09.04-08/09/88-00047

MEETING SUMMARY
TECHNICAL REVIEW COMMITTEE
AUGUST 9, 1988

INSTALLATION RESTORATION PROGRAM
MARINE CORPS BASE, CAMP LEJEUNE, NC

The Marine Corps Base Technical Review Committee conducted its initial meeting on August 9, 1988. TRC members were briefed on the Marine Corps Base Installation Restoration Program (IRP) activities. This meeting focused on the shallow aquifer of Hadnot Point Industrial Area (HPIA), the review of alternative cleanup proposals, and the recommended Remedial Action.

The preferred cleanup alternative was presented to the TRC members as described in the Focused Feasibility Study. This alternative proposes installing recovery wells and pumping the groundwater for biological treatment into the Hadnot Point sewage treatment plant. Actions required prior to implementing groundwater recovery and treatment include further definition of groundwater hydrology, monitoring of recovery wells for contaminant concentration, and evaluation of sewage permit issues.

Target cleanup standards were presented for the HPIA shallow aquifer in comparison with drinking water standards. The TRC was informed that a health assessment will be conducted to determine cleanup criteria at HPIA. This assessment will ensure the selected remedial action provides adequate public health protection.

Interim measures as recommended by the Focused Feasibility Study were also discussed. Several actions are either planned or underway in the HPIA to protect against health risks and prevent further contamination. These actions include water supply well assessment, ambient air monitoring, underground workspace monitoring, continued groundwater monitoring, and cessation of continuing sources of pollution.

The TRC was informed about the next phase of IRP work for the HPIA to complete the RI/FS for Hadnot Point. Steps to be taken are as follows:

- Generating data to conduct feasibility studies of the deep aquifer and shallow soils contamination.
- Completing a public health evaluation of the site.
- Collecting additional data to facilitate design of the selected remedial action for the shallow aquifer.

TRC members were reminded that comments from all agencies and individuals were essential and should be provided when requested, within 45 calender days or 30 working days of receipt.

Enclosure (1)

TRANSCRIPT OF

THE TECHNICAL REVIEW COMMITTEE MEETING

HELD ON

9 AUGUST 1988

The Technical Review Committee meeting opened at 0915 hours, 9 August 1988.

COL DALZELL: On behalf of Brigadier General Donald Gardner, the Commanding General of Marine Corps Base, Camp Lejeune, I would like to welcome all of you to Camp Lejeune for our first Technical Review Committee for Marine Corps Base, Camp Lejeune's Installation/Restoration Program. I'm Colonel Tom Dalzell. I'm the Assistant Chief of Staff for Facilities for Marine Corps Base, Camp Lejeune. A few administrative remarks that I would like to make to you--feel free to help yourself to any of the coffee, ice tea or donuts that we have here. They're for your enjoyment. If any of you need to make a telephone call, right out the door to the left, there's a hallway that goes back down, and there's two public phones that are available for your use. If you go out the door and take a right, the restrooms are down the hall. The ladies room is to the right, and the gentlemen's room is to the left. We will be having lunch here in this building. There is a lot of construction that's going on. The entire building is in a two-year renovation program, and the center portion, the lobby, is currently being renovated now. You can walk through that area, but please watch your step. There's some plastic on the floor there to protect some of the carpeting, so before you venture through there, look around and look up before you go through, but it is safe to walk through that area.

What I'd like to do is just kind of go around the room and have the individuals introduce themselves. You see their name tags in front of them, and it'll help you identify the name with the face. And we have also provided to you in your packages, a listing of the membership of the Technical Review Committee. We'll start down on the far right here with Mrs. Jarman.

JARMAN: Sue Jarman. I work with the Assistant Chief of Staff, Facilities Office.

SOUTHERLAND: Dan Southerland from Jacksonville Citizen's Committee.

MADER: Jack Mader from Jacksonville.

DOWNING: John Downing, Jacksonville Citizen Committee Member.

CAULFIELD: Tom Caulfield, Jacksonville Citizen.

JONES: Colonel Joe Jones, Retired, Citizen Member.

HOWARD: Preston Howard, Regional Supervisor for Division of Environmenta Management, Wilmington Field Office.

ALEXANDER: I'm Bob Alexander. I'm the Base Environmental Engineer. I work with Colonel Dalzell.

WEEKS: Victor Weeks, EPA, on the Superfund Program.

BARNETT: My name is Cherryl Barnett, I'm with the Atlantic Division, Naval Facilities Engineering Command in Norfolk.

GREGORY: I am Bob Gregory. I am from Hunter-ESE, the contractor doing the study for LANTDIV here.

ATWOOD: I'm Stan Atwood. I work for the North Carolina Superfund Health Services.

LANIER: I'm Cameron Lanier, Onslow County Health Department.

BITTNER: Jerry Bittner, City Manager of Jacksonville.

HUMPHRIES: Ray Humphries, Jacksonville Citizen Member.

COL DALZELL: And in the back?

HILL: I'm Fred Hill, and I'm with the Water Supply Branch for the Division of Health Services.

JOHNSON: Nina Johnson, Atlantic Division, Naval Facilities Engineering Command.

COL DALZELL: And a lot of these names are on the listing that you have there. And we also--the two ladies that are over here talking into the machine--as we are required by law to record all of the goings on, so we have a tape recording going, and we also have a transcription going so that we can record the minutes of this Technical Review Committee. And we have Sandra Mihalcik and Joan Stanley. Sandra has the machine on right now, and Joan is assisting her on her right there.

You'll find in your packages here, one paper that says "Technical Review Committee" and has three main topics--composition, function, and proposed procedures. And you also have in there an agenda. If you'll take out the agenda first, you'll see we're in the welcoming phase, and I'm going to go now into the purpose of the Technical Review Committee. Then we'll follow on with a little background on the history of the installation/restoration program, a review of some of the characterization step and feasibility study, then we'll be going out and taking a tour of the area to familiarize all of the

members of this one particular sight that we're looking at down at the Hadnot Point Industrial Area. Then we'll come back here, we'll have lunch--we'll go through a cafeteria line here--they have soup, salad and other things you can have for lunch, and we'll sit in the newly renovated dining room to have our lunch, and then after that, we'll come back and get into some of the implementation of interim feasibility study recommendations followed on by an overview on investigations of the Hadnot Point Industrial Area. We're going to review a community relations plan by our Joint Public Affairs Officer to make everyone aware of what we're doing to keep the public informed about what's going on here at Camp Lejeune relative to the installation/restoration program, and then the last half-hour will be more or less discussions, questions, and answers that you may have.

I do appreciate all of you taking time out of your schedules to attend this. This is a very, very important phase for Marine Corps Base, Camp Lejeune. The base has been here 46, 47 years now, and a lot of the past practices that were carried on here at the base were carried on with good faith and based upon what we knew at the time. A lot of disposal actions were carried on that now we're having to go back and take some actions to try to clean up. But at the time, those particular actions were what was the "norm" for the time. I'm concerned right now, for instance, we're removing asbestos from all of our buildings. In accordance with the current procedures, we're wrapping this asbestos in double mil plastic bags and burying then in a trench in accordance with regulations, in our landfill. I'm sure that maybe 20 or 30 or 40 years from now, somebody is going to come back and say, "You shouldn't have done that because of what it's doing to the ground water or the environment," and we're going to have to go back and maybe clean all of that up. But right now, that's the standard procedure that's being used to dispose of asbestos.

What we have found here in reviewing the various procedures, we've looked at records, and we took a look at where things were dumped, and we found out that a lot of the processes that we used have contaminated some of the environment. And the purposes of the Technical Review Committee, is to take a look at what we at Marine Corps Base, Camp Lejeune, are proposing to clean up this environment. The composition of the Technical Review Committee--I will be the Chairperson for this committee. We have representatives from the Environmental Protection Agency, North Carolina Division of Environmental Management, the North Carolina Division of Health Services of the City of Jacksonville, Onslow County Health Department, and of course the citizen members who have so graciously responded to our request to sit on this committee.

There's a wealth of experience, both technical and longevity type

experience, that we can call upon as we go through this. The functions of this Techinical Review Committee is to review and to provide us comments on the studies that have been made and the remedial actions that are proposed. It's to insure that we have very early and a continual ongoing coordination between the federal, the state, the local agencies, and the base, and of course the citizens of Onslow County and the City of Jacksonville. We need to enhance communication. So many times communication is the downfall of any endeaver we attempt in this world today, and we've got to insure through the Technical Review Committee that this communication is continual and ongoing.

Another function is to coordinate the agency review of these technical documents with the Federal EPA, the state agencies, the county, and the city, and the base, all this having a myriad of requirements to do. Sometimes it takes a long time to get things through the normal bureaucracy, and what we want to do is to insure that we are coordinating these things to get these reviews in a timely manner. We need too at this Technical Review Committee, try to resolve many of the technical issues that will come up. And we have a lot of technical expertise, and then we have a lot of people like myself tha don't have that much experience in this particular area of the environment. And of course then we've got to identify what are some of the remedial actions that we're going to be looking at in here.

Some of the proposed procedures that I have listed down there is that the meetings will be announced by myself as needed, and we will try to get you as much advance notice, but at least a minimum of a two-week advance notice to the TRC members. Knowing that all of us have our regular jobs to do and all the things that we are involved with, we need to have our plans made as much as possible, so I will try to insure that you have as much advance notice of these meetings as possible. The meetings for all intents and purposes will be held here in the Camp Lejeune or the Jacksonville area. We feel that this is the site where all of this is ongoing. Many times it may require visits out to take a look at what's going on, so it would be more advantageous, especially towards the citizen membership, to hold the meetings in the Lejeune-Jacksonville area.

I will continue to provide you information as it becomes available, will provide it to you to review, and I would like to try to establish a goal of at least a 30-day TRC review period. The Technical Review Committee as I mentioned earlier, will be transcribed for documentation in our Marine Corps Base administrative record. The Technical Review Committee members will be provided a summary report of the major issues discussed, like for our meeting today, and a complete transcript of what goes on, and the other documents will be provided to you on request.

Because of the tremendous cost involved in trying to reproduce all of the various documents, we'll generally just provide an overview of what transpired at the TRC so that the members can refresh their mind and say, "Yes, that's exactly what went on."

The meetings will be conducted to really encourage a fluid discussion and to provide me with the comments on the studies and the remedial actions that we're proposing. I'll guide the sessions towards identifying and defining the issues, discussion of those issues, and insuring that each issue is addressed during the remedial process. The various federal and state agency members are expected to serve as their agency's spokesperson. Positions that are going to be advanced by these members during the meeting, I'm going to consider as your agency's position. An expression of agency positions in writing is encouraged so that we can include this in our meeting transcript. Anyone have any questions relative to some of the things that I menitoned relative to composition, function, or any of those proposed procedures?

MADER: What generated this activity? Was it a directive out of higher headquarters, or a directive out of a major government agency, or something of that nature or is this----

COL DALZELL: It was a directive by federal law and the Resource Conservation and Recovery Act that we--the Federal Government needed to clean up the material hazardous waste sites throughout the country. And so it was this Federal Law under the Resource Conservation and Recovery Act that directed it, and then of course, the Department of Defense, under its various regulations, directed these programs to be established. And we initiated a study, in fact in the early '80's to identify here at Marine Corps Base, Camp Lejeune, as on other bases throughout DOD, to identify sources of contamination of the environment and to initiate a program to get them cleaned up. So it's a multi-facete program. The first phase is to stop whatever action is taken to contaminate the environment, and then to go in and clean up those areas that were contaminated. And we'll provide a little bit more background as we go through this today on how we got where we are today, and that will be provided a little bit later on this morning.

If there are no questions at this time, I would like to introduce Ms. Cherryl Barnett. Cherryl is our representative from the Atlantic Division, Naval Facilities Engineering Command. They handle all of our construction and other types of contracts for us, and she has been handling this particular issue for us at Camp Lejeune. Cherryl, I'd like to again welcome you and Nina, who is new to the program--she is going to be working with us on this--welcome them both from Norfolk here today.

BARNETT: Thank you, Colonel. I just want to give a quick overview of the installation/restoration program. I know some of you have a fairly good understanding of how the program is set up and what we're trying to do, and some of you are very new to it. I just want to give a quick overview so that we're all speaking the same language and we're all starting from the same point. I'm going to go through a lot of abbreviations very quickly, so if you'll look at the package that was handed to you out there, there's a list of abbreviations. If you don't understand something that I've gone over, you can ask me questions, and then later if you have a question, you can look at your list of abbreviations.

Okay, I do want to correct one thing the Colonel just said. The requirement for the Technical Review Committee is not a requirement of the Resource Conservation and Recovery Act. It's a requirement of the Superfund Amendment Reauthorization Act that was passed back in October of 1986. And there was a specific tasking in that act to ask DOD to establish these committees to review and comment basically on what they were doing at the various installations. Congress was concerned that EPA and the state and local citizens were not being kept informed of DOD's progress in the installation/restoration program. That's where the requirement originated from.

Actually DOD started their program back in 1980. We were concerned with again past hazardous material usage and disposal. We were concerned that we might be contaminating the environment of our installations. We started back in 1980--before the superfund amendment was something called the initial assessment study where we went out and looked for sites where we may have disposed of hazardous materials in the past.

The second phase of our program was called the confirmation study. That consisted of actual sampling to determine if we did have contamination and to look at alternatives for cleaning up the contamination. And our final phase, the "RM" stands for "remedial measures". That was originally set up to be our actual site cleanup.

Again, in response to the Superfund Amendment and Reauthorization Act, which is known as "SARA", we were directed to change our program so that basically it conforms with what EPA does under their superfund program. So we've changed our terminology a little bit, and unfortunately both sets of terminology are still floating around.

The first phase of the program is now called "preliminary assessment/ site investigation". The second phase which is the phase we're in now, which is basically analogous to our old confirmation study, is now called "remedial investigation/feasibility study" or RI/FS. And there are some additional requirements on an RI/FS that we basically didn't have under our old confirmation study. And that includes the Technical

Review Committee requirement, and that includes some requirements for public participation that we weren't required to do beforehand. It also includes requirements for public health evaluation and risk assessment to basically look at what are the risks that people could be exposed to contaminants from these sites. Again, these are three things that we weren't doing in the past, and we are now just starting to institute as a result of the superfund amendment.

The third phase is basically the same as the old remedial measures. It's the remedial design/remedial action or RD/RA. Again right now at Camp Lejeune, we're in the second phase, remedial investigation/ feasibility study. We started back in the early 1980's. We did an initial assessment study which is basically the same thing as EPA's preliminary assessment. That was completed back in April of 1983. And the study identified 76 sites on the base that may have been a problem, may have received hazardous materisl from some time in the past, and it basically performed an evaluation on the 76 sites and recommended that 22 could present a threat to health and the environment and should be included in the confirmation study or the second phase of the program. The initial report was completed back in 1983 under the state agency and the EPA should have a copy of it. If any of you citizen representatives are interested in looking at it, we can certainly get a copy.

