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TRANSCRIPT OF PROCEEDINGS

NASA/JPL MEETING

Wednesday, January 21, 2004

Jet Propulsion Laboratory

4800 Oak Grove Drive

Pasadena, California

2:45 p.m. - 3:30 p.m.

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| 7 | MUHAMMAD ZAIDI | LA RWQCB | |
| 8 | DAVID AMIDEI | NASA | |
| 9 | MICHAEL ISKAROUS | DTSC | |
| 10 | JEFF O'KEEFE | CA DHS | |
| 11 | RICHARD O'TOOLE | JPL | |
| 12 | HALL DAILY | CALTECH | |
| 13 | CHARLES L. BURIL | JPL | |
| 14 | JUDY NOVELLY | JPL | |
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1 We hope the communication will be two ways, not
2 just us telling you what we think.

3 At the end of the meeting, one way you can help
4 us is to fill out the evaluations. Again, talking about
5 whether this format is the useful format, whether there's
6 other ways, whether you would like it more technical, less
7 technical, and how often you want to hear from us.

8 You'll notice we have a court reporter
9 transcribing remarks here. And that's for two reasons: We
10 want to make sure we keep track of everything that you say,
11 and we want to follow up on our commitments that we make to
12 you today.

13 A couple of things I want to bring to your
14 attention. We have a website that's got all the
15 administrative records. That's the technical documents
16 that are required from CERCLA. So a lot of technical
17 information is in there. And that's at [http](http://www.nasa.gov), and I say
18 that because there's no [www](http://www.nasa.gov) in front of it. Just JPL water
19 dot NASA dot gov.

20 We've also got the brochures. And, additionally,
21 we've got comment cards. I don't know if you picked them
22 up as you came in, but we could distribute them or pick
23 them up, and you can walk over here during the meeting, if
24 you'd like. You can jot down a question there. If you
25 would like us to repeat it and answer it, or if you'd like

1 us to follow up with a written response, you can let us
2 know that. You can also mail them to us, and you can use
3 internal mail or the U.S. Postal Service.

4 I think almost everybody's signed in, but we
5 encourage you to do that too.

6 And, first, I guess I'd like to introduce
7 Mr. Richard O'Toole.

8 MR. O'TOOLE: Yeah. I manage our legislative and
9 international affairs office here at JPL, but I'm also a
10 member of the executive council. And I'm here today to
11 welcome you on behalf of JPL and to ensure that what goes
12 on in this whole process is brought to the attention of the
13 executive council and to our directors.

14 So we're very pleased of the progress that's
15 being made on the water cleanup, the team that NASA has put
16 into place -- Steve Slaten and Merrilee Fellows.

17 We also realize that we have a dual obligation
18 here. We work on this site, but many of our employees live
19 in the close vicinity of JPL, including myself. I live
20 about two miles away, have for 28 years. And so we realize
21 that we have concerns, both as an employee and as someone
22 who lives in the neighborhood.

23 I'm going to be part of this process through the
24 series of meetings that we have, and I hope you have all
25 the information that you need here today.

1 Give it back to Merrilee.

2 MS. FELLOWS: I've got a number of different people
3 here from various agencies who work with us on this
4 project. But I first want to introduce Steve Slaten, who
5 oversees the cleanup program here at JPL. After Steve,
6 we're going to make brief presentations and open it up for
7 your questions.

8 MR. SLATEN: Let me know -- I'm going to try doing
9 this without a microphone. Let me know if I'm loud enough.
10 If not, let me know, and I'll try to speak up even more.

11 My name is Steve Slaten, and I am the NASA
12 project manager for this project. I am a hydrogeologist.
13 I have experience in cleaning up at other federal
14 facilities.

15 The purpose of today's meeting is to give you
16 information about what we're doing, where we are, and what
17 we plan to be doing. We are -- both here at JPL and with
18 the groundwater adjacent to JPL.

19 Before I get into my talk, I wanted to introduce
20 a couple of people here.

21 Dave Amidei works for NASA and has been
22 associated with this project in the last year. And
23 Keith Fields works for Battelle and does technical work on
24 contract with us.

25 And -- all right.

1 To give a little history, I think most people
2 will know -- will know on the map that -- where we are in
3 relation to the cities and understand where the Arroyo Seco
4 is next to JPL.

5 What we're talking about here today are chemicals
6 that have migrated to groundwater, and what we have is
7 mostly two types of chemicals.

8 One is volatile organic compounds, which are
9 commonly used cleaning solvents that you find in many
10 places where there's been cleaning activities going on.
11 And the other is perchlorate, which is a rocket fuel
12 component.

13 To tell you about what we've been doing is -- it
14 is our job to clean up the groundwater impacted by the JPL
15 site. There has been activities going on with soil cleanup
16 and soil vapor extraction on plant site for several years
17 now up in this area (indicating).

18 It's -- the volatile organic compounds have been
19 removed by soil vapor extraction system, which actually
20 vacuums out the soils, gases out of the soils.

