont Professional Plaza
Greenville, North Carolina 27858
TEL: (252) 355-4700 (800) 849-8448
FAX: (252) 355-4707

LIST OF ATTACHMENTS

ATTACHMENT [1] Public Meeting Agenda, April 21, 2009.

COURT REPORTER NOTE: The public meeting portion of the Restoration Advisory Board (RAB) meeting convened at 6:00 p.m., in Room 105 of the Business Technology Building, Coastal Carolina Community College.

MR. ROBERT LOWDER: We'll go ahead and get started. First of all, we're going to do a public meeting here on a "Proposed Remedial Action Plans" (PRAPS) for both Sites 73 and 35. Then we'll -- we'll see if we have -- you know, if we want to take a break or not after those two. You know, I know Matt and Chris will get kind of dry when we're up here, so we may take care of you guys. Our Site 6 Assessment Activities, our Site 8 "Treatability Study Brief," we'll let you know what we're doing out there. And then, we'll take care of some RAB business and set the next date. We haven't been here -- the last date we had the big storm of '09, I guess; we didn't make the January. I guess the last time we talked, I predicted that the Dallas Cowboys were going to win the Super Bowl, but that didn't quite happen. But, Matt, don't laugh, Tampa Bay didn't make it either. I'm -- I'm just glad the Giants didn't do it again. And I don't know, Laura, I think you said the Redskins? Okay. But, let's go ahead and start. Matt, are you starting up? We'll start with 35.

MR. MATTHEW LOUTH: All right. Like Bob said, the first part of the meeting is a public meeting to go over

1 the Proposed Remedial Action Plans for Site 35 and 73. A
2 public meeting is part of the community involvement,
3 community awareness for the selected remedial alternatives
4 for these two sites. So what this presentation will do is
5 we'll talk about the community involvement piece but also
6 walk you through the history of each site. We'll tell a
7 story of all the different studies and delineations of the
8 contamination and possibly to try to treat it, and then
9 complete remedial investigation for each site to kind of
10 summarize all of the activities, and then the feasibility
11 studies to select a remedy as the final treatment for both
12 sites. Moving into the next phase on the circle which is the
13 Record of Decision, we have the ROD. So, basically with this
14 presentation, I'll go ahead and present both of the Proposed
15 Remedial Action Plans as indicated. The PRAPs is what
16 they're called. It identifies the Preferred Alternatives in
17 addressing all the contamination at each site as the final
18 remedy. And basically the PRAPs tell a story of the sites
19 and then gives the rationale for how these alternatives were
20 selected. And then to answer any questions and seek
21 community feedback on the PRAPs. Today, April 21, starts the
22 30 days with public comment period for the community to ask
23 questions about the selected alternatives. I have PRAPs here
24 for members and attendees. We also have copies at the Onslow
25 County Library. We also have the information on the website

as well that can be accessed at the Onslow County library website.

Like I was saying, a big piece of the Proposed Remedial Action Plan is the community participation. And just a little history on the community participation for Camp Lejeune, the RAB started back in 1995, very active as far as having members of the community, Navy, Marine Corps, EPA and the State involved. And then the Navy and Marine Corps continually solicited input from the RAB members in the community on ongoing environmental activities at the base. You know, the RAB meetings are quarterly. Whenever we have a PRAP, we do a public meeting to talk about the remedial action that's being selected. In addition, a Community Relations Plan was developed about five years ago. We're in the process of updating that currently to make sure we do have a good understanding of the community interest and then the works going on at the base from an environmental standpoint and that we are reaching out to the community to get their input. Then lastly, having the community's acceptance for these remedial actions since they are the final actions for these two sites moving forward.

So as part of the PRAPs, as I was saying, some of the things we have to do to make sure the community is aware of these two PRAPs, is you have to do public notices, and we've put public notices in the *Jacksonville Daily*, *The Globe*, and

the *RotoVue*. You can see the dates that they're being circulated in those papers. As I was saying, today starts the public comment period. Part of it we have to have is public meetings to make the public aware. And, as indicated, this is the website link. (*http//public.lantops-ir.org/sites/public/lejeune/Site35_73Prap,aspx.*) It's also on the back of the -- or within -- within the PRAPs where you can access all the documentation, not just the PRAPs that went into making a decision for the remedial action that's being proposed. And then lastly, at the Onslow County Library there's copies of the PRAPs and also computers where you can access the website.

MR. LOWDER: And their website's also on the PRAP documents up here.

MR. LOUTH: Okay. So that said, it kind of sets the -- the objectives for tonight's meeting as far as the public community -- public involvement and awareness. Now we can delve into each specific site and kind of walk through the history and all the different investigations that took place and how we got to tonight proposing the final remedial action at each site.