Okay, what we want to talk about today is our confirmation study. Basically our remedial investigation/feasibility study was started back in 1984 with what we call "ground one". That was basically a series of sampling out of all these 22 sites to determine again whether or not we had any contamination. We installed ground one monitoring wells and collected soil samples, surface water samples, sediment samples, and we performed a whole range of analyses to determine whether or not there were contaminants present in all these sites. As part of that effort, we sampled a lot of the potable wells here on Camp Lejeune, and we discovered some contamination in basically eight wells that were immediately closed by the base. This contamination was from volatile organic compounds, is what they're called--benzene, trichloroethylene--things that you would not normally find in your water supply--things that EPA has ruled a potential human carcinogen. Basically, based on that finding, we initiated an accelerated study for the Hadnot Point Industrial Area which we abbreviate here as "HPIA", in 1985. It basically said, "Well, of these eight wells that are in th Hadnot Point area, what's causing the contamination? Let's look-- quickly see if we can pinpoint where the contamination's coming from. We can do a quick feasibility study to determine what our best method is of cleaning up, and let's do that ahead of all these other sites that we don't have an immediate health threat."

Basically what we're doing today is presenting the results of our study to the Hadnot Point Industrial Area. Yes, we do have these other 22 sites. We are still looking at those, and we will have some results to present to the Technical Review Committee probably within six months. But right now, we'd just like to present what we've done for the Hadnot Point Industrial Area, for you to take a look at what we've done, and give us your comments.

The Colonel alluded a little bit to what our responsibilities are, and there are a lot of people in this room from the base. I wanted to just explain what everybody's task is in this program. Again, I work for the Atlantic Division, and we're called the Engineering Field Division. There are six engineering field divisions across the country. We've been tasked directly with conducting the installation/restoration program for the various installations. And again, that goal was I think to insure consistency from one installation to the next. We're looking at contracts that are in the hundreds of thousands of dollars to millions of dollars. We have contracting authority for contracts, and that's another reason why we were assigned the responsibility. So our task is basically to administer the program, to manage the contracts, provide technical guidance, and to provide legal assistance as well through the Office of General Counsel.

The way the program is set up, the installation's responsibilities are basically to manage the public affairs program, and again, you'll hear a little bit more about that this afternoon. They're tasked with coordinating the agency review process, chairing the Technical Review Committee, as Colonel Dalzell is acting as our chairman today, and they're tasked with signing records of decision and interagency agreements which are basically steps that we have to enter into after the completion of our remedial investigation/feasibility study, and finally, to provide long-term operation and maintenance cost. If we should construct something in the Hadnot Point area for example, and it would require five years of treatment, then the base is responsible for the program and paying for the cost of that actual treatment alternative, and for long-term monitoring at any of these sites. That's basically the way responsibilities are divided up. Does anybody have any questions?

Okay, I'm going to turn it over to Bob Gregory. He's going to go over some basic----

SOUTHERLAND: I have a question.

BARNETT: Yes?

SOUTHERLAND: You mentioned 76 sites and 22 sites in the--Hadnot Point. Is Hadnot Point just one site?

BARNETT: Okay, that's a good question.

ALEXANDER: Good question--a very good question.

BARNETT: Actually there is more than one site in Hadnot Point. There are three of those 22 sites that are actually in the Hadnot Point area. The problem that we found is that the contamination of the well is not coming from any of those sites. The trichloroethylene and chlorine solvent that we're finding in our wells, we can't attribute to any of our identifying sites. So we basically made another site called the Hadnot Point Industrial Area, and we went and looked for additional sources. But again, Bob's going to explain what we found and where we're going to go from here. Anything else?

COL DALZELL: Thank you very much, Cherryl. Good overview on that there. At this time, I'd like to introduce Mr. Bob Gregory, who is going to provide us a review of the characterization study that was done by his company under contract for us here.

(During the presentation by Mr. Gregory, overviews were being shown as he referred to them.)

GREGORY: I urge all of you to ask questions as they come up. I'm going to present an awful lot of information that we've collected over the last few years, and I don't have an infinate quantity of time to do it, so I'm going to be going somewhat quickly.

JONES: Bob, could I ask one before you begin? You referred to ground water in the feasibility study, and there was a comment there that I didn't quite understand, in that it says "ground water is generally nutrient depleted," and then in one of your assessments, your remedial actions, you're going to have to basically satisfy this nutrient depletion. I was--in talking of ground water, I'm looking at rain washoff. Am I looking at the wrong thing, because that generally is not nutrient depleted?

GREGORY: Well, the answer to that question isn't all that simple. For the Hadnot Point area, what we're talking about in the document that you've received, is shallow ground water.

JONES: Okay.

GREGORY: That is in fact recharged by rainfall, infiltration from ditches and the like. As far as the nutrient loading, what we're saying in our feasibility study is that in order to maintain a polulation dense enough to treat the contaminants that are in the ground water, you have to add nutrients to it. So you know relative

to what a natural group of bacterial or whatever could be sustained in ground water, the natural levels that are nutrients might be foreign. But we're looking for a very concentrated dense or immunity that would have to be treated or fed nutrients in order for them to sustain a life cycle long enough to treatment of contaminants.

JONES: So the shallow--speaking of the shallow ground water, it does incorporate rain washoff?

GREGORY: Absolutely, absolutely--the storm water and the like. As Cherryl mentioned, in fact this is where some of the old language is still floating around the confirmation study. This is in fact the first phase of the RI/FS, remedial investigation/feasibility study, for the Hadnot Point area, which is why we're gathered here today. We conducted a number of specific work elements trying to determine where was that contamination with these volatile organic compounds which are waste solvent type compounds. Where are they coming from? I'll show you in a minute. The existing sites that have been identified by the initial study done in '83 did not identify those contaminant levels that could have gotten down into the ground water, so that's what we're looking at.

Specifically, what we started off was a detailed record search. This was almost a door-to-door investigation of all the buildings that were in the Hadnot Point area trying to find out what was there; what are people's recollection of what this building used to be 10 years ago, 20 or 30 years ago; what's being done there now. So we've got a long list of potential study sights to look at.

We followed that up with a soil/gas investigation. Soil/gas is a quick field screening technique in which you can actually extract soil vapors--the air between the soil particles--analyze it immediately right in the field with sophisticated field instruments and determine the presence of these volatile compounds. We call them volatile organics. They tend to evaporate quickly, and they would much rather be in a vapor phase than they would be absorbed in the soil or dissolved in water. So this technique allows us to take a large study area, and by inserting probes into the ground, which are just small tubes, extracting air, we could find where is there shallow contamination, and we can go back and do some later testing.

The main effort we've done so far is monitor the well installation. That of course is we've put in a well, we extract the sample, and we actually see what chemicals are present in this ground water. That was done for the shallow end and deeper zones within the Hadnot Point area. To satisfy a requirement that is really not needed at this point time but will be needed as this study progresses, we did an acquifer

test in the deep producing zone in the Hadnot Point area. That's a zone about 100 to 200 feet deep in which all of the drinking water and service water that's used on Camp Lejeune is pulled out of the ground. With that testing, we got certain quantification of acquifer perimeters. That will be useful in the future to determine rates of ground water movement and contaminant transport.

And based on all of the data that we've gotten out of this, we of course produced a report which most of you have seen. This is our assessment of what this data means at this point in time.

WEEKS: Bob, do you feel like you've fully defined those perimeters between the shallow and deep acquifers? One of our concerns is that that hasn't been fully defined yet, and we were just wondering what you felt about that.

GREGORY: Okay--certainly for the area of the pump test where that was conducted, both perimeters I think are very well defined. Whether those perimeters can then be extrapolated over a much larger area is another question.

WEEKS: Well, it was one our concerns.

GREGORY: Something to keep in mind -- the USGS is running independently though concurrently with our study--a general ground water supply study for the entire coastal plains area of the eastern coast. And certainly one of the areas they're concentrating in is the Coastal Carolinas, and they are doing studies specific to this region--Camp Lejeune.

WEEKS: Aren't there time limits as far as finishing that way beyond the time frames we're looking at? I mean, we're going to be pushed to finish this thing up.

GREGORY: Yes. We're receiving interim information from them--yes--so we are receiving information before our final report will come in on it. Because they run those open file type of projects, which means the projects never really close, they're always adding information to it. We're getting that prior to any reports actually being published. As we get that information, we will see whether that becomes sufficient for our needs.

WEEKS: So you're not going to propose any additional acquifer testing?

GREGORY: At this point in time, we haven't.

WEEKS: And you're not going to?

GREGORY: I can't say that at this point.

WEEKS: Okay.

GREGORY: Between LANTDIV and I, we sit down and we evaluate what information we have at certain points in time and determine if it's sufficient. Part of what this review committee meeting is, is to get those ideas out here and discuss them.

WEEKS: Well, there were several comments in the report that were not specific. It was "maybe", or "perhaps", things of that nature, and you know, those are technically what concerned the people in my Ground Water Protection Division which we haven't received comments back from yet, but I'm sure they're going to have some.

GREGORY: Okay--well, as those comments come, it's our position of course, to address those directly if that affects us.

WEEKS: Okay, I was just wondering what you had already planned because we'd already talked this morning, and you guys were already telling me things you were going to do that we weren't aware of that might clear up some of these issues.

GREGORY: Okay--well, that--to present our position on it so far, what we have proposed is the next phase of work order. At this point in time, it's my understanding that is not all the work we're going to do period. So there are opportunities to add to that----

WEEKS: Okay.

GREGORY: -- as we receive comments. Again, this is the first opportunity really to start getting ideas from all the technical people and all of the citizen groups that have certain concerns, and we'll try to blend that into an overall project.

WEEKS: All right.

GREGORY: As Cherryl mentioned and a direct question from over here, this is our definition of the Hadnot Point Industrial Area. This is Holcomb Boulevard, and coming into here is the Main Service Road to the south, Lewis Road on that boundary, and then Sneads Ferry Road at the top. This is the area that we are calling the Hadnot Point Industrial Area. Once you get outside of it, there really aren't industrial activities going on, and we also have some data that shows

that these types of contamination that are present here aren't present outside, so it's just by definition a study area.

There are additional study sites that are included in the overall RI/RF for Camp Lejeune, but not in the Hadnot Point Industrial Area, and that is a cross hatch that--I will show their proximity to our study. This is a burn material landfill down here which is just adjacent to the river, and a sewage treatment plant is down in this area. Site 24 is what appears to be a construction landfill--construction rubble, certain materials from the water treatment plant, the potable water treatment plant. Over here through the center part of the site, Site 22, is the Hadnot Point Fuel Tank Farm, which is a source of fuel contaminants in the ground water. Site 21, you see to the upper left, is a storage lot which has stored PCB, contaminated transformers, and some pesticides that's been stored there in the past. We are investigating these sites as far as part of the overall investigation. As I mentioned and Cherryl mentioned, the types of contamination that we've identified in this area is very low level and very dissimilar to what we're seeing in the deep wells in the Hadnot Point area and therefore they don't appear to be the sources of that contamination. They are in fact sources of other contamination that we are looking at, but they don't pose any sort of immediate threat. So they're being run through the normal process but weren't part of the accelerated process for that area there.

As I mentioned before, part of the reason that we are looking at this new Hadnot Point area, and once again it's definability between there and there in that sense, there are a number of water supply wells that are on the periphery of the Hadnot Point area and part of our water in the '84 time frame was to sample a number of these wells based on their proximity to some of the other sites, such as Site 21 over here and Site 22 here. This well in particular triggered this whole investigation. It was an active water supply well at the time, and by sampling and analyzing, we identified the presence of some of these volatile organic compounds, waste solvent, fuel derived materials. Based on that finding, Camp Lejeune initiated a self-sampling of all of these wells. You see all of them marked except for this one here, 603. The wells that are marked with this symbol were found to be contaminated and were immediately shut off and removed from the water system.

BITTNER: What kind of levels were you getting there in terms of the contamination of loading?

GREGORY: It depends on where you are. This was in the--and I'm speaking off the top of my head--it's been a number of years--30 to 30 parts per billion--fairly low but still toxic enough for you that you don't want to touch that water. Down in this area here, levels were quite high, into the thousands of parts per billion for awhile, and the ones along Sneads Ferry Road were down in the 10's and 20's again. That's changing with time. Since these wells have been shut off, those contaminant levels are changing. They're going way way down. What we feel is happening there is that you stop pumping the wells and the wells are no longer pulling that material towards it anymore and so naturally, it's flowing elsewhere. So it was of concern.

BITTNER: But where? What's the ground water?

GREGORY: We'll get to that in a minute.

BITTNER: Okay.

GREGORY: That's part of what I'm presenting, and it's also part of the additional work we need to do.

As I mentioned, the first phase of our work was the records search. It was almost a door-to-door search of each building in the Hadnot Point Industrial area. Based on that, we came up with a number of potential source areas that we needed to look at with further investigation meaning soil/gas investigation, monitor well sampling, and then our feasibility study. To give you a brief overview of it, starting at the top, this group of buildings here is up north of the Hadnot Point or the Sneads Ferry Road area, and we identified the presence of an underground tank that used to be for TCE storage, one of our solvents that we're looking at, general engine maintenance in that area--a lot of maintenance occurred just in an open field. We need to work on that. They drained all the engine fluids, it went into the ground, and they proceeded on with the maintenance.

That of course has been changed in recent years, and going back quite a few years in fact. That no longer occurs. But as Colonel Dalzell mentioned, way back when that was first initiated, that was the normal procedure everywhere in the country. So that has created a problem. Building 1100, which is on the Holcomb Boulevard area, a very small but a former service station, and at the time of our investigation in '84, there was an empty drum of solvents located outside. It's a solvent that's being used for dry cleaning and other types of functions currently, so that's why it was here, but why it was at that sight, we don't know. So we looked at that site.

This group of buildings here, paint shop and emergency maintenance, again, the people on this list here, these buildings are not identifiable sources. Positive contaminants came from here. What it identified is that these materials were used in the past some time or they're being used now. We need to go look at them. Is there a potential problem here? We did not identify that it is in fact. The paint shop and emergency maintenance, just by the mere fact that they're using solvents, they're using those types of material, we need to go look at it. The Base Maintenance Shop documented solvent use in storage. This of course, as many of you know, is a big maintanance facility there, and those types of material are present. In the 1300 series of buildings here, sort of a fringe type of situation, solvent usage was documented there, but it didn't appear to be any problem, but solvents were present, and we need to go look at them.

We start moving down to this whole group of buildings on the southern end of the Hadnot Point Industrial Area, 1500, 1600, 1700 series buildings there, and a very large motor vehicle maintenance facility. There are signs of brown stains from oils and greases, black spots, maintenance racks, storage tanks, and the like, a very likely candidate for us to go look at. And the point to make out here is that there are many many other buildings within the Hadnot Point area. Those not included on the list were purely administrative buildings and/or warehouses--buildings for nontoxic materials. So they were looked at, but they were not looked at further because there's absolutely no record of there being anything of concern in those buildings.

CAULFIELD: I have a question.

GREGORY: Certainly.

CAULFIELD: Have you--on that chart--I can't see it--maybe you had it on another one, but do you recall or on your research, showed an area near that 1600 area where the Bulk Fuel Platoon of Force Troops had their training and maintenance area? Also, they used an area across the road on the left going out on Holcomb Boulevard, near the old theater, for training.