21 Also, we conducted several pilot tests on
22 groundwater extraction in this area. And from these pilot
23 tests, we've used those to help us figure out the best
24 technology to use in what we call the expanded treatability
25 study for the on-site groundwater.

1 The result of this is we expect to break ground
2 in February of putting in a new system to extract
3 groundwater, bring it up and treat it, and then reinject it
4 locally back into the ground.

5 Next.

6 First, talk about some of the options for
7 treatment.

8 For the off-site groundwater, we're now
9 considering the treatment options in the treatment plants.
10 The first one that I'll talk about is ion exchange system.

11 The photograph, not too clear on this scale, is
12 actually another ion exchange system that's working
13 somewhere else in California, just to give as an example.

14 And in these systems, groundwater is extracted,
15 first volatile organic compounds removed by a
16 granular-activated carbon system, which is a standard tried
17 and true technology for removing volatiles from water.

18 Then the part -- it goes into an ion exchange in
19 which perchlorates are removed by ion exchange with a
20 resin. And then the water is finally filtered and
21 initially being reinjected into the ground. And in --
22 possibly in the future, taken and used as a drinking water
23 source by the City of Pasadena.

24 In what we call Option 2 is fluidized bed
25 reactor. In this one, groundwater is extracted as before,

1 and exactly the same as before, carbon is used to remove
2 the volatiles.

3 But the difference -- the main difference is in
4 this one, what's called a fluidized bed reactor, which
5 contains naturally-occurring food grade bacteria, is used
6 in which perchlorate is actually eaten, destroyed by the
7 bacteria, then the water goes out to a filter to remove any
8 bacteria, the groundwater is then reinjected or, as in this
9 case, also could be later taken possibly and used by City
10 of Pasadena as a drinking water source after appropriate
11 chlorination.

12 So both of these technologies that I've talked
13 about here have been conditionally accepted by the State.
14 Both technologies are shown to work.

15 So what we're in the process now of doing is
16 studying these technologies, preparing a technical report
17 which will detail these technologies, and help us come to a
18 decision for the off-site groundwater of which technology
19 is the most appropriate to use.

20 So with that said, I would like to introduce
21 Mark Ripperda from EPA.

22 MR. RIPPERDA: Thanks, Steve.

23 My name is Mark Ripperda, and I'm an engineer
24 with the United States Environmental Protection Agency.
25 And it's my job to oversee NASA in its cleanup effort here.

1 I work closely with a couple of gentlemen from the State of
2 California.

3 This is Mr. Muhammad Zaidi from the Regional
4 Water Quality Control, and Mr. Michael Iskarous from the
5 Department of Toxic Substances Control.

6 And the reason that we're here looking over
7 NASA's shoulder is that -- because NASA's perchlorate and
8 volatile organic compounds migrated through the groundwater
9 and reached drinking water levels off-site, and because JPL
10 is a large, complicated facility, EPA declared it as a
11 national priorities list site, which is also known as
12 Superfund.

13 And under Superfund, EPA and the state agencies
14 are required to review and approve everything that NASA is
15 doing during the cleanup. So we have to review and approve
16 the initial investigation of where the contamination is,
17 where it came from, where it's going. We review the work
18 plans, the decision-making process, to decide which
19 treatment options to use, and then, finally, the
20 construction, installation, and long-term operation of the
21 cleanup process.

22 And there's one other State of California agency
23 here who's going to talk briefly about the drinking water
24 component. Initially, NASA is going to treat the water and
25 inject it back into the ground as part of cleaning up the

1 aquifer.

2 And under the Superfund law, NASA has to clean
3 the aquifer up to the drinking water standard, whether or
4 not the water is being used as drinking water. But if
5 water is going to be used as drinking water, the Department
6 of Health Services oversees that, and this is Jeff O'Keefe,
7 who will tell you a little bit about that.

8 MR. O'KEEFE: Thanks. I'm Jeff O'Keefe. I'm the
9 district engineer for the California Department of Health
10 Services drinking water program. And I'm based here in
11 our Los Angeles field office.

12 We are responsible for ensuring that water
13 utilities comply with the California and Federal Safe
14 Drinking Water Act and meet all water quality standards.

15 Our department establishes drinking water
16 standards, reviews and approves new drinking water
17 treatment technologies, and also issues permits to water
18 systems to utilize those treatment technologies.

19 For this project, we will issue a permit to the
20 City of Pasadena in order for them to use the treated water
21 from these off-site wells for drinking water source.

22 Before that permit could be issued, the
23 department has a very extensive evaluation process, and
24 that's to make sure that the treated water is safe and
25 protected for public health.

1 And then, ultimately, our department will hold a
2 public hearing before the water can be accepted for
3 drinking water purposes.

