

N42237.AR.000091
NSB KINGS BAY
5090.3a

MINUTES OF CROOKED RIVER ELEMENTARY SCHOOL PUBLIC INFORMATION SESSION
12-17-1992
12/17/1992
NATIONAL TECHNOLOGIES ASSOCIATES, INC

**MINUTES OF
CROOKED RIVER ELEMENTARY SCHOOL
PUBLIC INFORMATION SESSION
December 17, 1992**

**PREPARED BY
NATIONAL TECHNOLOGIES ASSOCIATES, INC.
1279 KINGSLEY AVE., SUITE 109
ORANGE PARK, FLORIDA 32073**

THIS is to certify that the attached minutes are, to the best of my knowledge, a complete transcription of the original recording of the proceedings at Crooked River Elementary School, Public Information Session held on December 17, 1992.

SIGNED on this the 25th day of December, 1992.

NATIONAL TECHNOLOGIES ASSOCIATES, INC.

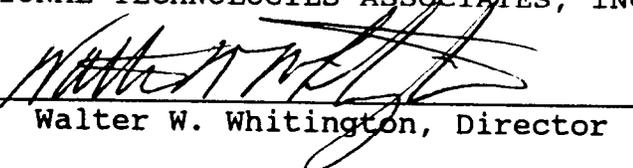
By: 
Walter W. Whittington, Director

ABB ENVIRONMENTAL SERVICES
CROOKED RIVER ELEMENTARY SCHOOL
PUBLIC INFORMATION SESSION
DECEMBER 17, 1992

Capt. Scullion: "Good Evening. On behalf of the Naval Submarine Base, Kings Bay and the City of St. Marys, thank you for joining us this evening. I would like to start off by introducing Capt. Mike O'Neil, the Commanding Officer of Sub Base Kings Bay.

Capt. O'Neil: "I thank you for coming out tonight. We are going to go over the results of what we have so far. It is a little preliminary in that, we would like to have more information, but I'll tell you this it is going pretty fast. As a matter fact, I have talked to the people around here, and the regulators have been telling me that this is one of the fastest moving investigations that they have seen in one of these areas."

"We told you we would get back to you in about this time frame and that is why we are here tonight to show you what we do have, where the plan is, and try to answer any questions you have, and let you know the next time we will be back in front of you. Thank you."

Capt. Scullion: Introduction. "And the Honorable Mayor Brandon, the City of St. Mary's. Mayor."

Mayor Brandon: "I appreciate everybody coming tonight. I just wanted to let you know on behalf of the city, we have the same concerns you do. Our primary interest is in your health and safety. We realize that there are potential economic impacts on this, as far as, the water concern. You will see on the back of your handout there that we are asking that you do not use your wells until we can get this situation resolved or at least better in time. We will have experts here to tell you what the situation is now and where we are going from here. Again, welcome."

Capt. Scullion: "Thank you, Mayor. We certainly appreciate your continued support and involvement in our efforts to identify and correct the problems associated with the ground water contamination at the Old County Landfill. For those of you who did not attend the first and second sessions that we had, I am Capt. Lynn Scullion and I am the Public Works Officer at the Sub Base Kings Bay."

"As I mentioned, this is our third public information session. The previous ones were conducted on the 3rd of September and October 15th. On the 3rd of September, we identified to you what we saw as the issue with the plume. The ground water contamination migrated from the old landfill area. On the 15th of October, we presented to you our interim corrective measures screening program

ABB ENVIRONMENTAL SERVICES
CROOKED RIVER ELEMENTARY SCHOOL
PUBLIC INFORMATION SESSION
DECEMBER 17, 1992

which is aimed at sampling to identify where the plume is and what the contaminants are there."

"The purpose of this our 3rd session is to explain the progress we have made in our investigation and to distribute the well test and hydrocone sampling results to individual property owners. Our consultant, ABB Environmental Services, completed the sample collections associated with our most recent effort in late November. They are currently evaluating and interpreting all of the data from the sample results. The full details of their evaluations are not yet available."

"We felt it necessary however, to hold this meeting tonight so we could update you on our progress and let you know what the next step in the overall progress will be. We have worked hard to provide you with the results of the prior irrigation and well sampling events. Please understand that we are still evaluating an awful lot of data. We are here to keep you informed and to provide you with what we know now. There will be many questions that you have this evening that we may not be able to answer, but we will record those questions and provide you with the answers to each of you as soon as we have those answers."

"At our last meeting, there was one un-answered question which remains, and that is " Are the fish in Porcupine Lake safe to eat?" We can not tell you that the fish are safe to eat. But, we can tell you that the volatile organic compounds which we are investigating, such as, vinyl chloride, do not bio-accumulate. That means that the vinyl chloride would not be present in the fish if vinyl chloride were found in the lake. We will tell you this evening that we have not found vinyl chloride in the lake, or in the soil of the lake. There may be other contaminate sources that we do not test for that would have existed for some reason."

"Tonight, you will hear two acronyms, two abbreviations. One is VOC, Volatile Organic Compound and the other SVOC, semi-volatile organic compounds. These are classifications of chemicals and they are the target chemicals that we are concentrating our investigation and sampling on."

"As in the past, I would ask you to hold your questions until we get through with our formal presentation. Then we will address each one of your questions, one by one, to try and give you what we know, or we will record the specific questions to be answered at a later time."

ABB ENVIRONMENTAL SERVICES
CROOKED RIVER ELEMENTARY SCHOOL
PUBLIC INFORMATION SESSION
DECEMBER 17, 1992

"You all have a handout so you can follow along. Our agenda is as follows: Tonight, we are going to discuss the progress in our investigation. We will provide a brief historical overview for those who have not been present in the first couple of meetings. We will review the activities of the recent few weeks. Next, we will discuss the ground water status and the assessment of the ground water contamination plume. We will discuss the private irrigation well results. This is in addition to the session we have already had with those individuals who had well samples that had results. And, what the data sheets in each of those packages mean.

"We will then present where we are and what our next steps in this phase of the investigation will be. Included in our discussion this evening will be a presentation on what a Risk Assessment actually is, and that is what many of you want to know, what is the risk of the contamination?

"The hand-out tonight has very detailed review of what a Risk Assessment is. One of our consultants is going to present an overview of that. We have presented you off-slide, because at that next session when we have the information on the Risk Assessment we are going to cover exactly what a Risk Assessment is and what our preliminary risk assessment findings are."

"Finally, we will summarize the presentation and open the floor to discussion of questions. Again, I ask that you hold your questions."

"First the historical overview, just to review the past activity. Our first investigation in January and February, 1992 this year. We were doing our investigation under the Installation Restoration Program (IRP) of a couple of sites at Kings Bay. We did geophysical surveys and at the landfill site we installed nine ground water monitoring wells around the perimeter of the landfill. We are doing volatile ground water sampling which began in February and will continue on through January under our initial work plan."

"The ground water samples from one of those wells, well 11-2, showed vinyl chloride and that indicated that leachate from the landfill may be a source of ground water contamination. In August of this year, ABB Environmental Services conducted an initial screening investigation using the direct push technology to try and identify more information about the ground water contamination. Many of you have seen that truck which uses the probe that goes into the ground and grab samples for us at various depths up to a

ABB ENVIRONMENTAL SERVICES
CROOKED RIVER ELEMENTARY SCHOOL
PUBLIC INFORMATION SESSION
DECEMBER 17, 1992

100 feet. As a matter of fact, some of you have had that truck in your yard and we appreciate your participation in allowing us to do that."

"Vinyl Chloride and other volatile organic compounds were detected down gradient from the landfill. Down gradient meaning that the water flows basically from the sub base site of the landfill towards Spur 40 and the down gradient is the direction of the flow. We have indicated to you that in late August we thought the plume had moved off Sub Base property based on our testing on the west side of Spur 40. The results of that August investigation confirmed the presence of the plume and contaminated ground water. At that point in time we notified City and County Officials, the public, Georgia Dept. of Natural Resources, and the U.S. Environmental Protection Agency."

"In October we held the second open information session which kicked off our most recent investigation effort. The interim screening investigation including collection of 144 ground water samples from 45 different hydrocone punching locations. Those locations ranged in depth from 5 feet to 72 feet below the surface of the ground. Sampling, was conducted in the landfill, around the landfill, in Crooked River Plantation Subdivision, and again, on the west side of Spur 40."

"In addition to the hydrocone testing, 51 private wells within Crooked River Subdivision were sampled. The wells sampled were locations of where we had permission slips prior to the demobilization of our crew in November. We now understand that there is approximately a dozen well owners who were missed during that sampling procedure. We are planning to get all those wells tested early in 1993 and if there are folks here this evening who are not sure whether we are going to get your well and you want to get with us and give us permission to test your well, please stay and get with the environmental staff of ABB so that we can get your permission and know where your well is so that we can test those wells."

"In addition to the well testing, we did surface water test and sediment samples in Porcupine Lake. We also did air monitoring in Crooked River Plantation Subdivision to screen any vinyl chloride in the air. Let me summarize a little bit about where we took hydrocone sampling. In slide two let me point out the open circles are the circles of where we did hydrocone punching in August. The target circles are where we did hydrocone sampling in October and November."

ABB ENVIRONMENTAL SERVICES
CROOKED RIVER ELEMENTARY SCHOOL
PUBLIC INFORMATION SESSION
DECEMBER 17, 1992

"You can also see where we took surface water and sediment samples in Porcupine Lake. The surface water samples were taken in the lake and the sediment samples were taking on the shore line perpendicular to the surface water samples. This slide talks about the sampling location of the private wells indicates where the 51 irrigation wells are that were sampled throughout Crooked River Plantation Subdivision."

"Continuing with our historical overview, the analytical program for the Interim Corrective Measures Screening Investigation included on-site analysis for vinyl chloride and nine other volatile organic compounds. We actually brought two gas chromatographs on base, set them up, stabilized them and we did on base analysis of samples so that we knew where to move the hydrocone punching machine around during the investigation."

"In addition, we did an off-site analysis of a portion of those samples, around ten percent of the samples, for higher level EPA laboratory procedures approved confirmation. The off-site analysis included vinyl chloride and 36 other volatile organic compounds. The 36 chemical we analyzed for in addition to vinyl chloride are listed on the EPA's Target Compound List for typical analytical program such as we are working."

"The surface water and sediment samples from Porcupine Lake were analyzed in the off-site laboratory for not only the volatile organic compounds, but also semi-volatile organic compounds because we were able to get larger water samples and did a lot more testing for the semi-volatile compounds."

"In October and November we established a Technical Review Committee, the TRC. The TRC reviews and comments on the documents that are produced regarding the overall Installation Restoration Program, in particular, site No. 11 which is what we call the landfill site. This is a cross sectional advisory group. The committee is comprised of Navy personnel, State and Federal Regulators, City and County officials, and private citizens. The TRC includes three residents from Crooked River Subdivision."

"We also started developing a community relations plan. In this plan and the purpose of this plan is to guide us in responding the public needs. It also implements the process for distributing the information to the public, and many of you met Kathy St. Peter from ABB Environmental and some of our folks as they went out to the homes and talked to people about the right way to get the

ABB ENVIRONMENTAL SERVICES
CROOKED RIVER ELEMENTARY SCHOOL
PUBLIC INFORMATION SESSION
DECEMBER 17, 1992

information out to get your perceptions so we know how to handle the issue."

"We also started to develop an Administrative Record and this is a compilation of our decision making documents which we will keep available and have available publicly in the local library for people to review."

"In December, we had two TRC meetings. The first one, last week was an organizational meeting and the second one today was the first meeting the TRC really got going in and it was a very successful meeting. All that brings us to today's information session where analytical data associated with the sampling on private property is being distributed, the private well data and the hydrocone data from the sampling private property."

