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TRANSCRIPT OF PROCEEDINGS

NASA/JPL CERCLA RPM MEETING

March 4, 2004

Raymond Basin Management Board

4536 Hampton Road

La Cañada Flintridge, CA

1	NAME	AFFILIATION
2	STEVE SLATEN	NASA
3	BRAD BOMAN	CITY OF PASADENA
4	MERRILEE FELLOWS	NASA
5	KEITH FIELDS	BATTELLE
6	MARK RIPPERDA	USEPA
7	ALAN SORSHER	CA DHS
8	JEFF O'KEEFE	CA DHS
9	GARY TAKARA	PASADENA WATER & POWER
10	MICHAEL ISKAROUS	DTSC
11	CHUCK BURIL	JPL
12	RUSSELL SIRABIAN	BATTELLE
13	SAM FRISCH	SHAW ENVIRONMENTAL
14	KAREN ARTEAGA	GEOSYNTEC CONSULTANTS
15	WILLIAM GUARINI	SHAW ENVIRONMENTAL
16	MARK NIELSEN	BATTELLE
17	JUDY NOVELLY	JPL
18	JOHN LOPEZ	LOS FLORES
19	HECTOR COLLINS	CA DHS
20	MOHAMMED ZAIDI	RWQCB, LOS ANGELES REGION

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1 La Canada, California, Thursday, March 4, 2004

2 10:08 A.M.

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5 MR. FIELDS: Well, I think we can begin.

6 Introductions.

7 MR. SLATEN: Steve SLATEN, NASA RPM for the  
8 ground marketing.

9 MR. BOMAN: Brad Boman, City of Pasadena.

10 MR. FIELDS: If you could spell your last names  
11 for the court reporter.

12 MR. BOMAN: Boman, without a W. B-o-m-a-n.

13 MS. FELLOWS: Merrilee Fellows. M-e-r-r-i-l-e-e,  
14 F-e-l-l-o-w-s. I'm with NASA.

15 MR. FIELDS: Keith Fields, F-i-e-l-d-s, with  
16 Battelle.

17 MR. RIPPERDA: Mark Ripperda, R-i-p-p-e-r-d-a.

18 MR. SORSHER: Alan Sorsher with Department of  
19 Health Services, S-o-r-s-h-e-r. And it's A-l-a-n.

20 MR. O'KEEFE: Jeff O'Keefe, O-K-e-e-f-e. I'm  
21 with the California Department of Health Services, also.

22 MR. TAKARA: Gary Takara, T-a-k-a-r-a.  
23 Pasadena Water & Power.

24 MS. THOMAS: Linda Thomas with Raymond Basin.

25 MR. ISKAROUS: Michael Iskarous,

1 I-s-k-a-r-o-u-s, DTSC.

2 MR. BURIL: Chuck Buril, JPL.

3 MR. SIRABIAN: Russell Sirabian,

4 S-i-r-a-b-i-a-n, with Battelle.

5 MR. FRISCH: Sam Frisch with Shaw. And that's

6 F-r-i-s-c-h.

7 MR. GUARINI: Bill Guarini with Shaw. That's

8 G-u-a-r-i-n-i.

9 MS. ARTEAGA: Karen Arteaga, A-r-t-e-a-g-a,

10 with Geosyntec for the City of Pasadena.

11 MR. NIELSEN: Mark Nielsen, N-i-e-l-s-e-n, with

12 Battelle.

13 MS. NOVELLY: Judy Novelly, N-o-v-e-l-l-y, with

14 JPL.

15 MR. FIELDS: Okay. The first thing that we had

16 on the agenda was for Merrilee to give us an update on

17 the public involvement outreach.

18 MS. FELLOWS: There's two items on the agenda

19 for me, one of them is to give you the status of the

20 health meeting. And it's coming up, but I don't have a

21 firm date yet. We're still targeting toward the end of

22 March, but it's very difficult to find high quality in

23 the mix of expertise we want and make sure they're

24 available on the same day the venue is available.

25 We're looking at the Altadena Community Center

1 up at Lake and Altadena -- I've forgotten -- Altadena  
2 Boulevard, I guess. And it's a room that holds about  
3 100 people.

4           There are a couple of other nice venues, but  
5 I'm not sure how much -- I suspect about 40 myself. In  
6 the event there's more, I hate to turn people away and  
7 make them upset. The composition of people that we're  
8 looking at from Water, from the City of Pasadena,  
9 Department of Public Health, and they have offered a  
10 doctor to speak. They also not only offered to have him  
11 speak, but they've also offered a venue. It was only  
12 for 25 people; so we couldn't accept it. They already  
13 offered to be a co-host, epidemiology, and somebody  
14 local from the county public health and the cancer  
15 registry people. So we have a couple of names for each.

16           And what we're trying to do is -- we have a  
17 medical person on our staff, a consultant, to interview  
18 people, make sure they can explain things. We just want  
19 to make sure it goes smoothly and with the kind of  
20 people that can translate to the public. So we're doing  
21 that right now.

22           The people that we're talking to are from the  
23 epidemiology program that was suggested by DHS and  
24 Dr. Tom Mack from the cancer surveillance program or  
25 Dr. Henderson. And Marilyn Underwood who is a

1 toxicologist for -- what is it? -- Environmental Health  
2 Investigations --

3 UNIDENTIFIED SPEAKER: That's right.

4 MS. FELLOWS: Not only from Jeff, but it turns  
5 out that the medical staff we have helping us know her  
6 quite well and say she's really terrific in public.

7 What we're looking for is the expertise and  
8 that friendliness -- I shouldn't say friendliness --  
9 accessibility on it.

10 If you have any suggestions on a different mix,  
11 we don't have to have this cast of stars coming up and  
12 talking to people. We want people who can basically  
13 translate. Our goal is to get people with health  
14 concerns with people who can talk to them about what  
15 their next steps are, whether their concerns are  
16 considered. You know, valid isn't the right word.

17 I still need to be trained on this because I  
18 don't know all the language yet. Just to make sure that  
19 they can answer the questions and meet the needs of the  
20 local population.

21 MR. O'KEEFE: The time frame is still the same?

22 MS. FELLOWS: Still towards the end of March,  
23 although I'm suspecting it's going to be a little later  
24 because it's already the first week in March and we  
25 still need to get a mailing out to 13,000 people in the

1 area from about here in La Canada a little further over  
2 all the way to Lake Boulevard on the east and then down  
3 to the freeway on the south. A little bit broader  
4 spectrum than they had for the public meetings. We need  
5 to make sure we try to capture everybody.

6 I guess that's it on the health meetings.

7 The other issue I wanted to bring up was the  
8 article in the Star News today. I don't know if you  
9 guys saw it. I'll summarize it as I pass it around.

10 This has to do with the San Marino rate  
11 hike request, and they're requesting an increase of  
12 about 21 percent for the first year. And what they've  
13 been doing is pointing to the fact that their -- that  
14 some wells are closed and saying the cause for that is  
15 the fact that the Pasadena wells (inaudible) to pay  
16 higher rates for water. This sort of slops over into  
17 the fact that they're suggesting that the wells in San  
18 Marino are closed because of JPL chemicals.

19 And one of the things that we wanted to ask  
20 people here -- and actually I'm not sure there's anybody  
21 in the room that knows -- is whether San Marino is in  
22 the Raymond Basin or not.