4 And back to Merrilee.

5 MS. FELLOWS: Are you finished with that?

6 MR. SLATEN: Yes.

7 MS. FELLOWS: Okay. Now, we're going to open it for
8 questions. I do -- it's optional, but we'd like you to
9 state your name, give the neighborhood you're from, and if
10 you sign in, we have a list there. The court reporter will
11 take it down as well. And just like to hear what you're
12 thinking.

13 If you want more technical information, we can
14 talk about that briefly here. We can provide meetings
15 later on. We can talk about data in general. If you want
16 in-depth study, you can meet with our offices or some other
17 forum for that.

18 So does anybody have any questions?

19 You were first.

20 MR. JAMES M. LUMEDEN: You talked about the potential
21 of the treated water being (inaudible) Pasadena water
22 distribution system --

23 THE COURT REPORTER: It would help if he identified
24 himself and used a microphone.

25 MR. JAMES M. LUMEDEN: Since I'm from Safety, let's

1 make sure this doesn't turn into a trip hazard.

2 James LUMEDEN, and I'm a resident of Building 125
3 up here.

4 My question is, since there's a potential of this
5 treatment process being used directly as drinking water,
6 will the monitor -- will it, A, will it feed back into the
7 JPL water system, and B, is the monitoring of the quality
8 of the water continuous, or is it just periodic sampling,
9 like once a month or something like that (inaudible)?

10 MS. FELLOWS: Jeff.

11 MR. O'KEEFE: Sure.

12 Well, yes. At this time, I don't know the piping
13 layout detail. But yes, it would -- it would enter the
14 City of Pasadena's distribution system, which is connected
15 to this campus. So it's not a direct connection to this
16 campus, but it goes through treating facilities first.

17 And there would be some continuous monitoring
18 requirements. There is online instrumentation that can
19 monitor for perchlorate continuously, and that, most
20 likely, would be a requirement.

21 And there's also an extensive monitoring program
22 that is part of the permitting process, which (inaudible)
23 source water monitoring and treatment plant monitoring,
24 some continuous (inaudible) on weekly, some less frequent.

25 Does that answer your question?

1 MR. JAMES M. LUMEDEN: I think it will put it in
2 perspective.

3 Thank you.

4 MS. CYNTHIA COMPTON: My name is Cynthia Compton. I'm
5 a JPL employee.

6 The treatment plants, where are you recommending
7 locating that at?

8 MR. SLATEN: Maybe let's --

9 MS. CYNTHIA COMPTON: If I could follow up. I have
10 about four other questions.

11 MS. FELLOWS: Sure.

12 MR. SLATEN: Okay. This is probably the best close-up
13 map that I have that shows the facility.

14 Keith, help me here point to the right area.
15 It's near -- it's in this area right in here (indicating).
16 It's actually -- there's -- we have located the pilot test
17 study in the same area, and it will be in the same area
18 that that was located.

19 MR. SLATEN: And is that good enough to help
20 understand --

21 MS. CYNTHIA COMPTON: Yes, I know where that is. The
22 parking lot up above the fire station there.

23 MR. SLATEN: Yes.

24 MS. CYNTHIA COMPTON: When you're talking about
25 reinjecting the water, where would you reinject it at? At

1 that location, or would you take it up -- upstream
2 somewhere?

3 MR. SLATEN: Slightly upgradient. Perhaps I should
4 have prepared a map that showed, but it's very close in --
5 the extraction wells and the reinjection wells are going to
6 be within a few hundred feet of each other for the on-site
7 groundwater system that's going in here in the spring and
8 summer. So for the first system that -- that's where
9 the -- what I'll call a closed loop of extraction and
10 reinjection to clean out the groundwater or flushing closed
11 loop.

12 MS. CYNTHIA COMPTON: When you have these public
13 meetings, will you be providing a map of the aquifer as
14 well, and map -- I mean, I'm concerned about water that is,
15 say, down there where monitoring well No. 10 is.

16 Is that going to be sucked up to that treatment
17 facility upgradient?

18 MR. SLATEN: The area of influence will be fairly
19 small from this system where we're talking about. We have
20 the higher levels of chemicals that are here are in a
21 fairly localized area. And so that is what we're working
22 to clean up for the on-site groundwater.

23 There's a different system that's being put in
24 for the off-site groundwater, which comes on a little bit
25 later.

1 MS. CYNTHIA COMPTON: Is that part of operating unit
2 No. 1?

3 MR. SLATEN: No. No.

4 MS. CYNTHIA COMPTON: That's the other --

5 MR. SLATEN: Sorry. I haven't introduced these terms.
6 I was trying to keep us on fairly high level.

7 It's what we call Operable Unit No. 3, which is
8 all of the off-site groundwater, in which case much lower
9 levels of chemicals have migrated down towards these wells
10 and actually impacted these wells. They are turned off.
11 They are closed now. And that -- the intent of that is to
12 prevent further spread of these contaminants and control
13 the chemicals in the groundwater here.

14 MS. CYNTHIA COMPTON: Okay. So this whole set of
15 meetings and treatment studies and presentations is all
16 based on just Operating Unit 1?