The first one we're going to talk about is Site 35, which is up at Camp Geiger up near the bypass on base. Some of the history for Site 35, it's the former Camp Geiger Area Fuel Farm, which was in operation from 1945 to 1995.

1 Originally, it was five 15,000-gallon above -- above-ground
2 storage tanks (ASTs) and all the associated piping for
3 distribution. The fuels that were stored within those tanks
4 were No. 6 fuel, diesel, kerosene and gasoline. Back in
5 1995, as part of the bypass construction, the tanks were
6 dismantled and taken out of operation.
7 Some of the previous investigations going back all
8 the way to 1983, when the "Initial Assessment Study" was
9 conducted, the fuel farm was identified as a potential site
10 that may have released fuels from those ASTs into the
11 environment. The next step was in 1990. Confirmation
12 samples were collected and confirmed that oil and grease and
13 volatile organic compounds (VOCs) contamination were within
14 the soil and groundwater exceeding criteria for those
15 constituents. In addition to benzene and trichloroethane
16 (TCE) and the daughter products of TCE. The next phase in
17 1990 was the Focused Feasibility Study that was conducted to
18 expand the investigation areas out from the fuel farm to the
19 north, where it also discovered additional exceedances of
20 petroleum products. And then next, in 1992, a Comprehensive
21 Site Assessment was done on the fuel farm area to look at the
22 nature and extent of the contamination with regard to the
23 soil groundwater exceedances for the chlorinated solvents,
24 the total petroleum hydrocarbons, MTBE and effects.
25 And from that study, in 1994, Baker did an Interim

Remedial Action Remedial Investigation [(RI)/FS] to look to see and select an interim remedial action for the soil exceedances, and they identified two areas that needed to be removed. So, from that documentation, the first Interim ROD was put in place for the contaminated soil in 1994 to remove the impacted petroleum soil from that area.

Next, in 1995, Baker continued to do Remedial Investigation (RI) expanding out away from the Camp Geiger Fuel Farm, conducting soil gas sampling, soil, groundwater, surface water sediment to look more at the bigger picture of the nature and extent of the contamination, but also look at the human health and ecological risks associated with that contamination. And, from their investigation, there was soil and groundwater exceedances of the following compounds: benzene, TCE and the daughter products from TCE and vinyl chloride (VC).

MR. LOWDER: And all those documents as well can be accessed through that website.

MR. LOUTH: Right, right. That website, there's a folder that has all the documentation in there to support it.

Next, you'll see, in 1995, there's been a lot of work done out at Site 35. The next in 1995, an Interim Feasibility Study (FS) looking at the surficial groundwater in the portion of the site near the former fuel farm was

conducted. And, from that documentation, the next Interim Record of Decision (ROD) for surficial groundwater was put in place. And the selected remedy from that Interim -- Interim ROD was In-Situ Air-Sparging (IAS) trench to remdiate the shallow groundwater near the former fuel farm. What we're presenting tonight is more site-wide. We have these two Interim RODs, one for soil, one for groundwater, that were done back in the mid- to early 90's. This ROD is going to be the final ROD for the site taking care of the contamination for the whole site, not just selected areas. And then, from that action, an additional supplemental groundwater investigation was conducted in 1996 to fill a lot of gaps that were identified from the Remedial Investigation (RI). And from that they detected exceedances of benzene, TCE and cis-1,2-DCE, and arsenic in groundwater. From that investigation, they did the draft IAS Treatability Study looking at the in-situ air sparging trench and the effectiveness in treating groundwater, and they determined that there was limited effectiveness on the ground on the VOCs in groundwater from the in-situ air sparge trench. From that, the next step was doing a large soil removal to remove 15,700 tons of contaminated soil within the Camp Geiger Fuel Farm area.

Then, from that soil removal, long-term monitoring was instituted looking at groundwater for volatile organic

compounds from 1999 through 2004 and collecting data on groundwater, assessing data over time from a larger picture at Site 35. In 2003, Baker did a Natural Attenuation Evaluation (NAE) to look to see if the chlorinated solvents were degrading as they moved across the site. And it indicated that there was some marginized attenuation occurring, but it was stalling in some portions of the site, which could be caused by not right bugs being in place, or the right conditions to -- for the degradation to continue. From that, Baker did a Hot Spot Characterization identifying two TCE hot spots. One in the shallow -- a shallow hot spot was identified near Building G480. And I'm going to turn on a light so -- we'll have a map next, but I'll point out where the building is and just -- just for everybody's visual practice, this is a conceptual site model that we've developed. (Indicates map/model.)

