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PUBLIC MEETING AND PUBLIC COMMENT PERIOD

MONDAY, MAY 14, 2001

6:00 P.M.

NASA JET PROPULSION LABORATORY

4800 OAK GROVE DRIVE

PASADENA, CALIFORNIA

1 PASADENA, CALIFORNIA  
2 MONDAY, MAY 14, 2001; 6:00 P.M.

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4 MR. SAUNDERS: Good evening. We're  
5 going to start a couple minutes early. Welcome to  
6 the Jet Propulsion Laboratory. Thank you for taking  
7 the time tonight for attending this meeting.

8 My name is Lee Saunders. I am an  
9 environmental public affairs officer for the U.S.  
10 Navy and the facilitator for tonight's meeting about  
11 the proposed plan to select a remedy to clean up  
12 soils at the National Aeronautics Space  
13 Administration Jet Propulsion Laboratory, located  
14 here in Pasadena.

15 During this portion of the meeting  
16 you, the community, can provide questions and  
17 comments to these representatives and their agencies  
18 on the proposed plan.

19 Excuse me. Let me backtrack just a  
20 moment. Prior to the meeting you had the  
21 opportunity to speak with NASA federal and local  
22 lead and regulatory agency representatives on a  
23 one-to-one basis about the proposed cleanup  
24 actions. During this portion of the meeting you,  
25 the community, can provide questions and comments to

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1 alternatives, followed by a formal comment session  
2 where you, the community, can provide us with your  
3 comments and questions.

4 I'm going to ask you to please hold  
5 your questions until the presentations have been  
6 completed. Once we've heard from all  
7 representatives, we will open the floor for  
8 questions and comments. You may want to use the  
9 comment sheets that are in the back, to write your  
10 questions down during the formal comment session,  
11 while we're waiting for that opportunity.

12 To ensure that everyone that wishes to  
13 make a comment or ask a question has a fair and  
14 equal opportunity do so, we ask that you limit your  
15 comments or questions to two minutes. At the end of  
16 that time, please take your seat. If you have not  
17 finished your remarks, you may continue for another  
18 three-minute period after we've heard from all the  
19 other speakers.

20 We have court reporters, two of them,  
21 here tonight. So we ask you to please state your  
22 first and last name and spell your last name before  
23 you begin your comments. If you do not wish to  
24 provide verbal comments or questions, you may also  
25 submit your comments and questions in writing.

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1 these representatives and their agencies on the  
2 proposed plan. These comments and questions will be  
3 included in a meeting transcript and become part of  
4 the final decision for soil cleanup at JPL.

5 Representing the agencies responsible  
6 for cleanup and talking to you about the proposed  
7 plan and its remedial alternatives are agency  
8 representatives, who will each introduce  
9 themselves. To my left ...

10 MR. ROBLES: Peter Robles, of NASA,  
11 representing the Superfund cleanup group.

12 MR. ZUROMSKI: Hi. I'm Richard  
13 Zuromski from the Naval Facilities Engineering  
14 Command.

15 MR. GEBERT: I'm Richard Gebert, with  
16 the state of California Department of Toxic.

17 MR. RIPPERDA: And I'm Mark Ripperda,  
18 with the United States Environmental Protection  
19 Agency.

20 MR. YOUNG: Hi. David Young, with the  
21 Los Angeles Regional Water Quality Control Board.

22 MR. SAUNDERS: Ground rules for  
23 today's meeting are as follows: This evening's  
24 format will consist of presentations by our  
25 representatives about the proposed plan and remedial

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1 There are comment sheets available on the tables in  
2 the back, for those of you in the audience that  
3 would prefer to submit your input by this method.

4 For those of you wondering why the  
5 U.S. Navy is involved with the environmental cleanup  
6 of a NASA facility, the explanation is fairly  
7 simple. In 1999 NASA and the Naval Facilities  
8 Engineering Command, more commonly known by the  
9 acronym NAVFEC, reached a memorandum of agreement  
10 establishing roles and responsibilities that state  
11 NASA may procure environmental engineering and  
12 consultancy services from NAVFEC and its subordinate  
13 commands. In late 1999 NAVFEC became heavily  
14 involved in providing environmental services to  
15 NASA-JPL.

16 Peter Robles, remedial project manager  
17 from NASA, is our first presenter.

18 Peter?

19 MR. ROBLES: Good evening.

20 What we're going to present today is a  
21 site description, give a little history of why this  
22 site is on the Superfund list, then we're going to  
23 have Mark Ripperda talk about regulatory framework,  
24 coming up with Richard Zuromski talking about site  
25 assessment and investigation activities and the

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1 remedial activities and the proposed remedial  
2 alternatives for OU-2 soils.  
3 We will, at a later date, talk about  
4 groundwater. We'll have another public meeting in  
5 the near future. But right now what we're focusing  
6 on is the soils underneath JPL and how to remediate  
7 the contaminants in the soil, to minimize any  
8 migration into the groundwater. And that's what  
9 we're going to do right now.

10 The site that we call JPL has been  
11 active since the late '30s, early '40s. It was  
12 owned by the Army Ordinance, and then it was owned  
13 by NASA in '59 to '60, when we took it over.

14 During the '40s and 50s seepage pits  
15 were the main method to dispose of waste. At that  
16 time it was the most accepted practice. It was  
17 within the regulations, no problem at all. We found  
18 out later that that was a mistake and we had to  
19 correct that. In the late '50s, early '60s we,  
20 NASA, started programming to replace these seepage  
21 pits with sewer lines.

22 Now, in the case -- in the question  
23 that came in on Saturday was: So contaminants are  
24 going down the sewer line. No, they're not. That's  
25 a good question. Very little gets put into

6

1 feet below the surface to about 200 feet, which is  
2 the groundwater zone that we're talking about.  
3 In the soils we're talking about  
4 chlorinated solvents, and when we say "vadose zone"  
5 we mean in the vapors stayed in the soil. NASA  
6 wants to address this issue tonight. We will be  
7 addressing groundwater in the future.

8 Now we'll have the EPA talk about  
9 regulatory framework.

10 MR. ZUROMSKI: I just want to ask the  
11 court reporters really quick: Can you hear me okay  
12 without having to use the microphone?

13 Okay. We're going to try -- Mark and  
14 I are going to try to do ours without the  
15 microphone.

16 MR. RIPPERDA: So I can stand out of  
17 the light.

18 So what's it mean to be a Superfund  
19 site and, for that matter, what's -- cool. I get a  
20 toy. What's it mean to be a Superfund site. For  
21 that matter, what's Superfund.

22 About 20 years ago Congress passed a  
23 law, it's called CERCLA, I won't talk about what the  
24 acronym means, that authorized a tax on the chemical  
25 industry, and that tax all went into a trust fund

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1 landfills. We usually destroy or recycle the  
2 chemicals that we use today, or they are used up in  
3 the operational processes. We do not do that.  
4 Regulatory requirements require us to make sure of  
5 that. So from the standpoint today, we are all  
6 within regulations. But at the time, the main  
7 reason why the contaminants got into the ground soil  
8 is because of these seepage pits.

9 In 1992 the site became a Superfund  
10 site. It was put on the national priorities list,  
11 and the EPA will talk a little more about that. We  
12 are talking about trying to remediate Operable Unit  
13 2, which is the soils.

14 As I said before, currently all  
15 operations meet federal, standard, local  
16 requirements. We have a host of regulations that we  
17 have to follow and so, therefore, we are assured  
18 that we're doing what's right. What we're dealing  
19 with is past practices that we have to take care  
20 of.

21 Here is a conceptual model of what  
22 we're talking about. What you have here is a VOC  
23 plume, volatile organic carbons, that have gone  
24 through the soils because of past practices from  
25 JPL. The area that we're most concerned with is 50

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1 which is called the Superfund, which EPA can spend  
2 to clean up abandoned hazardous waste sites. That  
3 same law passed by Congress also gave EPA the  
4 authority to go to existing, ongoing sites such as  
5 NASA-JPL that have contamination that might pose a  
6 serious threat to public health.

7 And we have the authority to force  
8 them to clean it up. In order for us to use that  
9 authority, we have to rank how bad the potential  
10 hazard might be. If it scores high enough, the  
11 site's put on a national priorities list, also  
12 called the NPL. And, like Peter said, that happened  
13 with NASA-JPL in 1992.

14 So what was it that first got NASA-JPL  
15 on the national priorities list? In the late, very  
16 late '80s the city of Pasadena found some chemicals  
17 in their drinking water wells, right here across the  
18 arroyo, just through their standard compliance  
19 testing that they have to do with the state of  
20 California, and that's what got all of us  
21 regulators, the state of California, Richard and  
22 David and myself -- well, actually, our  
23 predecessors, but that got us involved looking over  
24 their shoulders, making sure that they're doing the  
25 cleanup appropriately.