17 MR. SLATEN: No. Today is general background
18 information on everything we're doing. So all of that is
19 under discussion today.

20 We're talking about -- when I was talking about
21 the two systems under consideration, that was for this
22 system, the -- what we call the Operable Unit 3, the
23 off-site groundwater, in which case wells down in this area
24 will be -- extraction will be brought up onto plant site,
25 treated, and then reinjected initially further on this site

1 on plant site. Two different systems.

2 MS. FELLOWS: Let me just add because, I know you were
3 involved in the soil vapor extraction on the OU-2. So
4 you're really talking about groundwater here, not
5 (inaudible). I'm only using the term because I realize
6 they use at the meeting --

7 MS. CYNTHIA COMPTON: What is the decision point or
8 who makes the decision as to whether to reinject the water
9 or to directly direct it to Pasadena drinking water?

10 MR. SLATEN: The -- with both systems, we're talking
11 about now, the off-site -- off-site groundwater -- I'll
12 reiterate. For the on-site groundwater, it will never be
13 used for drinking water. It's a closed loop. It's always
14 reinjected.

15 Coming along later, we will be talking about more
16 this spring and starting to put it in through the end of
17 this year and maybe in place by the end of the year for the
18 off-site groundwater. That system will initially come up
19 online, and all the water will be reinjected.

20 But then later, we may go through the process to
21 make that available, and there are permitting processes
22 that we were talking about that; then later, the decision
23 would be made by the City of Pasadena whether to take that
24 water or not.

25 MS. CYNTHIA COMPTON: And is the City of Altadena

1 involved at all in the permit and taking that water?

2 MR. SLATEN: No.

3 MS. CYNTHIA COMPTON: No.

4 MR. SLATEN: No. It's -- we've only been working with
5 the City of Pasadena on the possibility of taking that
6 water.

7 MS. CYNTHIA COMPTON: Okay. I just have one last
8 question.

9 The option 1 and option 2, are you going to be
10 making a recommendation?

11 MR. SLATEN: Yes. The technical documents that we're
12 preparing now are looking at the pros and cons of those,
13 and when those are published coming up this spring, there
14 will be a recommendation on which one to use.

15 MS. FELLOWS: Maybe this is a good time to talk about
16 the documents.

17 MR. SLATEN: Right.

18 Coming -- the documents that are being prepared
19 now are called Engineering Evaluation Cost Analysis, EECA,
20 and the action memorandum that summarizes that. Those are
21 documents we're working on now, which will describe these
22 systems and start proposing systems.

23 MS. CYNTHIA COMPTON: Are all of the documents that
24 are in the repositories, the libraries -- are all of those
25 available on this website that you're talking about?

1 MS. FELLOWS: Yes. There are several libraries
2 (inaudible) through and make sure they haven't been taken.

3 MS. CYNTHIA COMPTON: Great. Thank you.

4 UNIDENTIFIED MALE SPEAKER: (Inaudible) also an
5 employee of JPL.

6 I'm not sure how relevant the situation might be,
7 but I'm sure that the Santa Susanna field laboratory that
8 Rockwell used to test the main engines for the shuttles
9 also had contamination of the soil. I'm not sure if it
10 also went to the water or not.

11 Of the two options, do you know if one is already
12 existing to treat the water system in the Santa Susanna
13 field laboratory that you guys could use as a benchmark, or
14 are you just coming up with these two new technologies for
15 JPL?

16 MS. MELNYK-VECCHIO: I'm from the State Health
17 Department.

18 Currently, ion exchange is a -- it's called a
19 BAT, best available technology, that is used at a number of
20 sites through Southern California that we have permitted
21 and are operating very effectively to remove the
22 perchlorate.

23 The Santa Susanna facility is going through the
24 process right now. They're going to have to treat at some
25 later date. There's nothing there right now.

1 Now, the fluidized bed, it's a different
2 technology. There is one currently operating, and it's up
3 in Rancho Cordova in California, and it's toward the
4 Aerojet facility, the contaminated groundwater supply with
5 perchlorate, but the water is not used for drinking water
6 purposes. It is used for reinjection. It works
7 effectively.

8 And so both of these treatments have been
9 conditionally accepted by our department.

10 The ion exchange does not have a bunch of
11 conditions that have to be worked through. But the
12 fluidized bed has a number of (inaudible) conditions that
13 have to be met. Because you do use bacteria, there is --
14 there is a biomass that's created. It has to be filtered.
15 You have to be sure that the bacteria are fed correctly,
16 and you have the appropriate operating conditions. And
17 that you filter the water afterwards and that you also
18 disinfect.

19 So these are both accepted technologies, and
20 they're -- like I said, just one for the fluidized bed and
21 many for the ion exchange.

22 UNIDENTIFIED MALE SPEAKER: And the last question is,
23 is there a threshold for contaminants, and how far above
24 the threshold are we?