Thanks, Randy.

MR. W. RANDY McELVEEN: Sure. (Turns up lights.)

MR. LOUTH: For the Site 35 former Camp Geiger Fuel Farm area, which is located up in this area, this is the bypass right through here, the Camp Geiger area. To identify, the blue is the TCE, the site as of 2008. This is our aquifers, the surficial aquifer and the Castle Hayne aquifer. And this is the conceptual model of the

contamination in the sub-surface directly below this area indicating that bio-degradation is taking place as it moves towards Brinson Creek. And there's also another spot down here. Groundwater flow is towards the creek, and it's shallow but also it's deep towards the river. Thanks, Randy.

MR. McELVEEN: Sure thing.

MR. LOUTH: So the next, the deeper hot spot was from -- extending from Building TC470 going underneath the bypass. So, in 2003, CH2M Hill did a technical evaluation to look at different remedial alternatives for the TCE in groundwater for the area within the bypass area. And the recommendation was to do chemical oxidation by injecting modified Fenton's reagent, followed by potassium permanganate injection to knock down the TCE contamination in those hot spot areas. So, in 2006, hot spot -- the pilot study was initiated, and 26,000 gallons of modified Fenton's reagent was injected, and 19,000 gallons potassium permanganate were injected. The results of that pilot study were favorable; 80 to 98 per cent of TCE concentration were reduced, and about 72 to 85 per cent of the total VOC reductions occurred in the pilot study area.

Next, for the other area that had a hot spot, from 2006 to 2008 an Engineering Evaluation Cost Analysis (EE/CA) was conducted, EE/CA, to do a Non-Time Critical Removal Action (NTCRA) within that area, and the selected remedy was

to inject emulsified oil, 5,000 or 6,000 gallons, with a lactate mixture to -- to create a reducing environment to reduce the contamination. The outcome of that, there was very little limited reduction due to the microbial population and the distribution with the injections. We didn't see the -- a dispersion from the injections out into the aquifer. It was just not the right microbial population was spurred to reduce the contamination. To look at the whole site and finish up the whole site, a Supplemental Remedial Investigation was conducted from 2006 and just finalized in 2009, which collected additional soil gas, soil, groundwater, surface water, sediment sampling to look at the whole Camp Geiger area to move the whole site to this final remedy. And from this investigation, we had exceedances in two areas as demonstrated in the conceptual site model for benzene, TCE, and cis-1,2-DCE and vinyl chloride. When the -- from that Supplemental Remedial Investigation, the Feasibility Study was moved forward from 2008 and just finalized in early 2009 looking at five different alternatives for the shallow groundwater at the site. And the five alternatives that were evaluated. (1) No Action, which has to be done as a baseline. (2) The next was looking at just Monitored Natural Attenuation (MNA) and Land Use Controls (LUCs) for groundwater. (3) Next was Enhanced Reductive Dechlorination (ERD) with Bioaugmentation and then Monitoring, and Land Use

Controls. (4) And then, In-Situ Chemical Oxidation (ISCO) with Persulfate, Monitoring, and then Land Use Controls on the groundwater as well. (5) And then, Air Sparging, Monitoring, and Land Use Controls are the last alternative.

Some of the things that were taken into consideration from the RI to the FS were the Chemicals of Concern (COCs) in the shallow and intermediate groundwater. And those COCs are the chlorinated volatile organic compounds (CVOCs), mainly TCE, cis-1,2-DCE, vinyl chloride and then some petroleum-related hydrocarbons and benzene. And just to give you a graphic (indicating aerial photograph), the pink or magenta is the TCE; the green is the cis-1,2-DCE; the orange/gold is VC; and then the blue is the benzene at the site. And here's the second area as well. And then again, the primary sources from this was G533 and an area south of G480. G533 was a former vehicle maintenance garage, and then G480 was part of the former fuel farm area.

Just a summary of the site risks associated with the contamination from a human health standpoint. Our COCs, the current site use poses no unacceptable risk, but the potential for cancer risk to a future resident from the chlorinated solvents in the groundwater poses a risk. And then, also, the benzene is detected above the North Carolina Groundwater Quality Standards. (Indicates two graphs.) So you can see here, these are maximum -- maximum concentrations

at the site for the particular COCs. And then, from an ecological standpoint, there is no site-related risk to the ecologicals. This is a quick summary of the different media, whether it be soil all the way down to sediment, fish crab, benthic, and then to human health and ecological.

This is just the same graphic we have here depicting Building G533 and Building G480. (Shows conceptual site model.) The blue is the TCE across the sites. Once again, this is the bypass area and Brinson Creek.