23 MR. BOMAN: They are.

24 MS. FELLOWS: They are in the Raymond Basin?

25 We're talking about whether we want to reply to

1 this, and the answer is probably not except that we may  
2 talk to the reporters just in an educational way to make  
3 sure we got all the facts consistent.

4           And I do have some pretty good quotes from  
5 Steve. If they hadn't included the quotes from Steve,  
6 that's (inaudible) but they did a good job.

7           If you have any thoughts on it, let us know.

8           Nobody has had a chance to read it?

9           MR. RIPPERDA: This (inaudible) to respond to  
10 or be upset about. City got contaminated wells. You're  
11 the biggest possible source. And they're not really  
12 picking on you so much as just complaining about rate  
13 hikes.

14           MS. FELLOWS: They have sent a letter to the  
15 PUC that says the wells are closed because JPL has  
16 contaminated the wells, and JPL has accepted  
17 responsibility for contaminating the wells.

18           So it's getting blurred. Wells close to us and  
19 wells six miles away, I think you're right. Maybe  
20 that's just one of the things we shrug. We know that's  
21 not likely.

22           MS. FELLOWS: That's something to talk to --  
23 we've actually called the City of South Pasadena and  
24 City of La Canada, Pasadena, and San Marino. South  
25 Pasadena isn't --

1 MS. FELLOWS: Initially we had been told we  
2 actually got the water from you, and I guess that's not  
3 true.

4 MR. TAKARA: But it's not our water. They're  
5 going directly through an (inaudible). It's not our  
6 water that's going into their ground water.

7 MS. FELLOWS: But they have their own wells,  
8 too; right?

9 MR. BOMAN: Yeah.

10 MS. FELLOWS: It doesn't matter.

11 MR. BOMAN: No. They have their own ground  
12 water.

13 Steve or Mary, can you add any information?  
14 They are saying that the reason for their losses is tied  
15 to the contamination as well as lower water levels --  
16 yeah, lower water levels -- in the ground reservoir.

17 MS. FELLOWS: He said it was confidential. So  
18 I don't know anymore.

19 MR. SLATEN: So she can talk about it in the  
20 paper, but it's a secret.

21 MS. FELLOWS: And they have said that they've  
22 contacted us, but they haven't. So we'll -- I mean it's  
23 not really an issue right now, rate hikes of the PUC,  
24 not us.

25 MR. O'KEEFE: Neither I nor Heather know much

1 detail about this system because unfortunately it's  
2 under the jurisdiction of our other supervisor.

3 MR. BOMAN: And actually they're getting most  
4 of their additional water -- a lot of their additional  
5 water -- from us through an interconnection. And then  
6 we're having to pass on the Metropolitan Water District  
7 charges onto them. So that's where a lot of that water  
8 is coming from.

9 MS. FELLOWS: I think -- I mean that's partly  
10 what they're saying here. They get (inaudible) because  
11 you have reservoir water available because wells are  
12 closed. That's probably accurate. But the suggestion  
13 that the San Marino wells are closed because of JPL  
14 chemicals is the worry --

15 MR. FIELDS: What is their water rights in the  
16 Raymond Basin?

17 MR. BOMAN: Do you know what their water rights  
18 in the Raymond Basin are?

19 We can get that for you.

20 MS. FELLOWS: Is there one there?

21 MS. THOMAS: I'll get it.

22 MR. SLATEN: So does that do it for the public  
23 involvement part?

24 MS. FELLOWS: Unless anybody has any questions.

25 MR. SLATEN: We go to OU-1 next; right?

1           MR. FIELDS: We're just going to say a little  
2 bit about OU-2.

3           MR. SLATEN: So we don't have any slides for  
4 that?

5           MR. FIELDS: We have slides, but it's sort --  
6 we're going to put it off to the end if we have time.

7           MR. SLATEN: We've got some ta-da about it.

8           Since we've got so much stuff on the agenda,  
9 why don't we save it until after we've heard about  
10 Castaic Lake and talk about OU-3, and then we'll go into  
11 OU-2 at the end of the agenda. If we keep moving, we'll  
12 get to see it all; otherwise -- well, let's --

13          MR. RIPPERDA: OU-1 -- Mohammed sent a letter.  
14 And, you know, a huge part of any OU-1 discussion is  
15 going to be talking to the regional board. I talked to  
16 him last weekend, and I think he's just going to be late  
17 again. So maybe just give him another ten minutes  
18 before we talk about -- follow your original --

19          MS. FELLOWS: Does anybody have his phone  
20 number because I'll go outside and call him?

21          MR. FIELDS: Are you suggesting to hit on OU-2  
22 a little bit, Mark?

23          MR. RIPPERDA: I would just say stick to your  
24 original schedule.

25          MR. SORSHER: We should be done by 3:00

1 o'clock, don't you think?

2 MR. O'KEEFE: Yeah. We'll be leaving if you're  
3 not done by 3:00 o'clock.

4 MR. SLATEN: We have more to talk about.

5 MR. RIPPERDA: Let's plow on with OU2.

6 MR. SLATEN: We'll talk a little bit about  
7 progress.

8 Next slide.

9 Okay. This slide shows all the dots are soil  
10 gas monitoring locations. So there's a good spread of  
11 those. And the four gas extraction wells inside the  
12 centers of the circles -- and I guess the circle is  
13 supposed to be their approximate radius of influence of  
14 the extraction.

15 Is that enough on that one, Keith?

16 MR. FIELDS: Maybe just to clarify that, what  
17 has been done so far starting in 1998, they were  
18 extracting from VEO-1 under a pilot test scenario. In  
19 2002, they installed VEO-3, 4, and 2, and they've  
20 operated for six months; at VEO 3, six months and  
21 currently making a transition to moving over to VEO-2  
22 (inaudible) about 500 CFM. And this system is designed  
23 to address VOCs.

24 MR. BURIL: What were the gray areas?

25 MR. FIELDS: We used water board water. Sort

1 of an indication of concentrations that may need to be  
2 addressed. And the gray there was two chemicals that  
3 exceeded the VSTs in certain wells, carbon  
4 tetrachloride. And this was after the significant VEO-1  
5 under your jurisdiction.

6           And so what that is is sort of a combined map  
7 of exceedances of the (inaudible) that still need to be  
8 addressed.

9           Here's a little bit of an additional  
10 description of connections access to August 2003. There  
11 are still two chemicals that exceed the vapor screening  
12 levels of carbon tetrachloride, and there is six points  
13 within -- or six monitoring well locations -- that would  
14 have an exceedance of a VSL. And those are -- as you  
15 can see, these levels are very low. Those are about the  
16 levels that we were seeing two years ago. The levels of  
17 TES are still quite low.

18           And just to give you a sense, the vapor  
19 screening levels is kind of a rough guide as to the  
20 concentrations we want to deal with. And, also, to  
21 understand, VSLs are calculated to leaching to ground  
22 water. There's chemical properties in there. There's  
23 soil properties, and then there's the depth or the  
24 distance between the water table and where the chemical  
25 can be observed within a monitoring point. And so VSLs

1 vary with depth at this site.