GREGORY: Okay, we--as far as anything around in this area, yes, we've looked at, and yes, we're familiar with all the fuels in here. Up toward the drive-in theater area, we did do specific investigations out there. There are some landfill areas, construction rubble type things, and we did some of the soil/gas work that I described briefly.

We've looked in that area, and we did not find any--nothing whatsoever. So there are a lot of areas that were used for things, but we have no evidence at this point to show that there's any sort of problem. We have identified within this list here a shorter list with definite problem areas.

HUMPHRIES: Question--I realize it's pretty easy to identify the stationary or the buildings that are stationary. How about those moveable sites such as motor parks, tank partks, engineer type units, where they're parked out in open fields?

GREGORY: Yes, the initial assessment study, the one that was completed in 1983, which identified those 76 potential sites, it's my understanding that all of that type of possibility was looked at. That was a sit-down with the commanders of different divisions within Camp Lejeune, find out what the activities were, where did you use them, and to get a list of where those sites are. They're spread out all over the place. Their training areas--they've been investigated. It may be verbal discussions, whatever's applicable, but they have been looked at. Those that were questionable, if there was some possibility of fuel disposal or solvent disposal, those were looked at as part of the 22 sites and they're included in the overall study, but it has been evaluated.

Certainly, we encourage anybody that has specific history of a specific area that isn't included in any of these studies to please come forward and let us know about it. Camp Lejeune's a very big area, and there's always the possibility of something we missed by the fact that we didn't talk to the few individuals that knew what happened in that spot. So we're always trying to seek out that information.

CAULFIELD: Bob, I would imagine that you've been to Bluebird then?

GREGORY: I don't know that one.

CAULFIELD: The training site that's at the Hammocks's Beach Road, all the way out. It's on the left. That's where they--the Bulk Fuel people--usually set up there for our major operations out here. And also, they had the first Harriers in there for training, and the Air Wing has always had their fuel dumps there--which actually the Bulk Fuel Company was in there too. And I've been out there year after year with some of those units.

BARNETT: Can I interject here for a second? I brought a copy of the initial assessment study. Perhaps maybe during the break, if

you take a look at some of the areas that we did look at, and if there are additional areas that you know about that aren't in here, certainly let us know, and we'll take a look at them.

CAULFIELD: I'll be glad to do that.

BARNETT: Yes, I'll leave that out here on the table and--for anybody who wants to look at it.

CAULFIELD: I just threw that one out because I know it's a big one.

GREGORY: Certainly, let's keep that one in mind.

COL DALZELL: Now any actions that we are doing now, like these operations out at Bluebird, we do an EA, environmental assessment, before any of these actions take place, so if they are going to be doing refueling operations or all of that, they have to show us in the environmental assessment exactly what mitigation they're taking to prevent these contaminants from getting into the ground water.

CAULFIELD: Thank you, Colonel. Of course, in our day--I mean things are new and different today.

COL DALZELL: Yes.

CAULFIELD: And I have to keep remembering that----

COL DALZELL: That's right----

CAULFIELD: --how far back we go sometimes.

COL DALZELL: --but a good point, Tom.

GREGORY: Okay. What I want to do is quickly go through the soil/gas data that I've got. Again, keep in mind what the soil/gas data is supposed to do for us. It takes a very large area of investigation and lets us very quickly, in a matter of a week or two, determine, are there spots of contamination, and we then have to go back and monitor the wells, get soil samples, and some of the field techniques take longer to do. We have to actually construct something. We take samples, and they go to the laboratory, and it takes a couple of weeks or a month to get the data back. If we put a well or a sample in the wrong spot and it's clean, that doesn't help us find where the contamination is. Soil/gas helps us do that quickly.

Okay, we're on the Sneads Ferry Road here, the northern part of the industrial area--and I identified the fact there was an underground

storage tank that had TCE in it in the past. It's located right about here. The closed circles and the open circles indicate where our soil/gas samples were taken, and of course these black dots with the numbers associated with the protected bodies of TCE, trichloroethylene, which is the primary compound that we're been looking at here. Again, this whole area in here was identified as just an open maintenance field. In the past, the vehicles were worked on there. The parts were cleaned directly on the ground. Those materials soaked in. So we've got an area here that is definitely worth further looking at as part of our study.

We move to the south through the industrial area--this is Holcomb Boulevard here. This is that small former service station area. And as you can see, we took a number of soil/gas samples around it and actually detected some TCE present at that little spot. So again, it warranted further investigation as part of our study.

This is the Base Maintenance Shop--this oddly shaped building--1202. This was the Base Maintenance Shop--obviously still is. The solvents were used there--paint, fuels, all sorts of things. We took a great number of soil/gas samples from around the area, and as you can see in the central part here, we got some fairly high levels of the 37,000 approximate parts per billion. So that's a fairly high level. Again remember, these are soil/gas samples. These are evaporated solvents that are located in the interstitial spots in the soil particles. If you were to dig that soil up and expose it to the air, those things would evaporate further and disperse. Now we did identify potential for contamination in this area. There were some fairly high levels.

As we move further south towards the 1500, 1600, and 1700 series buildings, again, these are large motor pool maintenance areas. As you can see, we've got even higher levels in this one spot, 703,000 parts per billion. That's quite high, and lower levels around. So once again, we identified that. Yes, our record search information was correct. This is something to be looked at.

Go to the very southern end of it, 1700 series buildings. We identified a couple of spots here--33,000 to 35, so there's definitely still some contamination here. Of course, the 1600 series buildings you saw earlier up there, but there's still some contamination present down here in soil/gas samples. And what that did for us--we had this larger area.

Now we go ahead in and put in monitor wells to find out what's in the soil/gas, what's actually in the water, because that's the

material that happens to move. It migrates and gets into our drinking water supplies. So based on those soil/gas values that we detected, we needed to put in a number of monitor wells to try and detect what are the levels in the ground water and in which direction may the water be moving. As you see, we have numerous dots down here in the 1500, 1600, 1700 series building to try and determine what's going on there. At building 1202, we've got a number of wells around it, trying to determine what is the strength of the center of that soil/gas high spot, and what might be around it. Wells previously existing over here in the 900 series buildings, there are a number of wells up in there. These different symbols here were well clusters. At Camp Lejeune, there are a number of different water bearing zones. What we've been looking at so far would just be the shallow ground water. We put in a 25-foot well approximately, and there's about 15 feet of ground water in it. So the water's within 10 feet of the land line surface. So we monitored that zone.

Below that we have water bearing zones that go all the way down to great depths, but water that's being extracted for drinking water and for service water at Camp Lejeune and in the surrounding community is coming from about 100 to 200 feet. There's a sand zone there that produces a lot of ground water. That's what we saw contaminated in these water supply wells marked with triangles. That's what we're looking at in those deeper well sites. So in three areas, what we thought to be the three main source areas within Hadnot Point, we have the 25-foot monitor well, the 75-foot well, and 150-foot well in these three spots right there. The idea is to try and get some sort of handle on what's the vertical distribution of the contamination. We've identified it so far as soil/gas as being in the shallow ground water or can it be elsewhere. That's where these wells came from.

BITTNER: Is there interaction between those different levels of acquifers?

GREGORY: Yes, very much so. In answer to an earlier question, if you measure water levels in all of the wells that we installed, you can come up with the ground water contour map which will tell you in which direction ground water flows. Now these contours come from the shallow acquifer which is what we have--over 30 shallow monitor wells, so it's fairly accurate. What it's showing is that from a height up in the northwest corner, the ground water generally flows to the south, and little bit toward the southwest. It's heading towards the river. Of course that's to be expected. So any shallow contamination that might exist in any of these source areas is flowing perpendicular to these flow lines as we go from highest elevation to lowest elevation.

Because we only have three monitor wells in the 75-foot zone and the 150-foot zone, we don't really ahve enough data to generate these contour maps to answer the question "Where's the deep ground water going?" Now that the supply wells have been shut off, where's that contamination that we tested for--where is it going? We don't have that data. That would be part of the next phase that's coming up, which I'll describe in the afternoon session. And so this tells us which way the shallow ground water is going.

JONES: Bob, from that I take it that what you're saying is that the wells that were closed, then the eight wells that were closed initially, were classified as deep?

GREGORY: Yes, that's correct. And they extracted ground water from multiple zones from 100 to 200 feet total depth. That's true almost throughout the entire Camp Lejeune area. What I'm doing here is going back to the locations of the soil/gas data that we had earlier and install monitor wells there to figure out what is in the shallow ground water. We took samples, ran those samples, we collected them and reset the data approximately 60 days apart to get some sort of time variations with these contaminants. And we collected some significant data from these points. The underground storage tank again was right over here, and this monitor well here shows--of one our solvents, rather than TCE we're seeing DCE, which is a slightly different solvent, but still a solvent. It can possibly be a degradation product of TCE, but it may be a solvent all on its own. We see some fairly high levels. These are parts per billion in the ground water itself--in the shallow ground water.

As we move out in this direction, we don't see any of the volatile solvents that we've seen. Methylene chloride is a solvent material. It's a troublesome compound, but it's possible from the data shown in that set two, at this well, we'll see some more. It's possible that's a laboratory contaminant. It's a commonly used compound in any laboratory. It's extremely volatile. It evaporates quickly, and it can get absorbed on to certain materials. We don't think that's really environmental contamination. That was just a laboratory problem.

So out in that direction, if you remember from my ground water contour map, the water is flowing this way. It doesn't identify any certain problem out here. One thing to note, we always have oil and grease. In most monitor wells throughout Camp Lejeune, we're always seeing oil and grease showing up at lower levels. Again, related to the industrial vehicle traffic all over the base. It seems to be a common problem.

As we move down this way, which is generally downgrading of what used to be this open maintenance area in here, and using TCE, we got some fairly high levels of both TCE and DCE on this map as well. Something to note too, is look how it changes through time. You're never going to get sets of data to replicate themselves. You can wait months. It all depends on how much rainfall, how the ground water levels fluctuate, but we definitely have ground water contamination here.

Another thing to point out, this fence line that we have here is our Site 21, which once again is included in the overall investigation. We have a monitor well right here. It wasn't done as part of the Hadnot Point area, but it was done separately. We don't see those compounds right here, so we do sort of have a limit of contamination coming right here, but it doesn't appear to have gotten this far. This is where I was talking about. The fore building 902 right here, and then further south in the industrial area, we have a number of wells here. This is the original water supply well. That was found to be contaminated. If we looked in this area here, this is related to the Fuel Tank Farm, as is this facility here, fairly high levels of fuel related compounds here--benzene, ethylbenzene, toluene, xylene, they're all common constituents of fuel. Obviously we've got a fuel problem here.

As we move out this way, these fuels dissipate almost completely, and you see a little bit of lead there, but not much else. So any fuel problems related here doesn't seem to move too far. Building 1202 is located right here in this area, and we're looking for sources of contamination to water supply wells. If you'll look through this fleet of detected compounds, none of those compounds are seen in the water supply area. So therefore, this is the source of contamination, but it's not the source of the TCE and the DCE that we saw in the deep zones.

BITTNER: Are you going to get involved later on--I've been involved in the ground water contamination issue years back, and it's always a concern in terms of--the term was used before "suspected and known carcinogens", and at what level are some of those compounds in terms of EPA's current standards--take a well out of a potable use and make it contaminated?

GREGORY: That's an interesting question. We will be, as part of the proposed work effort coming up later on this fall, we're doing public health evaluations and you may have also heard the term "risk assessment/danger assessment". That's a fairly rigorous process by which those questions are answered. All the data that we have to work with is derived from EPA in experimental research with laboratory

animals. That's where these terms "suspected" and "possible" come up. Certainly the laboratory animals are chosen in that their responses in certain organs are similar to humans. So if those laboratory animals can get cancer from these types of chemicals, then it's a probable percentage in humans because we're saying that the response should be fairly identical. So from a scientific point of view, yes, that would be part of the public health evaluation that will be coming up. We'll identify that.

The other side of that is what are the applicable regulations. We come into a term called "acceptable risks". The EPA specified certain levels of the suspected and probably carcinogens as acceptable risks. Certainly the State of North Carolina can have their own set. Whichever is the most stringent is the one that will be applicable to our situation. And then there is a long list of compounds that there is really insufficient data now to identify what are the safe acceptable risk levels. So our public health evaluation will go through all of that and will come up with levels that are acceptable in soils, ground water, and surface water based on those current regulations.

BITTNER: In your list of contaminants there, you've used the term "trichloroethane" I believe. Does that take in the whole family of the 1-1-1's and so on or are you just using that as a generic term?

GREGORY: Trichloroethane?

BITTNER: Yes.

GREGORY: I'd have to look up the specific one. There are trichloroethanes that have data available for them and then there are others that do not. What you have to come up with then is either federal or state ARARS, applicable----

BARNETT: Evidently----

GREGORY: --relevant and appropriate requirements, or some other language. It's done on a case-by-case basis, hopefully with everyone's input into it. So the question of trichloroethanes, there are a few that the data are available for. To be conservative, a proposed approach might be that all trichloroethanes be handled in the same manner. Unfortunately, what happened, there are compounds in which no regulations exist for. So in theory, that means no one has to do anything. There are no rules or guidelines. From a scientific technical point of view, you've got to address them as part of the examples of contaminants, but be conservative. It's a general approach on this public health thing.

Okay, we're back to that small former service station--Holcomb Boulevard—we're still in the 1100--in this area. We put a monitor well right next to it to try and look for TCE that we saw in the soil/gas. In the first set of data, we did see TCE at 6, and TCE at 2.5, and the oil and grease seems to be there most of the time, and in the rest of the data, it goes away. Those levels are very close to the instrument's detection level which is only one part per billion. So if you have some ground water fluctuation, if you have extensive rainfall, these low levels of contamination get diluted and you don't see them anymore. The bottom line is that it's still there. They're still there in very low levels. So as we do additional work, we'll determine whether those low levels pose a significant threat to health and the environment.

We're down to the 1500 and 1600 series buildings. Remember we have some fairly high soil/gas values in this central area here. We installed a number of monitor wells around to see, are those values you saw in the soil/gas, were they actually present in the ground water, and in some cases, yes, they are. We've got TCE, DCE, present in some fairly high levels. In this well in particular, we're starting to see ethylbenzene, xylene, lead, and some other fuel derived contaminants, and so we have a double source here, solvents and fuels. And as we look around other areas, this well located over here, we have TCE, DCE, chloroform, which is degradation products, TCE up in this well also, and also up in this area, we've got a different list of volatile compounds. Those tend to be more freon based compounds--air conditioner, refrigeration--those sort of waste materials are present in that area.

Now once again, we've identified--record search identified potential--soil/gas identified, yes, there is contamination in the soil vapors, ground water, shallow ground water type problems there.

JONES: Bob, can we draw on the analysis? I see again, on every one of the areas that we've looked at except one, showed a higher degree of contaminants. Was there any attempt made to try to relate to rainfall and other things that might impact or influence these tests?

GREGORY: What happened in between the sets of data, we got into more and more of the dry season basically. What happened--the ground water levels fell. And what could be happening, and this is something that we'll be addressing in the upcoming work, we don'g have the direct answer to that, but the potential problem could be that we have what's called residual contamination that's in the soil. We've got pits, tanks, just spilled areas. A lot of these materials will

absorb into the soil particles. They'll be stuck on the outside of it. As the ground water levels fluctuate, when the ground water levels are up, all of a sudden relatively clean ground water, say in the set three data, rises up into one of the contaminant soils and starts to pick up some of these. That may be what's going on.