9

1 Right when the contamination was first  
2 found, the city of Pasadena put treatment systems on  
3 their wells immediately, which means that anybody  
4 who is drinking the water was protected right from  
5 the beginning. But to clean up the actual release,  
6 to clean up both the aquifer and the source here on  
7 site is a long, lengthy process.  
8 And that -- the majority of that  
9 process is called the remedial investigation and  
10 feasibility study, which means that they have to go  
11 out, drill bore holes all over the site, take soil  
12 samples, soil vapor samples, that included  
13 monitoring wells, take groundwater samples, both on  
14 the site -- they also went out into the  
15 neighborhoods, put monitoring wells out there,  
16 sampled them. They also worked with the water  
17 purveyors, to look at their water analyses. And  
18 with all of that, they figured out where the  
19 contamination is now, where it came from originally,  
20 and they go through a process of deciding how best  
21 to clean it up.  
22 You usually clean up groundwater  
23 contamination by looking at the source, where the  
24 contamination is coming from, and at the aquifer  
25 itself in two separate stages because you're using

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1 found, over the 20 years that we've been doing  
2 Superfund cleanups, to be the one system that really  
3 works in a case like this, where you've got volatile  
4 organic compounds in the soil deep beneath the  
5 site. You can't really dig up the site. You know,  
6 one alternative might be dig up the whole site, take  
7 the soil away. But, obviously, you can't do that  
8 here because you'll be digging up all of JPL.  
9 There's some other technologies, such  
10 as heating the soil with large electrical currents  
11 to actually -- what's called vitrify it, so you turn  
12 it into one solid lump, you melt the soil, and you  
13 can't do that here. So technology like that, which  
14 exists but they don't really make sense for a site,  
15 you know, we, the government, don't make NASA do a  
16 detailed evaluation of.  
17 So they essentially cut right to the  
18 chase and said, "What we're proposing is the one and  
19 only system that really works best now. There might  
20 be something else that comes along in the future,  
21 but for now this is what makes sense."  
22 So once they select a remedy, they  
23 have to do a legal document which is called a record  
24 of decision. Before you get to that point -- I  
25 forgot the most important part. The yellow box,

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1 different physical mechanisms to clean up the two.  
2 And so what they're working on now and what this  
3 whole meeting about is the actual cleaning up of the  
4 source here on site, as Peter says, to keep it from  
5 going into the water, which means that ultimately  
6 the water can be cleaned up faster.  
7 So in the feasibility study, they look  
8 at various alternatives on how best to clean  
9 something up. And in some cases, such as here at  
10 JPL, there is only one real option. I don't know if  
11 you've read the proposed plan, but it looks like you  
12 were given two choices: Do nothing or do what NASA  
13 wants to do.  
14 And that may look like you don't  
15 really have a choice, but Congress said that we  
16 always have to look at the do nothing alternative  
17 because they didn't want EPA out there spending  
18 money willy-nilly, making facilities and industry  
19 spending money if doing nothing might work. I don't  
20 know why they didn't trust us to be good stewards of  
21 public money, but they didn't. So in this case,  
22 they had to look at the do nothing alternative.  
23 And the other alternative that they've  
24 shown to you in the proposed plan, which is called  
25 soil vapor extraction, is something that EPA has

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1 where we are now, they have to go out to the public  
2 and say, "This is what we are proposing. What do  
3 you think?" So you can comment both on, you know,  
4 their selection of a remedy, but you can also make  
5 whatever comments you want on, you know, how they  
6 random process, how well they've involved the  
7 public, if you think they've been hiding things from  
8 you or whatever, which they haven't, but anything  
9 you might think, you can make comments on now. It  
10 doesn't just have to be on their remedy.  
11 They then have to respond to your  
12 comments, they have to check with the regulators,  
13 make sure that the state of California and EPA is  
14 happy with how they've responded to the public. And  
15 at that point, if we're all happy with each other,  
16 they do the record of decision, and then they go on  
17 for the remedy implementation.  
18 And eventually, if the site gets  
19 completely cleaned up, there's no longer a Superfund  
20 site, you get delisted from the national priorities  
21 list. But even if that happens, there's still  
22 always going to be long-term monitoring and review  
23 of what the situation is here at JPL.  
24 And, you know, this is just kind of  
25 what we've already said. This is a chance for you

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1 to ask us questions, and also make comments on what  
2 you think about both the remedy and the process, you  
3 know, everything that's going on right now. You can  
4 always call Peter. Peter's name and number is in  
5 the documentation you got. I don't think my phone  
6 number is there but -- it is. Good. You can also  
7 feel free to call me. And I'll even say feel free  
8 to call the state of California guys, if you feel  
9 like you're not getting responses from NASA.  
10 MR. ZUROMSKI: Thank you, Mark.  
11 Hi. My name is Richard Zuromski. I'm  
12 with the Naval Facilities Engineering Command and,  
13 as Lee described earlier, I'm here to assist NASA in  
14 their cleanup efforts here at JPL.  
15 In 19- -- from 1994 through 1998 JPL  
16 conducted what's called a remedial investigation, as  
17 Mark described earlier. During the remedial  
18 investigation, over nine different sampling events,  
19 JPL took 45 soil vapor wells, 35 soil borings and  
20 three test pits throughout the site to investigate  
21 where the chemicals may be found in what we're  
22 calling Operable Unit 2. Further, over 37 -- or 37  
23 of those points were turned into permanent  
24 monitoring -- soil vapor monitoring points that we  
25 now monitor on a regular basis, to see how the

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1 soils and eventually reach the groundwater. And  
2 that's the purpose of the remedy that we're talking  
3 about here today, is to make sure that those  
4 chemicals do not enter the groundwater and pose a  
5 further problem in groundwater.  
6 Now, we are currently studying how to  
7 remove these chemicals from groundwater. And that's  
8 going to be the subject of a meeting very similar to  
9 this, probably within a year from now. However, the  
10 groundwater and the risks from chemicals in the  
11 groundwater, there's no risk because the water  
12 purveyors, or those people who deliver the water to  
13 the public, have to meet very, very strict  
14 regulatory requirements. So today's meeting is  
15 focused on removing this source of contaminants,  
16 what we call source reduction, from the soils before  
17 they reach the groundwater. And that's the purpose  
18 of our meeting today.  
19 Now, this graphic shows the extent to  
20 which any level of a volatile organic compound was  
21 detected here at the site during the remedial  
22 investigation. Now, the hottest or most -- the  
23 highest levels of these chemicals were found in the  
24 north central part of the site, right up here, where  
25 most of the laboratory activities took place. And

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1 contaminants are moving, or not moving in this case,  
2 within the subsurface.  
3 Now, during the remedial  
4 investigation, samples identified the extent to  
5 which the chemicals were in the soil, and the  
6 results showed that there were elevated levels of  
7 four different volatile organic compounds. They  
8 were carbon tetrachloride, trichloroethene,  
9 Freon 113 and 1,1-dichloroethene.  
10 Now, these were -- these chemicals  
11 were used back, as Peter described earlier, in  
12 the '30s, '40s and '50s to clean out the inside of  
13 rocket motors that they were testing back in those  
14 days, which they don't use here any more, and that's  
15 where the chemicals came from that are now in OU-2.  
16 OU-2 risk assessment, the human health risk  
17 assessment, determined that there were no risks  
18 above regulatory thresholds from exposure to soils  
19 or soil vapor.  
20 Now, the primary reason that this risk  
21 was so low was the fact that, as Peter described  
22 earlier, these chemicals are now more than 50 feet  
23 below the ground surface. So exposure to humans is  
24 very much unlikely. However, there is a risk that  
25 these chemicals will continue to migrate through the

15

1 that's where we focused a lot of our efforts to date  
2 doing some pilot studies, which I'll talk about in  
3 just a moment.  
4 Now, based on the results of the  
5 remedial investigation and our ongoing monitoring  
6 program of the soil vapor, we have found that the  
7 soil vapor and the chemicals in the soil vapor have  
8 not migrated off the JPL site boundary but it does  
9 encompass roughly 45 acres on the site.  
10 So based on the analysis, and the  
11 remedial investigation, and also the continuing  
12 monitoring we do here at the site, the remedial  
13 objective for Operable Unit 2 is to remove the  
14 chemicals or the VOCs from the soils before they  
15 migrate to the groundwater.  
16 To meet this objective, kind of as  
17 Mark had talked about earlier, JPL evaluated several  
18 alternatives to remove the chemicals. And of those  
19 alternatives, two were selected for a very detailed  
20 evaluation. If you look in your proposed plan, I  
21 think it's on the third or fourth page, there's a  
22 list of nine criteria that we have to go through  
23 when evaluating each technology in detail.  
24 The first is called no further  
25 action. As Mark talked about earlier, this is a

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1 baseline that all other technologies are compared  
2 to. Now, at this site no further action would  
3 entail continuing our regular soil vapor monitoring  
4 program, to see how the contaminants are behaving in  
5 the subsurface.

6 The second, and the proposed  
7 alternative for OU-2, is soil vapor extraction with  
8 granular activated carbon treatment and, also, the  
9 continuation of our regular monitoring program.

10 To help evaluate these two  
11 alternatives, JPL conducted a pilot test of the soil  
12 vapor extraction technology, and this started back  
13 in 1998. In over 14 months of operation of this  
14 pilot test, we removed roughly 200 pounds of VOCs,  
15 these chemicals, out of roughly up to a maximum of  
16 5,000 pounds that are throughout the site. But  
17 within this area, we removed 200 pounds of chemicals  
18 from the subsurface.

19 Now, this was so successful, this  
20 system is currently still operating here at the site  
21 and the pilot study does go on and will continue  
22 throughout the proposed plan stage, all the way  
23 through the record of decision stage, until we  
24 decide the final full scale size of the technology  
25 that we'll put here at the site.

18

1 carbon filters that are inside this vapor treatment  
2 system and take them to either a recycling facility  
3 or dispose of them in some recon- -- some type of  
4 legal, regulatory manner. And then we take a new  
5 carbon treatment system, and replace it, and  
6 continue the vapor extraction phase. That's  
7 generally how the soil vapor extraction works.

8 So based on our analysis, alternative  
9 one does not meet our remedial objective of keeping  
10 the chemicals from migrating to the groundwater.  
11 Therefore, we're proposing soil vapor extraction as  
12 our proposed remedy. There are several reasons why  
13 we're choosing soil vapor extraction for our  
14 proposed remedy.