25 MR. SLATEN: Once again, if we're talking about the --

1 near the original source, the levels of perchlorates appear
2 are in the 4,000 part per million range, and they migrated
3 off-site in the --

4 MR. ZAIDI: Part per billion.

5 MR. SLATEN: I'm sorry. Part per billion.

6 And the water down here, we're talking about much
7 lower levels, 10, 15, in that range, in places down here,
8 we have detected a low. The action level that we're
9 working for and cleaning up to is four parts per billion.
10 And both systems should be able to achieve that and better.

11 MS. MELNYK-VECCHIO: I would like to add one little
12 thing.

13 The Arroyo well (inaudible), and we had levels as
14 high as 80 -- 80 and 100. So most of the wells are much
15 lower, but the highest was (inaudible) which belongs to the
16 City of Pasadena.

17 UNIDENTIFIED MALE SPEAKER: (Inaudible.) I just want
18 to know what the time frames are for producing wells by
19 (inaudible).

20 MR. SLATEN: Okay. I guess I can say for both,
21 groundwater pump entry is a tried and true way and really
22 almost the only way to remove contaminants from groundwater
23 in many cases. And it doesn't happen real quickly. It
24 takes years to flush out groundwater, reinject, flush out
25 groundwater. So I would say we're looking at years, we're

1 looking at possibly a few decades to finish the job.

2 In the meantime -- in the meantime, of course,
3 water won't be used until it's cleaned up.

4 UNIDENTIFIED MALE SPEAKER: It will also be spreading
5 in the meantime; right?

6 MR. SLATEN: No. The question was, will it be
7 spreading in the meantime in the years or decades it takes
8 to finish the job? No. The intent of the on-site is to
9 control the remaining source, the higher levels, so they
10 don't continue to move.

11 The off-site will be to capture and stop any
12 further migration of the chemicals and to begin cleaning
13 them up.

14 MR. RIPPERDA: I have just a little bit to add.

15 The chemicals that are moving, the groundwater
16 flow is kind of in a diagonal like this (indicating). And
17 we know before those Arroyo wells and the Well 52 went
18 off-line, they were doing a pretty good job of keeping the
19 perchlorate from moving farther. And a little bit of
20 perchlorate had moved past them, and since they've been off
21 for the last couple of years, more perchlorate has moved
22 past them.

23 So as part of this whole process, NASA has to
24 monitor north, south, and east, so they are going to have a
25 monitoring system that works downgradient and

1 cross-gradient (inaudible) water levels (inaudible), then
2 NASA is responsible for that.

3 But whether or not it's completely caught by two
4 those wells, NASA has to monitor the whole area.

5 MS. AMY POSNER: Amy Posner. I'm a JPL employee. I
6 had a question.

7 Comparing these two options, how do they compare
8 in terms of noise levels, power usage, and footprint space?

9 MR. SLATEN: I believe the general answer is going to
10 be they're very similar. They will probably look and sound
11 exactly the same to anybody who didn't know that there was
12 a difference.

13 Keith, do you have anything to add?

14 MR. FIELDS: I think that's accurate. They both pick
15 up roughly the same footprints. (Inaudible) they have
16 pumps and air compressors and things (inaudible).

17 UNIDENTIFIED MALE SPEAKER: Do we know what those
18 noise and dynamic levels are?

19 We have a lot of instruments and experiments
20 around JPL that are very, very vibration sensitive,
21 detecting minute vibrations, more sensitive than
22 seismometers.

23 Do we know what those effects are going to be on
24 the laboratory environment?

25 MR. SLATEN: First -- I'll add to that question too,

1 that how will it compare to the pilot study that was
2 already overprocessing as well?

3 MR. FIELDS: It will be similar to the pilot study
4 that had been operating already. And while I don't know
5 the exact decibel levels, we can look into that and get
6 back to you as far as --

7 MR. SLATEN: And we do work closely with facilities on
8 everything we do, from siding to putting in the pipelines
9 to how we effect transportation and parking. We have been
10 working closely with facilities on all of that.

11 So I hadn't thought about the seismic impact or
12 whatever before, but I would think that they would have
13 helped us think about that if it were an issue.

14 UNIDENTIFIED MALE SPEAKER: We need to make sure
15 there's one other organization that JPL gets plugged into
16 the loop here, and I will work that out with Chuck.

17 UNIDENTIFIED MALE SPEAKER: Was there some sort of
18 treatment plant up on the other side of the Arroyo a few
19 years ago --

20 MR. SLATEN: There still is. That -- I believe it's
21 probably right a little bit off the picture here, down near
22 the bottom of this (indicating).

23 That is a volatile organic compound removal
24 plant, which was put in in about 1990 when they first found
25 volatile organic compounds in the water, and that takes out

1 the volatile organics out of the water before it is used
2 by --

3 MR. FIELDS: The City of Pasadena?

4 MR. SLATEN: -- by the City of Pasadena.

5 It's not operating right now because those wells
6 are turned off. But it's still down there and still
7 functioning. You can probably all see it out the window.