JONES: What I'm--I guess the bottom line--what I'm saying is that we shouldn't draw any conclusions that there has been a reduction?

GREGORY: No, not at all. It's there. Certainly in the long range naturally you're going to get pollution from rainfall that's coming in clean. It's going to get polluted. There are certain biological and biochemical things that happen naturally in the ground, certain critters might eat the stuff up, but that is so long term that it is insignificant in any sort of time frame that we're talking about here. So the reduction that we're seeing here is purely related to the differences in ground water level, rainfall and the like. If we took samples continuously, you'd see things that would go up and down. So it's still there. Even in some of those areas where in a case like this, I would not say that we no longer have to worry about that spot. All that's happened right now is the levels dropped below our method detection level, about one part per billion. In the future, it'll be back up to 7, 010, you never know. So for our 1600 series buildings, we've identified a pretty siginficant source of these volatile solvents.

Part of the investigation was to look at all potential cleaners. We didn't really have any indication that the current service station is presenting any problem. But since we were out there, we needed the ground water data, flow direction, and that sort of thing. We installed a number of monitor wells around it to see if we were having any problem with this gas station. Another reason for that is well 603, which is still operating and has remained clean through time, is located right over here on the other side of Holcomb Boulevard, so we wanted to see if there was any contamination moving toward that well. Well, in the shallow zones, once again, all we're seeing is oil and grease, and honestly, we've seen oil and grease in just about every monitor well we've put in in the Camp Lejeune area. A little bit of lead from this one set of data here. The standard for lead in the drinking water is 50, so it's present, but it's below the--any sort of action limit there. So it doesn't look like the gas station is the source of any sort of problem, certainly not the volatile solvent problem that we are seeing in these supply wells.

Going down to the 1700 series buildings, we did have some soil/gas readings in this area, and we do have a contaminated water supply well which is located right here. So we want to look at what sort of things did we see in the shallow ground water there. Up here very close to the maintenance area, we've got benzene, toluene, TCE and DCE, so we have a mixture of solvents and fuel waste. They're present in fairly low levels as we note, and of course, the levels have changed with time.

We move into this area here, these POL, petroleum, oil, and lubricants. These are what we call separator type facilities, and once again, we're seeing the same thing, though in this area almost totally fuel related, lead, oil and grease, and benzene, ethylbenzene, toluene, xylene, which are all gasoline components. We move down into this area, you've got gasoline--primarily oil and grease--and down here, once again gasoline, trichloroethane, which I believe is a currently used solvent now though much less toxic. That's a standard issue now. So in these areas down here, we've got a contamination problem. It is not the TCE or DCE things that we saw in the deeper ground water. That appears to be more located up here in the 1600 series. But we've identified a number of problems down here.

We have a number of other monitor wells that aren't really related to any specific potential source, but we needed to look at for specific reasons. All of those water supply wells in the black dots, the wells that were shown to be contaminated and were shut down, we put in shallow monitor wells right next to it to try and determine is the contamination that we saw in the deep wells, is it related to the shallow source sitting right at that well, or did somebody dump a drum of solvents right next to the well and it soaked straight down into it. And in most cases, that was not at all what seemed to be going on. All we're seeing once again everywhere is oil and grease, a little bit of lead below the standard of 50, and unfortunately occasionally we keep seeing this methylene chloride popping up, and it's always in this set two data. So once again, we don't think that's an environmental problem.

I've already discussed this well in the previous overhead. It's got a list of fuel derived contamination, and it's in the general maintenance down here. What we're seeing in well 608, a deep well, is a mixture of some of the fuels, and then the TCE/DCE is showing up again. So it's not necessarily related to the shallow stuff right there.

To fill in some of the other areas in the Hadnot Point area, just in case that our record search and/or the soil/gas missed a couple

of potential sources, we put in a number of monitor wells that really aren't related to anything whatsoever at all. They just filled in gaps in the data base and would help us determine what the end of the contaminant flume might be. So I think in the Hadnot Point area, we've really got a very good coverage in the shallow acquifer. And as you can see through all of these data sets, primarily oil and grease is showing up. Tetrachloroethene, which is another solvent base, shows up here. Well number 12 in this area, which is located just to the north, shows high contamination here, and just to the south, a potential contamination that we saw in here. Oil and grease and lead we saw down here.

Now something that I haven't mentioned at all, the contamination that we saw at the Base Maintenance Shop 1202, we found some pretty high levels in the soil/gas. We installed a number of monitor wells right at the Base Maintenance Shop. Nothing was detected in the ground water at all.

Moving back to the soil/gas slide--these are the soil/gas numbers. We installed a number of monitor wells in the area of these highest values in the soil/gas. There is a well located right here. There is a well located out in this area, and there's one on either side here. No solvents were detected at all. Oil and grease or anything weren't detected in the shallow ground water. So that becomes a real puzzle. We were wondering what in the world was going on there. That is something we're going to investigate in the future, but our impression right now is that this entire area of the Base Maintenance Shop was paved over. We saw roadways, storage lots, parking areas, and what we did with our soil/gas is we actually drove the probes through the asphalt/concrete and pulled a sample there. What appears to have happened is that there were sources of contamination in the past there in the shallow ground water, or in the shallow soil. Once again, these compounds that we're looking at are very volatile. They want to evaporate immediately They have. They've evaporated. They've tried to move upward through the soil zone, but then they hit, which is essentially a permeable cap there. They are caught and concentrated underneath the pavement and/or concrete work areas. By taking our soil samples--or excuse me--our soil/gas samples, we were extracting those which seemed to indicate that we had a problem. Ground water wise, our monitor wells were right in the hot spots. There's no TCE or DCE or any volatile solvents in the ground water. So it's a bit of an enigma. It's also somewhat positive in that we don't have a shallow ground water problem here.

I'll go into it in the afternoon session how we're going to address the enigma there. I mentioned that we will be looking at some soil samples.

To go backwards again, this is our distribution and monitor wells everywhere. I mentioned these were well clusters here in which we identified shallow contamination down in this area, and then up in the 900 series buildings. Once again, the Base Maintenance Shop with the wells around it, didn't identify any shallow ground water problem. We went back and installed deep monitor wells there. These volatile solvents that we see in laboratory experiments, if you were to pour solvent into a column of water, they're not very soluable at all, and very heavy relative to water. They'll sink to the bottom like a stone. So there's a possibility that okay, we didn't see shallow ground water contamination at 1202. Maybe that's because it's moved through the water column, through the sediments and is actually deeper. So we went back and looked at deeper zones of ground water, the 75-foot zone and the 150-foot zone. The 150-foot zone is right in the middle of where the potable ground water is extracted by these water supply wells on the fringe of Hadnot Point. So we dug right in the middle of that zone.

We went and installed those well clusters here, here, and here, and in all cases, except for right here, we found no contamination whatsoever. In this area and this area here, we found MEK, which is another solvent type of compound. I believe it's still sold in stores as an acetone like compound. It's also a catalyst to plastic, polyester, resins, and that sort of thing. So it's a compound available today. Here and here, we found fairly low levels of MEK. What's our concern there is that we didn't see MEK in any of that shallow ground water in any of those sites, and there are 30-plus monitor wells here. So we've got another enigma there. We've got shallow ground water contamination. The compounds in the shallow ground water are very similar to what we saw in the deep wells. When we drilled deep below the source areas, we identified only one compound, and it's not any of the ones we saw out here in the water supply wells drinking site. So we have a question area there in the deep acquifer. We don't have all the data we need to describe the situation. Additional data will be collected in the future regarding that. MEK is a compound to be concerned with, so we need to look at that. For the shallow acquifer therefore, we can with some computer models sort of put together two zones of ground water contamination that may be present in the shallow ground water that will require remediation. These things are centered. This is 1602--1601 area with a certain zone or flume of contamination around it. Up to the north, we've got contamination derived, and it's probably from the maintenance facility right there, and then underground storage tanks. It's now centered a little bit to the south, which is the way the ground water flows, and we've got some fairly high levels there.

In addition to that, any proposed treatment system for volatiles can also remove, in addition to TCE and DCE, tetrachloroethylene, and solvent things. It can also remove fuel based volatiles like benzene, ethylbenzene. We've identified a fuel problem at the tank farm, and so any treatment system would probably include that. So we've got these two major zones of shallow ground water contamination. We feel we've got a very good handle on where that shallow ground water contamination is, and unfortunately we don't have the data for the deep zones, and we'll seek in the future with additional work to get that data for the deep zones.

In order to try and fast track some sort of remedial action in the Hadnot Point area, we initiated a feasibility study which selects a good technology to clean up a contaminant problem, and we call it "focus" because it's focused in on the shallow ground water only. We don't have the data to look at intermediate deep depths of ground water. But certainly we feel that any steps that can be taken to clean up the shallow ground water contamination are compatable with any long range remedial action for the overall sight. We know that the shallow contamination can be pretty concentrated, so let's take some steps to try and start cleaning that up.

Our feasibility study consisted of a number of different steps. I'll go through them briefly. We talked about this a while earlier related to risk assessment or public health evaluation. We've got to establish some sort of drinking water standard or target standards. If we clean this place up, what standards do we have to meet. And we looked at these ARARS as we described earlier, MCL's, or maximum contaminant levels, and they can be either federal or state based. We collected that information and any sort of technologies that we're looking at for cleaning up the shallow ground water, we've got to meet those standards. It's a simple criteria.

Specifically, we looked at five interim remedial actions. That's what the "R-A" stands for. What can we do right away to minimize any exposure or risks for these shallow contaminants, and look at it in a more detail study of what the long term remedial actions, what types of technologies should we pick to clean this ground water up so that it will meet any standards that apply? As I mentioned, we conducted a detailed evaluation of these long term alternatives. Based on that evaluation, we came up with a recommended preferred alternative for cleaning up shallow ground water, and on top of that, we've identified any data gaps that might exists that would feed into a design package for this preferred alternative.

Later on, Bob Alexander will go through those interim remedial actions that we came up with. Again, they're designed primarily to minimize or eliminate any potential exposure while this study is continuing. Are there certain steps we can take right now to minimize that? Bob will go through that in a little bit.

What we're looking at, we've got volatile organic compounds present in the ground water. Now typically though, those compounds are toxic, and they're relatively easily in the grand scheme of things to remove because what they want to do is really not be in the solution. They want to evolve. They want to evaporate. So there are a number of treatment technologies that we can look at to try and do that best. "Best" means something that can be accomplished quickly, and something that is cost effective, doesn't cost incredible sums of money, and yet it's still effective, still meets the goals, including the risks.

We selected five different types of technologies that can be looked at that are effective for groups of compounds that are present. Trickling filter biological treatment--simply stated, this is the existing sewage treatment plant here on Camp Lejeune. It has that technology and that technology has the ability to extract these contaminants from the water. The other option would be to put in what's called a "plastic media biological tower". It's the same sort of process except it's a natural plant that you would install next to the site and try and treat these ground water contaminants through columns loaded below the bacteriological cultures that could grade the compounds that we've seen. Carbon absorption is another. Carbon has a strong affinity for volatile compounds. If you flow contaminated ground water through an activiated carbon cylinder or vessell of some sort, it has a very good ability to remove those compounds from the water, stick it on to the carbon, and then the carbon is handled as a waste material through certain affirmative operations. A very effective way of removing volatiles.

Air stripping is a technoloty in which where columns of water are established and you force air bubbles into that water column, and once again, the contaminants that are in solution in the water, leave being in solution, get into the air column and are extracted through the column. Steam stripping is a subset really of air stripping. Certainly, as you increased the temperature of your air stream, your removal efficiency goes up, so it's potentially quicker and more effective from a time frame point of view. But it costs more because you have to generate the steam as opposed to just using regular air. This was considered because there is a steam source available over here on base, and so that's why it was considered.

I'll briefly go through what the feasibility study looks like, and I don'g really have time today to look at all of this. The feasibility study looked at a number of different aspects. The given in all of this is that technology has to work. We're not trading off, "Well, this costs a lot less, and although it's only 50 percent effective,

we only have this much money, that's why we're going to use this." That's not at all what the feasibility is. It has to meet the water samples that we're looking at, so it's got to have that performance. It can't be a very flaky technology, and that's got to work, and that has to do without any sort of constant maintenance on it because that does cost money. So we're looking at over realibility. Implementability relates to a number of different factors. Is there the land space needed to build say a small treatment plant? Are there certain air emission standards that apply to this treatment plant? Do we have to look at state, federal, even local type of regulations? Is a proposed location for a treatment plant located adjacent to some environmental offensive or social sensitive facility in the town? So we looked at that also, and is the operation of the plant, whatever the treatment facility is, is it safe for the people working there and the adjacent population?

So we've got to look at all of those potential factors. The environment/instructional benefits, we've got to look at those type of factors for cleaning up ground water. What are we going to do with that ground water? Do we inject it into a reusable resource? Do we discharge it? There are a number of different factors down there, and then of course, we have the most important one--cost. What does all of this cost? If there is a technology that is 800 million dollars and there is one that is 8 million dollars, and they're both equally effective, why would you pick the 800 million dollar one? It doesn't make any sense. So that's where the cost and the money comes in here. We're looking at an effective way of doing it, but it's got to meet all of these technical perimeters first. It's got to satisfy the regulations and the health needs of the public.

Rather than me going in depth on each one of those five long term alternatives--that could go on for hours--that exists in the feasibility study report which I think everyone has as part of their package, I'm not going to go through each one of these tables. I think it's pretty dry. The bottom line is that two alternatives popped out in this whole analysis. All of the technologies that we picked were effective, in that they could meet the standards. They would work. They are safe to work with, and some of them are relatively similar, but the main deciding factor--controlling factor here--was cost. In picking alternative one, which is the available sewage treatment plant, it makes the most sense. It's present here. There's certain costs involved in getting the ground water out of the ground, piping it and pumping it all the way to the treatment plant. The treatment plant would require some upgrading. It's permit would have to be looked at because it's now treating volatile compounds and that's not part of it's permit now. And so it has to be looked at for that, and any adjustments to monthly monitoring

at the plant, those are all cost elements that went into the selection. However, it is a lot cheaper than looking at some of these other ones.

The second alternative, which is relatively close, and the reason we're putting it in there, there are certain problems with this. If the permit can't be upgraded, and it involves some sort of major problems in the permit process, then we can drop to the second alternative, air stripping, which is to build a small plant, and as I mentioned earlier briefly, we'd pump ground water to this plant, and what essentially happens there is we bubble air through the water column and it extracts the compounds. It is very effective. There are certain permitting things that have to be looked at for that too, and in an unregulated air stripping plant, you can--and what you're doing is that you're transferring the contamination from the ground water and you're releasing it into the air. And of course, there are air standards, federal, state, and local based air standards that would have to be met, so there are some permits there. But in general, these come out cost wise as being the most effective ways to handle the contamination in the shallow ground water.

WEEKS: Bob, how are you going to address the lead contamination with technology?