"We will also present some general summary information regarding our findings from the Interim Corrective Measures Screening Investigation. The many specific details of the investigative findings are being evaluated by ABB Environmental personnel and we can't present all those to you tonight because we don't have all the confirmation and all the analytical results finished. ABB has worked extremely hard to get us to where the point we are tonight. We wanted to have this meeting. I am sorry it is in the middle of the busy Christmas season, but we wanted to have the meeting to tell you what had, as we promised in October session."

"Now, I would like to introduce Mr. Ed Lohr from Southern Division Naval Facilities Engineering Command in Charleston, South Carolina. Again, Ed is the overall Navy technical lead for this investigation. Our consultants, ABB Environmental, is represented tonight by several individuals. Mr. Frank Cater, who will share the microphone with me in just a bit, is the Project Manager for this site. Mr. Cater is a professional engineer and has several years experience in engineering a project management of this type of investigation."

"Also, with him tonight is Mr. Mike Murphy who will also present to you the information on Risk Assessment. Mike is the Risk Assessment Team Leader within ABB Environmental Services. He has 8 1/2 years with state agencies and risk assessment review preparation and presentations. You may remember Dr. Marlin Delane who was with us last time. Dr. Delane is still heavily involved in the project and is actually performing the risk assessment work as we are here this evening. Dr. Delane, of course, is the ABB

ABB ENVIRONMENTAL SERVICES
CROOKED RIVER ELEMENTARY SCHOOL
PUBLIC INFORMATION SESSION
DECEMBER 17, 1992

certified public health specialist which deals in toxicology. We also have here with us tonight, Ms. Kathy St.Peter. Kathy is ABB Environmental Services' community relations individual, public affairs."

"I would like to turn the microphone over now to Mr. Cater. Mr. Cater will review the status of the plume, the private well results, and our next steps. I'll come back and summarize and field the questions."

Frank: "Thank you Capt. Scullion, and thank you for coming out tonight for our presentation. What I would like to do now is discuss the findings we have found in our investigation. During the investigation of Porcupine Lake, we took three samples of surface water and three sediment samples. Analysis of the surface water and sediment samples in Porcupine Lake did not show any concentrations of VOC's or SVOC's, volatile organic compounds or semi-volatile organic compounds."

"We also did air monitoring in the subdivisions. During this time we took a specific instrument that was calibrated for vinyl chloride. We did not detect any vinyl chloride in the screening of the ambient air around or in the subdivision. Additional air monitoring will be done during the next phases of our investigation where we may do controlled modeling aspects."

"Results of the hydrocone ground water investigation indicate to us right now that the plume is extending approximately 750 feet west of the west side Georgia's Spur 40. At present, the depths range from 9 to 58 feet. We have detected depths of the contamination 9 to 58 feet within the landfill, and from 16 to 51 feet within the subdivision."

"This slide indicates the location of the hydrocone samples. Denote the dark, filled in circles are locations of where we had detections of volatile organic compounds. The open circles are the locations of non detect, we basically didn't see anything in those. At the present time we are evaluating data and begin model what we think the plume may look like. It may look that the leading edge of the plume won't have a smooth curve to it. Essentially has a crowfoot shape to it of some kind."

"Basically what we found inside the plume was the vinyl chloride and other solvents were detected in the ground water. The solvents we are talking about could be the solvents related to typical solvent products; degreasers, paint thinners, etc. as we

ABB ENVIRONMENTAL SERVICES
CROOKED RIVER ELEMENTARY SCHOOL
PUBLIC INFORMATION SESSION
DECEMBER 17, 1992

have discussed before. We also found a few fuel related multiple organic compounds. These could come from a gas spill, or potentially other sources of gasoline possibly used to light trash burnings. It only takes one gallon of gas and a million gallons of water can contaminate it. A typical expression we use is... it doesn't take much for us to detect a fuel related volatile organic compounds."

"The next subject I would like to talk to you about is the private irrigation wells. The vinyl chloride and other solvents plus the fuel related volatile organic compounds, were detected in 16 of the private wells samples, with 51 private well samples collected. Of these 16 samples, 11 contained volatile organic compounds we believe to be unrelated to the plume. Five of the samples from private wells containing volatile organic compounds that we believe are related to the plume. That includes vinyl chloride, dichloroethene, and ethylbenzene."

"The volatile organic compounds believed to be unrelated to the plume include carbon disulfate and acetones. Carbon disulfate is a compound that occurs naturally, which basically means that mother nature manufactured through the sulfur rich deposits which are commonly in marshy areas. If you turn on your wells, you can smell the sulfur. What happens is bacteria is present in the subsurface and will eat the sulfur, the end product of their metabolism is the carbon disulfide. The by product of this natural process. Carbon disulfide is also compound that is used in the industry to make rubber which is contained on our analytical list of 36 VOC's that we've performed in the off-site analysis."

"Acetone is a volatile organic compound we frequently detect in environmental samples. A lot of times it is introduced into that sample accidentally during sample collection or at the laboratory. The instruments which we used to collect the samples in the laboratory to analysis that sample could become contaminated with the acetone. We take blank samples if you will in controlled water, we take rinseates, and we take trip blanks which are shipped from the lab and back. Those samples we look at detect acetone in those it allows us to make judgmental calls about where the potential source of the acetone would be."

"We have reviewed the private well data and determined that those samples that contained concentrations of acetone and or carbon disulfide would not contain those volatile organic compounds as a result of the plume. It is artificially introduced of the results. Also realize that there are other possible sources of

ABB ENVIRONMENTAL SERVICES
CROOKED RIVER ELEMENTARY SCHOOL
PUBLIC INFORMATION SESSION
DECEMBER 17, 1992

volatile organic compounds that came from private well samples. We took these samples through your jet pumps and out your spigots and not a real controlled environment."

"If the well or the pumps contain parts that have been glued together, the glue would cause the samples to contain the solvents. The glues that are used to put PVC pipe together and may push the well off contains the same solvents that we are investigating within our plume. Other sources of volatile organic compounds that we did detect could include gasoline, paint thinners, degreasers that may have been used on your property. Washing paint brushes with your garden hose might cause the VOC's to be detected during our sampling event of your well water. Also, an accidental spill of paint, or filing a gas can for your lawn mower around or near wells could affect our sampling long after the spill has occurred."

"We would like to talk about the reasons why we still recommend that you don't use your private irrigation wells. We continue to advise you not to use your wells, the potential health risk that we are trying to evaluate are not complete and we don't know what the results of that evaluation might be. We feel it is a prudent thing to say is don't use your well right now."

"Also, the plume continues to migrate so the data that we have is a little bit dated. The migration of the plume is a mixture of the typical ground water migration movement and the potential impact of well usage to accelerate that movement. What I would like to show you that the potential exists for your irrigation wells to draw into the contaminated ground water."

"This cross-section you see a plume, if you will, underneath your well, and your well is off. If you turn your wells on the potential exit if the plume runs close to your well which would draw it up immediately. If the plume is a little deeper. It may take a little bit longer time of pumping before you draw that plume up into it. Even if you feel we are talking about depths of 16 to 51 feet this addresses wells that are maybe 12 feet, conversely if you have well that is very deep, you could draw that plume down into your well. The potential exits that if you move that plume, a migration pathway, this applies not only to plumes that are directly underneath your well but for a plume that could be say, beside you are all down gradient, if you will. The typical path of the plume maybe that it is just going to pass by your property, by your house, or by your well. If you turn on your wells and you hear the pump, you potentially curve that plume upwards towards

ABB ENVIRONMENTAL SERVICES
CROOKED RIVER ELEMENTARY SCHOOL
PUBLIC INFORMATION SESSION
DECEMBER 17, 1992

your well. It doesn't take much to affect ground water flow around."

"What I am going to right now are the next steps that we are going to discuss. As you can see on this slide the non shaded area is the events we have already performed, or are performing right now. We are at December 17th with our public meeting information session. Right now the data is being evaluated, being interpreted, being looked at. We are also at the same time we are in the process of performing a preliminary risk assessment."

"All that data will now be put together into a report and submitted to Georgia and the EPA until around the beginning of February. At that time, they will be going in and looking at it, and saying they concur, they agree with our risk assessment and what we call the immediate corrective measures. We then issue a final report in which time we will be briefing you over what we found in the risk assessment."

"Understand that in January, February, and March while all this review is going on and while we are writing that report. We are not just going to be stopping on this site. In January we will finish up the initial phase of this investigation, if you will, that initiated this action on all the sites and produce that report. At the same time, we will be planning what our next steps are going to be in going towards the end product."

"What I would like to have is to have Mike Murphy present to you what initial Risk Assessment is actually about."

Mike: "Thank you for the opportunity to be here with you tonight. I will be describing for you health risk assessment processes so that you will understand the work that is currently underway by ABB Environmental Services. Also, so you will have an idea of the type of information that the risk assessment report will generate."

"The health risk assessment for this plume is being conducted by a team of public health specialist, risk assessors, and toxicologist from ABB Environmental Services. The members of this team have many years of experience in conducting similar risk assessments. The risk assessment team will be directed by Dr. Marlin DaLane, toxicologist who has met with you previously. I will be serving as the Senior Technical Reviewer for the risk assessment."

ABB ENVIRONMENTAL SERVICES
CROOKED RIVER ELEMENTARY SCHOOL
PUBLIC INFORMATION SESSION
DECEMBER 17, 1992

"I would now like to describe to you how the risk assessment fits into the overall scheme of things in this project and then describe for you how a risk assessment is actually conducted."

"The risk assessment is not a stand alone activity. The risk assessment is part of a larger process called risk analysis. In the first step of that risk analysis process, you conduct a risk assessment and identify the nature and magnitude of the risk. In other words, we identify what types of health affects might occur from the chemicals that are present. We attach some measure of the likelihood that those affects could occur if exposure occurs at that location."

"Once that information is available we move on to the risk management stage of risk analysis. That is where we identify options for controlling those risks and we then select one or more control options. That is essentially selection of the clean up approach for the particular location."

"Now we will look at the four basic components of the risk assessment they are hazard identification, dose-response assessment, exposure assessment and risk characterization. In the identification phase, we identify chemicals which are present, and in this case, the type that are present in the ground water plume. We also search the literature to identify the adverse health effects that have been associated with each of those chemicals."

"All of this data evaluation as a result of the sampling effort is indeed part of the hazard identification activity. From all this evaluation of data and the survey of the toxicological information we will identify a list of chemicals of concern. Those are chemicals that have a potential for causing adverse health affects at the location. That list of chemicals of concern will be the basis for the entire risk assessment. We will look for vinyl chloride and the other volatile organic compounds."

(Bell rings- can't make out) "that is where we identify the levels of exposure, or the amount of contact of the chemicals that is associated with these adverse health affects. In this situation we are actually identifying regulatory levels which represent safe levels of exposure. Those safe levels of exposure are called reference doses and those pertain to non cancerous affects. We also identified cancer slope factors which are the measure of the strength of these chemicals in causing cancer."

ABB ENVIRONMENTAL SERVICES
CROOKED RIVER ELEMENTARY SCHOOL
PUBLIC INFORMATION SESSION
DECEMBER 17, 1992

"Most of this information comes from laboratory studies in animals. We do not have a complete data base for the affects of these chemicals on humans. So we take the information that is available on the animal studies and we apply some uncertainty factors to them. We assume that humans are ten times more sensitive than animals in all these activities and therefore our estimates are the safe level, at least ten times lower than they are for the animals. We have taken a conservative health protective approach."

"Once we have that information, we will climb to what we call the exposure assessment. The purpose of the exposure assessment is to basically identify who might be exposed to the chemicals, who could be coming in contact with them, how does that occur, how frequently does it occur, and for what duration of time?"

"First of all we would look at the source of the contamination. In this schematic, we have here, we have a general source, which for this particular locations appears to be the landfill and we also know that these chemicals can move in the environment. Primarily they move by leaving the landfill area and entering the ground water in what is call the plume."