8 MS. FELLOWS: I think Martin was about to ask a
9 question. Okay.

10 UNIDENTIFIED MALE SPEAKER: No. That was it.

11 UNIDENTIFIED MALE SPEAKER: (Inaudible) JPL employee.

12 When you say (inaudible), what I see missing from
13 your presentation is the outline of the existing plume.

14 Where is it?

15 MR. SLATEN: Okay. I'll point to the appropriate
16 location of it.

17 UNIDENTIFIED MALE SPEAKER: You should be able to put
18 up a graphic that overlays so the outside public knows
19 where it is.

20 MR. SLATEN: Okay.

21 UNIDENTIFIED MALE SPEAKER: And the second thing, I'm
22 curious of what you're going to do as far as to put a water
23 curtain to use hydraulic drive to hold the plume in place.

24 I'm from the oil industry. I am -- we never
25 inject right near our well. We always go out and put a

1 curtain in and put hydraulic (inaudible) back toward the
2 source. I'm curious why you don't expect you're going to
3 get a cone right there where you are pumping --

4 MR. SLATEN: Actually, I'm from the oil business, too,
5 in a previous life and went out on to become a
6 hydrogeologist, so I know exactly what you're talking
7 about.

8 There will actually be -- when we begin
9 extracting here, and then the reinjection is going to occur
10 over here, (indicating) a long way, so that there will be
11 what we call, in hydrology, a cone of depression around
12 this area, which will stop further migration downgradient,
13 will pick up the chemicals here (indicating), and create
14 actually a low point, a barrier, so that things won't flow
15 on past it.

16 There's not -- now, we have not -- we're not
17 talking about the final remedy here. We are talking about
18 an interim action to contain the chemicals in the
19 groundwater.

20 As a part of the final remedy, there may be other
21 things that are employed, including a mounding water
22 curtain, if you will, to push back or to hold back.

23 But, for now, we're talking about an action to
24 stop the further spread, and we're -- over the next couple
25 of years, we're going to be talking about what may

1 constitute the final remedy.

2 UNIDENTIFIED MALE SPEAKER: (Inaudible) is the
3 overlay?

4 MR. SLATEN: I don't have it with me today. I can
5 point, if people are interested. The off-site
6 groundwater --

7 UNIDENTIFIED MALE SPEAKER: I think that that's going
8 to be DOA with the outside world. I think you need to be
9 able to overlay it just like you would in the oil industry
10 and show them where that reservoir is.

11 MR. SLATEN: Okay.

12 UNIDENTIFIED MALE SPEAKER: It may upset people that
13 their house is sitting on top of something, but I don't
14 think I'm the only guy to ask this question.

15 MR. SLATEN: All right. And, of course, you know, if
16 you're in the oil industry, when you draw that line, you're
17 inferring that it's exactly there. You don't know --

18 UNIDENTIFIED MALE SPEAKER: It is exactly there.

19 MS. FELLOWS: But generalized idea.

20 MR. SLATEN: I agree, a generalized overlay to show
21 that the chemicals have migrated; that clearly in wells
22 there have been down here some indications that the
23 migration has continued down into this area. The end of my
24 pen is what I'm working off of here.

25 So we are talking about putting in some further

1 monitoring wells, and perhaps -- I think I do have another
2 slide here that might help.

3 That gives a little more detail of the number --
4 of the monitoring wells that we have and where they're
5 located, so we're trying to find the exact extent so we
6 know exactly what it is, how far it's gone, and what we
7 have to do about it.

8 MS. FELLOWS: Do we have anything further on this
9 slide?

10 MR. SLATEN: No. You mean further slides?

11 MS. FELLOWS: No. Like the one down here is the one
12 furthest southeast.

13 MR. SLATEN: Oh, of our monitoring wells? That's
14 correct. This shows all our monitoring wells.

15 UNIDENTIFIED MALE SPEAKER: Going to beat you to death
16 on the oil side.

17 You need to tell people how far down it is on the
18 surface, and it's not coming up in their backyard, and
19 whether you're talking just one strata or you're talking
20 multiple strata.

21 MR. SLATEN: Okay. Yes -- I've considered -- the
22 geology is sort of complex here. There are several
23 stratas, and there are different stratas that are affected
24 by our chemicals.

25 For this introductory meeting, I was thinking it

1 might be better to give people general information. We're
2 going to continue to have meetings in other ways to get out
3 more specific information.

4 So we'll talk about whether we want to go ahead
5 and get more complicated on the geology or hydrogeology
6 (inaudible) in the next few days.

7 MS. FELLOWS: But it's something that we can address
8 over time.

9 MR. SLATEN: At some point, I agree. It's going to be
10 necessary to introduce people to the geologic complexity.

11 MR. ZAIDI: I may add to the question.

12 I am from the Regional Water Board, and we are
13 requiring some monitoring wells, and they will be
14 extracting and then reinjecting here.