15 First, it permanently removes the  
16 chemicals from the soil and the soil vapor.

17 Secondly, it protects the groundwater  
18 from further migration of the VOCs.

19 Third, it's fairly simple to operate  
20 and fairly inexpensive to implement.

21 Fourth, the treatment period is  
22 relatively short, probably from one to five years  
23 depending on how effective the system is here at the  
24 site. But based on our pilot site scale results, it  
25 should be very exact and the cleanup should not take

20

1 This is a conceptual diagram of how  
2 soil extraction works. First, you have here, as  
3 Peter described earlier, the seepage pits, which are  
4 no longer existing here at the site. But this is  
5 where the chemicals came from, and then the VOCs,  
6 chemicals, became deposited here in the soil.

7 Now, soil vapor extraction's fairly  
8 simple. What we do is, we apply a very strong  
9 vacuum, just like your vacuum cleaner, to suck these  
10 VOCs, these chemicals, right out of the soils and  
11 the soil vapor into this vapor extraction well,  
12 right here. Now, these vapors are -- since we're  
13 talking about volatile organic compounds, the  
14 compounds become, in a vapor phase, when we pull a  
15 vacuum on the soils and soil vapor. So what you're  
16 extracting here is air and chemicals in vapor, which  
17 comes above the surface through this pump, into a  
18 vapor treatment system. And the vapor treatment  
19 system consists of granular activated carbon. What  
20 it does, is it captures the chemicals and holds them  
21 within the vapor treatment system, and then clean  
22 air is released from the system.

23 What happens every three to six  
24 months, depending on how much chemical we're  
25 removing from the system, we have to take those

19

1 very long.

2 And, finally, because this soil vapor  
3 extraction technology has all those qualities, being  
4 very effective in the types of soils here at JPL and  
5 being very effective in removing this type of  
6 chemical from the soil, EPA says that this is what  
7 is called a presumptive remedy. Or basically, this  
8 is the best technology that you can use at hundreds  
9 of other sites, including here at JPL, throughout  
10 the country. And so we call it what is -- what's  
11 deemed to be a presumptive remedy.

12 So based on our pilot study and based  
13 on our ongoing analysis of the site, NASA proposes  
14 soil vapor extraction as the proposed remedy for  
15 OU-2.

16 MR. SAUNDERS: Thank you, Richard.  
17 We are now available for comments and  
18 questions from you, the public.

19 As a quick reminder, to ensure that  
20 all participants providing comments or questions  
21 receive equal treatment, please limit your comments  
22 or questions to two minutes. We also ask you to  
23 please state your first and last name, and spell  
24 your last name for the court reporters. Thank you.

25 Do we have any questions or comments

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1 from the public? Please feel free to come up to the  
2 mike and, again, state your first and last name and  
3 spell the last name for the reporters -- court  
4 reporters.  
5 MR. ROBLES: Somebody ask a question,  
6 please.  
7 MR. SAUNDERS: Well, we have some  
8 comments from the public.  
9 Thank you, sir.  
10 MR. ZUROMSKI: Thank you.  
11 MR. STORK: My name is Edward Stork,  
12 and my last name is spelled S-t-o-r-k, and I  
13 actually am the president of the Rose Bowl Riders,  
14 which is right next door. And so I was interested  
15 to hear that the chemicals are apparently only  
16 within the boundaries of JPL, correct?  
17 Can you tell me where the soil vapor  
18 extraction wells will actually be located?  
19 MR. ZUROMSKI: We -- I can tell you  
20 that at this point in time the one location that we  
21 are currently operating the soil vapor extraction is  
22 right where I was pointing, at the highest levels of  
23 the chemicals that we found on the site.  
24 The other wells -- what we're doing  
25 right now is we're doing continuing monitoring of

22

1 MR. ZUROMSKI: Right.  
2 MR. STORK: Okay.  
3 MR. ZUROMSKI: Right up here's  
4 where -- right about there, where my light's  
5 shining?  
6 MR. STORK: Uh-huh.  
7 MR. ZUROMSKI: Is where the current  
8 vapor extraction pilot study's operating. And  
9 that's where the highest levels of the chemicals  
10 were found on the site.  
11 MR. STORK: And just out of curiosity,  
12 how much area does one of these vapor extraction  
13 wells take up, when you install it?  
14 MR. ZUROMSKI: The actual well itself  
15 is usually probably from four to six inches, just  
16 for the well itself. However, the radius of  
17 influence from the vacuum at the site can be  
18 anywhere from four to eight -- seven or eight  
19 hundred feet from the center of the well.  
20 MR. STORK: Thank you.  
21 (Inaudible.)  
22 MR. ROBLES: The site -- the size of  
23 the site, they also want to know how big is that.  
24 It's about 45?  
25 MR. ZUROMSKI: 45 acres.

24

1 the soil vapor levels at the site. And that,  
2 actually -- I think Mark described the remedial  
3 design phase that occurs after we sign our record of  
4 decision, where we actually look -- where we  
5 actually look, at that point in time, where the  
6 highest levels of the chemicals are and then we  
7 place the well.  
8 So, no, we don't know exactly where  
9 they would be right now, but we would focus on where  
10 the highest levels of the chemicals were.  
11 MR. RIPPERDA: But the level of  
12 contamination as you move south -- you're here from  
13 the riding stables, right?  
14 MR. STORK: Right. Just below here,  
15 yeah.  
16 MR. RIPPERDA: As he said, the highest  
17 level of contaminants -- can you put --  
18 MR. ZUROMSKI: Sure.  
19 MR. RIPPERDA: You might want to put  
20 the example up.  
21 The highest level of contaminants are  
22 up in the northern part.  
23 MR. STORK: Right.  
24 MR. RIPPERDA: And as you move south,  
25 it's negligible to undetectable.

23

1 MR. ROBLES: 45 acres. That yellow  
2 spot.  
3 MS. COMPTON: You said none of the  
4 wells --  
5 MR. ROBLES: Yes. None of the wells  
6 that we're talking about the soil vapor will be  
7 off-site, it's all on-site because that's where all  
8 the soils are at.  
9 But understand also, everybody, that  
10 we revisit this periodically. Every five years we  
11 go back and revisit, so that we make sure that we're  
12 doing the right thing with the regulators.  
13 Any other questions?  
14 (Inaudible.)  
15 Oh, because of the comments on  
16 Saturday -- I thank the lady -- we are planning to  
17 have a third meeting. And we want to have it in  
18 Altadena. And what we want to do is probably --  
19 we're trying to set it up, I haven't talked to  
20 anybody over there. We'll probably host it in the  
21 middle of June, so that we can make sure that the  
22 whole community has a chance. I didn't know this,  
23 and that was one of the things why we have public  
24 meetings, is that the folks in Altadena can't make  
25 it over here at night because there is no bus

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1 service. So we want to know if there's any concerns  
2 out there.

3 So if you get another proposed plan in  
4 the mail, please don't get angry at us. We're just  
5 announcing that we're going to have a third meeting  
6 in Altadena so that we can make sure that we have  
7 the public comments in there. We want to solicit  
8 comments. We want to make sure that the public is  
9 comfortable with this. We might have better  
10 suggestions and that's what we want to shoot for.

11 So we want to thank the lady on  
12 Saturday, that was a good comment that we had. And  
13 we have talked to some of the purveyors, and they're  
14 willing to put it in their billings. We're going to  
15 work on that, as well.

16 MR. SAUNDERS: All right. Quick  
17 feedback from Saturday's meeting.

18 What other questions do we have?  
19 Comments. Feel free to come on up to the mike and  
20 express your opinions, your comments, your questions  
21 at this time.

22 MR. CLAIRDAY: Good evening. John  
23 Clairday with the -- and the last name is spelled  
24 C-l-a-i-r-d-a-y. I'm a board member with the  
25 Lincoln Avenue Water Company, which is a neighbor,

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1 the site and for the types of soils that we have at  
2 the site.

3 Now, what we do to ensure that that is  
4 the most effective technology for the site is,  
5 No. 1, we conduct a regular monitoring program of  
6 the soil vapor around the site, to see and actually  
7 watch, we've actually seen -- some of the data is in  
8 the back of the room. You can watch the chemicals  
9 that have been removed slowly disappear from the  
10 soil, and we do that on a very regular basis. And  
11 during our pilot study, we actually did it monthly  
12 to see what the effect of the system is on the  
13 chemicals in the soil.

14 Now, what we do for the long-term is  
15 once we've signed our record of decision and once we  
16 install the system throughout the site, we do --  
17 again, we have a regular monitoring program to see  
18 how effective it is, and then at least every --  
19 just -- every five years we do what is called a  
20 five-year review, where the regulatory agencies,  
21 NASA, sits down, looks at the results, how well the  
22 technology is looking, looks at new, possible  
23 innovative technologies if the technology we've  
24 chosen was not as effective as we thought it would  
25 be, and basically says, "Are we still doing the best

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1 right next door. We appreciate the opportunity to  
2 come over here and -- for this meeting.

3 Just a coup- -- one statement and then  
4 one question, as well. One -- and I don't think  
5 this is inconsistent with what Mr. Robles said, but  
6 we already do have a groundwater problem, and I  
7 think that's been recognized, but I just wanted to  
8 emphasize that, since it's an area that we're  
9 interested in.

10 And then a second one. I'm wondering  
11 about the effectiveness of this extraction program.  
12 Is it 100 percent effective? How do you know how  
13 well you're doing, and is the testing continue  
14 throughout that term?

15 And then, also, if it's not 100  
16 percent effective, does that mean that a certain  
17 percentage will ultimately reach groundwater and  
18 contaminate it?