"You think you can see how this schematic that plume moves and it can enter a region where there are wells. So, this is obviously the case that we have in the subdivisions. As you can see here when the wells are operating they can draw the ground water and chemicals up out of the sub surface and bring them into a location where people might come in contact with them."

"Fortunately, this is some what an un-carded situation, but the wells are not used for drinking water purpose and that means that there is much less potential for exposure. In the situation here in the subdivisions where we have irrigation wells, basically which through sprinkler systems, are releasing the water and the volatile organic chemicals in the water, are leaving the water and evaporating into the air."

"So, I have identified a complete migration path for you where the chemicals can move from the landfill through the ground water, up to the wells and into the air for the potential for people to come in contact with it."

"We Have also ask you for some information on how often you use your sprinkler systems so that we can get some idea of how much of the water and the chemicals being withdrawn from the ground

ABB ENVIRONMENTAL SERVICES
CROOKED RIVER ELEMENTARY SCHOOL
PUBLIC INFORMATION SESSION
DECEMBER 17, 1992

water and is being put into the atmosphere. We also used the information about how often you use your sprinkler systems to identify how often people might be exposed."

"There has been some preliminary air monitoring done at the location and there was no vinyl chloride detected, we will be conducting some mathematical modeling where we can estimate how much of the chemicals is being drawn up out of the ground with the irrigation wells."

"We have used the models to predict concentrations of the chemicals in the air. Those exposure point concentrations will then be plugged into a regular form book to determine what the risks are for this scenario involving the sprinkler systems and inhalation of the chemicals."

"Once that exposure assessment is complete, we move back to the risk characterization phase, the last phase in the risk assessment. It is there that we estimate what counter affects might occur from this exposure and we attach some measure of the likelihood if those affects would occur."

"This characterization really incorporates all of the previous steps of hazardous identification of those responses assessment and exposure assessment. The next slide will indicate what the common measures of health risks are. These are the measures that will be presented in the Risk Assessment Report."

"The first measure of risk is called Hazard Index, that hazard index is a measure of the likelihood that non-cancer health affects might occur as a result of exposure to the chemicals. And that hazard index is simply the ratio of the sites exposure, on the amount of the contact with chemicals, to a published allowable or safe exposure. We will get the allowable of safe exposure from the U.S. EPA Publications, and where they are not available from EPA, we would search for counter scientific literature to identify those safe levels."

"Since the Hazard Index represents a ratio of site exposure to allowable or safe exposure - when the hazard index has a value of one the exposure occurring at this location would be equal to the safe exposure. That indicate that as the hazard index gets higher than one, we would become more concerned about the possibility of adverse non-cancer health affects. If the hazard index was less than one, we would be less concerned."

ABB ENVIRONMENTAL SERVICES
CROOKED RIVER ELEMENTARY SCHOOL
PUBLIC INFORMATION SESSION
DECEMBER 17, 1992

"The second measure of health risk that we will presented in the risk assessment report is the incremental lifetime cancer risk and that is the probability that the site exposure could result into development of cancer for exposed individuals. Now the sense of the slide, that is above and beyond the background cancer risk. What we are doing here is strictly looking at the probability of developing cancer as a result of just the exposure relating to the sprinkler system scenario."

"We are not looking at the background cancer risk, which in the United States is surprisingly high, based on cancer registry statistics somewhere between 20% and 25% of the U.S. population develops cancer some time during their life time."

"So these are the common measures of risk. This is how the risk estimates will be presented in the risk assessment report, and the risk assessment report will also present all the assumptions that were made to calculate the numbers and will also identify any uncertainties. It will identify any assumptions that we needed to make and it will identify also the number of assumptions that are conservative or health protected assumptions consistent with U.S. EPA protocols."

"That basically concludes a general overview of risk assessment process."

Frank: "We promised to talk about your well results. This is a sample of the private well sampled and I would like to generally discuss this issue. In general, most of you that picked yours up today would be looking at a form very similar to this. The first column talks about the compounds. That list of the compounds on our target compound list were analyzed on the off-site lab. That's a full list from the EPA contract lab protocol, Target Compound List."

"On the on-site lab we have the shaded area which is not applicable. With the other areas our target compounds that we identified in our on-site lab through limited resources that we focus in on. Most of these compounds dealt with areas of fuel related volatile organic compounds and the vinyl chloride and it's parent products, or sister products."

"As you notice the non-detect (ND) means that we basically did not see any compound in there. You have areas of where it talks about duplication, on-site duplication and off-site duplication. Part of the quality control process of environmental sampling was

ABB ENVIRONMENTAL SERVICES
CROOKED RIVER ELEMENTARY SCHOOL
PUBLIC INFORMATION SESSION
DECEMBER 17, 1992

to take a duplicate sample at a 10% ratio. Basically, every tenth sample you take another sample at random. That helps you to evaluate if your analytical process is on track, which your results are useable for verification. Basically checking the usability of the data."

"The next to last column with the MCL. That column is the maximum concentration limit for drinking water. This is either taken from EPA, or the State of Georgia Dept. of Natural Resources rules for safe drinking water. All the numbers that we have presented here are in micrograms per liter, or parts per billion. There is one part in every billion."

"The last column is comments. A lot of the time those comments, that is where we would put in to get a qualifier. Instead of using some of the environmental terms we put in a typical qualifier was carbon disulfide. Most likely a natural occurring substance."

"Later at the end of this discussion, at the end of the presentation, we will take you on any questions. The Captain will be more than happy to answer the questions that you have. If you have questions about your sample taken, we will answer those privately. I would like to turn it back over to Capt. Scullion. Thanks."

Capt. Scullion: "I want to try to summarize it now. I know we have been up here for awhile and we want to get to the questions part. I would like to summarize now what we know about the plume. What we know about the landfill is that the samples that we took on the east side of the landfill, we had no detects. That indicates that contamination does not exist east of the landfill which is up-gradient, which is where the ground water is coming from."

"We also tested south of the landfill; and one of the questions we had informally received was, is there contamination that could be going down to Crooked River Elementary School? We originally conclude from what we see there, there is no contamination on the south side of the landfill."

"The way we have the detects on the west side of the landfills and over to the Crooked River Plantation Subdivision indicates that the plume widely originates in the landfill and is moving westwardly. So, no contaminates found up-gradient or east of the landfill. We talked about no contaminates found south of the

ABB ENVIRONMENTAL SERVICES
CROOKED RIVER ELEMENTARY SCHOOL
PUBLIC INFORMATION SESSION
DECEMBER 17, 1992

landfill, and our reasonable conclusion that the plume originates in the landfill."

"We found no volatile organic compounds or semi-volatile organic compounds, contaminants in the samples of the surface water or the sediment, the dirt samples if you will, from Porcupine Lake. We know based on the results we showed you with the dark dots and the no color dots, that the plume detected irregularly approximately as far as 750 feet west of Georgia Spur 40 into Crooked River Plantation Subdivision as a result of getting laboratory analysis of the samples we took in October and November. That is where it was at that time."

"The presence of volatile organic compounds in the samples from the private wells in the plume indicates that there is potential for plume contaminants to be drawn by use of the private wells."

"The data collected from during the interim corrective measures screening investigation represents a snap shot in time. It is important that you remember that. As the plume migrates, it may change in location and in concentrations as we test for the contaminants."

"We also know that a significant effort is going on now to evaluate the potential of health risk through our preliminary risk assessment. As far as continuing action, our main effort right now is to complete the preliminary risk assessment. This process and the results of the process will be discussed in our next public information."

"One of our major endeavors around the February time frame will be to work with the regulatory agencies, Georgia Dept. of Natural Resources Environmental Protection Division and the U.S. EPA to provide them our draft report, our preliminary risk assessment report and the result of interim corrective measures screening analysis."

"Their concurrence with respect to our recommendations will lead us to determine the next steps in our process. If the level support that we got recently, particularly from the EPA, in the support of the Technical Review Committee in our current efforts, if it is any measure of the type of support we are going to get in February looks very good for us. The lights are lined up green, because we have got excellent support from the EPA through the TRC."

ABB ENVIRONMENTAL SERVICES
CROOKED RIVER ELEMENTARY SCHOOL
PUBLIC INFORMATION SESSION
DECEMBER 17, 1992

"Please understand that we are moving as fast as we can. We are moving forward. This all leads us to clean up. We don't know what those clean up actions are going to be. It is typically a long process, but as we mentioned, we are moving faster than the Navy and consultants have moved on typical sites similar to this."

" We are aware of your concerns. We deal with those concerns on a day in and day out basis. We are trying to take as a proactive of stance as we can to get to the point where we are actually cleaning up the contamination."

"What I would like to do now is open the floor for questions. If you could ask your questions in such a manner that I can repeat it simply, then either I will try to answer, or we will find one of our experts to help answer it. If we can't answer, Mike if you would write the summary of the issues that we can't answer now and we will record them. Ready for your questions. Yes, Sir."

Resident: "Are other forms of contaminates being tested for, organelle phosphates,(can't make out)?"

Capt. Scullion: Repeats - "Are other forms of contaminates being tested for, and I am not even going to try to repeat all the ones that you mentioned. Let me turn it over to Frank."

Frank: "During the typical RFI phase of this process will be starting with our ground water wells around the lake. We tested for full pendix nine parameters and the includes the organelle phosphates and the other compounds, and I am like Capt. Scullion, I am not going to try and repeat those other chemicals."

We did full rounds of analysis on our wells. At this time, we have completed five rounds of bi-monthly sampling. We will complete our 6th one in January. We have no reason to really suspect that we have a release that is migrating or coming out of our landfill based on our five rounds of analytical. Until we do statistical analysis we won't know for sure."

"We have noticed that maybe a few semi-volatile organics, but nothing along the pesticides, PCBs, metals. We haven't noticed that as yet, but lets not rule out that they could potentially be there. Further investigation will happen, however, we don't feel this will stop us from proceeding forward with what we know right now about volatile organic compounds."

Capt. Scullion: "Does that answer your question?"

ABB ENVIRONMENTAL SERVICES
CROOKED RIVER ELEMENTARY SCHOOL
PUBLIC INFORMATION SESSION
DECEMBER 17, 1992

Resident: "Yes, thank you."

Capt. Scullion: "Next question."

Resident: "Of those 11..., about 2/3rd of the wells were tested for reasons that seem to be unrelated to the plume. What would be the origination of those if they are not coming from the plume."

Capt. Scullion: "We took result of those 16 private wells that showed detects of contaminates, and we recently have concluded that 11 of those 16 are unrelated to the plume, or the contaminates that we have been looking at. Frank wanted to talk about acetone in particular."

Frank: "Basically the two samples we talked about were carbon disulfide and acetone. Carbon disulfide being an anaerobic or naturally occurring material which comes from little bacteria eating sulfur in the ground, and their by-product is carbon disulfide."

"The other is acetone. Acetone in environmental samples is typically introduced in the laboratory. It is a product that is used in the laboratory to clean the instruments. We detected it in quite a number of samples, and part of quality control is to use controlled samples of water that we know are clean and we if see acetone is in those, then we can pretty well rule acetone out other detections in the sample. That is what occurred on those 11 samples of acetone. The VOC's of the 11 we say are unrelated to the plume are basically acetone and carbon disulfide."

Resident: Can't make out.

Frank: "He ask that, that wouldn't be uncommon to find those any place we tested. The carbon disulfide is typical to marshy areas like we have. So that would be.. in this area, yes, it would be. Acetone is something that we do to our test to control cross contamination, if you will, of our rinsing and everything else, but, it does happen in the environmental field."

"Part of the quality control we use allows us to say, that is not an indication of the samples. We haven't ruled acetone out of a potential ground water contamination of the landfill. We just do not feel what we saw in the private wells are an indication of coming from the landfill."