15 We are requiring that the monitoring wells be
16 placed in order to monitor the (inaudible) injected water
17 that goes in, the treated water so that we can monitor it
18 before it gets to the (inaudible).

19 Also, OU-1, which is the on-site facility, and
20 also on the west side where you have this MW-14 on the west
21 side, there are going to be a series of injection wells
22 also, and treated water will be injected there.

23 And also (inaudible) MW-7, that's where we have
24 the high concentration on the plume. So that -- there's
25 also one, maybe up to two, extraction wells, and then

1 upgradient to them will be injection wells.

2 And then downgradient of that, in addition to
3 these monitoring wells, we're going to require some more
4 (inaudible) in order to completely monitor the plume to
5 make sure that the water quality is protected in accordance
6 with the requirements (inaudible).

7 MS. FELLOWS: Next, please.

8 This is helpful to us, not only because we want
9 to know what you think, but because we have to go into some
10 public meetings. So I really encourage you to help us out
11 here.

12 UNIDENTIFIED MALE SPEAKER: One more shot.

13 You got oil and gas. You got this contaminant,
14 the plume that goes all the way across the Arroyo. All
15 right. If it's in the surface strata, every time it rains,
16 it gets flushed down through, past this Devil's Gate dam
17 and down.

18 What mechanism is keeping it from being flushed
19 through every time we have a real bad rainstorm or
20 something like that? If it's far enough down in different
21 strata, different aquifer, and the surface water goes over
22 the top of it, is there any surface water (inaudible) on
23 this plume, or is it hydraulically driven upgradient down
24 to the aquifer?

25 MR. SLATEN: We start to get into some of the

1 complexities. But the answer is that the levels that have
2 our chemicals in them are the lower levels down a couple
3 hundred feet below the surface, not the near -- there are
4 some nearer surface aquifers or pieces of the aquifer, and
5 our chemicals have actually migrated more in the lower
6 zones. So surface water impact is less, and when there's
7 surface water, as you described, it kind of moves then --
8 combines with groundwater, and kind of moves down the
9 Arroyo. It's not directly impacting our lower zones where
10 our chemicals are. So in that way --

11 UNIDENTIFIED MALE SPEAKER: I think that's very
12 important --

13 MR. SLATEN: -- in that way, we're lucky.

14 UNIDENTIFIED MALE SPEAKER: That factor is very, very
15 important.

16 UNIDENTIFIED MALE SPEAKER: Just to clarify.

17 The depth to the groundwater table is 200 feet or
18 maybe within the Arroyo (inaudible) closer to 150,
19 something like that. So there's a significant (inaudible)
20 from ground surface to the top of the water table. And
21 then, once you're within the water table, there's five --
22 four or five strata that have been identified, which is
23 another 800 or 1,000 feet thick of aquifer saturated
24 thickness.

25 So just -- I think that's a good point, but just

1 to clarify, there is a significant difference between
2 ground surface and water table. And the groundwater table
3 does not feed the Arroyo Seco. The Arroyo Seco would be a
4 losing stream, so to speak, that could be feeding the
5 groundwater table.

6 UNIDENTIFIED MALE SPEAKER: This is a reinforcing
7 comment to the questions that Fred has been posing here.

8 The purpose of this gathering, A, is to inform
9 us, but B, also to get some feedback before going to the
10 outside.

11 Depending upon where you hold that public
12 meeting, you may or may not -- you will have more or less
13 technical people in the audience. And these kinds of
14 questions will be coming up. So I'm glad to hear them
15 coming out here, and I hope we don't get defensive in this
16 meeting --

17 MS. FELLOWS: It's great.

18 And also, it gives us sort of a chance to
19 practice answering technical levels, and also to think
20 about how we translate that and make sure everybody can
21 understand the answer.

22 UNIDENTIFIED MALE SPEAKER: Thank you.

23 MS. FELLOWS: Martin.

24 UNIDENTIFIED MALE SPEAKER: (Inaudible).

25 Another question about the existing plant.

1 I presume it was City of Pasadena that shut that
2 down. Was it their decision to shut down the existing
3 treatment plant --

4 MR. SLATEN: Yes. It was their decision. It was
5 affected by the existing volatile treatment plant down in
6 Arroyo does not treat perchlorates, does not take
7 perchlorates out. So when -- in the late '90s, when they
8 discovered perchlorates, they shut down those wells, and
9 then the treatment system didn't need to be treated.

10 They didn't need to treat for volatile organics
11 anymore because perchlorates were still there, and they did
12 not have technologies at that time to treat perchlorates.

13 UNIDENTIFIED MALE SPEAKER: (Inaudible) it's not
14 useable. So you are not -- you can't use that many in
15 addition to any other treatments or --

16 MR. SLATEN: Well, it could be used again, but if --
17 as long as the water has perchlorate in it, you will have
18 to have a treatment system for the perchlorate as well.