19 MR. ZUROMSKI: I'll answer your  
20 question.

21 First of all, every technology that we  
22 attempt, we choose because of -- because it is the  
23 most effective. 100 percent effective, I don't  
24 think we could guarantee, but it is the most  
25 effective technology for the types of chemicals at

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1 thing that we can do to remove the chemicals from  
2 the environment?" And that's generally how we  
3 monitor how effective the technology is over the  
4 long-term.

5 Now, if you look the back of the room,  
6 we have an estimate, I think -- I can't quite read  
7 it from here -- but it looks like it's about  
8 three -- little over \$3 million. That's a present  
9 value cost of what it's going to take to operate the  
10 system, from our estimate, one to five years and  
11 then monitor it for 25 years after that. So we do  
12 continuously monitor this throughout the entire  
13 period, to make sure that what we've done was the  
14 best thing for the site.

15 As far as a level that we remove the  
16 chemicals to, that level is determined during the  
17 remedial or -- excuse me -- the record of decision,  
18 where we -- as Mark said, we all sit down and agree  
19 to a level that we will clean the site to. And  
20 that's based on all the regulatory requirements that  
21 we're required to make.

22 MR. RIPPERDA: And on an ongoing --  
23 you know, the groundwater, you know, they're also  
24 responsible for. So over time, you know, whatever  
25 the record of decision for the groundwater remedy

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1 has, that will include monitoring and clean up of  
2 the aquifer. So they're removing the source to  
3 protect it from going into the aquifer in the  
4 future.  
5 But for the contaminants that have  
6 already gotten into the groundwater NASA will, of  
7 course, still be responsible for that in the  
8 future.  
9 MR. SAUNDERS: Thank you.  
10 Any other questions, comments? Please  
11 feel free to take this opportunity.  
12 Thank you.  
13 MS. COMPTON: My name is Cynthia  
14 Compton, C-o-m-p-t-o-n. I'll try to be easier on  
15 you. I gave you lot of comments Saturday and I  
16 appreciate your response to my comments.  
17 My first comment is that two minutes  
18 is not enough time for my questions and my comments.  
19 MR. ZUROMSKI: Can we give her a  
20 little extension?  
21 MR. SAUNDERS: Well, again, she can --  
22 we can give her more time after the other folks have  
23 responded --  
24 MS. COMPTON: There you go.  
25 MR. SAUNDERS: -- she can come back

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1 employees are here, but the actual e-mail didn't say  
2 anything about the meeting, it just said the  
3 proposed plan is available at a web site. And she  
4 had a great comment that the actual e-mail needs to  
5 announce when and where the meetings are. So we'll  
6 make sure that NASA -- any e-mail that goes out in  
7 the next week or two for the next meeting has right  
8 in the text of the e-mail that this is a public  
9 meeting, when and where it will meet.  
10 And he wants me to talk about soil  
11 particles, also. (Laughter.)  
12 MS. COMPTON: He's already responded.  
13 MR. RIPPERDA: Yeah.  
14 So her question pertains to the fact  
15 that in the slides it almost always said "soil  
16 vapor," it didn't say "VOCs in the soil," it always  
17 said "soil vapor," and that's because the actual  
18 measurements we take are of the soil vapor.  
19 When the contaminants are 50 feet, 100  
20 feet below the surface, you actually have to drill a  
21 bore hole to get down to it. And the act of  
22 drilling that bore hole, the heat and the air that  
23 you have to inject, bring the cuttings, the dirt  
24 back up out of the hole, basically blow away all the  
25 VOCs that you're trying to sample for. So you can't

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1 for three minutes.  
2 MS. COMPTON: Okay.  
3 Quickly. I know that there was some  
4 testing done in Building 107, in the basement, for  
5 the air atmosphere, and I wonder if that has turned  
6 into one of the 37 permanent test points.  
7 Another question I have is: I'm  
8 interested in a record of the public notices that  
9 were sent out, in the newspapers and mailings, and  
10 I'm still having a little trouble distinguishing the  
11 difference between contamination in the particles of  
12 soil versus contamination in the vapors. And if  
13 maybe you could clarify that a little bit with me.  
14 And the other thing is, that my --  
15 same comments I made Saturday. I think we, the  
16 public, deserve a little bit earlier notice -- and  
17 thank you for offering another meeting, I'm going to  
18 put that in my official comments. But a little  
19 earlier notice and something to the JPL employees  
20 that says "Public Meeting," maybe, in the subject  
21 title.  
22 MR. RIPPERDA: I'm going to say one  
23 thing to the last thing.  
24 She showed me a copy of the e-mail  
25 that went out, and -- I don't know how many JPL

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1 take a soil sample very well from 100 feet deep and  
2 analyze that soil for how much contamination it has  
3 in it.  
4 So, instead, what you do is you drill  
5 your bore hole and then you let it sit for a few  
6 weeks, reach equilibrium, and then you suck some air  
7 out. And because the VOCs are attached to the soil  
8 particles and all the soil around the bore hole,  
9 they evaporate naturally and they'll fill the bore  
10 hole. And as you suck the air out, you see "Oh,  
11 we've got VOCs in our air that we're sucking out,"  
12 so, therefore, we know that there's VOCs in the soil  
13 of this location. You can do kind of rough  
14 correlations between the amount that's in the soil  
15 vapor you're measuring to what's actually in the  
16 soil.  
17 So it's just -- it's the physics of  
18 not being able to measure the actual particles of  
19 soil, we have to do a correlation between the soil  
20 vapor and the soil. So we're always going to talk  
21 about soil vapor, even though what we're really  
22 concerned about is what's attached to the soil.  
23 Because what's attached to the soil is what gets  
24 dissolved in rain water as it infiltrates down.  
25 That's what ultimately brings it to the drinking

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1 water aquifer.  
2 MS. COMPTON: But when you're sucking  
3 it and cleaning --  
4 MR. RIPPERDA: Right. So when we're  
5 sucking, we're sucking the vapor out. But as we  
6 suck the vapor out, the particles of the chemicals  
7 that are attached to the soil are always  
8 evaporating. As we suck more air, more particles  
9 evaporate off the soil and, relatively quickly, by  
10 keeping on sucking, you have sucked most of the  
11 particles of contamination out.  
12 MR. ROBLES: I mean, you asked about  
13 the building. I'm not familiar with that. I know  
14 that samples have been taken.  
15 MR. RIPPERDA: You have to talk louder  
16 in your answer, for court reporter.  
17 MR. ROBLES: Oh. You were saying  
18 about which building again?  
19 MS. COMPTON: 107, I think.  
20 MR. ROBLES: 107. It must be in our  
21 plan. I don't remember it exactly. I can get back  
22 to you with that information.  
23 MR. ZUROMSKI: We'll have to respond  
24 to that.  
25 MR. ROBLES: Yeah, we'll have to

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1 started May 7 and runs through June 11.  
2 Keep in mind, the comments and  
3 questions asked tonight, as well as responses, not  
4 only the ones given here but, furthermore, in-depth  
5 responses, answers to your comments and questions  
6 will be included in a responsiveness summary which  
7 will be included with the ROD into the annual  
8 record.  
9 Yes.  
10 MR. ZUROMSKI: The time period has  
11 been extended.  
12 MR. SAUNDERS: Okay. You're going to  
13 extend the comment period. All right.  
14 MR. ROBLES: We're going to extend the  
15 comment period past the meeting coming up so,  
16 therefore, it's fair for everybody.  
17 MR. SAUNDERS: Okay. So instead of  
18 waiting for the public to request an extension,  
19 we've already extended the comment period at this  
20 time.  
21 Do we have a date as of yet? Or that  
22 will be --  
23 MR. ROBLES: It will be in the --  
24 MR. SAUNDERS: It will be in the  
25 information sent out to the public, as to how long

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1 respond to that.  
2 MS. COMPTON: I'd appreciate it.  
3 MR. ROBLES: I don't -- it's not  
4 familiar to me within the document, so we'll have to  
5 get back with you.  
6 MR. SAUNDERS: Thank you.  
7 What other questions, comments do we  
8 have? I'm sure there's plenty of other folks out  
9 there that have some feedback for us. Please feel  
10 free to come up to the mike and provide your  
11 comments, questions.  
12 If there's no other comments or  
13 questions, ma'am, if you'd like to come back up and  
14 get your next three minutes in, you're welcome to  
15 come back up at this time.  
16 MS. COMPTON: I'm all set.  
17 MR. SAUNDERS: Okay.  
18 Well, if there's no other questions or  
19 comments, we're going to wrap this up in a moment.  
20 I want to thank you for attending, encourage you to  
21 review and comment on the proposed plan, and there's  
22 copies on the back table of the proposed plan.  
23 The final decision regarding cleanup  
24 will be made after public comments have been  
25 received and considered. The public comment period

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1 the comment period has been extended.  
2 And if you could put that slide back  
3 up?  
4 As has already been mentioned, if  
5 there is any further comments, questions, the last  
6 slide that has Peter's address, feel free to send  
7 your comments, your questions, mail them, e-mail  
8 them to Richard at this address. It's also included  
9 in the proposed plan fact sheet. And we look  
10 forward to any further feedback that you have may  
11 have at this time.  
12 And before we close, I will give you  
13 one last chance. If there's any other comments or  
14 questions.  
15 If not, thank you for coming and have  
16 a good evening.  
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CERTIFICATE

I, LESLIE A. MAC NEIL, RPR, CSR  
No. 7187, in and for the State of California, do  
hereby certify:

That the foregoing \_\_\_-page  
proceedings were taken down by me in shorthand at  
the time and place stated herein, and represent a  
true and correct transcript of the proceedings.

I further certify that I am not  
interested in the event of the action.