GREGORY: The lead contamination that we see is below standards in shallow ground water.

WEEKS: But there was one that was 52, I believe, in one of the last slides that you showed.

GREGORY: Okay, what we're doing with lead, we are specifically, in our analysis so far, as we composite all of the water coming into the plant, lead will be below the standard by a great deal.

WEEKS: Okay.

GREGORY: We've identified some additional data in these. We're not saying we're going to dilute and that's why it's not a problem. For the data base that we had to come up with for this alternative, lead did not appear to be a problem. We are proposing some additional work to verify it, but lead is not a problem. If in fact it is a problem, then there would have to be a lead retreatment system included right before the air stripping to get rid of the lead.

WEEKS: And how would you incorporate that in your STP?

GREGORY: The same thing--we'd have a retreatment system set up so that doesn't overload the STP option.

WEEKS: Which would be easier?

GREGORY: It's really the same unit.

WEEKS: To implement----

GREGORY: I don't think that makes the cost selection between one or the other. I think what's really going to do it is----

WEEKS: I just don't know how our various branches are going to respond to the lead issue, and I just was trying to get you to think about that and see what you----

GREGORY: Well, it's been thought about.

WEEKS: I'm sure it has. I just wanted to see--to get your opinion.

GREGORY: Certainly, let me get into that in a minute because, you know, we've got specific plans of how we're going to handle it.

WEEKS: Uhmm-hmm.

BARNETT: One of the things proposed was a pilot test to look at pumping samples of the ground water into the sewage treatment plant or into a mockup of a sewage treatment plant, and then if a flood is a problem, you monitor for that, and then obviously you would go back and say, okay, we've got to go back and look at all the pumps again.

WEEKS: Sounds reasonable.

GREGORY: What we have here if you remember, I had a map on there showing--let me put it back up--two main zones of shallow ground water contamination. What we've done is some modeling. We need to install a number of what we would call extraction recovery wells. These are the ones that would have pumps in them, lines coming from these pump wells to a treatment plant. We need to have two recovery areas to recover all of the shallow contaminated ground water. This is the distribution wells. There would be wells in addition to the ones that exists now. They would have to be installed. Part of an output of these building studies would be what we call additional response actions.

BITTNER: Could you back up just a second to both of those recovery areas? There were existing potable wells there?

GREGORY: Potable wells?

BITTNER: That were closed?

GREGORY: Yes, this is the same graphic I've been showing you all day--601, 602----

BITTNER: Right.

GREGORY: 637 is right up there, 634, and 608 is down--right here. Those are the wells that are closed. And remember now, those are deep acquifer wells. What I'm saying right now is that we don't have the data to address the new contamination. What I'm trying to do is fast track shallow contamination that's there. It's migrating horizontally and vertically, so any interim action with trying to clean up that is totally compatable to the overall goal of trying to clean up this entire zone.

BITTNER: When those wells were running, did the sphere of influence take in the shallow acquifer or did they draw mostly in a deeper acquifer?

GREGORY: Based on our pump test--and we ran a pump test on well 642--it's located right here--its outside was not contaminated and still is being used. Based on that test, we didn't see much interconnection at that one spot between the two zones. Now what appears to be the case, both our study and that of the USGA--"There isn't any overall confining data" is the language that they used--say a clay bed permeability zone that physically separates the shallow ground water from the deep well water. We have a number of discontinuous little lines, so in one specific area, yes, there may be a clay bed that separates the two, but as you move over here, the clay line disappears.

BITTNER: I just noticed--one more question. I think it--may it was in the material--I didn't get through all ot it, but was there any thought given to, and I don't know what the base's water supply needs are, whether it would be any help to have those wells back on line by putting them back on line using air stripping units to remove the contamination, making it a potable source again, and using that as part of the cleanup effort?

GREGORY: That certainly is a viable approach. It hasn't been, for lack of a better term, it hasn't been considered to this point because we're only looking at the feasibility of doing the shallow acquifer ground water extraction. As we get to that phase of the work that is coming, that certainly is an approach. That's something for Camp Lejeune to look at. I know there are some water supply problems throughout the base, but new wells can be drilled in the clean areas

rather than have them to pump it and treat the existing wells. But that's an institutional requirement from the base itself. As we get to that phase of the work, yes, we would recommend that. We've got existing wells, why not use them, and it would cost money to build brand new ones. So that I would think in the long run that they would become part of the pump and treat remedial action.

WEEKS: Could I say something to this point?

GREGORY: Yes?

WEEKS: We would suggest that this right here--instead of remedial action, it would be more of an interim measure, and the remedial action would include the deep acquifer. I believe that was the acquifer concerned. It was scored on to get on the MPL which may be coming final probably at the end of this month, depending on what--the comments we return to EPA. So the deep acquifer will be addressed. It's just a matter of timing I guess. Hopefully this next phase of study will incorporate it and we can define the contamination.

GREGORY: "Additional response action" is a fancy term for what additional data we begat. As I showed you on the previous overhead, we have to install those recovery wells to help us retrieve the contaminated shallow ground water. When we install those wells, we are proposing to sample those wells also. To help characterize what the waste is, as was mentioned, what if lead is the problem? That would change our design so we would install and sample those wells to fully characterize what are the chemicals present in the water that we're trying to treat. Specific to that, as we install and sample those wells, we'll get exactly what the contaminant loads are coming into our plant, and our plant has to be designed so that it treats everything efficiently. Right now we've got some data to indicate what those contaminant loads are, but right before that plant starts operating, we need to know exactly what those contaminants are.

As we get that, that gets us into our final design and cost evaluation. As we know exactly what the contaminant load zones are, we can finalize the size of the plant and have some kind of spec package and go out for bids. We are proposing to do a risk assessment/public health evaluation for that Hadnot Point area shallow acquifer. Because there are a number of compounds in the area--to go back to an earlier question--that may or may not have any specific standard associated with it. That still means we can take data that exists in the experimental area and try and relate that to what potential human risks would be, and establish a relevant and applicable standard to the specific situation. So we're proposing that we look at the contaminants that we've seen now and go through

a public health evaluation and see what the standards should be, so that in this plant that's operating, the output of that plant is water that meets the standards. And as Cherryl mentioned a few minutes ago, in order to determine a known hazard or an unheard of problem, there's pilot testing, that as the plant is being built and our lines are coming together, here's the one pipe that collects everything that comes into the plant. We'll sample that water and see what's in there. If the lead is too high, well then we need a filtration system for it. If some other compound shows up that up to this point we haven't identified yet, then we can make some adjustment to that also.

So none of these things are cast in stone. We have to meet applicable water quality standards and through all steps of our process, we are looking at monitoring and analyzing to make sure that our influent and affluent that are coming out of our plant are correct and that they meet all of our standards.

That pretty much summarizes where we are to date. As I mentioned, in the afternoon session, I will go into a lot more depth of what we're proposing to do in the next phase of work here. We are proposing additional work efforts. A lot of them are to address where the deep contamination is. I showed you those three well clusters that we put in. We didn't identify volatile organic compounds, the TCE, DCE that we saw earlier. We don't know where it is right now, so we need to address that. I'll be doing that after the lunch hour. Any questions? (Negative response.)

COL DALZELL: Thank you, Bob. That was a good overview on that. If there are no question at this time, I'd like to take a five-minute necessary call, and then we can meet back here, and we'll be going out and getting on the bus to take our tour. So five minutes--the restrooms are down the way here. If you need to do that, we can leave our material here in the room, and then we can come back and get together, and we'll be going out this side door here to join the buses.

(The meeting recessed at 1055 hours, 9 August 1988.)

The meeting reconvened at 1300 hours, 9 August 1988.

DALZELL: Do any of you have any questions relative to the tour that we took down there and some things that we may have seen or not seen or any questions that may have come up from our presenters in the morning session?

This afternoon we're going to continue on with four different areas here. We're going to take a look, first of all, on some of the interim feasibility recommendations that Bob Gregory mentioned this morning. We're going to take a look then at some of the follow-on investigations in the Hadnot Point Industrial area. Bob Gregory will cover that and I think having gone down through the area it may kind of heighten a little bit more the awareness of some of the issues down there.

Then our Joint Public Affairs Officer is going to join us to provide us a little bit on our community relations plan that we have developed that will be utilized to provide information to the community through the media and other devices to ensure that the total community is aware of what's going on and then we'll have some questions, answers and discussions, we hope, later on. So, at this time, I'd like to welcome to the podium our Environmental Engineer at Camp Lejeune, Bob Alexander.

ALEXANDER: What we tried to do in this discussion of interim alternatives is to look at things that could have an immediate affect on the health or the safety of people that are working and living in those areas that we visited today.

The first three that we want to talk about right here are looking at the water supply wells that continue to operate in the Hadnot Point area. You saw the five on the map that we have closed that we have measured detectable levels of organic compounds in them. We still have two more that are still operating and pumping ground water, raw water into our treatment facility. Now, we've been checking the finished water from that water plant, the one right near the traffic circle. We've been checking that about quarterly for the volatile organics to see if anything could, possibly, be coming through the water plant and into the finished water. We haven't found anything. So, we feel safe about that but, one thing, we are going to go back this month to well 642 and 603 to get some samples from that right away. We're going to continue to measure those things, at least, quarterly, to see if there's any change in the quality of the water that they produce since they're in this nearby zone.

We've also been working very closely in the last couple of weeks with our Safety and Occupational Health people and we feel that we have a

plan in the very near future to accomplish ambient air monitoring and underground work space monitoring. The reason for the ambient air monitoring, as was described in the feasibility study, is in these soil gas hot spots we want to be sure that there are no compounds present inside the work spaces in these buildings that may be near these things which could have a long term chronic adverse health affect on the occupants of that building, the Marines and the civilian employees that work there. So, we're going to work with our Naval Hospital command to complete ambient air monitoring inside those areas. These folks are the industrial hygenics and the preventive medicine people who have the technology and the expertise to use these types of sample devices and are familiar with the threshhold limit values that are established for safe exposure over a long term to certain compounds. Likewise, on the underground work space monitoring, we have the Base Safety Division, which is the Occupational Safety Manager for the base. We have been successful over the last couple of years in establishing a gas free engineering program. We have a base policy on that that is very effective. Any time someone that is doing maintenance work or construction work in an underground confined work space, say, a sewer manhole or a steam tunnel or something that may be underneath a building or something where we suspect that we have problems, we have been doing gas free engineering certification before we let anybody go in and, possibly, expose themselves to the harmful compounds.

We're going to increase the amount of effort that we're putting into that, specifically, for these Hadnot Point area soil gas hot spots.

JONES: A lot of these are ongoing programs.

ALEXANDER: These two are ongoing programs. The only difference is in our ambient air monitoring that the occupational health people from the hospital perform, they're not looking for some of these particular compounds, so that's one thing that we're going to stress that they do in the future is to start looking for the things in the ambient air that they're out there checking today. We want to make sure that they look for these as well. Any other questions? Okay.

The last couple are a little bit different. Item number four here is actually going to be accomplished in the work that we're doing through LANTDIV and ESE as we look further at the monitoring wells, so we want to define more information about the shallow ground water and the deep ground water aquifers, so we're going to go back through that and that's part of our negotiation process with Hunter-ESE, Bob Gregory represents, and, of course, with the regulatory agencies. One of the things that I think you all can see is very important is number five there and that is something that we have a job to do every day. We have

people today that are out investigating mishandling practices or investigating the lack of adequate training for the people, the young Marines and the maintenance technicians and the maintenance officers and Staff NCO's at all of these maintenance shops as well as our civilian work force. Our training program is really what is going to make a difference in this. The amount of information, you know, a person's understanding about how to do things is based on how much information he has about it and that's one of the things we're trying to really improve on is getting the right kind of information up to that maintenance technician. They're all very conscientious people. I mean, their performance ratings are based on their success in keeping those shops running efficiently and one of the things that is judged in their ratings is how much problem they have in dealing with hazardous waste. It's quite a visible thing in every one of those shops that you go in. We've got to find those operations and techniques that are not up to date and we've got to change those. We change those every day.

We have a number of underground storage tanks in the Hadnot Point Industrial area that we know about. We have another number, I'm sure, that we don't know about and one of the efforts that we're embarking on this fall is to document the location of all the tanks that we can. A part of our long term program, I can mention this, it's not really been pinned down just yet, is how we will attain compliance with the EPA underground storage tank regulations that are just now being published. So, that's going to be a big issue that we've got to work on together in the next six months to a year because there are some very strict leak testing requirements and things like that that these new rules are going to come out and require us to notify and document all the situations that exist around these underground tanks. So, these are some of the things we're trying to do: health related; stopping some bad practices that we may have still been carrying on; keeping that information education program going and doing quite a bit more of monitoring work to be sure that we have a handle on the situation. Any questions about the interim alternatives?

DALZELL: Could you put the first three back up, please? To kind of follow-on from what Mr. Jones, Colonel Jones, had mentioned these are ongoing type of activities. I met with the staff on the 2nd and the 5th of August. I had the Base Maintenance Officer, the Safety Officer from the base, Industrial Hygiene, the Public Works Officer, our Environmental Engineer and I required all of them to provide to me, which they have, their milestones and plan of action to attain complete accomplishment of these interim alternatives. Bob mentioned about the water supply well assessment, which is ongoing. They have provided to me when they are going to take these and recordings of that so that we'll

have that for our record. In the ambient air monitoring, there was one particular device, I believe, that they had to procure to be able to get the readings at the level that we're talking on. They already have the item identified, they have the money, the purchase document is cut and we're just waiting now because SECNAV has put a freeze on some purchases, so we have to wait until that freeze comes off and then we can purchase that item.

The underground space monitoring is going on continually as you mentioned, but we are going to, again, stress that in the particular area of the Hadnot Point Industrial area, but we have a program ongoing for that. We had, I guess about four or five months ago, a contractor that was working out here at the club and Base Maintenance came out to do a routine repair job and they dug a hole in the ground and a couple of the workers became overcome by some type of material that was in the ground, but when our people came out and did the testing, it had all dissipated into the air. It was probably some kind of fuel or something that was spilled and when it was uncovered the fumes immediately affected the workers but monitoring it after that and taking tests showed nothing. Those are the type of things that we run into.

And, again, we're going to continue the monitoring of our wells and our water treatment plant to ensure that we have a continual data on them. So we will provide to you a recap in the summary minutes of this meeting of all of these interim alternatives because we have marched out smartly on these things here to ensure that the personnel that are working and doing maintenance in these particular areas down there are being protected from any type of health problems that could come about by contact with any of these contaminants.

At this time, I'd like to move on with an overview of the follow-on investigations in the Hadnot Point Industrial area by Mr. Bob Gregory. Bob?

GREGORY: We approached some of these questions in the morning session. Now I think we can answer them a little bit more fully. What, precisely, is planned at this point and keep in mind that we're in the planning stages for it. It's a new round of work that we are--between LANTDIV and my firm, we are proposed some additional work and we are in some contract procurement stages now, so there is an opportunity to comment. We're just casting stones is what I'm saying.