In the documentation for the Proposed Remedial Action Plan, the Remedial Action Objectives need to be identified. So, for Site 35, the objectives are to restore the groundwater quality in compliance with the North Carolina Groundwater Quality Standards (NCGWQS) and the EPA Maximum Contaminant Levels (MCLs) classified for the aquifer being a potential drinking source to prevent human health ingestion of the groundwater containing the COCs and concentrations above those standards, whichever is more conservative. In this case, the North Carolina Groundwater Quality Standards are. And then to minimize the migration of these COCs in groundwater to surface water bodies, whether it be Brinson Creek or the river. And so, in identifying its objectives, we have our Remediation Goals that we need to clean up to which are the North Carolina Groundwater Quality Standards for our particular COC.

And now, I'll walk you through each of the alternatives from the FS. You know, as I was saying, No Action, that's just the baseline for comparison. The Monitored Natural Attenuation, Land Use Controls, basically that just assesses the progress of natural attenuation over time, which has been demonstrated to be an ongoing process at the site, why it's been demonstrated to stall over time. And then, Land Use Controls are put in place to prevent exposure to groundwater and use of groundwater at the site. The ERD with the Bioaugmentation, Monitoring, Land Use Controls, which is basically the injections of microbial cultures and electron source and substrates to promote anaerobic biodegradation of the Chlorinated VOCs to reduce the dechlorination process. And then, conducting long-term monitoring to evaluate the effectiveness of those injections over time. And then lastly to, you know, continue with the Land Use Controls to prevent exposure to groundwater.

The next alternative that was looked at was the In-Situ Chemical Oxidation, the Persulfate, Monitoring and Land Use Controls. And basically, this would be similar to the policy that was done in the median of the bypass, injecting a chemical oxidant and activation agent to degrade the VOCs, and then continuing to monitor it over time to see if it was effective in reducing the contamination on site. And then also the Land Use Controls is another component of that

1 remedy. And then lastly, Air Sparging, with Monitoring and
2 Land Use Controls at the site. And basically the Air
3 Sparging would be injection of air induced through a mass
4 transfer or stripping of the VOCs from the groundwater and
5 providing an aerobic biodegradation as well. And then a
6 component of the Air Sparging would be the long-term
7 monitoring of it and also with the Land Use Controls as a
8 component.
9 As part of the Feasibility Study, we have to do a
10 comparative analysis on each of the five actions against the
11 different CERCLA Criteria to assess each of the actions to
12 come out, to evaluate them as far as the relative ranking
13 when comparing each one. (Presents a matrix depicting this.)
14 And, as you can read across the measle chart here, the solid
15 bullets are a high, the bull's eyes are moderate, and then
16 the low -- the unfilled is the low as far as low being not
17 effective. And as you see, you know, it varies for each of
18 the different alternatives.
19 In evaluating each alternative the Partnering Team
20 had numerous discussions about the alternatives and the
21 Partnering Team agreed that the Air Sparging alternative with
22 Monitoring and Land Use Control would be one of the -- would
23 be the Preferred Alternative at the site. And the rationale
24 for that Preferred Alternative is that Air Sparging through a
25 horizontal well has been done at similar sites, and several

other sites on base -- Site 86, Site 73, and Site 89 with -- with good -- good results as far as reducing the contamination. It provides a means for continued treatment until our Remedial Action Objectives are met. Basically, the team felt like, if we do an injection, it's a one-time injection, we may have to come back at another time in a couple of years and do more injections. If it worked or not, the horizontal well is in place, we just continue to pump air, having the compressors there. There is little -- well, that had the least impacts to Camp Geiger area, which is an active training -- which is a big part of the Base mission in training Marines, so we didn't want to impact them in what they were doing. It meets the statutory preference for treatment, and then the costs were lower or similar to other remedial alternatives. So, the team felt that this was a good alternative, based on the results at other sites and the contamination at the site, that it'd be effective in treating the site.

So, this is the proposed Air Sparging through the horizontal well. (Indicates aerial photograph.) You can see from this graphic groundwater flow. This is the bypass right here. The groundwater flows towards Brinson Creek. The yellow is the higher TCE zone, greater than 28 parts per billion. The blue being the lower to .8 parts per billion. The horizontal well issue point here, the hash lines, is the

well screen and then this would be the exit point over here, to pump air into the highest zone to treat it to knock the levels down as -- as the action thereby reducing the higher levels of TCE. Over time, it would help to reduce the time needed for Monitoring Natural Attenuation over time. Some of the statistics for the well -- they'll be 65 feet below ground surface. The screen interval's about 500 feet in length, here to here. And the 65 feet below ground surface will be just beneath the contamination, so the air percolating up will strip off the VOCs. And currently, the modeling shows that the system in operation for three years will aid in the clean-up and degradation of contamination of the groundwater.