19 And our treatment systems, we're going to take
20 care of in the new treatment system, both the volatile
21 organics and the perchlorates. So the future of that
22 treatment system for volatiles, I don't know what the plans
23 may be for that, but we'll see.

24 UNIDENTIFIED MALE SPEAKER: (Inaudible) can't drink
25 it, can't reinject it. So you can't really use it then.

1 MR. SLATEN: Right. Until we do our job, and we're
2 taking responsibility, until we take care of that and clean
3 that water up, it can't be used right now.

4 MS. FELLOWS: Any other questions?

5 MS. CYNTHIA COMPTON: Cynthia Compton again.

6 What about Altadena? What about Altadena water
7 supply companies? Are they involved in this process?

8 MR. SLATEN: There are other water supply companies.
9 And we work with Raymond Basin. We're not alone in this.
10 We have people who are very interested in what we're doing.
11 We have people that we work with closely because what we're
12 doing affects them and will affect them.

13 So there are other water supply companies that
14 have other water wells out here. We're in constant
15 communication with them. We're going to do things that
16 make -- that clean up the (inaudible) that make this right,
17 and return it back to the owners the way it was.

18 MS. FELLOWS: Lincoln Avenue Water Company is
19 co-hosting our public meeting next Tuesday and Rubio Canyon
20 (inaudible) management meetings that we attended so we do
21 work with them. But doesn't exactly answer your question,
22 but we do.

23 UNIDENTIFIED MALE SPEAKER: Just to add to that, the
24 City of Altadena is served by those three water systems.
25 They don't have a multiple system like the City of

1 Pasadena. It's served by Lincoln Avenue, Rubio Canyon and
2 Las Flores water --

3 MS. FELLOWS: Any other questions?

4 Well, then, let me, I guess, wrap up.

5 Just first, kind of like to add to that, talk
6 about the kind of action items. We're going to talk to
7 somebody in facilities to talk more about the vibration,
8 make sure we have somebody working on that, how to depict
9 the plume graphic and the depth, talk about the hydraulic
10 curtains and all the other questions that we have answered
11 for you.

12 I would encourage you to answer the evaluations
13 and take comment cards. I know it is a busy time at JPL
14 right now, and if you have a friend that couldn't come,
15 feel free to take the cards and send in the questions.

16 MR. SLATEN: Also, I think one of the questions dealt
17 with where we're going to have the other meetings or should
18 have the other meetings out in the community.

19 If it wasn't answered completely, we are going to
20 be at Eliot Junior High School, Tuesday. And where is
21 that -- no.

22 John Muir High School down here. So we are
23 making an attempt to get out and get into the neighborhoods
24 and communicate with people and hear what they have to say.

25 MS. FELLOWS: This is our first time in a long time,

1 but you are going to hear from us until you say stop, so
2 let us know.

3 MR. SLATEN: And there will probably be at least
4 quarterly meetings planned in the future, more or less, as
5 people let us know what they need.

6 MS. FELLOWS: At least quarterly.

7 MS. CYNTHIA COMPTON: Is Peter Robles and
8 Richard Zuromski involved in this project anymore?

9 MS. FELLOWS: Richard has gone on to become a member
10 of the bar and practices law downtown and --

11 MR. SLATEN: Peter works next to me. He still does
12 environmental issues. But for this project, I was brought
13 on as the project manager for this project, and I work with
14 Peter. He has historical knowledge. But I'm the project
15 manager now.

16 MS. FELLOWS: What NASA has tried to do, they brought
17 in Steve full time to work solely on the water cleanup
18 because Peter had a number of jobs. He's still doing all
19 those other jobs, but we are slowly concentrating on water.

20 MS. CYNTHIA COMPTON: One last question.

21 In the area of the political business going on,
22 with the current administration here, is there any impact
23 on the budget for this type of a cleanup?

24 I know it's not a high priority, the current
25 administration, to fund environmental cleanup activities.

1 MR. SLATEN: Perhaps I should answer it. There has
2 not been any impact. And NASA has paid a lot of attention
3 to this site and to this issue, and it has a lot of
4 interest in NASA all the way up to the top.

5 So I believe that NASA is committed to doing the
6 right thing here and providing the funding necessary to do
7 that.

8 MR. RIPPERDA: I would agree with that, having been on
9 the project for a few years. You certainly can't control
10 what the President and Congress do with the budget, but
11 senior NASA management has paid so much attention to this
12 in the last six months than they used to. And I feel like
13 NASA is really committed to working with this.

14 MS. FELLOWS: Thank you again for coming and for your
15 interest and keeping in touch. Our names are on the
16 brochures.

17 MR. SLATEN: And we'll be here for a few minutes, if
18 you want to catch any of us.

19 (The proceedings concluded at 3:30 p.m.)

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1 STATE OF CALIFORNIA)
2 COUNTY OF LOS ANGELES) ss.

3

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