This is a slide of the recovery system for the shallow aquifer. Now we identified that we needed some additional data before we would be in any position to go ahead with that proposed remedial action or interim action for the shallow aquifer. What we're proposing to do is

to install a number of dual purpose monitor wells in here. I believe there's a total of 32. These wells will be put in as extraction or recovery wells and that's where the ground water will be pumped out and would go to the treatment system. Before we get to that point, we would install these wells and sample them to identify what, exactly, the contaminants are. There are certain things we have found, MEK was an example. We have yet to see it in the shallow aquifer though we saw it in the deep aquifer. It's got to be there somewhere. We need to look at it. So, we've got these 32 wells. In addition to that, there are 35 existing monitor wells out there, so what we propose to do is put in new wells and sample all 67 wells and get an up to date chemical characterization of what's in the shallow aquifer.

JONES: Bob, if I can interrupt for a minute. Based on whatever alternative is finally decided on as the best approach, where is the final decision?

GREGORY: On the remedial action?

JONES: Yes.

DALZELL: Right here.

JONES: Here at base?

DALZELL: Yes.

JONES: CG.

DALZELL: Right. I make the decision for the Commanding General.

JONES: No concurrence required from anyone else?

WEEKS: Basically, there's a record of decision that is entered into by the administrator of EPA and, you know, it is something that is worked out between the agencies, but, actually, the ultimate responsibility is with the administrator of EPA which has been delegated to the regional administrator, but that process is on down the line.

JONES: Thank you.

GREGORY: I would say once the feasibility study has been accepted by all reviewing agencies as having been done in sufficient detail and that, therefore, the alternative selected makes sense, then it's a formal document that specifies what happens and that's this record of decision or ROD which you'll be hearing about. That's where everyone

has to sign off on it and the state's included in that, also, and there's public comment opportunities in the ROD procedure, also, so there won't be any surprise at all. It will be very well talked about.

In addition to this sampling of new monitor and old monitor wells, what we'll propose again is let's sample the water supply wells that are on the periphery of our study area because it's been a while since we sampled them. Let's get what the most current chemical data is for them. So we're talking about a fairly major sampling effort to characterize currently what we have.

In addition to the sampling, there are certain tasks we can do on monitor wells that help us figure out how quickly the ground water is flowing, in what directions they're flowing. You saw we had a contour map on it earlier. We have a pretty good idea in which direction they flow. We need to get a handle--a very specific handle--of what's the rate, how many feet per year are the contamininants moving, is the ground water moving. In order to do that there are a number of different tests we can do. Those tests will be performed on the new monitor wells that go in there. There's another data piece that we need as part of the design: we need to know what flow rate a well can maintain for x period of time. The shallow materials that we're going into don't yield up a lot of water. You can't put a big pump in there and pump hundreds of gallons a minute. It won't be that quick. So, we have to determine how much that is. That's a specific design input to final design of the remedial action or the interim action, however it will be termed, so that other series of tests need to be done, sort of distributed over a representative number of wells in the study area.

With that, once again, we feel that we will have a very good data base for the shallow aquifer period. Hopefully, at that point in time we will have determined where the MEK source is, specifically, and we may or may not identify any additional source areas that we have yet to see. When we're done with that then we need to go into the next step of the RI/FS, which will be called the public health evaluation. What this does, this tells us, "Here's the contamination. We've identified it. What affect would that have on potential receptors?" and that's a fairly rigorous process. We talked about it earlier. We need to look at different federal and state guidelines. It's not very cut and dry. Let me throw this up here and discuss it a little bit. We have this term to be dealt with "ARAR" which is applicable or relevant and appropriate requirements. That's got some real lega se in it. If there's an applicable standard, whether it be federal or state mandated, then that's the number that applies. As an example,

right now, the standard set for lead, both federal and within the state,is 50 parts per million. If we determine that ground water, shallow ground water, in the Hadnot Point area is below 50 then it's suitable as a public drinking supply. There's no need to treat for it. There's a fairly long list of chemical compounds in which applicable standards are available. If they're not, then we jump into very much of a gray area.

Let me back up to this. An applicable standard would be what I described before as an MCL, a maximum containment level. That's mandated by law. For public drinking water supply, it cannot be higher than this MCL. Certainly, we have federal and within the administrative code for the state, those numbers are specified. When we leave those MCLs and we get into these grey areas then we get into applicable or, excuse me, we have relevant or appropriate. Now, how we determine what is relevant and what is appropriate becomes a negotiating position. We have to go into what I described earlier, what would be the expected human response to certain levels of contaminants. There's a lot of research available in those areas and we would go through it. There are some theoretical approaches on how to do it and there are the other standards that I'll go through in a bit. We, certainly, have primary drinking water standards, which are like federal MCLs and those can apply. We have MCLs, as I mentioned, those are specific numbers for a lot of these volatile compounds which is what we're really dealing with here, health risk, a lot. From the federal level, they have MCLGs, MCL goals. This is your theory, this is your goal that you have to attain. Because a number of these compounds are possible and/or probable human carcinogens, the goals are typically zero. It's best not to have any in the water.

BITTNER: You talk about the future health risk and assessments going to the past. I take it all the wells go to a common treatment plant?

ALEXANDER: Yes.

BITTNER: What kind of tests were you getting when you were running those contaminated wells in terms of water quality? I imagine it would be pretty much diluted but you were still probably getting some readings if you ever took a scan.

ALEXANDER: We had very little, if any data, before we realized our ground water was contaminated.

BITTNER: So there's no record of it in terms of what you were pumping.

ALEXANDER: We had some tests--like at the Tarawa Terrace area--before we realized that ABC Cleaners was polluting our wells there. We had some tests and ended up with some measurable concentrations. But they were almost at the detectable level. When you're taking out of the Hadnot Point area 35 wells that had been servicing that system, probably a well would only run for about two days and it would only be about five or six wells running, so we had a rotating cycle of operations on those wells. It would be practically impossible to say what wells contributed what compounds on any given day. You'd have to backtrack from the residence time in the reservoir and all that to see what wells were going two days ago.

BITTNER: And, basically, Bob, there's no record of that.

ALEXANDER: It would be practially impossible to track that down.

BARNETT: There were no requirements, you know, the requirements to test your finished water for VOCs is a new requirement. It's a new EPA drinking water requirement, so there was no prior testing program before. It was just purely in the course of this investigation that we discovered that problem to begin with and since that time they've been monitoring the finished water effluents, but it was never a requirement.

GREGORY: We were discussing the MCL goals. Once again, for a lot of the compounds, we're having to deal with zero. Current analytical technology detection limits are one or slightly less than one, so, again, from a legal point of view, nobody could verify that at zero. You can't see zero, you can only see one or so. The goals are something that we have to strive for. If the technology prevents us from seeing that low, then we get, once again, into these relevant or appropriate. So that would be specified. To go one step past that, we get into what's called ambient water quality criteria, which are very research oriented. What they are they are numbers that if you were to drink contaminated water and to consume contaminated organisms from that water, you get certain levels of ingestion. What sort of risk is associated with that? That's what these ten to the minus fifth. This particular number is one extra case of cancer per one hundred thousand in population. So, at that point in time, we start having to deal with risk levels. These are just potential risks based on response of laboratory animals. Most of the research in that has been fairly conservative, so that if you see a number there it's not realistic at all, it's very conservative. It's a safety factor built in. So we get down to here and we get into the point of having to determine on a project by project basis what's an acceptable level of risk. Actually, the number that is used quite a bit is ten to the minus six

risk level, which is one extra case per million population. That's fairly across the board. Accept it as a standard goal to attain but it does not, necessarily, have any weight of law behind it. It's a guideline that everyone tries to attain.

JONES: Bob, pardon what has to appear to be a stupid question, but are we saying that up until now or beginning now there has been no national water quality standard that someone could say that the water is or is not potable or such?

GREGORY: For certain compounds that is absolutely the case. There have been standards for a number of these compounds that we're dealing with that have existed for years and those standards have been maintained by public water supply. There are other compounds that just don't have any and that's why we have to get down to this gray area type of analysis. We get down to these ADIs which are sort of the same thing, acceptable daily intakes. Some research laboratory has determined that an acceptable risk can be maintained if this ADI is met.

JONES: So all these years that we've been drinking supposedly potable water--questionable.

GREGORY: Someone has determined that it's an acceptable risk. You know, you get down to one case in a million, the danger of lightning strikes, traffic accidents, falling in the home, are far substantially higher and that's something that should always be kept in mind. We're not saying that some bureaucrat has said it's okay. It's viewed in what's attainable with today's technology. These contaminants, unfortunately, are everywhere. They're out there in the environment, so many places, and the risk is extremely low, one case in a million and that's only a risk. They never had any but it's just sort of a guideline and keep in mind that the research by which we come up with these risk levels is conservative. So the risk may actually be lower than that. All the regulatory folks that are present, we need to work together to determine what these relevant appropriate ones are. If it's applicable, we've got no problem. The weight of the law is behind it. Relevant and appropriate gets hard to work with. Where I'm heading on all this is because of those relevant and appropriate types of issues, we'll be doing a public health evaluation or, in other terms, a risk assessment or endangerment assessment for the shallow aquifer in the Hadnot Point area after we receive that additional information from monitor well samplings that we have just proposed.

In addition to shallow aquifer, as I mentioned earlier, we have a need for additional information in the deep aquifer. What we're proposing to do is to install additional well clusters. As I mentioned in the

morning session, we have three areas in which we installed a 75 foot and a 150 foot monitor with what we hoped that we would have detected contamination related to the shallow contamination. The data that we got didn't give us that information; therefore, we have a need for more. In addition to chemical data, we need information on ground water flow rates and directions which we do not have at this point in time. We have the ability to get that in that we do have the deep monitoring of the deep water supply wells around the edge of our site. Those, as I understand it from Bob Alexander, have now been surveyed in, so we can now use water levels from those wells, our own monitor wells and additional monitor wells and get a ground water contour map like that that I showed you for the shallow aquifer and we need an equivalent level of information here. I haven't listed where the deep monitor wells would go in that we need to see which way is down gradient. What may be happening if, say, we have a source area like we do here at 1601, if down gradient is that way, then it would make sense to put our deep monitor wells over here as opposed to putting them over here. Contamination gets to vertical migration down in deeper zones and flows that way. That's where we've got to put the wells, so we need to develop that information first. The surveying of water level taking that we'll be doing as part of our study will help with that and the USGS has also developed information specific to Hadnot Point as part of their study and we're in the process of receiving that information from them. So, with that, we'll know where to put our deep intermediate depth monitor wells. Hopefully, we'll get that chemical information that we need. Once we've received that information, we will need to prepare a report similar to what we have for the shallow aquifer, the remedial investigation reports for the deep aquifer. Here is our evaluation on where the contamination is, what it's strength is and in which direction and at which rate is that contamination moving. Once we have that, we go through this public health evaluation and, as I just described with the shallow aquifer, we'll go through that whole process. Here's what's present. What sort of risk does this pose to people within Camp Lejeune or off-post areas that might be down gradient from this site and where there's not an applicable situation.

In addition to dealing with ground water, we have another potentially contaminated environmental medium that we haven't talked with yet. Specifically, I want you to go back and remember about the soil gas data from 1202. We had some very, very high levels of TCE in the soil gas beneath this paved area which may be functioning as a cap. When we installed monitor wells in there, in that specific area, we saw no TCE or any volatile contaminants in the ground water, so it appears in that instance that there may be contaminated soil above the shallow ground water in that area that through construction projects, some of

the interim actions that Bob talked about, people could be exposed to those soils by dermal contact. When they're working in there, they may be volatilizing the permasoils, people are breathing it, so we could have a risk there. I think, as an earlier question we have, as the ground water levels fluctuate, new ground water--say we were to clean up the ground water, ground water levels rise, they go up into these contaminated soils. They're recontaminated again, so it's a never ending battle on trying to keep up with that so we need to get a handle on how much soil is in the ground and is contaminated. As a result of that need, we are proposing to take soil borings, actual physical samples of soils, collect them, send them to the laboratory and determine how much is in the soil itself and we'll be doing that around the major hot spots.

This area down here, 1202, and up in the 900 series buildings, also. Based on that information, we'll be looking at volatiles and potential metal content because we do have fuel derived contamination which would be leads and other heavy metals from industrial operations. So, we'll be looking at volatiles and metals. When we're done with that, we'll go through the same step process. We'll do a public health evaulation--here is what is in the soil. Does this create a problem, either through recontamination of ground water or actual exposure to the soils themselves, the dermal contact, again; through inhalation when you're working in them. We need to evaluate that. Based on that then we'll do a feasiblity study of how best to clean up the soils. So everything that we're doing here is really in these three steps: determine what's there, the remedial investigation, the RI. Once you know what's there, you have to evaluate is it a risk to somebody. If it is a risk then you do a feasibility study and you then know what the chosen technology is there to clean it up and you proceed on with the remedial design, the remedial action. So that's where we're heading, specifically, for proposed work in the Hadnot Point area. Timeframes, we hope to begin some of that work later on in the fall of this year. Again, Cherryl may want to address that more directly in that we are in a procurement process, myself, as the contractor on this, we are not authorized to begin that work yet. We're still dealing with scope, dollars associated with it, schedules. So it's not a closed issue yet. There's still time to respond to that. Any additional questions?

HUMPHRIES: Question: We've got what is called a county use plan. It identifies, I believe, more than a dozen type soils in the county. My question is are some soil types more receptive to absorption than the others?

GREGORY: Yes, certainly. Soils that have high organic contact,

natural organics: decay, leaves, grasses and the like, they have a chemical affinity for absorbing some of these compounds that we're looking at, so if you're in a swampy area, yes, they're known to collect metals and volatiles. What we're seeing in the industrial area is a mix of sand, silt and clay. There's not that great an organic content yet natural claysdo hold on to some of these contaminants So, if there's clay there, there could be a possibility of worrisome levels of some of these contaminants stuck on to them, so there is a wide range of possibilities. To give you an example of one end of the scale, beach sand, just ground up quartz particles, there's not much ability for things to stick to them whatsoever, unless it's an oil and grease which has its own viscosity, which can hold onto soil particles. If you were to pour pure solvent into a column of sand, you wouldn't see much of what would be called residual contamination stuck on the particles. It doesn't have the ability to hold on to it. If you poured water through it, it would flush it out. So we're seeing some of that here but we do believe, based on what we saw at 1202, that there's got to be material contamination, it still absorbs oil particl[illegible]. We saw it in the soil gas, we know it's there. It's not in the ground water, it must be in the soil itself. Yes?

CAULFIELD: This question may be for you or maybe Colonel Dalzell may want to answer it. What is your entire scope here? How much work have you done for the base? How much is programmed for your Hunter, Incoporated, to do now? I'm trying to see the extent of your company's involvement in this testing problem.

GREGORY: Our overall contract with LANTDIV is to do all RI/FS tasks for Camp Lejeune. That includes the New River side, also. So, in theory, we are on board for the project for everything up to the end of the feasibility study when we have this ROD, this record of decision. When it goes to the design - construct - operate phase of the final remedial action, that's outside the range of our contract. So, in theory, we'll be here for a while.

CAULFIELD: But then, say, at the end of that, after the feasibility study, when a contract is required for you, you know, the physical part of it, your company does that, too?