ABB ENVIRONMENTAL SERVICES
CROOKED RIVER ELEMENTARY SCHOOL
PUBLIC INFORMATION SESSION
DECEMBER 17, 1992

Capt. Scullion: "Would it be safe to say that there is a distinct possibility that the acetone didn't even happen on site. It originated in the lab?"

Frank: "Right."

Capt. Scullion: "I think that is what we are trying to say." So that is 10 of the 11 and the other one is the sulfur. Next question."

Resident: "The two pictures that you showed here show all the wells are being done out side the landfill. Have you done any inside the landfill to try and locate the source and go after it?"

Capt. Scullion: "We have not put any monitoring wells in the landfill. One of the things we have to do is to figure out how we are going to go about detecting the source in the landfill. Your question, I believe, is... Do we have monitoring wells in the landfill to test within the landfill, as oppose to on the boundaries?"

Resident: "Inside of it. If you go sampling and find out where the highest concentrations are then localize it and dig it up."

Capt. Scullion: "That's what we had to do. We started with the hydrocone punch truck in the landfill. We had a couple of problems with hydrocone punch truck in the landfill. If you noticed there was one hit in hydrocone sampling in the landfill. So, one of our concerns is, using that methodology, we may just puncture something that in the landfill which is something we probably don't want to do. The hydrocone push rig with the pointed tip on the front of it. It could go right through some sealed container. So that is a concern for us. If you were at the first session we told you about how we did a lot of metal detection and geophysical stuff in the landfill to see if there was drums in there and those sort of things and we had some pictures that showed what we found. We have got to go back now and concentrate on what we are going to do to identify the source in the landfill. (To Frank) Can you say that any better, or leave it at that.

Frank: "That pretty well covers it."

Capt. Scullion: "Ok. Anything else?"

Resident: "On the first session they had, well I had a question... saying that I wanted to do a sample of my own. I was told, I

ABB ENVIRONMENTAL SERVICES
CROOKED RIVER ELEMENTARY SCHOOL
PUBLIC INFORMATION SESSION
DECEMBER 17, 1992

believe by this gentlemen, you really can't do that because of the uncontrolled way you take the water out. In other words he said that if the water came out and hit the air, the vinyl chloride would immediately evaporate. That is the same way they took mine out of my well, so I guess I could use this process.

Capt. Scullion: "I guess the question is... During our first session we talked about how much.. how many precautions we go through, particularly with the hydrocone sampling to make sure that take was taken below ground level and brought up and it is not introduced to the outside air.

Resident: "No sir. I am talking about my well."

Capt. Scullion: "We told you about how we tried to sample so that we keep the specimen pure, and you are saying well after you told us all about that, we went out and sampled your well in a way that probably influenced the results. I think that is your question."

Resident: "Right.:"

Capt. Scullion: "Frank, it's all yours."

Frank: "Basically what we talked to you about in the first session, was not that you couldn't take the sample we told you, it is difficult to take those samples that come out into the air and it's going volatilize. That is one of the concerns we have about taking samples from private wells and using this data to try and interpret what is going on in the plume."

"One of the reason we used the private wells, and just answer the question is.. is the potential there for the contaminate to be drawn up, and we did answer that. Two, you can take your own private samples. You will need to go to a lab, or you need to contact someone to get it done. You were asking me if you could go out immediately take that sample. You can, but I wasn't sure that you would know what those results meant. By all means we encourage you, if you would like to take your samples, take your own sample."

"In the October 15th session, we advised you that at that time while we were out taking the sample, you could produce your own 40 millimeter vile. Have your own lab lined up and take a duplicate sample along with my crew."

ABB ENVIRONMENTAL SERVICES
CROOKED RIVER ELEMENTARY SCHOOL
PUBLIC INFORMATION SESSION
DECEMBER 17, 1992

"When we took the samples from the ground water for vinyl chloride through a jet pump out of the faucet, no, that is not an environmentally sound sample."

Resident: "Ok. That is what I want to know.

Frank: "In general, if anything, it is less conservative than the way we would rather take a sample out of a well. We take the sample out of a typical well, you have a two inch piece of PVC pipe stuck into the ground, straining would be pack the sand around it. We go in with teflon bailing and we bailer that well three well volumes and we take the sample out and very carefully pour it into a 40 milliliter vial to avoid any aeration of the sample."

"The hydrocone is a little more accurate for us. The private well sampling was an investigative method to look to see if the potential exits for contaminants to be drawn into the well and be exposed through the sprinklers. We have answered that question with a yes. The potential does exits for that to be drawn up through there."

Resident: "I think what he is saying is... the samples that you took from our wells is not a conclusive sample. Ok, if the samples that were taken from the wells was aerated and therefore the results that we see are, if anything, are lower than what was actually drawn out of the well, out of the ground."

Capt. Scullion: "That may be. Ok, I hear what you are saying. That may be. It may also be more realistic of the exposure from the stand point in that is the way the water is going to come out and that is the way vinyl chloride or whatever is going to get into the air."

"Now, we are going to leave that to Georgia DNR and their toxicologist, and EPA and their toxicologist in early January. In the middle of our preliminary risk assessment effort... We are basically going to take the methodology and the things that have been done to date by ABB Environmental, and they are going to take everything they have done and meet in Atlanta with Georgia DNR and EPA to show them what it is we are doing before we can prove the preliminary risk assessment is to make sure that we have concurrence in our methodology."

"They may conclude that those samples shouldn't be used for any further analysis. As I recall Frank, there was no EPA approved method for going out to evaluate the wells and figuring out how to take the samples. That is one of the things we struggled with when

ABB ENVIRONMENTAL SERVICES
CROOKED RIVER ELEMENTARY SCHOOL
PUBLIC INFORMATION SESSION
DECEMBER 17, 1992

we were setting up the interim corrective measures screening plan in September for our October effort."

Resident: "Are you going to be testing private wells many times over?"

Capt. Scullion: (repeats) "Are we going to be testing your private wells many times over before this process is over. The answer to that will be determined by the report and the approval. ABB may well recommend to the Navy in our actions with the state and the EPA that we do more testing. We may not do 51, we may do selected ones, but I don't think we can make that call now. I would think it is very likely that we do more well samples."

Frank: "We are going to do the people we missed in January."

Capt. Scullion: "We know we are going to do that, but we may be out there doing more well sampling as a part of our overall monitoring program."

Ed: "Definitely. We are more likely to go in and put permanent wells, because that is the more reliable wells."

Capt. Scullion: "The EPA approved procedures are that you go in and put in approved methodology wells and after the wells are in for awhile and the ground water stabilized and then you can start pulling your samples. Which is the equivalent of what we have been doing at the landfill sites around the perimeter and a couple of other sites on base with those wells that were installed last January. And, we waited till February to sample and then we are sampling bi-monthly so we can get a long term monitoring data base, or base line."

"Anybody else. Yes sir, blue shirt."

Resident: "Is it the Navy's intent to clean up the entire dump, or only this problem?"

Capt. Scullion: "Is it the Navy's intent to clean up the entire dump or only this problem? I don't know the answer to that yet. The immediate corrective action has to be to get to the contaminates that are in the subdivision at this point in time. We are focusing on that."

Resident: "This could be a potential problem over the next 1,000 years. There could be containers eroding away."

ABB ENVIRONMENTAL SERVICES
CROOKED RIVER ELEMENTARY SCHOOL
PUBLIC INFORMATION SESSION
DECEMBER 17, 1992

Capt. Scullion: "There has to be an interim corrective measure on a long term remediation."

Resident: "Based on what you know now, do you think the problem is better; is not as bad as you thought it might be; is worse than you thought it might be, are is pretty much what you thought it would be?"

Capt. Scullion: "Based on what we know now.. is the problem worse or better than what we thought it might be. That is an unanswerable question. Un-answerable."

Mayor Brandon: "I can tell you that we had hoped it had stopped at Spur 40, and it didn't, take that into account, then it is worse."

Capt. Scullion: "We did not know what to expect and that is why we have done so much sampling."

Resident: "The analogy was made that this whole problem could have been caused by gallon of solvent. Does that analogy still apply?"

Capt. Scullion: "That before the analogy was made that this whole problem could be created by a gallon of solvent?" The analogy that I remember Frank making was related to fuel related, semi-volatile organic compounds which is where he mentioned that a gallon of gas could contaminate.. how many gallons of water?"

Frank: "A million gallons of water. One gallon of gas will take you over the MCL of a million gallons of water. That is the analogy I used to show you that we found a few more out there in the fuel lines."

Capt. Scullion: "With respect to the volatile organic compounds specifically, the vinyl chloride. He was talking about other compounds, not vinyl chloride when he made that analogy. Am I correct? That was the semi-volatile. Vinyl Chlorides are volatile and it comes from cleaning solvents and those sort of things, not fuel related solvents. The trichlorethylene, dichloroethenes, the parent products that break down into the vinyl chlorides. To specifically answer your question. There may be more than one source in the landfill and they may be small. We don't know at this point in time. It could be dry cleaning fluid or something like that."

Mayor Brandon: "I think his question is.. though, If would one gallon, based on your experience with this sort of chemical, would

ABB ENVIRONMENTAL SERVICES
CROOKED RIVER ELEMENTARY SCHOOL
PUBLIC INFORMATION SESSION
DECEMBER 17, 1992

one gallon dry cleaning fluid or solvent.., could that cause this magnitude of a problem.

Capt. Scullion: "No. Right? Frank, says no."

Resident: "Did the Army have usage of this landfill facility or is that just a rumor I have heard?"

Capt. Scullion: "Did the Army have usage of this landfill facility? In the information we presented on the 3rd of September and the information we put out in our public releases is the information you will get to see when the Administrative Records is available to everybody that should need it."

"When they get all of that data together, you will find that in 1985, the Navy Environmental and Energy Support Unit out of California did a detailed assessment of potential sites on the Sub Base, and one of those is the landfill site. Based on discussions with people who were here when the Army was here, the landfill operators, records that they could review, to the best guest the contribution to the landfill was about 60% general municipal waste that any county receives. So it could come from likely anywhere in Camden County. Another roughly, 20% to 25% was Army and may be later Navy arrives and then there was other companies that contributed."

"Those are the numbers that are in the Navy assessment and control installation solution. The Navy assessment was done in 1985 and that is the best data we have right now to rely on."

Resident: "If we do not use our wells.. can this move or will it move?"

Capt. Scullion: "If you do not use your wells, can it move or will it move? The answer is.. it will move. There is a ground water flow naturally that goes in the northwest direction. And as Mr. Cater mentioned before... a very preliminary analysis of the type of geophysical environment and the soil that is down below us, we feel that it would move about 30 feet to 100 feet a year, just based on the normal transportation velocity of these types of compounds in the soils that are there. So. Yes it will move. Naturally."

"By using the wells we have the potential to influence unnaturally. And we are concerned about that. All the modeling

ABB ENVIRONMENTAL SERVICES
CROOKED RIVER ELEMENTARY SCHOOL
PUBLIC INFORMATION SESSION
DECEMBER 17, 1992

analysis that is done will be based on what we know about the natural perimeters of the sub-surface condition. The artificial things that you would do by moving it with the wells may be not helpful. Does that answer your question?"

Resident: "Yes."

Capt. Scullion: "Anybody else."

Resident: "Would it be possible to know these five wells that were tested and were contaminated whether they are near us, or around us, or is that private information?"

Capt. Scullion: "Would it be possible to know specifically the five wells, where they are? Frank, do we know that information to release that?"

Frank: "We have given it to the individuals and they are free to do with it whatever they want."

Capt. Scullion: "That's good thought, it is private info. We have given to them and they can do with it what they want."

Resident: "It would be nice to know."

Resident: "I have a question for Mike Mahaney. For your meetings, I don't know if we are able to attend them or not. But, from where I see it.. we stop using our well water, bottom line is we save you, city, money." (Can't make out)? "If we are going stop, we are going to save you guys money, and in turn we getting nothing.." (Can't make out)?