WITNESS my hand this \_\_\_\_ day of  
\_\_\_\_\_, 2001.

\_\_\_\_\_  
Certified shorthand  
reporter in and for the  
State of California

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PUBLIC MEETING AND PUBLIC COMMENT PERIOD

MONDAY, MAY 14, 2001

6:00 P.M.

NASA JET PROPULSION LABORATORY

4800 OAK GROVE DRIVE

PASADENA, CALIFORNIA

WISHNOW . TEARNEY . KILLION  
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PASADENA, CALIFORNIA

MONDAY, MAY 14, 2001; 6:00 P.M.

MR. SAUNDERS: Good evening. We're going to start a couple minutes early. Welcome to the Jet Propulsion Laboratory. Thank you for taking the time tonight for attending this meeting.

My name is Lee Saunders. I am an environmental public affairs officer for the U.S. Navy and the facilitator for tonight's meeting about the proposed plan to select a remedy to clean up soils at the National Aeronautics Space Administration Jet Propulsion Laboratory, located here in Pasadena.

During this portion of the meeting you, the community, can provide questions and comments to these representatives and their agencies on the proposed plan.

Excuse me. Let me backtrack just a moment. Prior to the meeting you had the opportunity to speak with NASA federal and local lead and regulatory agency representatives on a one-to-one basis about the proposed cleanup actions. During this portion of the meeting you, the community, can provide questions and comments to

1 these representatives and their agencies on the  
2 proposed plan. These comments and questions will be  
3 included in a meeting transcript and become part of  
4 the final decision for soil cleanup at JPL.

5 Representing the agencies responsible  
6 for cleanup and talking to you about the proposed  
7 plan and its remedial alternatives are agency  
8 representatives, who will each introduce  
9 themselves. To my left ...

10 MR. ROBLES: Peter Robles, of NASA,  
11 representing the Superfund cleanup group.

12 MR. ZUROMSKI: Hi. I'm Richard  
13 Zuromski from the Naval Facilities Engineering  
14 Command.

15 MR. GEBERT: I'm Richard Gebert, with  
16 the state of California Department of Toxic.

17 MR. RIPPERDA: And I'm Mark Ripperda,  
18 with the United States Environmental Protection  
19 Agency.

20 MR. YOUNG: Hi. David Young, with the  
21 Los Angeles Regional Water Quality Control Board.

22 MR. SAUNDERS: Ground rules for  
23 today's meeting are as follows: This evening's  
24 format will consist of presentations by our  
25 representatives about the proposed plan and remedial

1 alternatives, followed by a formal comment session  
2 where you, the community, can provide us with your  
3 comments and questions.

4 I'm going to ask you to please hold  
5 your questions until the presentations have been  
6 completed. Once we've heard from all  
7 representatives, we will open the floor for  
8 questions and comments. You may want to use the  
9 comment sheets that are in the back, to write your  
10 questions down during the formal comment session,  
11 while we're waiting for that opportunity.

12 To ensure that everyone that wishes to  
13 make a comment or ask a question has a fair and  
14 equal opportunity do so, we ask that you limit your  
15 comments or questions to two minutes. At the end of  
16 that time, please take your seat. If you have not  
17 finished your remarks, you may continue for another  
18 three-minute period after we've heard from all the  
19 other speakers.

20 We have court reporters, two of them,  
21 here tonight. So we ask you to please state your  
22 first and last name and spell your last name before  
23 you begin your comments. If you do not wish to  
24 provide verbal comments or questions, you may also  
25 submit your comments and questions in writing.

4

1 There are comment sheets available on the tables in  
2 the back, for those of you in the audience that  
3 would prefer to submit your input by this method.

4                   For those of you wondering why the  
5 U.S. Navy is involved with the environmental cleanup  
6 of a NASA facility, the explanation is fairly  
7 simple. In 1999 NASA and the Naval Facilities  
8 Engineering Command, more commonly known by the  
9 acronym NAVFEC, reached a memorandum of agreement  
10 establishing roles and responsibilities that state  
11 NASA may procure environmental engineering and  
12 consultancy services from NAVFEC and its subordinate  
13 commands. In late 1999 NAVFEC became heavily  
14 involved in providing environmental services to  
15 NASA-JPL.

16                   Peter Robles, remedial project manager  
17 from NASA, is our first presenter.

18                   Peter?

19                   MR. ROBLES: Good evening.

20                   What we're going to present today is a  
21 site description, give a little history of why this  
22 site is on the Superfund list, then we're going to  
23 have Mark Ripperda talk about regulatory framework,  
24 coming up with Richard Zuromski talking about site  
25 assessment and investigation activities and the

1 remedial activities and the proposed remedial  
2 alternatives for OU-2 soils.

3                   We will, at a later date, talk about  
4 groundwater. We'll have another public meeting in  
5 the near future. But right now what we're focusing  
6 on is the soils underneath JPL and how to remediate  
7 the contaminants in the soil, to minimize any  
8 migration into the groundwater. And that's what  
9 we're going to do right now.

10                   The site that we call JPL has been  
11 active since the late '30s, early '40s. It was  
12 owned by the Army Ordinance, and then it was owned  
13 by NASA in '59 to '60, when we took it over.

14                   During the '40s and 50s seepage pits  
15 were the main method to dispose of waste. At that  
16 time it was the most accepted practice. It was  
17 within the regulations, no problem at all. We found  
18 out later that that was a mistake and we had to  
19 correct that. In the late '50s, early '60s we,  
20 NASA, started programming to replace these seepage  
21 pits with sewer lines.

22                   Now, in the cas- -- in the question  
23 that came in on Saturday was: So contaminants are  
24 going down the sewer line. No, they're not. That's  
25 a good question. Very little gets put into

1 landfills. We usually destroy or recycle the  
2 chemicals that we use today, or they are used up in  
3 the operational processes. We do not do that.  
4 Regulatory requirements require us to make sure of  
5 that. So from the standpoint today, we are all  
6 within regulations. But at the time, the main  
7 reason why the contaminants got into the ground soil  
8 is because of these seepage pits.

9                   In 1992 the site became a Superfund  
10 site. It was put on the national priorities list,  
11 and the EPA will talk a little more about that. We  
12 are talking about trying to remediate Operable Unit  
13 2, which is the soils.

14                   As I said before, currently all  
15 operations meet federal, standard, local  
16 requirements. We have a host of regulations that we  
17 have to follow and so, therefore, we are assured  
18 that we're doing what's right. What we're dealing  
19 with is past practices that we have to take care  
20 of.

21                   Here is a conceptual model of what  
22 we're talking about. What you have here is a VOC  
23 plume, volatile organic carbons, that have gone  
24 through the soils because of past practices from  
25 JPL. The area that we're most concerned with is 50

1 feet below the surface to about 200 feet, which is  
2 the groundwater zone that we're talking about.

3 In the soils we're talking about  
4 chlorinated solvents, and when we say "vadose zone"  
5 we mean in the vapors stayed in the soil. NASA  
6 wants to address this issue tonight. We will be  
7 addressing groundwater in the future.

8 Now we'll have the EPA talk about  
9 regulatory framework.

10 MR. ZUROMSKI: I just want to ask the  
11 court reporters really quick: Can you hear me okay  
12 without having to use the microphone?

13 Okay. We're going to try -- Mark and  
14 I are going to try to do ours without the  
15 microphone.

16 MR. RIPPERDA: So I can stand out of  
17 the light.

18 So what's it mean to be a Superfund  
19 site and, for that matter, what's -- cool. I get a  
20 toy. What's it mean to be a Superfund site. For  
21 that matter, what's Superfund.

22 About 20 years ago Congress passed a  
23 law, it's called CERCLA, I won't talk about what the  
24 acronym means, that authorized a tax on the chemical  
25 industry, and that tax all went into a trust fund

1 which is called the Superfund, which EPA can spend  
2 to clean up abandoned hazardous waste sites. That  
3 same law passed by Congress also gave EPA the  
4 authority to go to existing, ongoing sites such as  
5 NASA-JPL that have contamination that might pose a  
6 serious threat to public health.

7                   And we have the authority to force  
8 them to clean it up. In order for us to use that  
9 authority, we have to rank how bad the potential  
10 hazard might be. If it scores high enough, the  
11 site's put on a national priorities list, also  
12 called the NPL. And, like Peter said, that happened  
13 with NASA-JPL in 1992.

14                   So what was it that first got NASA-JPL  
15 on the national priorities list? In the late, very  
16 late '80s the city of Pasadena found some chemicals  
17 in their drinking water wells, right here across the  
18 arroyo, just through their standard compliance  
19 testing that they have to do with the state of  
20 California, and that's what got all of us  
21 regulators, the state of California, Richard and  
22 David and myself -- well, actually, our  
23 predecessors, but that got us involved looking over  
24 their shoulders, making sure that they're doing the  
25 cleanup appropriately.

1                   Right when the contamination was first  
2 found, the city of Pasadena put treatment systems on  
3 their wells immediately, which means that anybody  
4 who is drinking the water was protected right from  
5 the beginning. But to clean up the actual release,  
6 to clean up both the aquifer and the source here on  
7 site is a long, lengthy process.

8                   And that -- the majority of that  
9 process is called the remedial investigation and  
10 feasibility study, which means that they have to go  
11 out, drill bore holes all over the site, take soil  
12 samples, soil vapor samples, that included  
13 monitoring wells, take groundwater samples, both on  
14 the site -- they also went out into the  
15 neighborhoods, put monitoring wells out there,  
16 sampled them. They also worked with the water  
17 purveyors, to look at their water analyses. And  
18 with all of that, they figured out where the  
19 contamination is now, where it came from originally,  
20 and they go through a process of deciding how best  
21 to clean it up.