2 Next to --

3 MR. RIPPERDA: And these are (inaudible).

4 MR. FIELDS: Yes, micrograms. And in the rod we  
5 said that we would be modeling a safe level and would  
6 not only be leaching to ground water, but we'd also  
7 consider mixes and travel time and things. So this is a  
8 very conservative screening paper.

9 MR. RIPPERDA: What do the points mean again?

10 MR. FIELDS: I'm sorry, Mark. That's a good  
11 point.

12 Each monitoring point location has multilevels  
13 of soil, gas, and monitoring points. So what I put here  
14 was the maximum detected concentration that was depicted  
15 in excess of a VSL in those monitoring points. And then  
16 to indicate that there was actually two points that  
17 exceeded --

18 MR. RIPPERDA: So monitoring any well, multiple  
19 horizons.

20 MR. FIELDS: That's maybe five to ten points  
21 per well -- is that about right? -- depending on the  
22 depth.

23 MR. RIPPERDA: Is there any correlation in the  
24 depth, two points to the deepest or the shallowest or  
25 anything like that?

1           MR. FIELDS: There's really no correlation.  
2 They vary based on location within the facility and the  
3 compound. So TCE may have been with higher  
4 concentrations that weren't necessarily exactly  
5 coordinated with the carbon tetrachloride.

6           MR. BURIL: Does it correlate where geology  
7 (inaudible) proximity to ground water?

8           MR. FIELDS: There have been some that are  
9 fairly close to ground water. When you're fairly close  
10 to ground water, the VSL is quite low.

11           We have some 3-D maps I didn't focus on, but we  
12 can look at those.

13           This is to give you a sense of what has been  
14 accomplished with VOC mass removal. This first phase  
15 between April '98 and June of '02 is just vapor  
16 extraction. OU-1, that was the one that was installed  
17 and pilot tested, and you can see it removed 283 pounds.  
18 And then there's been a 26-month test with VEO-3 and  
19 VEO-4, as described in the Record of Decision, and each  
20 of those, as you can see, are recovering significantly  
21 less which -- or much lower mass removal rate. I think  
22 those are in the 10-to-12 pound VOCs removed over the  
23 duration of six months.

24           I think what this also shows is that we talked  
25 a lot from reaching asymptotic conditions in the ROD, and

1 we definitely have kind of removed the bulk of the mass.  
2 That was definitely removal all during the 2003 time  
3 frame. So we're below our mass recovery.

4 MR. RIPPERDA: Asymptotic, yet --

5 MR. FIELDS: Or you might want to look at it as  
6 sort of mass removal rate, asymptotic meaning you're kind  
7 of at a constant, you know, X pounds per month and we  
8 can -- I think we need to reevaluate this further with  
9 the cost effectiveness we talked about in the rod. Cost  
10 effectiveness of this remedy versus dealing with these  
11 constituents once they're in the ground water. So that  
12 cost analysis will be part of the evaluation as to  
13 whether continued operation is cost effective given  
14 everything else that we're doing at the site.

15 We redid our mass estimates based on 3-D  
16 modeling of the vapor plume and based on (inaudible).  
17 And you can see from June '01, which we presented back  
18 in the rod, to August '03 for both carbon tetrachloride  
19 and TCE, they were roughly about the same. Of course,  
20 our estimate of mass is not accurate within two pounds.  
21 So I mean the point would be we're basically at about  
22 the same mass estimates between July '01 and August  
23 2003.

24 MR. RIPPERDA: How does this work when you're  
25 getting whatever, 10 to 20 pounds, and you estimate that

1 there's a total of 35 pounds in place?

2 MR. FIELDS: You have to look at this -- of  
3 course, you know that you can't get a perfect estimate  
4 of the mass in place. And we have to look at this --  
5 and just using two sets of data to look at -- how much  
6 mass we've removed versus an estimate of how much mass  
7 is remaining but realizing that those aren't -- you  
8 know, we can't just say with a high degree of accuracy  
9 there is exactly 11 pounds. But based on the data that  
10 we tested and a mass estimate that was done, it gives us  
11 a sense of where we are within the mass removal at the  
12 site.

13 MR. RIPPERDA: I would like (inaudible) mass  
14 calculations are totally screwed up. If you're getting  
15 10 to 15 pounds every six months, and that seems to be a  
16 constant rate, it means there must be just guessing  
17 more, like, you know, 100, 200 pounds in place as  
18 opposed, you know, to 11.1 or, you know, 30, 35. And  
19 you add the two together --

20 MR. FIELDS: And realize that this site is, you  
21 know, let's say a 100 acres. We have 40 monitoring  
22 points with some areas that are plugged. It, I would  
23 say, gives us an estimate of kind of two different data  
24 points where we are at. And we want to look at that in  
25 combination with your mass removal in concentrations

1 observed in the monitoring points and combine all that  
2 data to give us the best decision-making ability  
3 possible. This is what we estimate with the data that's  
4 available over a very large site.

5 MR. ZAIDI: These locations, are they located  
6 within the hot spots of the USC plume?

7 MR. FIELDS: We tried to locate the vapor  
8 extraction areas within areas that would be within  
9 mass -- within concentrations that exceeded VSLs.

10 You missed the first slide, but it was this.  
11 You reviewed this report, but, you know, these wells  
12 were placed in (inaudible) to try to best intercept  
13 concentrations that exceeded vapor screening.

14 MR. RIPPERDA: All the green dots in the  
15 monitoring points in the --

16 MR. SLATEN: Did you want to have Mohammed give  
17 his name?

18 MR. ZAIDI: Mohammed Zaidi, Z-a-i-d-i, last  
19 name.

20 MR. FIELDS: And there's a gentlemen that  
21 joined us, I believe, from Los Flores.

22 MR. LOPEZ: John Lopez, Los Flores.

23 MR. COLLINS: Hector Collins from DHS.

24 MR. FIELDS: The calculations that I have seen  
25 have about between --

1 MR. ZAIDI: Based on some pilot test; right?

2 MR. FIELDS: Not only are you collecting

3 chemical concentration data from the vapor monitoring

4 points, you're creating and you use those data to

5 estimate.

6 MR. ZAIDI: So the farthest what you consider

7 as the radius from the pumping well during the pilot

8 test was 10 or 15; right?

9 MR. FIELDS: Right. You cut off at a certain

10 vacuum level, let's say.

11 MR. ZAIDI: What is your cutoff?

12 MR. FIELDS: Battelle is not operating the

13 system; so I don't know that data. Whatever the

14 approved approach for determining radius of influence

15 is, part of the previous testing.

16 MR. ZAIDI: These dark edges are the hot spots.

17 These are the plumes; right?

18 MR. FIELDS: Right. And I think, you know,

19 there are areas that exceed vapor screening levels but

20 realize that the levels that we have in gas are fairly

21 low to start with. So there's not a hot spot in the

22 true sense of how the term is usually used. There's

23 just some areas that vapor screen --

24 MR. SORSHER: I think -- to keep reminding

25 myself -- and I think we all need to keep in mind

1 because there's been so much construction, buildings,  
2 foundations, utility lines, trenches all over the place,  
3 that, you know, that's going to affect, number one, the  
4 way the contaminants moved originally and how your  
5 vacuum is going to move through these various soils.