Also, part of the Preferred Alternative is the groundwater monitoring to monitor the effectiveness of the Air Sparging and Natural Attenuation over time. And then to make sure we're monitoring the impacts to the surface water and Brinson Creek and then the other migration to aquifers that -- to make sure that's not happening from the Air Sparge system. And then lastly, the Land Use Controls being put in place to prevent groundwater use of the drinking source until the mediation goals are met. And then, to maintain the integrity of the monitoring mediation system. This pink outline is basically the approximate Land Use Control area that will be put in place over the Site 35 area to prevent

1 groundwater use.

2 Any questions about Site 35 before we move into 73?

3 MR. BRYAN WILLIAMS: Well, I've got one and -- and

4 maybe you can clarify my concern. Having been up into the

5 Brinson Creek area and -- and noticing, you know, stuff,

6 that's not a very nice place to go, would that injection not

7 force more, because it appears that everything kind of

8 bubbles up toward Brinson Creek. Would that not cause that

9 -- those contaminants to get into Brinson Creek more readily

10 through the air injection system and then convergingly on

11 into the river?

12 MR. LOUTH: No.

13 MR. WILLIAMS: No?

14 MR. LOUTH: Basically, the horizontal well will

15 be underneath the contamination, so it would be a bottom up,

16 and the groundwater gradient is very flat in that area moving

17 them towards the creek. And so the theory is that our screen

18 and the actual exit points for the air are far enough away

19 from the creek not to push the higher levels towards the

20 creek, so that we wouldn't have contamination being pushed

21 into the creek.

22 MR. WILLIAMS: Okay.

23 MR. LOWDER: There's always a possibility that

24 something -- you know, you could have a preferential pathway

25 that it could happen, but I think that's why we are

monitoring that. And we could always adjust the system just like we've done the other two systems --

MR. WILLIAMS: Sure.

MR. LOWDER: -- that we've done. If we are getting some type of confluence out toward the creek that way we can always turn the system down.

MR. WILLIAMS: Having gone up in there, there's, you know -- there's, you know, a seepage coming into the creek from -- from the Geiger side. And I don't know if it's because, you know, that the strata the way it works or just what, because I've never been down into that water, but that was the concern that I had when I was sitting here listening to that.

MR. LOUTH: Yes.

MR. WILLIAMS: Brinson Creek doesn't need any more help to -- I have a friend of mine I used as a training aid. He scratched himself on the leg when we were paddling up there several years ago.

MR. LOUTH: He was your training aid?

MR. WILLIAMS: He was my training aid. I said, Dale pull your leg out or pull your pant leg up. Thank you.

MR. LOUTH: Any other questions? All right. Let's move on to Site 73

MR. McELVEEN: Do you need any -- does the court reporter need any names or anything?

COURT REPORTER: If people would say their names, I would appreciate it. Thank you.

MR. McELVEEN: That was Bryan Williams.

MR. LOUTH: All right. The next site being proposed is the Remedial Action Plan, Site 73. Also there's Operable Unit 21. There's the Amphibious Vehicle Maintenance Facility. Basically, this is down in the Courthouse Bay area of the base. Some of the history basically is the Amphibious Vehicle Maintenance area was initially constructed in 1946. Maintenance activities were historically conducted in the former maintenance Building A3, which is southeast of the Building A47, which is this main building here at the -- the Courthouse Bay. (Indicates.) Building A47 was constructed in the '83 to '89 time frame. Some of the former disposal practices associated with the vehicle maintenance was motor oil and battery acid discharging to the ground surface northeast of the former Building A3. And likely that chlorinated solvents were disposed of in the maintenance areas.

In walking you through the history of the investigations at Site 73, going back to the Initial Assessment Study in 1983, documenting these practices of the waste oil and the battery acid onto the ground surface. In '84 and '90 a Confirmation Study was conducted that confirmed that chlorinated solvents, benzene and lead were in the