Capt. Scullion: "I am not going to repeat that one. Mayor."

Resident: (Can't make out)

Mayor Brandon: "We are not really doing this to save money from a measuring of the plume standpoint. We are concerned about the plume spreading, but it is not from a money savings standpoint. It is from a health standpoint and a remediation standpoint, clean it up. We are working on all the economic factors involved. We understand that you have wells out there that you irrigate with and we are working on that. We are working on that and that is all I can tell you at this time. Most people don't have wells, and those people irrigate pay the city water for that. If we start making special cases for situations that differ from that, but there are

ABB ENVIRONMENTAL SERVICES
CROOKED RIVER ELEMENTARY SCHOOL
PUBLIC INFORMATION SESSION
DECEMBER 17, 1992

some things we can do and we are looking into that. Mike, do you want to add to that."

Mike: "Just a couple of points that I would like to make. Normally, this process is through and once you get through to solve the problem, in most circumstances the government comes back to you and tell you that this was originally a county landfill.. we want some money from you. This is what it cost and we want you to pay it. So ultimately, I guess what I am saying is this could be ten years down the road. If its a general case they are come back hand it down and say we have now solved this problem and it cost X dollars and you need to pay us back. So, if we stop the migration we really save money for ultimately all Camden taxpayers. The other thing that I think is very important is.. I think you need to keep your perspective on this. And I am not usually an optimist. I think city managers are usually pretty pessimistic, but, lets back up just a second and look at the big picture. There's 600 homes in Crooked River. Approximately one hundred saying we have wells, now you have five that have contamination because of VOC's OK. Another key point when we test our drinking water for 82 contaminates in a EPA lab on a regular basis, vinyl chloride is one of those. Their standard is two parts per billion. Alright, what they are saying in that standard list by their figures generally on that 82 items on that is to have one and a million chance of getting cancer from vinyl chloride if you drink two liters, like a big coke bottle everyday, over your life span. I think we need to keep that all in perspective because this water is not being drank on a regular basis. I think that is all I can say on that issue, but that may not be a resolve."

Resident: "Yea, but what I remember you saying is exactly what you're saying in reverse, and what you are saying is that I can't quite understand is between that.. So basically in the long run you are saying that if we can spend my money now, it will save you guys money.

Mike: "Well, it is going to save everyone in Camden County, because we all pay county taxes. Again, I don't think we can move that fast. I mean before we can get into those type numbers, you know the average person that uses city water increases their bill \$100.00 a month. You know you could use 9 months and 150 homes, you could very quickly get up in the \$100,000 range on initial usage here. I think it is much too soon for that. I think you have got wait until you get your risk assessment. You've got to get your hazard index. You've got to incremental cancer risk before we are going to be able to attempt to manage it. If this is

ABB ENVIRONMENTAL SERVICES
CROOKED RIVER ELEMENTARY SCHOOL
PUBLIC INFORMATION SESSION
DECEMBER 17, 1992

the answer your aiming for, you know.. what are we going to do to give you a break if your well is contaminated. It is just too soon. I don't know. And I don't know if anyone in here does."

Resident: "It is hard to keep it in perspective when you are paying a \$60, \$70, or \$80 water bill and half of that is sewage."

Capt. Scullion: "That is really a tough emotional issue and it is one that the TRC wrestled with today for a long time trying to advise all the officials what the problems were. Mr. Mahaney's contribution tonight was a very brief synopsis of his discussion today with the TRC. There is a couple of residents that are on the TRC discussed that with us considerably. This is a tough issue. I don't quite understand your logic of the cost from the standpoint of what it would be yesterday verses what everybody else would save in the long run. We really need to get some facts on what the risk are associated with using those wells so that we can discuss with the officials and discuss with DNR and EPA to make a reasonable determination on what we do with the wells. We don't know that yet. It just seems prudent to all of us that are trying to influence the resolutions of the remediation."

Resident: (Can't make out) Talks about if there was any way they could use city water and not pay the sewer bill for the water they use for sprinkling, but would probably mean you would use two meters.

Mayor Brandon: "Well, we talked about that today as well, and that may be the solution to this. Hopefully we will have some numbers with some better ideas before the spring growing season comes around."

Capt. Scullion: "It is not something that we will put on the shelf."

Resident: "Is there any pre-testing that is required by law for a land owner to have his water, ground water tested prior to his buying a residence."

Mayor Brandon: "I don't think at this point in Camden County they have any restrictions on putting your own well in. That means you don't need a permit and that means you don't have to do any test."

Resident: "The time in 85, was there a report available to the builders, homebuilders that there was a potential for contamination somewhere?"

ABB ENVIRONMENTAL SERVICES
CROOKED RIVER ELEMENTARY SCHOOL
PUBLIC INFORMATION SESSION
DECEMBER 17, 1992

Capt. Scullion: "Let me just talk about the 1985 report one more time. Certainly, this is made as part of the Administrative Records. The initial conclusion of the 1985 Assessment Study was there was no potential health risk for that site based on what we do about it on the procedures that we use to study, based on records and inventory. And. With out getting in there and digging a whole, keep in mind there was no really significant scientific testing that was done during the NACEP study in 1985."

"It was more of a survey of information and data to find out what the potentials were for that site and fifteen others. The conclusion was, there was no significant threat. So, your comment that... I wanted to make sure that you understand that the conclusion of the 85 studies was there was no significant threat. We now know that there is a significant threat. So just to clarify your points."

"Anybody else. Again, I thank you for coming."

Meeting Adjourned

PUBLIC INFORMATION SESSION:

GROUNDWATER INVESTIGATION

AT OLD COUNTY LANDFILL

17 DECEMBER 1992

INFORMATION SESSION AGENDA:

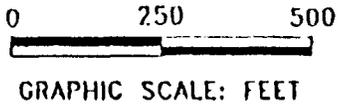
- **PROGRESS IN THE INVESTIGATIONS**
- **STATUS OF THE PLUME**
- **PRIVATE WELL RESULTS**
- **NEXT STEPS**
- **SUMMARY/DISCUSSION**

HISTORIC/ OVERVIEW

- JAN. / FEB. '92: GROUNDWATER MONITORING AT LANDFILL DETECTED VINYL CHLORIDE
- AUG. '92: VINYL CHLORIDE AND OTHER VOLATILE ORGANIC COMPOUNDS (VOCs) DETECTED WEST OF SPUR 40. CITY AND COUNTY OFFICIALS WERE NOTIFIED.
- SEPT. '92: PUBLIC NOTIFIED; FIRST INFORMATION SESSION HELD. USEPA AND GEORGIA DNR WERE NOTIFIED.

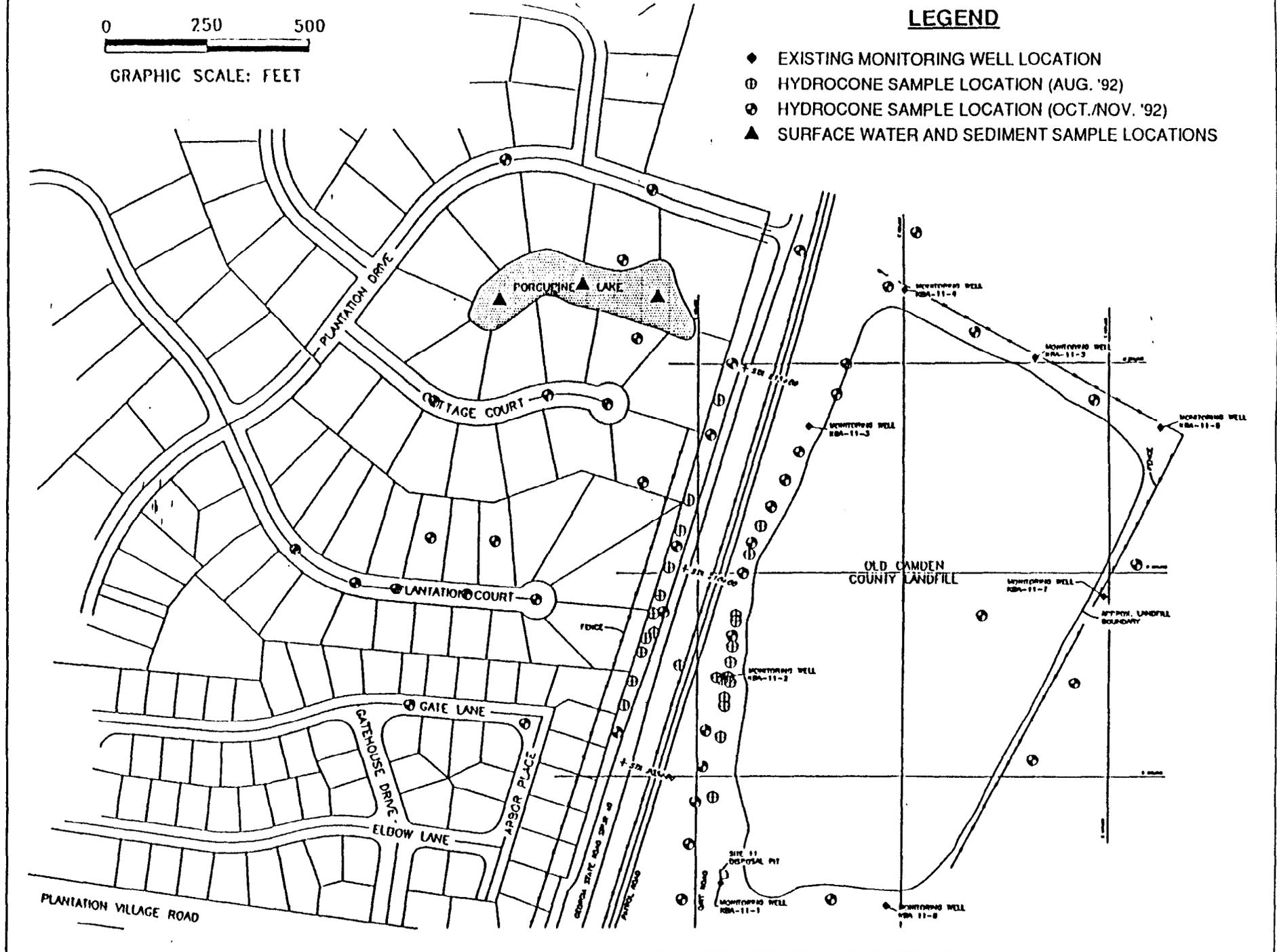
HISTORICAL OVERVIEW (CONT.)

- OCT. / NOV. 92: **SECOND PUBLIC INFORMATION SESSION HELD.**
 - **144 GROUNDWATER SAMPLES FROM DEPTHS OF 5 - 72 FEET COLLECTED AROUND LANDFILL, IN CROOKED RIVER PLANTATION COMMON AREAS AND PROPERTIES.**
 - **51 PRIVATE WELLS SAMPLED.**
 - **3 SURFACE WATER AND SEDIMENT SAMPLES COLLECTED FROM PORCUPINE LAKE.**
 - **AIR MONITORING CONDUCTED.**



LEGEND

- ◆ EXISTING MONITORING WELL LOCATION
- ⊕ HYDROCONE SAMPLE LOCATION (AUG. '92)
- ⊙ HYDROCONE SAMPLE LOCATION (OCT./NOV. '92)
- ▲ SURFACE WATER AND SEDIMENT SAMPLE LOCATIONS



HISTORICAL OVERVIEW (CONT.)

OCT. / NOV. '92:
(cont.)

**GROUNDWATER SAMPLES
ANALYZED ON-SITE FOR VOCs;
> 10% UNDERWENT
CONFIRMATORY ANALYSIS IN AN
OFF-SITE LAB.**

**PORCUPINE LAKE SAMPLES
ANALYZED FOR VOCs AND
SEMIVOLATILE ORGANIC
COMPOUNDS (SVOCs) IN THE
OFF-SITE LAB.**

HISTORICAL OVERVIEW (CONT.)