6 Are most of the extraction zones and your  
7 monitoring zones, are they below the level things were  
8 disturbed?

9 MR. FIELDS: Yeah. These start at 30 or 50  
10 feet below ground surface. So you're out of the area  
11 that would be disturbed by these activities. But I  
12 think your point of there's a lot of buildings, a lot of  
13 things, putting wells in is a very expensive endeavor.  
14 So, you know, we have the monitoring points and wells  
15 that we -- we are put in a position that not only made  
16 sense technically, but also had to work within the  
17 facility boundaries.

18 MR. SORSHER: It certainly complicates things.

19 MR. FIELDS: You know, again we're looking at  
20 all that data together to try to determine what kind of  
21 success that we're having with these systems.

22 MR. SORSHER: Is there any monitoring of the  
23 real shallow area? Has that been done during the  
24 screening portion of this?

25 MR. RIPPERDA: Yeah. They're with soil vapor

1 probes all over the land to check those.

2 MR. BURIL: To a depth of up to 20 some feet.

3 And typically those showed nothing.

4 MR. SORSHER: Way back there was actually soil  
5 excavations of hot spots.

6 MR. BURIL: There was only 12 locations, one at  
7 a storm drain.

8 MR. SLATEN: Generally the model here is the  
9 sea birch dug up to 30 feet deep. Put in a lot of water  
10 and a little bit of solvents and tried to flush stuff  
11 down. They went pretty much straight down.

12 MR. SORSHER: So they worked down. You can  
13 imagine out in that alluvium sewer and water and wash  
14 water and everything went into the seepage pits, and  
15 they were glad to see it go away.

16 MR. RIPPERDA: I guess I'd like to see the  
17 actual operator of this system. It's fine for, you  
18 know, a monitoring report of a remedial action report  
19 that after the new system -- well, after the system gets  
20 moved to its fourth location and it's operated for a  
21 month or so, it can monitor drawdowns in the surrounding  
22 monitoring. If they can give the date you're showing  
23 and give an overall report of the drawdown's influence,  
24 mass reductions in monitoring points, we can talk about  
25 what needs to go into that report. But today I'd rather

1 move on -- I think this is fine; this is good about as  
2 much as you know. So it's time for the actual operator  
3 to write a report.

4 Let's move onto OU-1 now unless you have a real  
5 nugget to give us.

6 MR. FIELDS: And I just didn't think of it when  
7 you said it before -- when you made reference to the VOC  
8 mass removed because it indicated that we're not getting  
9 a good rating.

10 I realize that VOC mass removed is a total VOC  
11 concentration which includes other things like the Freon

12 and other constituents. And here carbon and carbon  
13 tetrachloride was primarily located in that VEO-1. And  
14 since they've moved to the other vapor wells, that is an  
15 explanation that we're just looking at two volatiles  
16 versus all the volatiles as we were thinking and should  
17 have made that clear. Sorry.

18 MR. SORSHER: These are on the web.

19 MR. FIELDS: We have added through August '03  
20 soil vapor monitoring points or vapor monitoring reports  
21 to the website very recently within the past month.

22 MR. ZAIDI: One little comment on putting it  
23 together, the report and the progress report for the  
24 SVE, if you made a graph from start -- from the start --  
25 and then how did it come down and how did it get to the

1 same sympathetic level? I think that would be for each  
2 one.

3 MR. FIELDS: For each monitoring point?

4 MR. ZAIDI: For each one.

5 MR. FIELDS: That would have to be other than  
6 the operational report that is asked in the soil  
7 monitoring where they would be tracking concentration  
8 with time.

9 Yeah. We can check to see if that's in there.  
10 And if it's not, we can make that report.

11 MR. ZAIDI: That belongs -- if you left it  
12 alone, and you had a rebound period, what was the  
13 rebound? How much of that got up before you restarted  
14 the system? So that we know the D1 would be a good  
15 indication of what is the residual concentration here of  
16 the USC.

17 MR. FIELDS: Agreed. Okay.

18 MR. SLATEN: All right. OU-1 study.

19 MR. RIPPERDA: I have a quick question. You  
20 know, with the noise of this and with a lot of us  
21 facing --

22 MR. FIELDS: Can everybody hear? Everybody is  
23 talking Okay.

24 MR. SLATEN: We got this actual field work  
25 going on on OU-1. What's the first slide?

1           MR. FIELDS: Kind of a reminder where we're  
2 dealing with within --

3           MR. SLATEN: We gave something like this  
4 actually to the press last week, but a little simpler  
5 than this, a little less stuff on it. I didn't see them  
6 using it, but tried to do a real simple thing for them.  
7 We took out some of the -- of the arrows and so forth.  
8 This is a real simple monitor of the OU-1.

9           MR. FIELDS: There was a question at the last  
10 meeting of whether we would be going through that fault.  
11 I thought it was useful here to see what I was trying to  
12 explain at the last meeting, that the fault traces  
13 typically this edge point, what we see on a map. But  
14 this fault heads back --

15           MR. SLATEN: We went through, got into the  
16 granite, drilled through that and then fell out the  
17 bottom -- came out of the bottom of the granite. So,  
18 yeah. It was kind of an interesting little geology  
19 lesson.

20           This gives you the -- the right block is the  
21 one that we're working on now, which is the first phase  
22 of it. We've drilled that top-right well by -- above  
23 MW-7. Drilled that and then knocked down. And on the  
24 bottom-right blue one, we've drilled one well there.  
25 That's actually the location of two extraction wells

1 that are at different vertical levels. Then the left  
2 block is the second phase of it, which will happen next  
3 year.

4 Just a simple cartoon of the layout of the  
5 system. It's going to fit into an area 126 feet by  
6 160 feet, and that's some of it. Without going into the  
7 details, that's some of the bigger parts on it.

8 MR. FIELDS: A couple of the items are  
9 highlighted just to indicate there is a couple new  
10 design elements that have been added, the clarifier, the  
11 backwash garage and the primary ones.

12 MR. SLATEN: Most of that was to minimize the  
13 amount of waste water -- to press out more water, to  
14 return more water and not waste as much. And that's the  
15 backwash system, a cartoon of it really.

16 What this was about was to try to reduce the  
17 discharge, try to reduce what we were reinjecting back  
18 in the Raymond Basin. Pretty pictures of the first well  
19 we were drilling. It was just this last week.

20 MR. FIELDS: Yeah, a pause. It's raining.

21 MR. SLATEN: The drilling went well. I think  
22 everything went really smoothly. I think it's a  
23 professional crew, good equipment and good people.

24 MR. SORSHER: Who is the driller?

25 MR. FIELDS: Water Development Corp.

1           MR. SORSHER: Are they using that percussion  
2 method?

3           MR. SLATEN: Mud rotor. And the deer keep  
4 grazing right on the hills when the drills are chugging  
5 away. It's kind of loud, but the deer don't mind.

6           MR. RIPPERDA: How much do these cost? Do you  
7 know?

8           MR. FIELDS: The drilling costs within the  
9 four -- the four well locations were in the 400,000  
10 range.

11          MR. RIPPERDA: So 100,000 each for drilling or  
12 400,000 each for drilling?

13          MR. FIELDS: 100,000 each for drilling. In  
14 real life they're only going down about 300 feet each.

15          MR. RIPPERDA: You can do this with mud rotary  
16 because it's going to be production and extraction for  
17 monitoring points.