22                   You usually clean up groundwater  
23 contamination by looking at the source, where the  
24 contamination is coming from, and at the aquifer  
25 itself in two separate stages because you're using

1 different physical mechanisms to clean up the two.  
2 And so what they're working on now and what this  
3 whole meeting about is the actual cleaning up of the  
4 source here on site, as Peter says, to keep it from  
5 going into the water, which means that ultimately  
6 the water can be cleaned up faster.

7                   So in the feasibility study, they look  
8 at various alternatives on how best to clean  
9 something up. And in some cases, such as here at  
10 JPL, there is only one real option. I don't know if  
11 you've read the proposed plan, but it looks like you  
12 were given two choices: Do nothing or do what NASA  
13 wants to do.

14                   And that may look like you don't  
15 really have a choice, but Congress said that we  
16 always have to look at the do nothing alternative  
17 because they didn't want EPA out there spending  
18 money willy-nilly, making facilities and industry  
19 spending money if doing nothing might work. I don't  
20 know why they didn't trust us to be good stewards of  
21 public money, but they didn't. So in this case,  
22 they had to look at the do nothing alternative.

23                   And the other alternative that they've  
24 shown to you in the proposed plan, which is called  
25 soil vapor extraction, is something that EPA has

1 found, over the 20 years that we've been doing  
2 Superfund cleanups, to be the one system that really  
3 works in a case like this, where you've got volatile  
4 organic compounds in the soil deep beneath the  
5 site. You can't really dig up the site. You know,  
6 one alternative might be dig up the whole site, take  
7 the soil away. But, obviously, you can't do that  
8 here because you'll be digging up all of JPL.

9           There's some other technologies, such  
10 as heating the soil with large electrical currents  
11 to actually -- what's called vitrify it, so you turn  
12 it into one solid lump, you melt the soil, and you  
13 can't do that here. So technology like that, which  
14 exists but they don't really make sense for a site,  
15 you know, we, the government, don't make NASA do a  
16 detailed evaluation of.

17           So they essentially cut right to the  
18 chase and said, "What we're proposing is the one and  
19 only system that really works best now. There might  
20 be something else that comes along in the future,  
21 but for now this is what makes sense."

22           So once they select a remedy, they  
23 have to do a legal document which is called a record  
24 of decision. Before you get to that point -- I  
25 forgot the most important part. The yellow box,

12

1 where we are now, they have to go out to the public  
2 and say, "This is what we are proposing. What do  
3 you think?" So you can comment both on, you know,  
4 their selection of a remedy, but you can also make  
5 whatever comments you want on, you know, how they  
6 random process, how well they've involved the  
7 public, if you think they've been hiding things from  
8 you or whatever, which they haven't, but anything  
9 you might think, you can make comments on now. It  
10 doesn't just have to be on their remedy.

11                   They then have to respond to your  
12 comments, they have to check with the regulators,  
13 make sure that the state of California and EPA is  
14 happy with how they've responded to the public. And  
15 at that point, if we're all happy with each other,  
16 they do the record of decision, and then they go on  
17 for the remedy implementation.

18                   And eventually, if the site gets  
19 completely cleaned up, there's no longer a Superfund  
20 site, you get delisted from the national priorities  
21 list. But even if that happens, there's still  
22 always going to be long-term monitoring and review  
23 of what the situation is here at JPL.

24                   And, you know, this is just kind of  
25 what we've already said. This is a chance for you

1 to ask us questions, and also make comments on what  
2 you think about both the remedy and the process, you  
3 know, everything that's going on right now. You can  
4 always call Peter. Peter's name and number is in  
5 the documentation you got. I don't think my phone  
6 number is there but -- it is. Good. You can also  
7 feel free to call me. And I'll even say feel free  
8 to call the state of California guys, if you feel  
9 like you're not getting responses from NASA.

10 MR. ZUROMSKI: Thank you, Mark.

11 Hi. My name is Richard Zuromski. I'm  
12 with the Naval Facilities Engineering Command and,  
13 as Lee described earlier, I'm here to assist NASA in  
14 their cleanup efforts here at JPL.

15 In 19- -- from 1994 through 1998 JPL  
16 conducted what's called a remedial investigation, as  
17 Mark described earlier. During the remedial  
18 investigation, over nine different sampling events,  
19 JPL took 45 soil vapor wells, 35 soil borings and  
20 three test pits throughout the site to investigate  
21 where the chemicals may be found in what we're  
22 calling Operable Unit 2. Further, over 37 -- or 37  
23 of those points were turned into permanent  
24 monitoring -- soil vapor monitoring points that we  
25 now monitor on a regular basis, to see how the

14

1 contaminants are moving, or not moving in this case,  
2 within the subsurface.

3                   Now, during the remedial  
4 investigation, samples identified the extent to  
5 which the chemicals were in the soil, and the  
6 results showed that there were elevated levels of  
7 four different volatile organic compounds. They  
8 were carbon tetrachloride, trichloroethene,  
9 Freon 113 and 1,1-dichloroethene.

10                   Now, these were -- these chemicals  
11 were used back, as Peter described earlier, in  
12 the '30s, '40s and '50s to clean out the inside of  
13 rocket motors that they were testing back in those  
14 days, which they don't use here any more, and that's  
15 where the chemicals came from that are now in OU-2.  
16 OU-2 risk assessment, the human health risk  
17 assessment, determined that there were no risks  
18 above regulatory thresholds from exposure to soils  
19 or soil vapor.

20                   Now, the primary reason that this risk  
21 was so low was the fact that, as Peter described  
22 earlier, these chemicals are now more than 50 feet  
23 below the ground surface. So exposure to humans is  
24 very much unlikely. However, there is a risk that  
25 these chemicals will continue to migrate through the

1 soils and eventually reach the groundwater. And  
2 that's the purpose of the remedy that we're talking  
3 about here today, is to make sure that those  
4 chemicals do not enter the groundwater and pose a  
5 further problem in groundwater.

6 Now, we are currently studying how to  
7 remove these chemicals from groundwater. And that's  
8 going to be the subject of a meeting very similar to  
9 this, probably within a year from now. However, the  
10 groundwater and the risks from chemicals in the  
11 groundwater, there's no risk because the water  
12 purveyors, or those people who deliver the water to  
13 the public, have to meet very, very strict  
14 regulatory requirements. So today's meeting is  
15 focused on removing this source of contaminants,  
16 what we call source reduction, from the soils before  
17 they reach the groundwater. And that's the purpose  
18 of our meeting today.

19 Now, this graphic shows the extent to  
20 which any level of a volatile organic compound was  
21 detected here at the site during the remedial  
22 investigation. Now, the hottest or most -- the  
23 highest levels of these chemicals were found in the  
24 north central part of the site, right up here, where  
25 most of the laboratory activities took place. And

16

1 that's where we focused a lot of our efforts to date  
2 doing some pilot studies, which I'll talk about in  
3 just a moment.

4                   Now, based on the results of the  
5 remedial investigation and our ongoing monitoring  
6 program of the soil vapor, we have found that the  
7 soil vapor and the chemicals in the soil vapor have  
8 not migrated off the JPL site boundary but it does  
9 encompass roughly 45 acres on the site.

10                   So based on the analysis, and the  
11 remedial investigation, and also the continuing  
12 monitoring we do here at the site, the remedial  
13 objective for Operable Unit 2 is to remove the  
14 chemicals or the VOCs from the soils before they  
15 migrate to the groundwater.

16                   To meet this objective, kind of as  
17 Mark had talked about earlier, JPL evaluated several  
18 alternatives to remove the chemicals. And of those  
19 alternatives, two were selected for a very detailed  
20 evaluation. If you look in your proposed plan, I  
21 think it's on the third or fourth page, there's a  
22 list of nine criteria that we have to go through  
23 when evaluating each technology in detail.

24                   The first is called no further  
25 action. As Mark talked about earlier, this is a

17

1 baseline that all other technologies are compared  
2 to. Now, at this site no further action would  
3 entail continuing our regular soil vapor monitoring  
4 program, to see how the contaminants are behaving in  
5 the subsurface.

6                   The second, and the proposed  
7 alternative for OU-2, is soil vapor extraction with  
8 granular activated carbon treatment and, also, the  
9 continuation of our regular monitoring program.

10                   To help evaluate these two  
11 alternatives, JPL conducted a pilot test of the soil  
12 vapor extraction technology, and this started back  
13 in 1998. In over 14 months of operation of this  
14 pilot test, we removed roughly 200 pounds of VOCs,  
15 these chemicals, out of roughly up to a maximum of  
16 5,000 pounds that are throughout the site. But  
17 within this area, we removed 200 pounds of chemicals  
18 from the subsurface.

19                   Now, this was so successful, this  
20 system is currently still operating here at the site  
21 and the pilot study does go on and will continue  
22 throughout the proposed plan stage, all the way  
23 through the record of decision stage, until we  
24 decide the final full scale size of the technology  
25 that we'll put here at the site.

18

1                   This is a conceptual diagram of how  
2 soil extraction works. First, you have here, as  
3 Peter described earlier, the seepage pits, which are  
4 no longer existing here at the site. But this is  
5 where the chemicals came from, and then the VOCs,  
6 chemicals, became deposited here in the soil.