OCT. / NOV. '92:
(cont.)

TECHNICAL REVIEW COMMITTEE (TRC) WAS ESTABLISHED. A COMMUNITY RELATIONS PLAN WAS STARTED WITH COMMUNITY INPUT IN THE FORM OF COMMUNITY INTERVIEWS. THE ADMINISTRATIVE RECORD PROCESS WAS IMPLEMENTED

○ DEC. '92:

TWO TRC MEETINGS WERE HELD

SAMPLING RESULTS DISTRIBUTED AT 3RD PUBLIC INFORMATION SESSION.

INFORMATION SESSION AGENDA:

- PROGRESS IN THE INVESTIGATIONS**
- STATUS OF THE PLUME**
- PRIVATE WELL RESULTS**
- NEXT STEPS**
- SUMMARY/DISCUSSION**

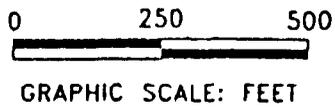
FIN. NGS

- PORCUPINE LAKE: NO VOCs OR SVOCs DETECTED IN SURFACE WATER OR SEDIMENT SAMPLES.

- AMBIENT AIR: NO VINYL CHLORIDE DETECTED.

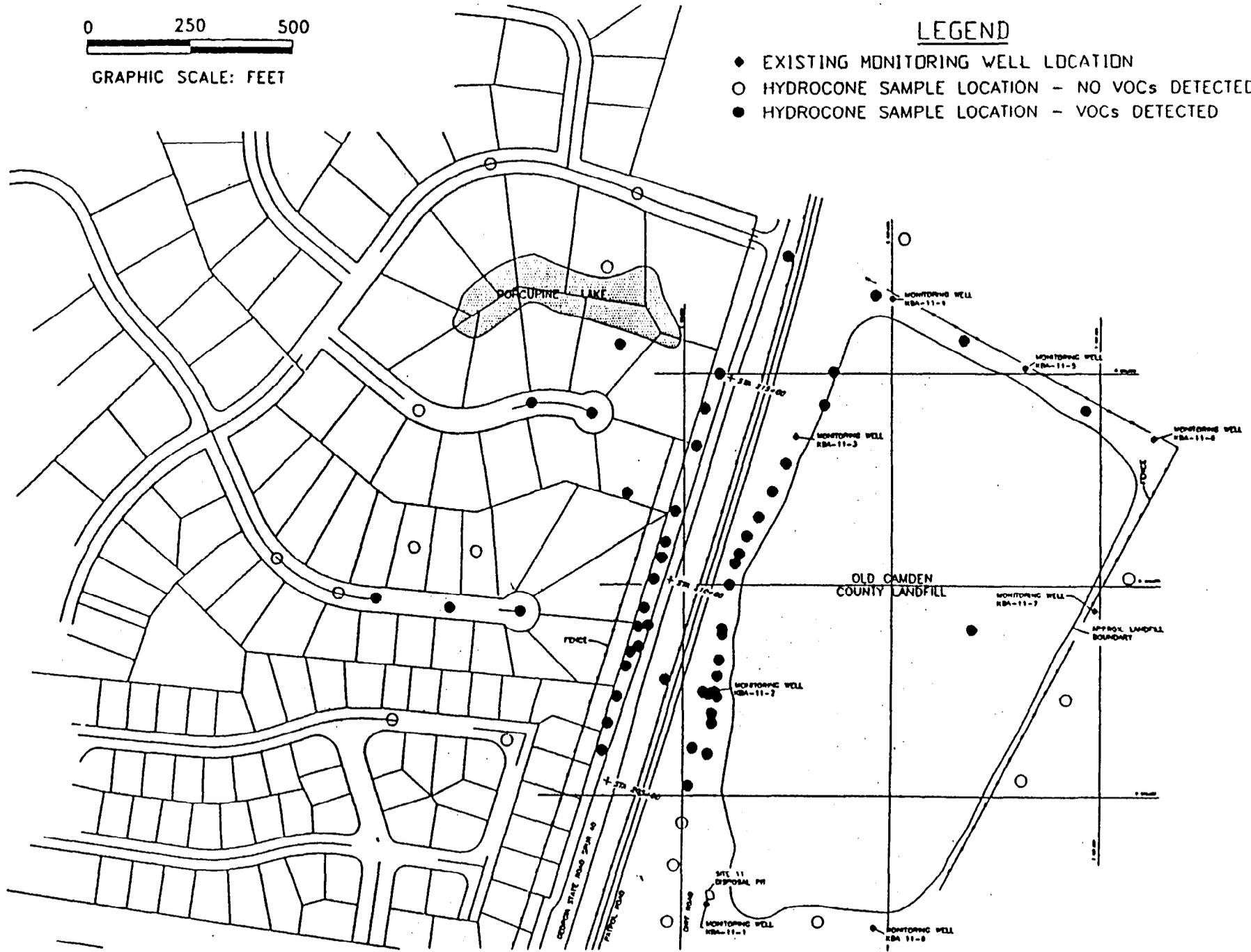
- GROUNDWATER PLUME: DETECTED APPROXIMATELY 750 FEET WEST OF SPUR 40

VOCs DETECTED:
 - LANDFILL: 9 - 58 FEET
 - SUBDIVISION: 16 - 51 FEET



LEGEND

- ◆ EXISTING MONITORING WELL LOCATION
- HYDROCONE SAMPLE LOCATION - NO VOCs DETECTED
- HYDROCONE SAMPLE LOCATION - VOCs DETECTED



FINDINGS (CONT.)

VINYL CHLORIDE AND OTHER SOLVENTS

AND

FUEL RELATED VOLATILE ORGANIC COMPOUNDS

INFORMATION SESSION AGENDA:

- PROGRESS IN THE INVESTIGATIONS**
- STATUS OF THE PLUME**
- PRIVATE WELL RESULTS**
- NEXT STEPS**
- SUMMARY/DISCUSSION**