1 groundwater. Then in 1994, Baker conducted a Preliminary
2 Investigation, collected some soil gas and some shallow
3 groundwater samples which identified nine areas across Site
4 73. Baker followed up in 1997 and conducted a Remedial
5 Investigation collecting the full suite of media as far as
6 soil, sediment, surface water, soil, groundwater to
7 characterize the nature and extent of these nine areas
8 identified. Only two of those areas that were identified had
9 potential impacts, and they had groundwater exceedances for
10 TCE, cis-1,w-DCE, vinyl chloride and benzene.
11 In 1998, Baker conducted a Feasibility Study to look
12 at the several remedial alternatives for treating the shallow
13 and intermediate groundwater. Natural attenuation with
14 monitoring -- Land Use Control was one of them. Groundwater
15 extraction and treatment was another. Air sparging was
16 another. From that, Baker conducted a Groundwater Modeling
17 Report looking at the natural degradation at the site,
18 indicating that the deeper aquifer had natural degradation
19 occurring and that groundwater discharge -- groundwater was
20 discharged into Courthouse Bay and then that went into the
21 New River. In 2000, Long Term Monitoring was conducted up
22 until 2005. Chlorinated solvents and benzene plumes were
23 shown -- demonstrated to be stable and not really expanding
24 at this site. In 2002, Baker conducted a Natural Attenuation
25 Evaluation, looking at the attenuation of the degrading

volatile organic compounds, which concluded that benzene was not discharging into Courthouse Bay, but there was potential for the chlorinated solvents to discharge into Courthouse Bay.

In 2003, Baker conducted a Technology Evaluation to look at different alternatives to -- to treat the intermediate groundwater near Building A47. They looked at ISCO with permanganate, abiotic reduction using colloidal iron injection, enhanced reductive dechlorination promoted by HRC, bioaugmentation, cometabolic sparging with air and propane, or sparging with ozone using a horizontal well, and hydrogen sparging. From this and from 2004 to 2006, MicroPact and Baker conducted a Phase 1 Pilot Study in which they installed a 900-foot horizontal well at the site, and they operated hydrogen sparging from 2004 to 2005. Okay, Randy, if you could grab that light for me. Thank you. This conceptual site model shows the horizontal well going across. (Indicating.) This is the layout for Site 73, the horizontal well with the screen across the more contaminated area exiting here. This is the subsurface showing the well going beneath the contamination where they injected their hydrogen into the subsurface. Like I said, they operated in 2004/2005. Average TCE concentrations were only reduced by about 35 per cent with the total only being reduced by 8 per cent. The Partnering Team decided that a Phase 2 Sparging

1 Pilot Study to look at sparging just air since the hydrogen
2 only sparged for one year had limited results. Sparging air
3 was successful at another site, Site 86. The Partnering Team
4 looked at doing a Phase 2 sparging, and from that Phase 2 air
5 sparging, average TCE concentrations were reduced by 75 per
6 cent while the vinyl chloride concentration remained steady.
7 It was able to reduce more of the TCE within the intermediate
8 groundwater.
9 To finish up and look at the site-wide area at Site
10 73, a Supplemental Remedial Investigation was completed from
11 2006 to 2009, and that was collecting soil and groundwater
12 across the site to fully delineate the contamination. From
13 the Remedial Investigation, groundwater exceedances of
14 benzene, TCE, cis-1,2-DCE, and vinyl chloride, and then soil
15 exceedances for petroleum hydrocarbons were presented as
16 results. Moving from the RI to the FS for the site, from
17 2008 to earlier this year, five different alternatives were
18 looked at for treating the shallow groundwater. Once again,
19 No Action, as the baseline; Monitoring Natural Attenuation,
20 Land Use Controls, ERD injections using -- via the Horizontal
21 Well with Downgradient ERD Injections before the Courthouse
22 Bay water body, and then Monitoring and Land Use Controls.
23 And then lastly, Air Sparging through the Horizontal Well
24 with Downgradient ERD injections, and then continue
25 Groundwater Monitoring and Land Use Controls were evaluated.

As part of the finishing up of the Remedial Investigation, the contaminants concerned evaluated in the Feasibility Study were TCE, cis-1,2-DCE, vinyl chloride and benzene in the intermediate groundwater, shallow and intermediate. And then, contaminant concerns in the soil were the petroleum hydrocarbons in the soil area. Primary source areas between Building A47, the footprint of the former maintenance shop area for this map, Courthouse Bay. (Indicates.) Down here is Building A47. This is the area where the soil impacted with petroleum hydrocarbons are located. The green on the map is the TCE exceedances of the North Carolina Groundwater Quality Standards. The blue is the DCE. The purple is vinyl chloride, and then the gold is benzene. And then, the red line going across is the horizontal well that's in place. And then, lastly, the maintenance facilities, which -- maintenance activities is also part of the source areas before the parking area was constructed.

MR. McELVEEN: And the black area around the horizontal well is the screen where the air would be basically injected into the aquifer -- the aquifer area?