18          Can you use this same method -- would you have  
19 to use the same sonic?

20          MR. FIELDS: Sonic would be preferable. The  
21 reason we needed this for the flow ratewise, we're going  
22 to pump and we couldn't using sonic drilling. Sonic may  
23 even have been preferable. If it could have given us a  
24 large enough four-hole diameter, sonic would be used.  
25 It can be used for monitoring point locations. You also

1 get a much better geologic rendering of what the  
2 surface --

3 MR. ZAIDI: Formations (inaudible). So  
4 pressure cake.

5 MR. SLATEN: Yes.

6 MR. ZAIDI: Then how would (inaudible).

7 MR. SLATEN: Normal well development, flushing.

8 MR. ZAIDI: Be able to remove it? So that  
9 would affect a lot.

10 MR. SLATEN: Developing later this week the  
11 first two wells -- or today, I guess, that maybe they  
12 will start.

13 So, yeah. They've got a drilling with mud.  
14 You've got to clean that up afterwards.

15 MR. ZAIDI: The oil industry, they have to do a  
16 lot of (inaudible) make sure that each is optimum.

17 MR. SLATEN: Got to get that mud back out of  
18 the way. So, yeah, flushing.

19 Next picture.

20 This one is looking down from kind of up to  
21 where the rig was, the location of that tank was. A lot  
22 of old equipment around. But that's the location of  
23 where the first actual plant is going to be that we  
24 showed you the layout before, you know. 161 feet by 26  
25 feet. That's that. It's going to be sitting there

1 where that -- to help define for people where it's going  
2 to be and where they can't park and get them used to  
3 seeing something there.

4           Next. We are still working on the sanitary  
5 sewage discharge, part of the reinjection. We're still  
6 working with Raymond Basin. I did get back a letter  
7 from them, like, last week asking for a little bit more  
8 and then air discharge. I still have an exemption  
9 request letter that I've got to send to them.

10           MR. ZAIDI: Letter? You got a letter?

11           MR. SLATEN: Yeah. Yeah. Yesterday or the day  
12 before. I haven't had a chance to really get into it.

13           MR. ZAIDI: Filling these wells, and I think we  
14 have suggested a few things that (inaudible). I've done  
15 the tube and a sounding tube because these pretty large  
16 diameter (inaudible).

17           What's the diameter?

18           MR. SLATEN: We're drilling at 12 right now.

19           MR. FIELDS: Yes, but the well itself will be  
20 six.

21           MR. ZAIDI: Because that will help. These  
22 wells, they will be working for a long time. So -- and  
23 you also suggested that the similar part of the cases  
24 previously in your plan, but designed to be of PVC, I  
25 think. But we suggested that --

1 MR. SLATEN: These wells are steel.

2 MR. ZAIDI: Stainless steel?

3 MR. SLATEN: Stainless steel screen and steel  
4 casing.

5 MR. FIELDS: That were refined as we were  
6 moving forward in some of the design details such as  
7 that.

8 MR. SLATEN: I'll get your comments and get a  
9 copy and make him read them on the airplane.

10 MR. ZAIDI: I will as well. So those things  
11 are also complied with.

12 MR. FIELDS: I realize that we've drilled over  
13 half the wells. And so a design change of a sounding  
14 tube is something we can definitely incorporate on Phase  
15 2. But I mean they're drilling and have completed wells  
16 already for Phase 1.

17 MR. ZAIDI: The thing is that when you are  
18 submitting a work plan, that means that you don't start  
19 the work before its approval. If you already built a  
20 well, and in four months after drilling a well  
21 (inaudible) still not, then it means you will not be  
22 able to incorporate all the requirements. And these  
23 wells are big wells. These will be dealing with  
24 hundreds of thousands of gallons. When you are  
25 measuring an injection well, you will not be able to

1 cause injecting a lot of water. At the same time you  
2 want to also keep track of what the mounting is doing  
3 there and for keeping track of how much ground level.

4 Now, during injection you have to have some  
5 place where you can put your sounding tube and get a  
6 non-turbulent level (inaudible). And if you don't  
7 include that -- that sounding tube -- then you will  
8 never get that data which is very important.

9 And there are other things, also, like pressure  
10 gauge, (inaudible). So, you know, the volume, how much  
11 is going. So these are very important.

12 MR. FIELDS: All those items that are requested  
13 (inaudible) the cone of depression, monitoring flows and  
14 pressures, all that data will be collected, and it's  
15 part of it. The question of whether a sounding tube has  
16 to be installed in order to get the water level data is  
17 something we need to -- you know, based on our design --  
18 initial design and discussions -- we did not feel we  
19 needed one.

20 MR. ZAIDI: You should have told us (inaudible)  
21 that we are not including, and you never tell us. I  
22 think that needs to be told because when the agencies  
23 requires something that (inaudible) and that has to be  
24 complied with. If you are disagreement with that, yes,  
25 discuss with us. If you convince us, we'll take it out

1 or modify it upon agreement. But just agreeing whatever  
2 you think is correct and without informing us, that's  
3 not very good.

4 MR. SLATEN: When did this work plan go out for  
5 comment?

6 MR. FIELDS: The first version went out in  
7 April '03.

8 MR. SLATEN: When did we feel like we had  
9 approval to proceed or whatever?

10 When did we feel like -- I kind of inherited  
11 most of this.

12 MR. ZAIDI: We never approved it.

13 MR. RIPPERDA: There's problems on all sides  
14 here -- me, you, NASA. You know, we've been beating  
15 NASA up, but the most important thing is to, you know,  
16 treat the problem. And we've all been pushing NASA for  
17 two years now. "You have to get out in the field. You  
18 have to do something about it."

19 They issued a work plan almost a year ago.  
20 And, according to the rules that regulate us and NASA is  
21 supposed to play by, we have 30 or 60 days to comment on  
22 it. At the end of that period, if they don't have any  
23 comments from us, they can just go final with it.

24 So NASA has waited, like, seven or eight  
25 months, and they're going forward. And so your comments

1 are important. But, in the meantime, they had to be  
2 getting work done.

3           So I guess I would, you know, say NASA's job is  
4 go out there and treat the problem.

5           And now that you've submitted comments -- I  
6 think your comments are good -- wells haven't yet been  
7 installed. They should sit down with you and discuss  
8 their technical reasons why they think they can get  
9 mounting levels and quality water level measurements  
10 without them, and you can see whether you believe it or  
11 not. But certainly for the wells that are already in, I  
12 would say those wells are in, and I want to see  
13 treatment start.

14           MR. ZAIDI: I'd (inaudible) but they submitted  
15 expanded study work plan in which there were a few  
16 (inaudible) like (inaudible). But then we had meeting  
17 with David, and he said (inaudible) adequate  
18 requirement. And we had given a comment on that  
19 previously. Then we had this work plan again. Again,  
20 quite a few things which already addressed in the  
21 previous comment, but they were not complied with and  
22 again being (inaudible).

23           So I think we got it. We addressed it. It was  
24 this should be discussed, and nobody else has so far  
25 addressed (inaudible). People are still giving comments

1 on EE/CA. So I thought that expandability work plan was  
2 the most important part because they can go ahead and  
3 install the valves and designing the system right now  
4 (inaudible).