FINDING (CONT.) IRRIGATION WELL INVESTIGATION

- VINYL CHLORIDE AND OTHER SOLVENTS PLUS FUEL RELATED VOC DETECTED IN 16 WELL SAMPLES**

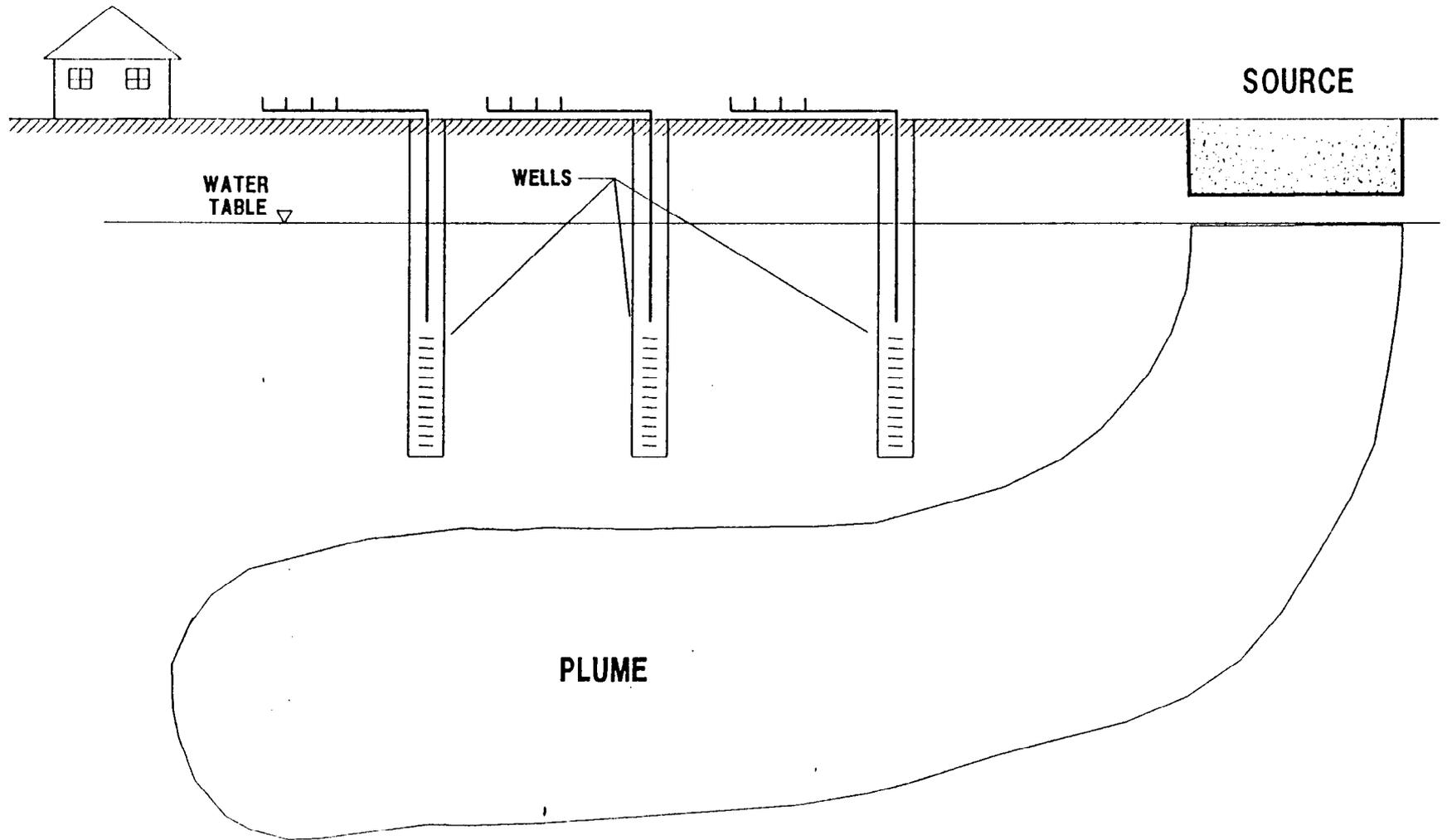
- 11 OF 16 WELL SAMPLES CONTAINED VOCs BELIEVED TO BE UNRELATED TO PLUME**

- 5 OF 16 CONTAINED VOCs BELIEVED TO BE RELATED TO THE PLUME**
 - VINYL CHLORIDE**
 - DICHLOROETHENE**
 - ETHYLBENZENE**

REASONS NOT TO USE WELLS

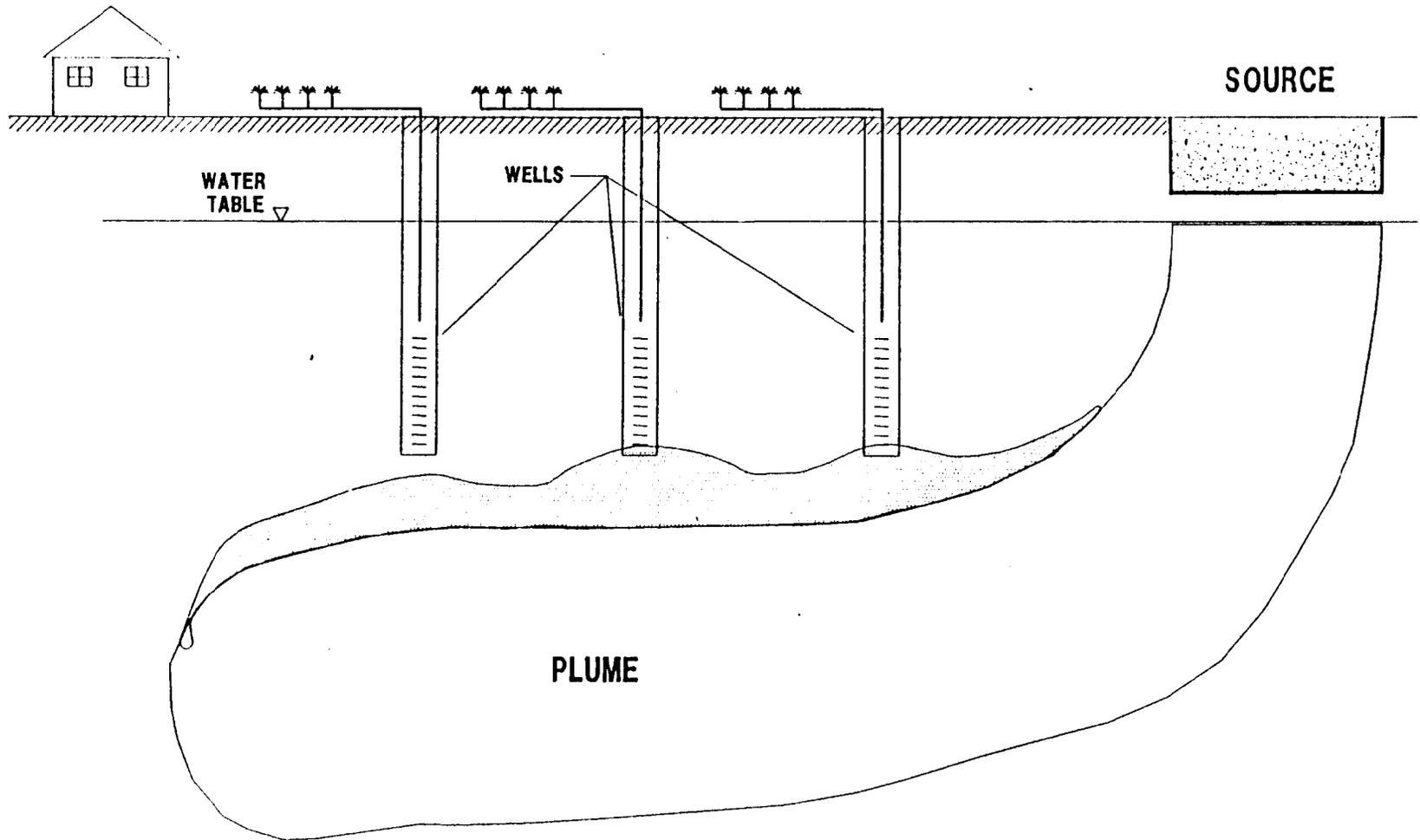
- POTENTIAL HEALTH RISK CURRENTLY UNDER EVALUATION**
- SAMPLE RESULTS ARE DATED; GROUNDWATER AND PLUME MIGRATING**
- MAY DRAW PLUME TO YOUR WELL**

WELLS OFF



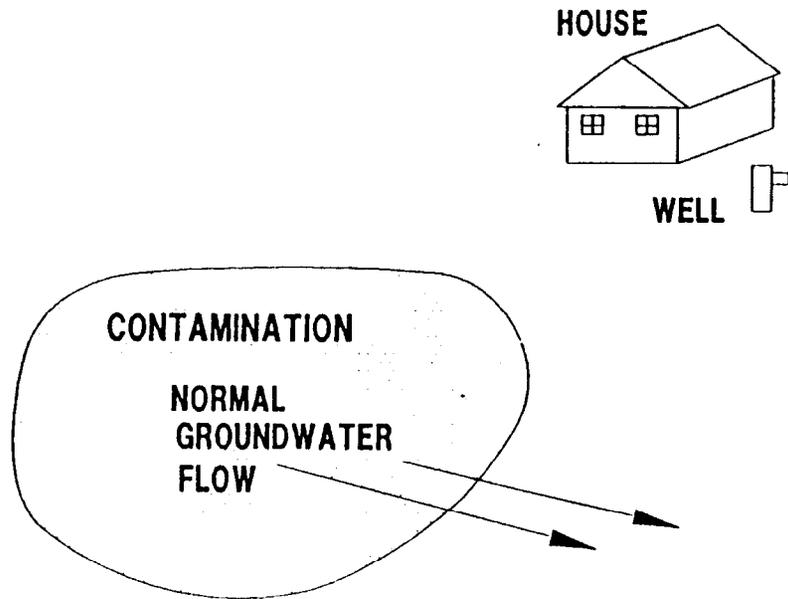
CROSS-SECTION

WELLS ON



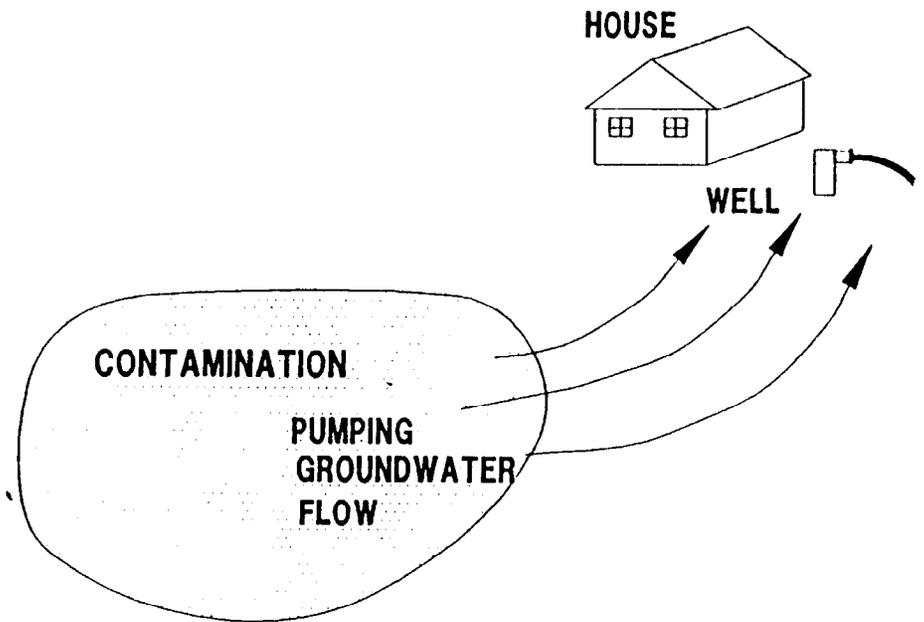
CROSS-SECTION

WELLS OFF



PLAN

WELLS ON

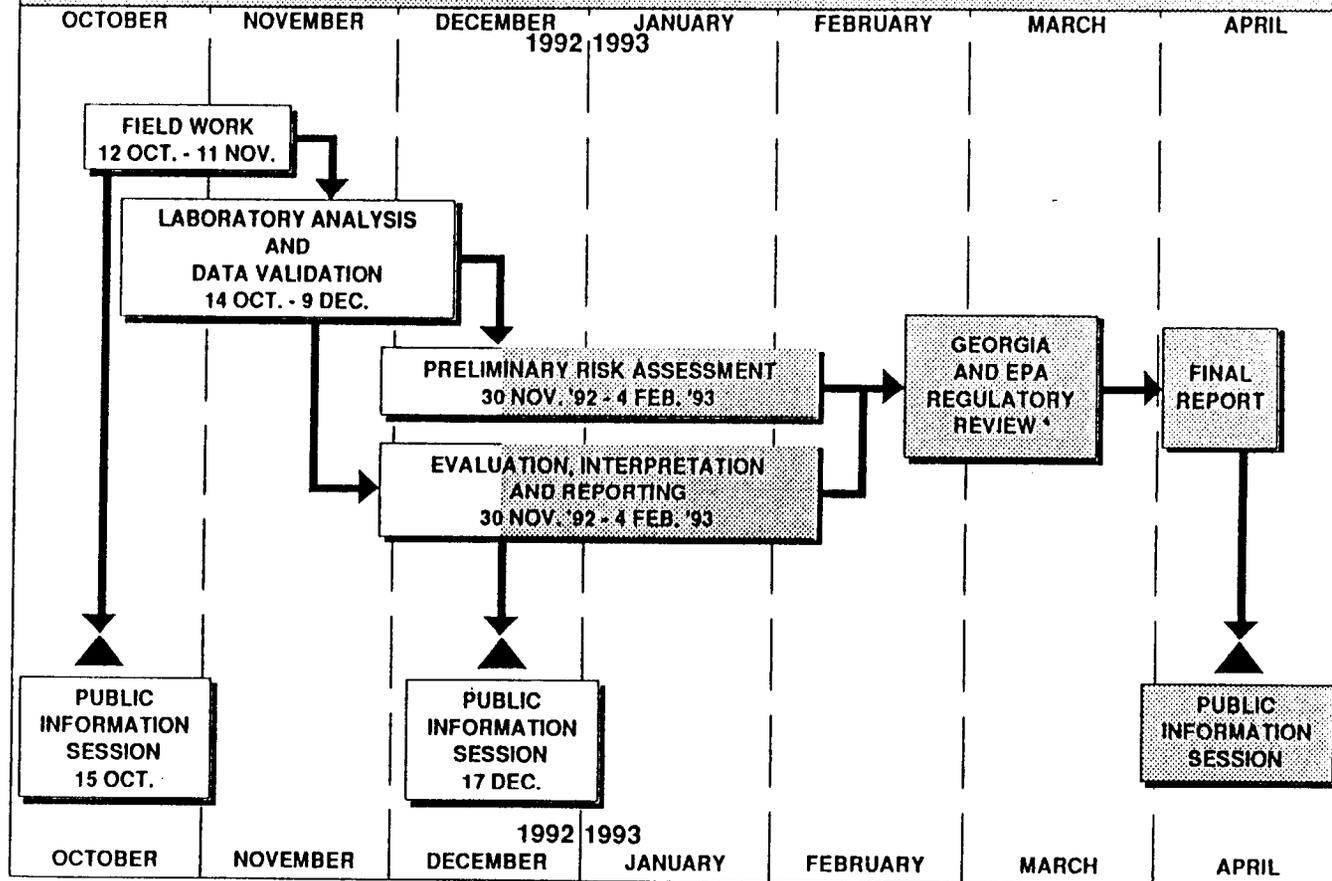


PLAN

INFORMATION SESSION AGENDA:

- PROGRESS IN THE INVESTIGATIONS**
- STATUS OF THE PLUME**
- PRIVATE WELL RESULTS**
- NEXT STEPS**
- SUMMARY/DISCUSSION**

COUNTY LANDFILL INVESTIGATION NEXT STEPS



* ASSUMES AN EXPEDITED REVIEW BY REGULATORS

STEPS OF A HUMAN HEALTH RISK ASSESSMENT

4 Basic Steps of Risk Assessment

- Identify the Chemicals of Concern**
 - Determine if there is any Potential for Chemical Exposure**
 - Evaluate the Toxicity of the Chemicals of Concern**
 - Estimate the Risk Associated with Chemical Exposure**
-

4 Basic Steps of Risk Assessment

- Identify the Chemicals of Concern**
 - Determine if there is any Potential Chemical Exposure
 - Evaluate the Toxicity of the Chemicals of Concern
 - Estimate the Risk Associated with Chemical Exposure
-

Identify the Chemicals of Concern

- Based upon Chemical Analysis**
- Answers the Questions:**
 - What is out there?**
 - How much is out there?**
- Usually Takes Several Months to Complete**
- Being Conducted at this Time**

4 Basic Steps of Risk Assessment

- Identify the Chemicals of Concern
 - Determine if there is any Potential for Chemical Exposure**
 - Evaluate the Toxicity of the Chemicals of Concern
 - Estimate the Risk Associated with Chemical Exposure
-

Determine if there is any Potential for Chemical Exposure

- Characterize the Physical Setting
 - Identify Potential Exposure Pathways
 - Irrigation Systems using Private Groundwater Wells
 - Identify Potentially Exposed Populations
 - Answers the Questions:
 - How Much have (can, will) I be Exposed to ?
 - Regulatory Approval for Sprinkler Modeling is Needed
 - Usually Takes Several Weeks
 - Being Conducted at This Time
-