MR. LOUTH: Yes. The Risk Summary to Human Health and the ecological perspective for Site 73. For human health there were no unacceptable risks under the current risk -- or current use scenarios. However, there is the

1 potential cancer risk to future residents from the vinyl
2 chloride in groundwater. And then potential non-cancer
3 hazard to future residents from the petroleum hydrocarbons in
4 the soil. And then, from the ecological standpoint, there is
5 no site-related risks present. The Contaminants of Concern
6 (COCs) from the 2008 sampling identified these maximum
7 concentrations, for each Contaminant of Concern -- for
8 benzene, TCE, cis-1,2-DCE, vinyl chloride and then petroleum
9 hydrocarbons, as well. (Using two graphs.) And this is just
10 another summary of the risk per medium at the site that was
11 evaluated.
12 Once again, this is just a conceptual site model of
13 Site 73, Courthouse Bay, horizontal well, contamination.
14 (Shows locations.)
15 As indicated for Site 35, for Site 73 we had to
16 identify what the Remedial Action Objectives and the Proposed
17 Remedial Action Plan are. And once again, to restore
18 groundwater quality at Site 73 to the North Carolina
19 Groundwater Quality Standards and the EPA MCLs for
20 classification as far as aquifer used as drinking water,
21 prevent human ingestion of the groundwater -- of the water
22 containing these COCs above the criteria, and then prevent
23 future residential exposure to the petroleum hydrocarbon left
24 in place from the soil that's above the North Carolina
25 Hazardous Waste Soil Screening criteria. And then to

minimize the transport from the groundwater -- from soil to groundwater, of those hydrocarbons, which is done by the parking area being on top, so it takes away the infiltration from rain and other run-off for that transfer mechanism. And then to minimize migration of the COCs and groundwater to surface water there at Courthouse Bay.

Once again, these are alternatives that were evaluated. No Action, MNA and LUCs, ERD using the horizontal well with Downgradient ERD injections, Monitoring, and Land Use Controls. And then, Air Sparging, again using the horizontal well with some Downgradient ERD injections to ensure that the contamination above the screen criteria is not impacting Courthouse Bay. And then monitoring the groundwater, and then Land Use Controls being in place as well. So basically, the -- you know, using the well for Air Sparging again and injecting the ERD into the subsurface to reduce contamination as it passes from the site to Courthouse Bay. Then Monitoring and Land Use Controls.

This is the measle chart again evaluating each of the different alternatives up against the CERCLA Criteria for effectiveness. And, as you can see here, pretty close as far as No Action, but the Air Sparging, ERD as far as effectiveness, but also from a cost perspective. The Partnering Team decided that the Preferred Alternative would be the Air Sparging. We have the horizontal well in place to

1 start sparging, to do the ERD injections, to ensure that
2 contamination is not entering Courthouse Bay, continue to
3 monitor groundwater and institute Land Use Controls.
4 The rationale for this alternative, the Partnering
5 Team feels it's a technology that is proven at Site 73, based
6 on the reduction that we've seen at the site thus far, the
7 ease of the implementation -- it's literally turn a switch,
8 the air compressors are still out there and can get going.
9 And then, it meets the statutory preference for treatment.
10 And the costs are lower than two more other -- two other
11 active treatment alternatives.
12 So basically from a conceptual standpoint, use the
13 existing air-sparging well. And this line of dots is the
14 preliminary schematic for the ERD injections. Basically the
15 thought is that air sparging would treat the high TCE
16 concentration and reduce the time needed for MNA, for the
17 contaminants to meet the remedial goals. The statistics on
18 the well is 85 feet below ground surface, the screen is 400
19 feet long; and the thought is that the system would operate
20 for five years, and in five years we should receive
21 significant reduction in the contamination at the site. The
22 downgradient ERD injections, to minimize any migration to the
23 Bay by injecting 25 points at a 20 foot spacing. Injections
24 about every three years for 20 years to ensure
25 protectiveness. And the initial bioaugmentation culture

injection would be -- would be conducted as well.

Also part of the Preferred Alternative is the groundwater monitoring to measure the effectiveness of the air sparging and attenuation over time and to monitor the impacts to the surface water there at Courthouse Bay and any migration to the deeper aquifer. Land Use Controls to prevent groundwater being used as a drinking source, to maintain the integrity of the system as put in place, and then also to prevent exposure to soil. (Indicates on aerial view.) So you'll see the pink outline would be the aquifer use, which is a tentative aquifer use, Land Use Control for groundwater cannot be used for drinking, and then this gold box would be the intrusive soil Land Use Control to prohibit folks from digging into this area from a risk perspective.