7                   Now, soil vapor extraction's fairly  
8 simple. What we do is, we apply a very strong  
9 vacuum, just like your vacuum cleaner, to suck these  
10 VOCs, these chemicals, right out of the soils and  
11 the soil vapor into this vapor extraction well,  
12 right here. Now, these vapors are -- since we're  
13 talking about volatile organic compounds, the  
14 compounds become, in a vapor phase, when we pull a  
15 vacuum on the soils and soil vapor. So what you're  
16 extracting here is air and chemicals in vapor, which  
17 comes above the surface through this pump, into a  
18 vapor treatment system. And the vapor treatment  
19 system consists of granular activated carbon. What  
20 it does, is it captures the chemicals and holds them  
21 within the vapor treatment system, and then clean  
22 air is released from the system.

23                   What happens every three to six  
24 months, depending on how much chemical we're  
25 removing from the system, we have to take those

1 carbon filters that are inside this vapor treatment  
2 system and take them to either a recycling facility  
3 or dispose of them in some recon- -- some type of  
4 legal, regulatory manner. And then we take a new  
5 carbon treatment system, and replace it, and  
6 continue the vapor extraction phase. That's  
7 generally how the soil vapor extraction works.

8                   So based on our analysis, alternative  
9 one does not meet our remedial objective of keeping  
10 the chemicals from migrating to the groundwater.  
11 Therefore, we're proposing soil vapor extraction as  
12 our proposed remedy. There are several reasons why  
13 we're choosing soil vapor extraction for our  
14 proposed remedy.

15                   First, it permanently removes the  
16 chemicals from the soil and the soil vapor.

17                   Secondly, it protects the groundwater  
18 from further migration of the VOCs.

19                   Third, it's fairly simple to operate  
20 and fairly inexpensive to implement.

21                   Fourth, the treatment period is  
22 relatively short, probably from one to five years  
23 depending on how effective the system is here at the  
24 site. But based on our pilot site scale results, it  
25 should be very exact and the cleanup should not take

1 very long.

2                   And, finally, because this soil vapor  
3 extraction technology has all those qualities, being  
4 very effective in the types of soils here at JPL and  
5 being very effective in removing this type of  
6 chemical from the soil, EPA says that this is what  
7 is called a presumptive remedy. Or basically, this  
8 is the best technology that you can use at hundreds  
9 of other sites, including here at JPL, throughout  
10 the country. And so we call it what is -- what's  
11 deemed to be a presumptive remedy.

12                   So based on our pilot study and based  
13 on our ongoing analysis of the site, NASA proposes  
14 soil vapor extraction as the proposed remedy for  
15 OU-2.

16                   MR. SAUNDERS: Thank you, Richard.

17                   We are now available for comments and  
18 questions from you, the public.

19                   As a quick reminder, to ensure that  
20 all participants providing comments or questions  
21 receive equal treatment, please limit your comments  
22 or questions to two minutes. We also ask you to  
23 please state your first and last name, and spell  
24 your last name for the court reporters. Thank you.

25                   Do we have any questions or comments

21

1 from the public? Please feel free to come up to the  
2 mike and, again, state your first and last name and  
3 spell the last name for the reporters -- court  
4 reporters.

5 MR. ROBLES: Somebody ask a question,  
6 please.

7 MR. SAUNDERS: Well, we have some  
8 comments from the public.

9 Thank you, sir.

10 MR. ZUROMSKI: Thank you.

11 MR. STORK: My name is Edward Stork,  
12 and my last name is spelled S-t-o-r-k, and I  
13 actually am the president of the Rose Bowl Riders,  
14 which is right next door. And so I was interested  
15 to hear that the chemicals are apparently only  
16 within the boundaries of JPL, correct?

17 Can you tell me where the soil vapor  
18 extraction wells will actually be located?

19 MR. ZUROMSKI: We -- I can tell you  
20 that at this point in time the one location that we  
21 are currently operating the soil vapor extraction is  
22 right where I was pointing, at the highest levels of  
23 the chemicals that we found on the site.

24 The other wells -- what we're doing  
25 right now is we're doing continuing monitoring of

22

1 the soil vapor levels at the site. And that,  
2 actually -- I think Mark described the remedial  
3 design phase that occurs after we sign our record of  
4 decision, where we actually look -- where we  
5 actually look, at that point in time, where the  
6 highest levels of the chemicals are and then we  
7 place the well.

8                   So, no, we don't know exactly where  
9 they would be right now, but we would focus on where  
10 the highest levels of the chemicals were.

11                   MR. RIPPERDA: But the level of  
12 contamination as you move south -- you're here from  
13 the riding stables, right?

14                   MR. STORK: Right. Just below here,  
15 yeah.

16                   MR. RIPPERDA: As he said, the highest  
17 level of contaminants -- can you put --

18                   MR. ZUROMSKI: Sure.

19                   MR. RIPPERDA: You might want to put  
20 the example up.

21                   The highest level of contaminants are  
22 up in the northern part.

23                   MR. STORK: Right.

24                   MR. RIPPERDA: And as you move south,  
25 it's negligible to undetectable.

1 MR. ZUROMSKI: Right.

2 MR. STORK: Okay.

3 MR. ZUROMSKI: Right up here's  
4 where -- right about there, where my light's  
5 shining?

6 MR. STORK: Uh-huh.

7 MR. ZUROMSKI: Is where the current  
8 vapor extraction pilot study's operating. And  
9 that's where the highest levels of the chemicals  
10 were found on the site.

11 MR. STORK: And just out of curiosity,  
12 how much area does one of these vapor extraction  
13 wells take up, when you install it?

14 MR. ZUROMSKI: The actual well itself  
15 is usually probably from four to six inches, just  
16 for the well itself. However, the radius of  
17 influence from the vacuum at the site can be  
18 anywhere from four to eight -- seven or eight  
19 hundred feet from the center of the well.

20 MR. STORK: Thank you.

21 (Inaudible.)

22 MR. ROBLES: The site -- the size of  
23 the site, they also want to know how big is that.  
24 It's about 45?

25 MR. ZUROMSKI: 45 acres.

1 MR. ROBLES: 45 acres. That yellow  
2 spot.

3 MS. COMPTON: You said none of the  
4 wells --

5 MR. ROBLES: Yes. None of the wells  
6 that we're talking about the soil vapor will be  
7 off-site, it's all on-site because that's where all  
8 the soils are at.

9 But understand also, everybody, that  
10 we revisit this periodically. Every five years we  
11 go back and revisit, so that we make sure that we're  
12 doing the right thing with the regulators.

13 Any other questions?

14 (Inaudible.)

15 Oh, because of the comments on  
16 Saturday -- I thank the lady -- we are planning to  
17 have a third meeting. And we want to have it in  
18 Altadena. And what we want to do is probably --  
19 we're trying to set it up, I haven't talked to  
20 anybody over there. We'll probably host it in the  
21 middle of June, so that we can make sure that the  
22 whole community has a chance. I didn't know this,  
23 and that was one of the things why we have public  
24 meetings, is that the folks in Altadena can't make  
25 it over here at night because there is no bus

25

1 service. So we want to know if there's any concerns  
2 out there.

3                   So if you get another proposed plan in  
4 the mail, please don't get angry at us. We're just  
5 announcing that we're going to have a third meeting  
6 in Altadena so that we can make sure that we have  
7 the public comments in there. We want to solicit  
8 comments. We want to make sure that the public is  
9 comfortable with this. We might have better  
10 suggestions and that's what we want to shoot for.

11                   So we want to thank the lady on  
12 Saturday, that was a good comment that we had. And  
13 we have talked to some of the purveyors, and they're  
14 willing to put it in their billings. We're going to  
15 work on that, as well.

16                   MR. SAUNDERS: All right. Quick  
17 feedback from Saturday's meeting.

18                   What other questions do we have?  
19 Comments. Feel free to come on up to the mike and  
20 express your opinions, your comments, your questions  
21 at this time.

22                   MR. CLAIRDAY: Good evening. John  
23 Clairday with the -- and the last name is spelled  
24 C-l-a-i-r-d-a-y. I'm a board member with the  
25 Lincoln Avenue Water Company, which is a neighbor,

26

1 right next door. We appreciate the opportunity to  
2 come over here and -- for this meeting.

3                   Just a coup- -- one statement and then  
4 one question, as well. One -- and I don't think  
5 this is inconsistent with what Mr. Robles said, but  
6 we already do have a groundwater problem, and I  
7 think that's been recognized, but I just wanted to  
8 emphasize that, since it's an area that we're  
9 interested in.

10                   And then a second one. I'm wondering  
11 about the effectiveness of this extraction program.  
12 Is it 100 percent effective? How do you know how  
13 well you're doing, and is the testing continue  
14 throughout that term?

15                   And then, also, if it's not 100  
16 percent effective, does that mean that a certain  
17 percentage will ultimately reach groundwater and  
18 contaminate it?

19                   MR. ZUROMSKI: I'll answer your  
20 question.

21                   First of all, every technology that we  
22 attempt, we choose because of -- because it is the  
23 most effective. 100 percent effective, I don't  
24 think we could guarantee, but it is the most  
25 effective technology for the types of chemicals at

1 the site and for the types of soils that we have at  
2 the site.

3                   Now, what we do to ensure that that is  
4 the most effective technology for the site is,  
5 No. 1, we conduct a regular monitoring program of  
6 the soil vapor around the site, to see and actually  
7 watch, we've actually seen -- some of the data is in  
8 the back of the room. You can watch the chemicals  
9 that have been removed slowly disappear from the  
10 soil, and we do that on a very regular basis. And  
11 during our pilot study, we actually did it monthly  
12 to see what the effect of the system is on the  
13 chemicals in the soil.