4 Basic Steps of Risk Assessment

- Identify the Chemicals of Concern
 - Determine if there is any Potential for Chemical Exposure
 - Evaluate the Toxicity of the Chemicals of Concern**
 - Estimate the Risk Associated with Chemical Exposure
-

Evaluate the Toxicity of the Chemicals of Concern

- Gather Toxicity Information For Chemicals Being Evaluated
 - Dose Response Assessment
 - Determine Toxicity Values for Noncarcinogenic Effects
 - Determine Toxicity Values for Carcinogenic Effects
 - Identify Exposure Periods Required for Toxicity to Occur
 - Acute (Short Term)
 - Chronic (Long Term)
 - Answers the Question:
 - What can Happen if I am Exposed?
 - Usually takes Several Weeks to Complete Analysis
 - Being Conducted at this Time
-

4 Basic Steps of Risk Assessment

- Identify the Chemicals of Concern
- Determine if there is any Potential for Chemical Exposure
- Evaluate the Toxicity of the Chemicals of Concern
- Estimate the Risk Associated with Chemical Exposure**

Estimate the Risk Associated with Chemical Exposure

- Estimate Risks from Potential Chemical Exposures
 - Uncertainty Analysis
 - Answers the Questions:
 - What is the Greatest Risk that can Occur from Exposure?
 - How Good are these Risk Estimates?
 - What Do We Know?
 - What Don't We Know?
 - May Take up to a Month for Completion of Analysis
 - Not Yet Begun
-

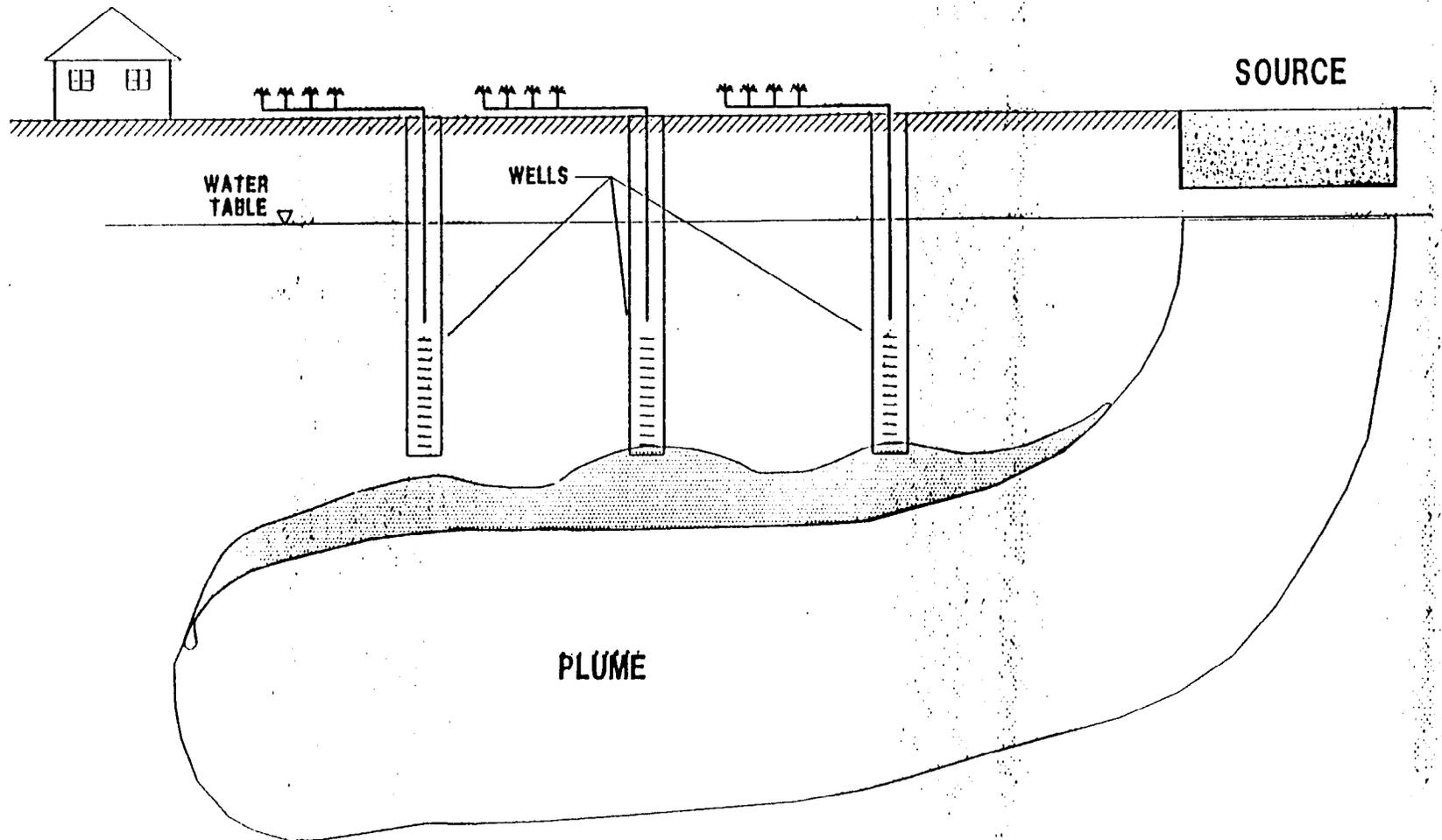
Facts About Risk Assessment

- The Risk Assessment Process is Very Conservative. These Risk Numbers Usually Represent a "Worst-Case" Situation**
 - The Actual Risks are Usually Much Lower and, In-Fact, May be Zero**
 - Many Factors besides Chemical Exposures Contribute to the Risk of Developing Cancer**
 - Heredity**
 - Lifestyle (Smoking, Drinking, Eating)**
 - Unknowns**
-

Risk Assessment

- Hazard Identification
- Dose- Response Assessment
- Exposure Assessment
- Risk Characterization

WELLS ON



CROSS-SECTION

Risk Analysis

- Risk Assessment
 - Identify nature and magnitude of risks
- Risk Management
 - Identify options for controlling risks
 - Select and implement one or more control options

Common Measures of Health Risk

- Hazard Index - Ratio of "site" exposure and allowable (safe) exposure.
- Incremental Lifetime Cancer Risk - Probability that "site" exposure could result in development of cancer for exposed individuals. (Above and beyond "background" cancer risk)

PRIVATE WELL SAMPLE RESULTS FOR:

Compound	*On-Site Lab	*On-Site Duplicate	*Off-Site Lab	*Off-Site Duplicate	*MCL**	Comments
Chloromethane			ND			
Bromomethane			ND			
Vinyl Chloride	ND		ND		2	
Chloroethane			ND			
Methylene chloride			ND			
Acetone			ND			
Carbon disulfide			ND			
1,1-Dichloroethene			ND		7	
1,1-Dichloroethane			ND			
cis-1,2-Dichloroethene	ND		ND		70	
trans-1,2-Dichloroethene	ND		ND		100	
Chloroform			ND			
1,2-Dichloroethane			ND		5	
2-Butanone			ND			
1,1,1-Trichloroethane			ND		200	
Carbon tetrachloride			ND		5	
Bromodichloromethane			ND			
1,2-Dichloropropane			ND		5	
cis-1,3-Dichloropropene			ND			
Trichloroethene	ND		ND		5	
Dibromochloromethane			ND			
1,1,2-Trichloroethane			ND			
Benzene	ND		ND			
trans-1,3-Dichloropropene			ND			
Bromoform			ND			
2-Hexanone			ND			
4-Methyl-2-pentanone			ND			
Tetrachloroethene	ND		ND		5	
1,1,2,2-Tetrachloroethane			ND			
Toluene	ND		ND		1000	
Chlorobenzene			ND		100	
Ethylbenzene	ND		ND		700	
Styrene			ND		100	
Xylenes (total of 2)	ND		ND		10000	
1,3-Dichlorobenzene			ND			
1,4-Dichlorobenzene			ND		5	
1,2-Dichlorobenzene			ND		500	

NOTES:

- Expressed in micrograms per liter (parts per billion)
- Georgia Department of Natural Resources, 1992. Rules for Safe Drinking Water, Environmental Protection Division
- ND - Not Detected
- No regulatory standard developed. Defects but unable to measure.
- Shaded areas - not applicable

INFORMATION SESSION AGENDA:

- **PROGRESS IN THE INVESTIGATIONS**
- **STATUS OF THE PLUME**
- **PRIVATE WELL RESULTS**
- **NEXT STEPS**
- **SUMMARY/DISCUSSION**

SUMMARY

WHAT WE KNOW:

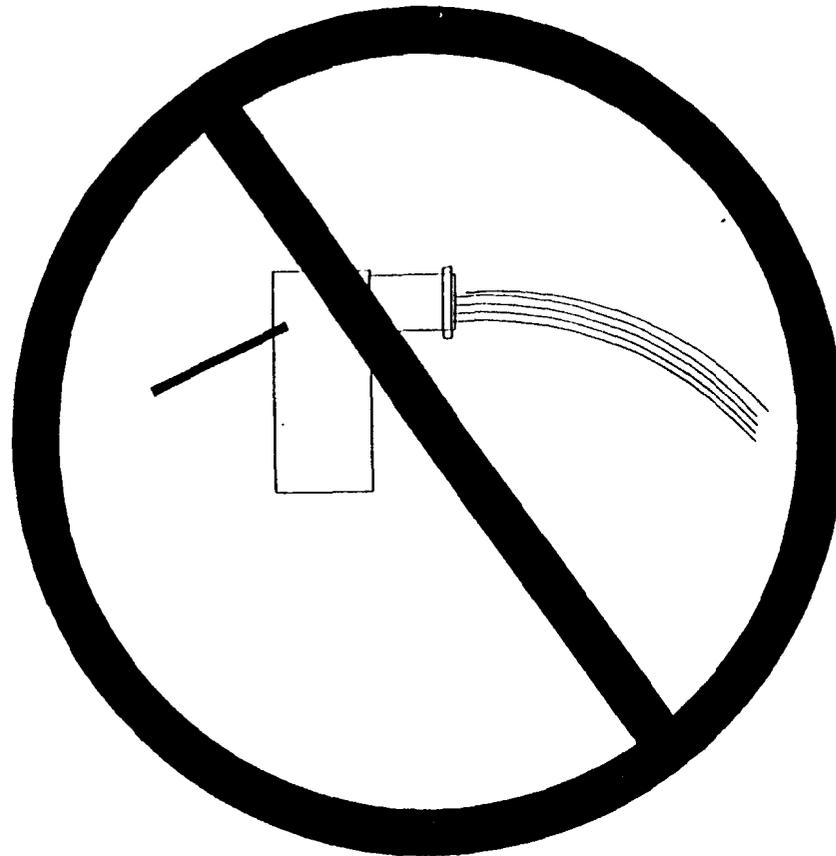
- NO CONTAMINANTS FOUND UPGRADIENT (EAST) OF THE LANDFILL
 - PLUME ORIGINATES IN LANDFILL
- NO VINYL CHLORIDE DETECTED IN AIR
- NO CONTAMINANTS FOUND IN PORCUPINE LAKE
- PLUME DETECTED APPROXIMATELY 750 FEET WEST OF SPUR 40
- VOC PLUME CONTINUES TO MIGRATE
- POTENTIAL HEALTH RISKS BEING EVALUATED

17 DECEMBER 1992

CONTINUING ACTION

- COMPLETION OF PRELIMINARY RISK ASSESSMENT**
- CONCURRENCE OF REGULATORY AGENCIES**

PLEASE DO NOT USE



YOUR IRRIGATION WELL