5 So that's why we gave these. And this was  
6 delayed because of the meeting and the change of the  
7 plans, also.

8 Previously there was no plan for reinjecting  
9 (inaudible). There was only one in the core of the  
10 plume. So, yes, there has been delays, but there has  
11 already been reasons for those delays and not  
12 (inaudible).

13 MR. RIPPERDA: We've all done things wrong  
14 here. So not meaning to beat up the original board, but  
15 you're looking at what our objective is: To clean up  
16 the hot spot in the aquifer. And obviously they have to  
17 pump where they're pumping. The places they're  
18 injecting are close to the best possible places that  
19 they can physically get.

20 So there's -- I don't have a problem with where  
21 they're pumping or where they're injecting the things.  
22 What we want to make sure what doesn't happen is the  
23 plume gets spread or somehow adversely impacted by this  
24 operation. And I feel like the -- you know, if you put  
25 a well map up -- which you may or may not have -- but

1 there's plenty of (inaudible) monitoring wells, which I  
2 kind of wanted to talk about with you and Steve and  
3 Keith. And it sounds like Keith hasn't yet seen your  
4 letter, and Steve hasn't had time to digest it.

5           Later maybe we can have a conference call in a  
6 week or so. But the actual construction of the wells,  
7 you know, sounding tubes, you know, those are nice. But  
8 if the purpose is to see whether the plume is being  
9 adversely impacted, you know, there's monitoring wells  
10 in the vicinity that give you some of that information,  
11 and you can turn -- if the water is too turbulent, there  
12 are designs (inaudible) you can turn the wells off for a  
13 day, take your measurements.

14           So there's certainly ways to work around all of  
15 that to get to what we really want to clean up, which is  
16 the aquifer, and make sure we're not adversely impacting  
17 it.

18           MR. ZAIDI: (Inaudible). But on the future  
19 wells, which have not been tried yet, this would be, I  
20 think, a greater idea because, you're right. If there  
21 are enough monitoring wells around, then, yeah, we can  
22 get some idea when we're injecting around that.

23           Nearest monitoring well, say, 300 or 500 feet  
24 there, we will not have an idea of how much mounting is  
25 here and where it's going. But if you have an idea how

1 much did it mount here and how much is this here, but  
2 here, that much, we'll not have good idea. We cannot  
3 protect it. That's why the mounting -- the measurement  
4 of the monitor by length flows to the injection well.  
5 That's why it was, I think (inaudible).

6 MR. RIPPERDA: I read your comments, and I  
7 thought, yeah, these are good technical comments, and  
8 I'd like to see how Keith's well design -- people plan  
9 to do it without that. Maybe they actually know what  
10 they're doing, and their design is going to be fine.  
11 And maybe we (inaudible) absolutely in the wells that  
12 you haven't completed yet required the sounding tubes  
13 and the other couple things you mentioned. But for  
14 those that are already done, I certainly think that the  
15 information that we need to get on how the water is  
16 moving, we can get. You know, this 90 gallons a minute  
17 out of that first production well and, you know,  
18 injecting 45 gallons a minute into the two split  
19 injection wells.

20 Whatever mounting there is it's going to be so  
21 localized. It's not going to affect (inaudible) outside  
22 of that immediate area. It's not going to drive the  
23 plume somewhere where it's not already.

24 I do think it's important in the future NASA  
25 closely tracks when documents go out. I share some of

1 the blame because, you know, with changing RPM, Davidson  
2 sent work plans. We changed our mind. We haven't  
3 really tracked a release date, a comment due date,  
4 response to comment date. That's something Steve and I  
5 have talked about ad nauseam.

6 MR. ZAIDI: Also, very important when we're  
7 injecting, we should know how much we're injecting.

8 MR. FIELDS: Yeah.

9 MR. ZAIDI: Because getting that injects  
10 sending the water down, down so that you are -- if  
11 there's a graph of how much you are putting in at what  
12 time, what days, you construct a history of that, also.

13 MR. FIELDS: And it's very important to the  
14 Raymond Basin Management Board that we know how much  
15 we're at exactly. There are pressure sensors that are  
16 going to be -- if there's a high water, you know, backup  
17 excessive amount (inaudible) well, automatic sensors  
18 that will shut the system off until we get that fixed.  
19 There's a significant level of process control within.

20 Once we see your comments, we'll be glad to  
21 respond to whatever level detail that you would like to  
22 see with regard to those, but I think in general, from  
23 what I've heard with the exception of a sounding tube,  
24 we already have it. Those items are definitely included  
25 in the sounding tube. We'll just have to look into it.

1 Quite possibly that's a better design.

2           Also, pressure -- a pressure sensor  
3 appropriately placed within the well and situated -- you  
4 know, tied into our POC and systems controls will be  
5 adequate as well. We just want -- we want to see your  
6 comments and then respond to them individually.

7           MR. RIPPERDA: Certainly your point that NASA,  
8 EPA, nobody can just blankly go forward with what NASA  
9 thinks is best.

10           MR. ZAIDI: Why are you (inaudible) giving it  
11 for your benefit? We want to control something. If you  
12 are free to do all by yourself, then (inaudible).

13           MR. FIELDS: I won't make anymore comments. I  
14 think since January it was made very clear we planned to  
15 start operations or start drilling in February. That  
16 was a clear message in the public meetings. We have  
17 other stakeholders that have been set up that we are  
18 going to start in February.

19           MR. SLATEN: We would have started a lot  
20 earlier. Actually we held off for the public meetings,  
21 things like that.

22           MR. FIELDS: So I mean with -- we just have to  
23 take into consideration all the issues that we're doing  
24 in the length of time of reviews. And we'll do our best  
25 to respond to your comments.

1           MR. SLATEN: I'll get a system in place to put  
2 a little more transparency to what the turn-around dates  
3 are and when we have to have comments back and when  
4 we're going to move forward, things like that.

5           MR. RIPPERDA: Can we have a conference call in  
6 a week with DTSC Regional Board, you guys, to talk about  
7 your response to Mohammed's comments and, also, talk  
8 about a tracking system and a schedule for upcoming  
9 documents?

10          MR. SLATEN: I think it will be important for  
11 OU-3, that we do have the schedule and everybody knows  
12 what it is. And then we try to contact someone and keep  
13 OU-3 moving forward.

14           Did we get through all of your slides?

15          MR. FIELDS: I'm pretty sure. We're still  
16 coordinating.

17           We had a good design meeting yesterday with  
18 Caltech facilities, and obviously there is a lot of  
19 coordination that has to happen on that. And critical  
20 operations are happening at the facility, all the  
21 utilities. So we're moving forward with that.

22           And then this was a slightly revised schedule  
23 you'll --

24          MR. SLATEN: I'm trying to find it, but this  
25 summer we'll be turning on the pumps.

1 I think on the agenda we had OU-3. Next  
2 there's some of the stuff we're going to talk about  
3 affected by the FBR and the Castaic Lake discussion.

4 So I would recommend that we go ahead and run  
5 through the Castaic Lake presentation now and then talk  
6 about OU-3 while we're eating our lunch or something.  
7 Part of what we're thinking about with OU-3 now has to  
8 do with acceptability of the FBR. People here know  
9 whether it really works or not.