14                   Now, what we do for the long-term is  
15 once we've signed our record of decision and once we  
16 install the system throughout the site, we do --  
17 again, we have a regular monitoring program to see  
18 how effective it is, and then at least every --  
19 just -- every five years we do what is called a  
20 five-year review, where the regulatory agencies,  
21 NASA, sits down, looks at the results, how well the  
22 technology is looking, looks at new, possible  
23 innovative technologies if the technology we've  
24 chosen was not as effective as we thought it would  
25 be, and basically says, "Are we still doing the best

28

1 thing that we can do to remove the chemicals from  
2 the environment?" And that's generally how we  
3 monitor how effective the technology is over the  
4 long-term.

5                   Now, if you look the back of the room,  
6 we have an estimate, I think -- I can't quite read  
7 it from here -- but it looks like it's about  
8 three -- little over \$3 million. That's a present  
9 value cost of what it's going to take to operate the  
10 system, from our estimate, one to five years and  
11 then monitor it for 25 years after that. So we do  
12 continuously monitor this throughout the entire  
13 period, to make sure that what we've done was the  
14 best thing for the site.

15                   As far as a level that we remove the  
16 chemicals to, that level is determined during the  
17 remedial or -- excuse me -- the record of decision,  
18 where we -- as Mark said, we all sit down and agree  
19 to a level that we will clean the site to. And  
20 that's based on all the regulatory requirements that  
21 we're required to make.

22                   MR. RIPPERDA: And on an ongoing --  
23 you know, the groundwater, you know, they're also  
24 responsible for. So over time, you know, whatever  
25 the record of decision for the groundwater remedy

1 has, that will include monitoring and clean up of  
2 the aquifer. So they're removing the source to  
3 protect it from going into the aquifer in the  
4 future.

5 But for the contaminants that have  
6 already gotten into the groundwater NASA will, of  
7 course, still be responsible for that in the  
8 future.

9 MR. SAUNDERS: Thank you.

10 Any other questions, comments? Please  
11 feel free to take this opportunity.

12 Thank you.

13 MS. COMPTON: My name is Cynthia  
14 Compton, C-o-m-p-t-o-n. I'll try to be easier on  
15 you. I gave you lot of comments Saturday and I  
16 appreciate your response to my comments.

17 My first comment is that two minutes  
18 is not enough time for my questions and my comments.

19 MR. ZUROMSKI: Can we give her a  
20 little extension?

21 MR. SAUNDERS: Well, again, she can --  
22 we can give her more time after the other folks have  
23 responded --

24 MS. COMPTON: There you go.

25 MR. SAUNDERS: -- she can come back

30

1 for three minutes.

2 MS. COMPTON: Okay.

3 Quickly. I know that there was some  
4 testing done in Building 107, in the basement, for  
5 the air atmosphere, and I wonder if that has turned  
6 into one of the 37 permanent test points.

7 Another question I have is: I'm  
8 interested in a record of the public notices that  
9 were sent out, in the newspapers and mailings, and  
10 I'm still having a little trouble distinguishing the  
11 difference between contamination in the particles of  
12 soil versus contamination in the vapors. And if  
13 maybe you could clarify that a little bit with me.

14 And the other thing is, that my --  
15 same comments I made Saturday. I think we, the  
16 public, deserve a little bit earlier notice -- and  
17 thank you for offering another meeting, I'm going to  
18 put that in my official comments. But a little  
19 earlier notice and something to the JPL employees  
20 that says "Public Meeting," maybe, in the subject  
21 title.

22 MR. RIPPERDA: I'm going to say one  
23 thing to the last thing.

24 She showed me a copy of the e-mail  
25 that went out, and -- I don't know how many JPL

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1 employees are here, but the actual e-mail didn't say  
2 anything about the meeting, it just said the  
3 proposed plan is available at a web site. And she  
4 had a great comment that the actual e-mail needs to  
5 announce when and where the meetings are. So we'll  
6 make sure that NASA -- any e-mail that goes out in  
7 the next week or two for the next meeting has right  
8 in the text of the e-mail that this is a public  
9 meeting, when and where it will meet.

10                   And he wants me to talk about soil  
11 particles, also. (Laughter.)

12                   MS. COMPTON: He's already responded.

13                   MR. RIPPERDA: Yeah.

14                   So her question pertains to the fact  
15 that in the slides it almost always said "soil  
16 vapor," it didn't say "VOCs in the soil," it always  
17 said "soil vapor," and that's because the actual  
18 measurements we take are of the soil vapor.

19                   When the contaminants are 50 feet, 100  
20 feet below the surface, you actually have to drill a  
21 bore hole to get down to it. And the act of  
22 drilling that bore hole, the heat and the air that  
23 you have to inject, bring the cuttings, the dirt  
24 back up out of the hole, basically blow away all the  
25 VOCs that you're trying to sample for. So you can't

1 take a soil sample very well from 100 feet deep and  
2 analyze that soil for how much contamination it has  
3 in it.

4                   So, instead, what you do is you drill  
5 your bore hole and then you let it sit for a few  
6 weeks, reach equilibrium, and then you suck some air  
7 out. And because the VOCs are attached to the soil  
8 particles and all the soil around the bore hole,  
9 they evaporate naturally and they'll fill the bore  
10 hole. And as you suck the air out, you see "Oh,  
11 we've got VOCs in our air that we're sucking out,"  
12 so, therefore, we know that there's VOCs in the soil  
13 of this location. You can do kind of rough  
14 correlations between the amount that's in the soil  
15 vapor you're measuring to what's actually in the  
16 soil.

17                   So it's just -- it's the physics of  
18 not being able to measure the actual particles of  
19 soil, we have to do a correlation between the soil  
20 vapor and the soil. So we're always going to talk  
21 about soil vapor, even though what we're really  
22 concerned about is what's attached to the soil.  
23 Because what's attached to the soil is what gets  
24 dissolved in rain water as it infiltrates down.  
25 That's what ultimately brings it to the drinking

1 water aquifer.

2 MS. COMPTON: But when you're sucking  
3 it and cleaning --

4 MR. RIPPERDA: Right. So when we're  
5 sucking, we're sucking the vapor out. But as we  
6 suck the vapor out, the particles of the chemicals  
7 that are attached to the soil are always  
8 evaporating. As we suck more air, more particles  
9 evaporate off the soil and, relatively quickly, by  
10 keeping on sucking, you have sucked most of the  
11 particles of contamination out.

12 MR. ROBLES: I mean, you asked about  
13 the building. I'm not familiar with that. I know  
14 that samples have been taken.

15 MR. RIPPERDA: You have to talk louder  
16 in your answer, for court reporter.

17 MR. ROBLES: Oh. You were saying  
18 about which building again?

19 MS. COMPTON: 107, I think.

20 MR. ROBLES: 107. It must be in our  
21 plan. I don't remember it exactly. I can get back  
22 to you with that information.

23 MR. ZUROMSKI: We'll have to respond  
24 to that.

25 MR. ROBLES: Yeah, we'll have to

1 respond to that.

2 MS. COMPTON: I'd appreciate it.

3 MR. ROBLES: I don't -- it's not  
4 familiar to me within the document, so we'll have to  
5 get back with you.

6 MR. SAUNDERS: Thank you.

7 What other questions, comments do we  
8 have? I'm sure there's plenty of other folks out  
9 there that have some feedback for us. Please feel  
10 free to come up to the mike and provide your  
11 comments, questions.

12 If there's no other comments or  
13 questions, ma'am, if you'd like to come back up and  
14 get your next three minutes in, you're welcome to  
15 come back up at this time.

16 MS. COMPTON: I'm all set.

17 MR. SAUNDERS: Okay.

18 Well, if there's no other questions or  
19 comments, we're going to wrap this up in a moment.  
20 I want to thank you for attending, encourage you to  
21 review and comment on the proposed plan, and there's  
22 copies on the back table of the proposed plan.

23 The final decision regarding cleanup  
24 will be made after public comments have been  
25 received and considered. The public comment period

1 started May 7 and runs through June 11.

2 Keep in mind, the comments and  
3 questions asked tonight, as well as responses, not  
4 only the ones given here but, furthermore, in-depth  
5 responses, answers to your comments and questions  
6 will be included in a responsiveness summary which  
7 will be included with the ROD into the annual  
8 record.

9 Yes.

10 MR. ZUROMSKI: The time period has  
11 been extended.

12 MR. SAUNDERS: Okay. You're going to  
13 extend the comment period. All right.

14 MR. ROBLES: We're going to extend the  
15 comment period past the meeting coming up so,  
16 therefore, it's fair for everybody.

17 MR. SAUNDERS: Okay. So instead of  
18 waiting for the public to request an extension,  
19 we've already extended the comment period at this  
20 time.

21 Do we have a date as of yet? Or that  
22 will be --

23 MR. ROBLES: It will be in the --

24 MR. SAUNDERS: It will be in the  
25 information sent out to the public, as to how long

1 the comment period has been extended.

2                                   And if you could put that slide back  
3 up?

4                                   As has already been mentioned, if  
5 there is any further comments, questions, the last  
6 slide that has Peter's address, feel free to send  
7 your comments, your questions, mail them, e-mail  
8 them to Richard at this address. It's also included  
9 in the proposed plan fact sheet. And we look  
10 forward to any further feedback that you have may  
11 have at this time.

12                                   And before we close, I will give you  
13 one last chance. If there's any other comments or  
14 questions.

15                                   If not, thank you for coming and have  
16 a good evening.

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CERTIFICATE

I, LESLIE A. MAC NEIL, RPR, CSR  
No. 7187, in and for the State of California, do  
hereby certify:

That the foregoing 37-page  
proceedings were taken down by me in shorthand at  
the time and place stated herein, and represent a  
true and correct transcript of the proceedings.

I further certify that I am not  
interested in the event of the action.

WITNESS my hand this 25<sup>th</sup> day of  
May, 2001.



Certified shorthand  
reporter in and for the  
State of California