GREGORY: We have the ability to do that but that would be, as I understand it, a separate procurement that would go out for bids and I'm sure we'd go after it but we might not be the winner of it.

CAULFIELD: So it's feasible that your company could be here from the beginning to the end.

GREGORY: Right.

CAULFIELD: Could.

GREGORY: Now, there is a problem with the RD versus the RA, the remedial design versus the remedial action through goverenment procurement standards. I don't think any company could do the design and then could actually do the work.

BARNETT: That's not possible. The design--they operated under a Navy contract, architect-engineer contract, that we secure professional services on. Just like the design services, when we get ready to do the design for the piping system and the treatment system, it will be probably a separate design contract with another engineering firm to do that. The actual construction will either be a construction contract that's awarded to the low bidder with maybe some pre-qualifier type things or, perhaps, it could be like a maintenance-service type contract if it's for construct and operate and maintain for the duration. No, whoever did the design would not be eligible to bid on that actual construction or operation. We may use the same person to inspect the guy who's doing the construction to make sure he's doing it right, but he would not be eligible to do both.

DOWNING: Do you have a specific time frame to complete your study?

GREGORY: We have specific time frames to complete the blocks, the phases of the study as we go along. In fact, today's meeting ends our involvement in this most current phase of the work. We are negotiating for the next phase of the work, which will have a specific time frame; however, beyond that, from EPA's perspective, federal law, there are time frames for the overall RI/FS process, how quickly it needs to move along. Once we get to a certain point. . .

WEEKS: I can give you some dates on that, if you want. If I can find them. Let's see--we're kind of behind in the process. They're not finalized on what we call the national priorities list yet. They're already ahead of the game; they've already completed at least half of their RI/FS. We would once final proposal is finished, we said that in January would be the start date of the RI/FS and we give them 18 months from that date to complete the RI/FS. Six months from that day we would enter into a ROD agreement, you know, proposing how we're going to deal with this contamination. So that would take us to July of 90 to finish the RI/FS. It would be October of 90 to sign a ROD. It would be July of 91 to begin a remedial design project, to give them four months to design, which is kind of short but they're already ahead of the game anyway, so these are just proposed dates by EPA. They don't have any--I mean they can be worked out or whatever, changed, and

then remedial action we said would start January of 92 and then we gave five years but it would probably be longer than that before they're actually finished and then you have to go through a de-listing process to finally get off the NPL, but it all depends on what the deep aquifer poses, what kind of problems it poses and how long it's going to take to remediate that.

DOWNING: In other words we haven't hit anything that's critical enough yet to change any of those dates, it's just. . .

WEEKS: No, we're actually just now catching up. They're ahead of the game already, we would think, at this point.

JONES: Bob, I guess if I understood, at least I thought, what I was reading in the feasibility study is that, basically, there were two immediate objectives to eliminate any health hazards and something dealing with environmental. I forget how that read. Assuming that we were to monitor, on a daily basis--I don't know that that's practi .l, based on the degree of testing and all--the water supply here, what would be the need for that immediate objective to reduce any immediate health hazard if there is none in the drinking water.

WEEKS: We have a system that scores various sites and based on a certain score relative to other sides, you get placed on what is called a national priority list and once that happens then all these statutory requirements kick in and you have to remediate the site regardless. Well, the health risk is going to be there, but based on the score. . .

JONES: I understand that that remedial which will be the cleaning up of the contaminants hasn't even been addressed yet. That's something to follow on, is it not?

WEEKS: Well, the feasibility study has suggested how they're going to do the remediation and that's by the pump and treat. That is the remedial action that they propose.

JONES: That is to eliminate the contaminant? I didn't. . .

WEEKS: In the shallow aquifer.

JONES: In the shallow aquifer. Okay. I didn't read that in there.

WEEKS: The deep aquifer hasn't been addressed yet and that's why I was saying the EPA's position would be that this would be an interim measure. The deep aquifer would have to be addressed in much the same manner as the shallow aquifer and would have to be remediated

depending on the outcome of their studies that they propose.

BARNETT: Okay. Let me interrupt, maybe we can clarify all this. I probably should have gone into this in detail this morning but I wasn't sure there was the need to get into this level of detail. Where we are right now is, basically, in the RI/FS process. There is no definitive deadline in the law for when you have to finish your feasibility study. When you have enough information to make a decision on a particular site is when, basically, you're finished. The 18 months that Vic mentioned is an EPA guideline. They are shooting to do all their RI/FSs in 18 months although I don't see how they can possibly do it.

WEEKS: They never do. It's 24 months usually.

BARNETT: Yes, you never make that. You go out, you take your samples, you find something that you didn't expect like this methyl-ethylketone and you've got to back and start again. You've got to go back and look. Well, where could that be coming from? That's not coming from any of our identified sites and all this work that we've done so far. That has, basically, not solved that problem. So you, basically, go back and you do some more RI type work. So, we're basically--this looks at a small portion of the RI/FS for Camp Lejeune and that is only for the Hadnot Point area and only for the shallow aquifer are we this far along. The rest of the sites are even further back. We still have a lot of work in the deep aquifer and the shallow soil. Okay, again, this is where you get your Technical Review Committee involved, which is what we tried to do here today because we want to give you--we don't want to wait until we finish the whole RI/FS and send you this huge document and expect you to figure out what's going on. We wanted to involve you at an early stage so you can see where we're going and what we've been doing and we can get some feedback as we go along with the process. Okay. After we finish the RI/FS there are deadlines for preparing this Record of Decision which is, again, after you finish your RI/FS, that goes out for public comment. In addition to the Technical Review Committee, we have to publish a notice in the paper, make it available for anybody who wants to look at the study, accept any public comments, hold a public meeting if that's requested as well. Okay. Then we have to address all those public comments in a Record of Decision which, basically, says, okay, we've done our study. This is what we've decided to do at this particular site. You know, Colonel Jones had this particular comment, he didn't like it for this reason and we would have to respond to each individual comment in that Record of Decision but that's, basically, the final decision document on, yes, we're going to pump it to the sewage treatment plant or, yes, we're going to put in an air stripper. We may recommend

some things and, based on all the public comments we get back, we may have to change our mind and go with something else. So that's your final decision making document. Again, there's another public notice requirement. There's a requirement for an interagency agreement and, again, this is only for NPL facilities, which Camp Lejeune has just been proposed for the NPL. We have yet to start working on this interagency agreement. It's, basically, an agreement with the Department of Defense and the Environmental Protection Agency on how this whole process is going to proceed, when it's going to be done, who's going to get to look at what, that type of thing. Again, that's also required between the RI/FS and the Remedial Design and Remedial Action. Now, there are deadlines in the law for when you have to have this interagency agreement and I think it's six months after you finish your RI/FS.

WEEKS: That's the ROD.

BARNETT: That's the Record of Decision?

WEEKS: Right. The interagency agreement, I don't believe there's any set deadline, but EPA is encouraging early negotiations, like now, in the interagency agreements and we're trying to get them signed early.

BARNETT: Now, there is a deadline in the law that your clean-up has to start within 15 months after you finish your RI/FS. So, you can imagine after you've decided to put in an air stripper, you have to do your design and you have to have somebody out there starting constructior within 15 months. It's a pretty stringent time frame. That's the way DOD procurement type things go. That is a deadline in the law and, agair there are requirements if you make any changes in this process from what you told the public you were going to do beforehand, again, you have to give them a chance to comment on that as well. This is your final product but, again, we're still back in this process. We have all these other steps to go through once we finish RI/FS.

MADER: Does Congress get involved in this any more?

BARNETT: Congress has, basically, dictated all that to us.

MADER: I realize that but, I mean, do they get into the review process and the decision making process?

BARNETT: No, they don't. We have to report to them. I think ther s either a yearly or an every other year report to them on our progress They want to know how we're coming with our interagency agreements, how we're coming with our clean-ups at both NPL and non-NPL facilities, so

there are reports that have to go to Congress. I think it's every year on the progress. That's usually as far as they get involved, unless there are specific congressmen who have inquiries and then we respond to those directly.

HOWARD: How far ahead is the program funded?

BARNETT: Okay, we just finished budgeting through fiscal year 91 and, again, those were just our projections on what we think our remedial investigations/feasibility studies and our remedial design and remedial actions are going to cost. Right now, 89-90 projections are being finalized up at DOD. Again, NPL facilities get top priority for dollars. Right now, there are more dollars in this program than we can spend, however, as we get further along in the process we anticipate there not being enough money to go around and only the most severe sites are going to get the money first. Is there anything else?

GREGORY: I think I can add some more detail to the original question. In the public health evaluation or the risk assessment, one of the options, one of the potential things we can do is called the no action alternative. What happens if you do nothing out there, just leave it the way it is. So that is actively looked at as a possibility. We carry it through all of the evaluation steps and when you get that report it should clearly state whether or not the no action alternative is acceptable. Where it can break down into the gray areas is where we have these relevant and appropriate. It's highly interpretative and we have a number of agencies represented here today. We'll have the public to deal with, also. Acceptable risks have to be looked at. In theory the no action alternative never makes it through. It can't because of the effect to the environment. You cannot guarantee that the contamination that we see in here won't, through some time frame, migrate to some place now that's completely unmonitored, say, private homes on the other side of New River that are extracting ground water for their own use. You can't prove that it will never be affected and it's unacceptable. It will migrate someplace but that is something very much a part of the whole process.

BARNETT: That's one thing now that we're looking for the agencies that are here today. You know, look at our reports, the numbers we propose so far. You see things, perhaps, down the road that we should be considering. Start looking at these clean-up level type things because it's something we need to know, if there's a new standard on the horizon or something you think is going to be relevant, as up front as possible so we can direct our efforts to looking for technology that will meet that. One other thing I wanted to say as well--again,

when we set up a Technical Review Committee, our goal was just to send you, basically, reports when we have completed portions of the study. So now we've completed this effort in the shallow aquifers in the Hadnot Point industrial area. Now, if there are other things that you would like to see, other working documents that you would like to see, scopes of work, work plans, sampling plans, raw analytical data. This is specifically directed to the agencies. Please let us know and we'll make sure that you get copies of those things to take a look at it. Right now, we're not planning to just mass produce these across the board. If you are interested in taking a look at all these preliminary type documents before we do get a finished product ready to show to TRC, you need to let us know and we'll make sure you get a chance to look at all these preliminary things.

WEEKS: Well, we definitely would like to look at your work plans because, you know, we could have gotten in there with you on this RI/FS and helped you plan it out to where it would have satisfied our requirements as far as analytical requirements and, maybe, numbers of wells, things that--if you had gotten us in early, and you may have--you may have received comments from EPA, but that's why the next work plan, we'd like to be in on that on the front end, going in knowing what you're going to do rather than getting the results.

BARNETT: That's fine. We can send you a copy of the work plan that we produce.

WEEKS: If we go in with the same idea and the results come back, we'll have to be satisfied with that, I'm sure.

DALZELL: Are there any questions that anyone would have? Okay. At this time we'll take a five minute break.

The meeting recessed at 1355 hours, 9 August 1988, and reconvened at 1400 hours, 9 August 1988.

DALZELL: Before we get started, there are a couple of people I would like to introduce in here. The young lady over here in the red is Miss Mary Wheat. Mary Wheat is the environmental coordinator for Marine Corps Air Station at New River and she works very, very closely with us in all of these particular issues and because the Air Station is part of the Camp Lejeune complex, she wanted to sit in over here today and we're really glad to have her here and we'll probably be seeing much more of her as we go through all of these processes. Thi afternoon, the next issue that we're going to discuss is the Community Relations Plan and the two Marine officers you see up here are our Public Affairs Officer Major Stewart Wagner is our Joint Public Affairs

Officer here at Camp Lejeune and his young Lieutenant Shaw is one that you've probably seen in the media a lot. Lieutenant Shaw usually is the one that does the various interviews on media things that you see around here. He's in the last throes of his Marine Corps career. He'll be getting out of the service here within a few weeks, I believe, and going out to the west coast where he'll be working in public relations, I believe, with a firm out there and we're really pleased to have them here this afternoon to discuss with you all their part in this particular program. Major Wagner?

WAGNER: I brought Frank along because if I forget anything he'll remind me and I always tell Frank, even though he's leaving and he doesn't have a short timers attitude, I've only got one more thing for him to do. I'd like to talk a little bit about the COMREL plan and, before I start, I'll tell you what I'm going to talk about. We'll talk a little bit about public affairs. We'll tell you what our objectives are in this plan. We'll talk about what we've done to date and we'll talk about some of the things that we plan on doing.

In Public Affairs, we're the single source spokesman for the base and we're the advisors for the base in public affairs matters and we believe in maximum disclosure, minimum delay. In fact, if there's five gallons of hazardous waste that's spilled aboard the base, we release that information so, consequently, we have a good relationship with the media. If it's 500 gallons, we release it, too, and we not only release it but we come back and we tell them how we cleaned it up and if there's any damage to the environment. Our plan is really a media plan and a community relations plan because through the media we intend to educate the public without alarming them and keep them informed.

The audience, and it's important to remember, is not only Jacksonville, Onslow County, but it's, also, Camp Lejeune and so our media plan and our community relations plan deals with both and some of the things that we've done to deal with that have been put out press releases. We plan on holding public meetings, if that's necessary. We have a 24 hour hot line to the Public Affairs Office that anybody can call and what happens is when we get a call, we'll take it down; we will call Colonel Dalzell; we'll get the answer to that query and then we'll call back to them. And we are, also, planning in the future on providing the media and community leaders tours, once we begin the plan.

Here are some of the things that we've done. We came out with a release when we first thought that we might be put on the NPL list. We thought that was important. We have, of course, come out with a press release when we were placed on the list. We have a Public

Affairs Plan and a Community Relations Plan that is written and if anybody needs a copy, I can provide it. That's one. We didn't want to just make--it's about 40 pages thick, so we didn't just want to make 30 or 40 of them but. . . Is there anybody else that might like that? If you just let Colonel Dalzell know.

BARNETT: Did everybody get one? Yes, she sent them out when she sent out the final directions for the meeting.

WAGNER: Yes, but Mr. Weeks wants one.

WEEKS: I didn't get final directions to the meeting, so. . . It takes about two to three weeks for things to work down to me.

WAGNER: No problem. It is expensive and I really don't plan on going through it bit by bit by bit because I've been to a lot of these kind of meetings, but I want to hit some of the highlights. We have started, as I mentioned, a 24 hour NPL hot line in my office and we've written several articles for the Globe. The press releases were for the Daily News, Wilmington Star, Raleigh News and Observer and the TV stations, but we felt that we wanted our internal audience to also understand the problem because they're the ones that are drinking the water and we interviewed Colonel Dalzell and we followed up with several articles in the Globe about our drinking water, how we test it, and those kind of things and we'll continue to do that and we'll continue to write articles as we move along in this process. We, also, have a 15 minute program called "The Camp Lejeune Report," a television program that we air internally and we did the same thing on that, so we feel that we have covered, fairly well, our internal and external audience.

BARNETT: How many calls do you get on the hot line? Do you get any?

SHAW: We haven't gotten that many. When we initally went out with the release, we got a few calls, but we provided so much information that there's just not any more to give out and we really haven't gotten a call, probably, in about two months, three months.