10 So I'm going to turn it over. Okay.

11 MR. GUARINI: Bill Guarini, G-u-a-r-i-n-i, and  
12 I'm with Shaw Environmental.

13 And my phone number is wrong. It should be  
14 433-7183. I didn't check it.

15 MR. SLATEN: What about lunch?

16 MR. FIELDS: We were going to pick up  
17 sandwiches at noon if that's okay. That's why we had  
18 Subway --

19 MR. SLATEN: Sorry to interrupt.

20 So everybody gets to hold their hunger until  
21 noon.

22 MR. GUARINI: First of all, I'd like to thank  
23 you for the opportunity to stand up here and explain to  
24 you what happened at Castaic Lake. It's not often I get  
25 a chance to stand in front of a group in public and

1 admit where I've done something personally and my  
2 company has done something that probably shouldn't have  
3 been done. Certainly, there are some things that we  
4 would have done differently if we could go back in time  
5 but, nevertheless, I will tell you the story.

6 MR. FIELDS: Go to the next one.

7 MR. GUARINI: What I decided to do -- I really  
8 get upset when people make excuses for what they do.  
9 That's not right, and it's never been something that I  
10 felt comfortable doing. However, to answer your  
11 questions and get into discussion on what happened at  
12 Castaic Lake, I'm going to have to point out some things  
13 that went wrong. Most of them were things that we could  
14 have changed, although some of them were Murphy hanging  
15 around the pilot program. But I thought the best way to  
16 help you understand why we made some of those business  
17 decisions -- whether you agree with them or not -- and,  
18 also, the best way for you to understand the FBR  
19 technology would be to go back to where the technology  
20 is and how it fits in relation to the Castaic Lake  
21 project.

22 So what I'm going to talk about today is the  
23 full-scale system. Some of you have seen the system up  
24 at Aerojet, and we have a couple others running.

25 I'm going to talk to Gary Takara and

1 Dave Amidei to get the conditional approval. We'll talk  
2 about the Castaic Lake project with Sam Frisch who is  
3 the process engineer in our Lawrenceville group who  
4 designed many of these systems. He also happened back  
5 in 1992 to have designed and had constructed the pilot  
6 unit that we used at Castaic Lake. And that's a long  
7 story that I'll tell you about.

8           And today, Webster -- who is not here yet --  
9 he's in our San Diego office. He's a Ph.D.  
10 environmental engineer from USC that actually was  
11 involved on a more regular basis with Castaic Lake,  
12 although clearly not as involved with that program as we  
13 typically are with our pilot programs.

14           Then what I'd like to do is remind you that we  
15 tested the FBR technology using more appropriate for the  
16 (inaudible) reactor peak of the valve that's today --  
17 Webster is walking in here now.

18           But, anyway, I'd like to remind you that we did  
19 a pilot test using JPL over (inaudible), and you'll see  
20 the results of that testing.

21           And then I'd like to open up for comments. So  
22 if you have any questions, please feel free at any time  
23 during this to ask questions, otherwise I start to get a  
24 little wet under the collar.

25           These are pictures of three full-scale items,

1 and I'll go through each one of them. It's a very, very  
2 minor detail I'm not going to spend a lot of time on. I  
3 think a lot of you have heard this presentation before.  
4 Some of you know a lot about this, even more than I do.  
5 I thought it would be a good idea to give you an  
6 overview on it.

7           Out at Aerojet they have continuous flow JAB.  
8 Right now they feed on an automated process flow  
9 controls that allow you to know when they need more  
10 electronic donor when the concentration has changed, and  
11 all this is done without a resident operator. So when  
12 Brad and Gary and David Amidei and I and Sam went out to  
13 visit the unit, we actually had to make arrangements to  
14 get in the control room and wipe a few cob webs off of  
15 the control panel.

16           These things run themselves in the full-scale  
17 system that you don't see in the pilot system for a lot  
18 of reasons, but a pilot unit takes a lot more attention  
19 than a full-scale unit. They also wanted to test -- I  
20 mean acknowledge as a substrate at Aerojet -- which is  
21 the electron donor. The ground water is such they don't  
22 have to add any neutrons. So we have no (inaudible) to  
23 the Aerojet system. And because there is a small  
24 recycle, they do have some flexibility to air flows.

25           If you read Dr. Zaidi's letter, this technology

1 is appropriate. If you're going to be somewhat content  
2 to the resector (inaudible) at least some sort of  
3 re-calculation in the front in the seal so that the  
4 nitrate concentrations fluctuated significantly during  
5 the course of the operations. And I'll get into that in  
6 more detail.

7           Next slide, please.

8           As I mentioned, there were four 14 diameter  
9 fluid bed units each of which has fluidization  
10 (inaudible) fluidize the bed or expand the bed. That  
11 rate stays the same. What changes is the amount of  
12 recycle and the amount of net feed to the reactor.  
13 Right now those reactors have been tested. Each one of  
14 them can treat 1500 gallons a minute of forward flow  
15 from the ground. They are currently feeding about 1325  
16 gallons per minute. So they're treating over 7 million  
17 gallons a day with ground water anywhere from low levels  
18 of perchlorate -- I think we've reached each thousand parts  
19 per billion. The original design of these units, by the  
20 way, was 900 gallons per minute for reach reactor. So  
21 the units are operating well above the design  
22 capacities. It's --

23           MR. ZAIDI: Can you go back to the slide? I  
24 didn't catch the fluid indication rate. It's the rate  
25 that injecting at the bottom?

1           MR. GUARINI: Right. What's happening is you  
2 have a line rights, and that's circulating 1850 to 2000  
3 gallons a minute. But that 1850 comprise 1500 of water  
4 from the ground and 350 gallons per minute of recycle  
5 from the top of the reactor.

6           MR. ZAIDI: Okay.

7           MR. GUARINI: So you're sending 1500 gallons  
8 out or, in that case now, 1325 gallons per reactor is  
9 being surface discharged up at Aerojet, and they're  
10 making up the difference with recycle.

11          MR. SORSHER: What's the lowest concentration  
12 that you're dealing with there?

13          MR. GUARINI: Well, the lowest is zero, but  
14 right now they're running about 1700 PPB. They added  
15 some additional flow capacity, and some of that has very  
16 little perchlorate. And I don't have a detail of  
17 everything they're doing at Aerojet.

18          MR. SORSHER: Just general.

19          MR. GUARINI: Next side.

20                 This is the first 32 weeks of operation. I  
21 actually have not with me today -- it's back in  
22 Lawrenceville -- a disc from the EPA that apparently is  
23 public information that will show you what the inlet and  
24 outlet concentration of those reactors are that they  
25 reported. It's public information. But I could tell

1 you, from talking to the Aerojet personnel recently,  
2 they've been operating five years now and consistently  
3 have about four (inaudible). So the regulators and  
4 Aerojet, and by definition Shaw, is very happy with the  
5 operation of those systems. And I welcome any one of  
6 you who hasn't seen those to come up and take a look at  
7 those reactors, and I think it will address a lot of  
8 your questions on the long term (inaudible) of the unit.