As indicated earlier, part of the Community Participation -- the Proposed Remedial Action Plan is the Community Participation. Currently is the public comment period. If you have comments, feel free to submit them to any of the members of the Partnering Team: Gena with EPA; Bob with the Base; Bryan with NAVFAC; Randy with the State, and then also Randy's at Site 35; and then, Beth Hardisill from the State is from Site 73.

Are there any questions about Site 73 before I move to what happens next?

PARTICIPANTS: (No questions or comments were made on

Site 73.)

MR. LOUTH: All right. Path forward. Basically during the public comment period, the Base, maybe EPA, State take any comments. If they do receive comments, they review them and take them into consideration for this final action at the site. They address them under the responsive summary in the Record of Decision (ROD), which is the next document to come out after this public comment period is over, to finalize this as the final action at the site for both 35 and 73 which identifies the selected remedy that we've talked about. And then, the Responsiveness Summary and then just public notification following the signature of the document that has to be signed by the EPA, the Base, the Navy in consultation with the State. Any other questions? It's a lot of information.

MR. LOWDER: All right. Thanks, Matt. All right, I think we might take five minutes.

*****THE PUBLIC MEETING CONCLUDED AT 7:00 P.M.*****

STATE OF NORTH CAROLINA)

) C-E-R-T-I-F-I-C-A-T-I-O-N

COUNTY OF PITT)

I, BOBBIE G. NEWMAN, A COURT REPORTER AND NOTARY PUBLIC IN AND FOR THE AFORESAID COUNTY AND STATE, DO HEREBY CERTIFY THAT THE FOREGOING PAGES ARE AN ACCURATE TRANSCRIPT OF THE PUBLIC MEETING ON THE PROPOSED REMEDIAL ACTION PLANS (PRAPs) FOR BOTH OPERABLE UNIT 21, SITE 73 AND OPERABLE UNIT 10, SITE 35, MARINE CORPS BASE CAMP LEJEUNE, WHICH WAS TAKEN BY ME BY STENOMASK, AND TRANSCRIBED UNDER MY DIRECT SUPERVISION.

I FURTHER CERTIFY THAT I AM NOT FINANCIALLY INTERESTED IN THE OUTCOME OF THIS ACTION, A RELATIVE, EMPLOYEE, ATTORNEY OR COUNSEL OF ANY OF THE PARTIES, NOR A RELATIVE OR EMPLOYEE OF SUCH ATTORNEY OR COUNSEL.

THIS THE 6TH DAY OF MAY, 2009.

NOTARY PUBLIC NUMBER 200616600172.

Bobbie G. Newman

BOBBIE G. NEWMAN
COURT REPORTER AND NOTARY PUBLIC
CAROLINA COURT REPORTERS, INC.
105 OAKMONT PROFESSIONAL PLAZA
GREENVILLE, NC 27858

Restoration Advisory Board (RAB) Meeting Agenda
21 April 2009

Welcome and Introductions **(Mr. Bob Lowder)**

- **Public Meeting**
  - Proposed Remedial Action Plan for IR Site 35 (OU 10)
  - Proposed Remedial Action Plan for IR Site 73 (OU 21)

Break

- **IR Site 6 Assessment Activities Update**
  - Additional Chlorobenzene Sampling
  - Anomaly Investigation
  - Ordnance Burial Site

- **IR Site 88 Treatability Study Brief**
  - In-Situ Chemical Oxidation (ISCO) w/Permanganate
  - Enhanced Reductive Dechlorination (ERD) w/ Bioaugmentation Injection
  - ERD Barrier Wall w/ Bioaugmentation

- **Question & Answer Period**
  - RAB Business
  - Future Agenda Items
  - Set Date for next RAB Meeting

Attendees:
Bob Lowder/Camp Lejeune
Andrew Smith/Camp Lejeune
Robert Campbell/Camp Lejeune
Carmela Gonzales/Edwards AFB
Bryan Beck/NAVFAC Mid-Atlantic
Dave Williams/EPA Region 4
Gena Townsend/EPA Region 4
Randy McElveen/NCDENR
Chris Bozzini/CH2M HILL
Matt Louth/CH2M HILL
Kim Henderson/CH2M HILL
Laura Bader/RAB Co-Chair
Brian Wheat/RAB Member

Site 35 Question:

Mr. Wheeler: Would air injection force more contamination to Brinson Creek? Brinson Creek already receives seepage from Geiger fuel farm.

Mr. Louth: Not likely based on the screened interval beneath contamination and treatment occurring upward, exit point far away from creek, and the flat gradient.

Mr. Lowder: Monitoring will also be conducted to confirm no preferential pathway and the system can be adjusted as needed.

Site 73 Question:

No questions/comments received on Site 73.