WAGNER: I think that we will begin to get calls once we determine the action and once we start cleaning up and those kind of things.

WEEKS: Well, I think you might even get more once you're finally on NPL. You might get more national coverage. The national media would really like to focus in on the federal facilities and, you know, I'd be prepared for that, to deal with them.

WAGNER: To date, we've had three press releases, three articles in

the Globe and two Camp Lejeune reports on television. We, also, have given the media an extensive press packet of all the background information, to include our COMREL immediate plan, to them so that they would have all this information. They probably won't read it, but they've got it. These are some of the things that we still want to do. We are going to establish an information repository at my office and at the Camp Lejeune and Onslow County library and we're going to do a little bit more than just come in and set all this information down. We are going to prepare a video, that if somebody comes in they can see what all this information is and I think that's a good idea.

We've also had a couple of students that have called us up that are working on this out in town that wanted to interview us. We could send them over to the library. We're going to, with Colonel Dalzell, meet and brief the community leaders, Rotary Club, Chamber of Commerce, Military Affairs Committee, the commissioners, the mayor, so that we're going to target our information so that these people, too, know what's going on and if they have any questions, those questions can be addressed. We'll make a press release when the feasibility study is complete according to the law and a public meeting if that's necessary. We'll make notices all along the way from the time that we decide what action we're going to take to the time that we begin to take action until it's complete and then--and any query that comes in between we'll answer. We'll, also, act as your advisors during this whole thing. For example, we had a radio station that wanted to come in today and listen. We felt that coming in today might not be productive since this was a time that there were some decisions that maybe you wanted to make or this was the first meeting, but when we get these requests we're open to them and, you know, I'll work with Colonel Dalzell and we'll talk about it. That is a brief overview of the COMREL media plan and our actions to date.

WEEKS: Who is the keeper of the administrative record?

JARMAN: That's Cherryl Barnett and myself for Camp Lejeune.

BARNETT: And, basically, we have two copies. We are required to maintain a copy and, also, since it has to be available to the public at or near the installation, Sue is maintaining a separate copy there. I'm sure in the information repository that will be in there, that the administrative record is available at such and such a place and that additional information is available by calling.

MADER: Other than the reaction to your hot line, do you have a feel for what really is the public interest as far as this activity is concerned?

WAGNER: Well, no, I don't. The reason I say that no, I don't, is that we have not gotten any negative comments or any positive comments to date.

MADER: Has there been a lot of media interest? I say "a lot," I know there'd be some.

WAGNER: When we hiccup there's a lot of media interest. So, yes, there's a lot of media interest but. . .

MADER: I haven't seen any reaction or result of that.

WAGNER: I think that's because, as I said before, whenever--we really believe in putting a light on our problems so whenever there's any kind of a spill or, for example, Colonel Dalzell was mentioning the gas leaks that they had over at Camp Geiger, the same day AMTRAC had spilled some pollutants and we put out a release right that day, so we are continually putting out information about how we're cleaning up and taking care of the environment--the good things and the bad things. So, I think that the media is really waiting for the next step. They're not hostile. I think we have a pretty good relationship and we're going to tell the truth, I mean that's what we're here for.

SOUTHERLAND: In this phase of ground water contamination clean up, you've had asbestos abatement, you've had PCB elimination, you've had hazardous waste, why is it necessary to get the community so aware and involved in this area?

WAGNER: Why is it?

SOUTHERLAND: Yes.

WEEKS: It's written in the law, that's the first thing, and then it's a smart idea, secondly. I mean, if you're taking the lead and addressing the public rather than the public asking all the questions you're in a much better position to defend yourself and your actions.

DALZELL: And I think, too, because the majority of this program is really directed at cleaning up of groundwater that affects much more than, say, asbestos or PCBs or some of the other contaminants because we all draw from the same aquifer at different levels. We draw from the shallow aquifer. The city and county, I think, draw from some deeper aquifer.

MADER: Are you going to talk to the Marine Fisheries people?

WAGNER: That's a good idea. We will. It's the same reason that we came out when we thought we were going to be put on the NPL list. We came out and we said to the public, "We think we're going to be put on the NPL list."

WEEKS: I must compliment you all on that because most facilities don't respond that way, in that there's a wait and see type of response is usually what we get, so, like I said, Camp Lejeune is way ahead of the game and we're real confident it's going to be a fairly smooth operation.

MADER: I kind of get that feeling, too.

DALZELL: Any other questions or comments for Major Wagner or Lieutenant Shaw? Okay. Thank you, gentlemen. We appreciate your coming by.

That concludes the major items that we had on the agenda. The last item was to see if any of you had any particular comments or questions or discussion that you would like to make at this time relative to anything that we discussed today or what might be coming up in the future. Yes, Tom?

CAULFIELD: Colonel, what type of coordination does the base have with the Fleet Marine Force units running through the woods with the bears, jumping with their AMTRACS in the water into New River, across our creeks and so on and so on. What type of education--do they receive any education from Marine Corps Base involving environmental matters?

DALZELL: Yes, they do. To answer that question, specifically, Bob Alexander touched on it earlier but we have a number of base orders that are out that outline the various programs for handling of hazardous material, hazardous waste, for protection of the environment like the red cockaded woodpecker, the wetlands, our forest lands and other endangered species, whether they be plants or animals. Specifically, getting back to this area with hazardous material, hazardous waste, each organization that has any type of a maintenance shop at all are required by the base order to have a hazardous material disposal officer and a hazardous material disposal--or hazardous waste disposal officer and NCO. Each of these individuals are required by law to be school trained. These people are trained, the record of their training is kept at the local unit and, also, with our natural resources and environment affairs division. We do periodic inspections of every organization to ensure that their records are up to date; training is up to date; that their personnel are assigned properly; that they have them assigned; that they are storing, handling and disposing of the

material in accordance with the law and this is an ongoing program that has been in existence for a number of years here now because of the various requirements of this program, we are enhancing that with putting on more personnel and getting more resources, but we have a very, very active program on that. The Training and Operations Department recently put out a trainer's handbook and I call it my handbook for infantry officers because it's written in very, very simple English with lots of pictures and everything. The only thing we need to do for the infantry is put crayons with it and we'll be all set but it tells the infantry people and the tankers when they go to the field everything that they wanted to know about environmental matters: what the signs look like for endangered species areas not to go into; what to do with their waste oil when they change it in the field; about leaving comwire out there; about using portajohns; where they can or can't dig because of historic places, and so on and so forth. Every unit that goes to the field gets one of these green books. In fact, I ought to bring one and show it to you. It's really well done but it condenses all of these base orders into easy to read things so that when a lieutenant or a sergeant is getting ready to go out into the field, he can thumb through and it gives him a guideline on what he can and can't do and this helps us protect the environment. But it's a constant, constant thing because of the tremendous turnover that we have in personnel here at Camp Lejeune, it's a constant thing in training, but we do have the mechanism in effect, both in orders and personnel and in systems to train and manage all of this.

CAULFIELD: Colonel, I'm hard of hearing--did you mention you have an environmental school on the base, too, or a briefing program?

DALZELL: We have formal classes that are conducted here and we have N Safe, for instance, is one corporation that comes in and they actually hold various classes on how you handle and manage hazardous waste. They recently held some classes on what happens when you have a hazardous waste spill. How do you handle it? How do you go up and identify it? How do you get it cleaned up? In our fire department and all of these hazardous waste management officers and NCOs, our own people in natural resources have all been trained at these various courses and we conduct these courses periodically to continue training the new people that are being assigned because of the turnover, but we don't actually teach, we contract to have it taught. There's a lot of investment that goes into this.

CAULFIELD: Sounds good. Send a lot of those classes out to tanks and AMTRACS.

HUMPHRIES: Leave tanks alone, Tom.

BITTNER: It was mentioned, I think, for recovery area one and two, if you pump, it's going to take five years and probably longer to clean it up and, I suspect, it's probably longer and you gave us sort of like a cursory treatment to the no, do nothing alternative. I'm sure EPA probably doesn't like to hear that but does that deserve more than a cursory bit of attention? That thing would naturally flush itself to the New River, wouldn't it, in terms of ground water movement?

GREGORY: Eventually, that may be the case.

WEEKS: Unless it was seeping to the deep aquifer.

GREGORY: Which it has.

BITTNER: Okay, but you're going to treat the deep aquifer anyhow. Right? Eventually.

WEEKS: It would have to be remediated, also.

GREGORY: To back up a little bit, we give it more than just a cursory look.

WEEKS: It is an alternative they have to look at.

GREGORY: And those public health evaluations or riskassessments are looked at in depth and there are specific reasons given in that document why that alternative is not acceptable.

DALZELL: Yes, sir.

HUMPHRIES: Question, Colonel. To follow up on what Mr. Caulfield said on that, your training programs, in order for a program to be successful, you've got to be down to the lowest level. What I'm concerned about--I spend about half my time in the field there--you've got some private out there and he's topping off a vehicle or, perhaps, a tank, an AMTRAC, and let's say he's got an over spill. Who does he report this to? Range safety or after action report, or what because it's very important that the truck driver, the tank driver, whoever is handling POLs or what have you, he needs to report this to somebody. First, he needs to be aware, hey, this is a very dangerous situation and I made a mistake but I don't want to cover it up. I wish to report it. Now, what procedure does this person go through?

DALZELL: In that little green book, the environmental handbook that we give out to all trainers, in there it tells them and gives them the phone number that they can pick up the phone in the field and call a

range control and natural resources. Range control will get ahold of our emergency response team. It comes out there. Our fire department has the emergency response truck. They come out there; they've got all the absorbant material, the barrels, if it's just scooping up the earth, to take it. All of the material is right there and we make the clean up right on the spot.

HUMPHRIES: That partly answers my question but getting on, I'm really concerned about this area: Is the S-3 in every unit involved in training? Is it on the training schedule? Like you can have all the manuals in the world and books and lieutenants and staff NCOs and what have you but unless you reach that lowest private, who is the person who is actually handling the material or the solvent or what have you and knows how to handle it and what to do with it in the event he does make a mistake and I agree that training programs are the way to go but somewhere it's got to be down on the individual unit and level.

DALZELL: I agree and we have programs initiated to keep the pressure on the commanders. In fact, the other day we had about--not the other day--a couple of months ago we had a 350 gallon spill of diesel fuel. It was a tanker truck that had just pulled over to the side of the road and emptied out a truck into the woods. We found it and got it cleaned up but our general has now taken that and he is meeting with the other generals of the division and the FSSG. We're going to try to track it down. We've got the time and the day and all we've got is tire tracks. We know it's a military tanker truck and we know the area and what he's going to do is he's asking the generals of both the division FSSG to check their logbooks to see if we can track down a truck that was in that area at that particular time, at that particular day. So that's how far we're trying to go on this, but you're absolutely right. We need to continue to emphasize to the unit commanders that there is a procedure for taking care of these things and it needs to be highlighted at every echelon all the way down the line, but the key link is that young private or PFC that's out there working on it. An example was a few weeks back there was a big article about the light armored vehicles operating out in the field and the article started out, "Standing in a pool of red. . ." and so on and so forth and the captain was talking about how they had changed hydraulic fluid in the field and this was in the paper. Of course, immediately, as soon as we saw that, the next day our people were out there with that captain and we cleaned up. We found the spot and they drained the hydraulic fluid right there in the sand. But they learned a lesson. Any other comments or questions that anyone has? Yes, sir.

SOUTHERLAND: I was reading an article in the "Friends of Wildlife" of

Mr. Vick Venners. He said the State of North Carolina had established five hundred and something contaminated ground water sites. They had zeroed in on 76 of them. Most of those were land fills. I don't believe any of you ever had a land fill inside this Hadnot Point area, have you, as such?

DALZELL: Not in that particular area, no.

SOUTHERLAND: But you've had several in the surrounding areas.

DALZELL: Yes.

SOUTHERLAND: Have you addressed those areas with any kind of monitoring at all, the land fills that you used over the past . . .

DALZELL: Yes.

MADER: One of them is at Site 22, isn't it?

BARNETT: Well, they're part of the other 22 sites that we said we are looking at, we just don't have any data to present to you today.

SOUTHERLAND: I was surprised that the home products, such as cleaning fluids and chemicals in the home being just discarded out in the land fill has become quite a contamination problem, I understand.

DALZELL: Yes, it has. Okay, any other comments or questions? I really appreciate you all taking your time and volunteering to sit on this committee, the civilian community representatives and, also, I appreciate the agency representatives for coming here and going through the initial stage of our Technical Review Committee. We have provided to you the copies of the RI/FS and we would really need your formal written response with comments or recommendations by our next TRC meeting. We need these comments relative to the studies and the remedial actions that have been proposed and we're looking at, probably, convening another TRC probably within the next 60 days.

WEEKS: I was hoping in this new TRC charter you could allow us a 45 day comment period.

DALZELL: You think that the 45 days would be. . .

WEEKS: We could probably meet the 45 day, but the 30 day is the way our agency works. There's probably no way because I have to send copies of the documents off to four different branches for comments because of the alternative that has been proposed.

DALZELL: I noticed that in this proposed charter here that was used they were using 30 calendar days and I know we had a discussion the other day when we were talking about days, whether you meant 30 business days or calendar days because that can make a lot of difference in some months when you have a number of work days, so we'll try to set that at that 45 calendar days.

WEEKS: I think just the attitude of the person reviewing it would be different, too. I think it might be to your benefit.

DALZELL: Do we have the correct address to make sure something gets to you rather than sending it to--you've been sending them to Art Lenten, have you not?

JARMAN: He requested it, sir, in our meeting. Yes, sir, he requested the materials be sent to him, but we did send two copies.

WEEKS: Right and we received it. It just took a while.

JARMAN: Would it be best to send it to him or to you?

WEEKS: Well, see, he's in charge. He's our regional federal facilities coordinator. He's, basically, in charge of IRP but, see, once the NPL is finalized, if that happens, then we would be, basically, the lead at this site in our branch, therefore, you could copy him on things but you should send them directly to my branch chief which is Kurt Lucias (ph).

DALZELL: Do we have his. . .

WEEKS: I believe so.

DALZELL: I'm going to be sending everything out now return receipt requested to make sure we get it to the individual who really needs it.

MADER: Tom, would you be a little more specific on the comments and so on?

DALZELL: Maybe the comments are mainly from the government agencies.

MADER: If we want to send you an attaboy that's all right, though.

DALZELL: That's right. We're always interested in the comments that you have but I'm mainly looking for comments from the federal and state agencies relative to our plan because they're the ones that have to approve the actions we're taking but, yes, any comments that any of you

have or any of the people that you talk to relative to this are most appreciated and will be most helpful to us. Do you have any parting shots at all?

WEEKS: Well, I just wanted to congratulate you on the work you've done so far and I feel that we all have an opportunity to clean this up fairly fast and we're looking forward to working with the Navy and Marine Corps to do that.

DALZELL: The credit goes, really, to Bob and Cherryl and to Bob Gregory and their people that have been working on this and I just kind of steer now and then.

WEEKS: It takes a good chief.

DALZELL: Well, again, thank you very much and, ladies, thank you for the job in recording all of this, too. We appreciate it.

The meeting adjourned at 1432 hours, 9 August 1988.