9 MR. ZAIDI: How much (inaudible) solution of  
10 water that comes in?

11 MR. GUARINI: About 12 minutes.

12 MR. TAKARA: What was the insufficient ethanol  
13 dose?

14 MR. GUARINI: This is during the startup  
15 period. So at the beginning, as the biomass was  
16 growing, you had an acclimation period. One of the  
17 costs of operating this system is electron donor  
18 addition or how much ethanol or acetic acid -- we  
19 typically run 5 to 20 percent. Aerojet was testing to  
20 see how little electron donor they could add while still  
21 staying in compliance with their permits. If I were to  
22 bring this out five years, it would be a flat line.

23 Next, please.

24 This is a system out at the Longhorn Army  
25 Ammunition Plant. It's a five-foot diameter reactor

1 (inaudible) stainless as are the reactors at Aerojet,  
2 and this is a pump skid. I think I had mentioned that  
3 at my last presentation back on November 6th. They  
4 actually have three metering pumps which feed -- they  
5 use acetic acid. They do need some nitrogen and  
6 phosphorus at Longhorn. And the third one is for pH  
7 adjustment, but they don't need to adjust the pH because  
8 it's pretty close to seven. This unit has been  
9 operating since February '01, and has been operating  
10 very well. The original design capacity was 15,000  
11 parts per billion of perchlorate. Once they got the  
12 system up and running, they realized they could turn on  
13 this well that they had shut off previously and were  
14 running actually 20- and 30,000 parts per billion in the  
15 feed here.

16           This is an interesting story that I think I  
17 told you, also, last time I was here where on  
18 September 11th of 2001, the tragedy struck our  
19 country. The operator was asked to leave the site. He  
20 went out to the electron donor tank, which is a hundred  
21 gallon total that lasts about a month. And they have a  
22 five-gallon pail of nutrients that feeds the reactor.  
23 He made sure they were both full. He left the site,  
24 came back nine days later, and the reactor was  
25 removing 18,000 parts per billion to below four parts per

1 billion.

2           Clearly these things can run themselves once  
3 they're up and running. You'll see later on it's a  
4 silver bullet. I don't think there is a technology  
5 that's going to work everywhere, but when it's placed  
6 right --

7           MR. O'KEEFE: Is that system used for drinking  
8 water or discharge?

9           MR. GUARINI: In the case of the Longhorn, they  
10 actually discharge into a drinking water lake. It's  
11 Cato Lake where they get their drinking water supply,  
12 but it is not directly into the pipe.

13          MR. BOMAN: What's the low rate?

14          MR. GUARINI: Fifty gallons a minute, although,  
15 the load is pretty high. The way these things are  
16 designed, based on the load to the reactor per cubic  
17 foot of reactor, and load consists of oxygen nitrite and  
18 perchlorate that is being fed to the system. You also  
19 have to (inaudible) for the nitrite because the microbes  
20 will consume electron donor and (inaudible).

21           This is a picture of a reactor that's  
22 actually at a facility in McGregor Weapons Industrial  
23 Reserve Plant which is pretty close to Waco, Texas. The  
24 main reason I show it, aside from the fact that this has  
25 about two years of operating data, it's consistently

1 below four parts per billion.

2           If you go to visit this reactor, you have to  
3 get out of your car, I guess, six times. There were  
4 three fences, and inside the third fence there are  
5 cattle and horse roaming the field. And this reactor  
6 is, like, right in the middle of it. It's all  
7 controlled remotely. Every once in a while somebody  
8 goes out to fill up the electron donor tank (inaudible)  
9 GPM for 400 gallons a minute depending on the  
10 concentration. And the concentration ranges from 0 to  
11 20 parts per million or 20,000 parts per billion.

12           And the reason, also, is they have an in-situ  
13 trench there. When the rainfall is heavy, the in-situ  
14 trench biologically isn't sufficient to remove all of  
15 the perchlorate. So to contain the plume, they pull the  
16 water out and run it through our reactor. And once  
17 again that's been running for about two years.

18           So, anyway, the picture there is that this  
19 technology, although I'm not happy with the results  
20 you're going to see from Castaic, is based on some  
21 pretty large systems up and operating anywhere from two  
22 to 35 years. So it's not like Sam and I have been  
23 involved in fluid bed reactors for other chemicals  
24 like chloride solvents and checking for the 12 or 13  
25 years that we've been working for Shaw Environmental.

1 And they've actually been in industry probably for over  
2 20 years.

3 I put this slide up to show you that we have  
4 done a significant number of field studies. Obviously  
5 Aerojet, Longhorn, and McGregor have resulted in full  
6 scale. (Inaudible) that are supplied from U. S. Filter,  
7 the subcontractor, Shaw for the FBI, is to treat their  
8 ground water. That's all I can really say about that  
9 one.

10 We also did a pilot study at JPL that I'll  
11 present a little bit of data in a minute.

12 We also did a pilot test on site south of the  
13 Massachusetts Military Reservation where we treated  
14 anywhere from three parts per billion to 200 parts per  
15 billion. Nitrate was very low. It was only in the one  
16 to two parts per million ranges, and there were two  
17 antiseptic compounds used in munitions.

18 We also have done pilot tests at Redstone,  
19 American PF, and obviously Castaic Lake, which is why  
20 I'm here.

21 Aerojet decided that they wanted to take one of  
22 their reactors -- one of those four, 14-foot diameter  
23 bed reactors -- and generate data that hopefully would  
24 result in at least conditional approval, which it did,  
25 to promote drinking water. And, in addition, customers

1 they involved, DHS very early in that process and in  
2 discussions with DMS and the EPA and an expert panel  
3 that they put together, they established that they  
4 needed to confirm these parameters which included the  
5 operating parameters for the reactor. They wanted to  
6 be sure that water that they produced they would drink,  
7 as the public would, and basically collect data to  
8 support the design of a full-scale system.

9           What they actually tested there for nitrate and  
10 perchlorate was the granular activated carbon-based  
11 (inaudible) also have multimedia filters that we'll be  
12 putting in at the OU-1 area. They also have OV and  
13 chemical UV. Those were in (inaudible) and VOCs. They  
14 also had a liquid phase as a built-in suspender for the  
15 VOCs and then before anything would go into your  
16 drinking-water supplies. That's something that they  
17 also tested just to give you an idea of the scale.

18           And, once again, this is important when you  
19 compare it to the Castaic Lake project, at least in my  
20 simple mind. Their pilot treated anywhere from 900 to  
21 1500 gallons per minute, and they ran this from about  
22 March 2000 to somewhere into 2001. They finally  
23 submitted a report to DHS of results in April of '02 in  
24 a letter of conditional approval. They tested the  
25 350-gallon-per minute multimedia filter. The USO system

1 was 100 gallons a minute, anything liquid as carbon.  
2 And then they did a small disinfection unit, and they  
3 did some clarifier work to concentrate the biosolids.

4           In discussions with DHS and EPA and their  
5 expert panel, at least for the GAC fluid bed reactor,  
6 they knew that they had to look at these parameters.  
7 I'm not going to go through every one of them. But one  
8 that is important and one of the conditions -- and it  
9 was while we're flying to OU-1 area -- is the effluent  
10 from any (inaudible) from surface water. Their plant  
11 would be very similar to the back end of our plant.

12           We also took a look at control parameters that  
13 would give you extreme confidence that what was going  
14 into the pipeline did not contain something you didn't  
15 want it to contain.

16           Aerojet wanted to see if they could use  
17 reduction potential to help control the system. DHS  
18 wanted to go one step further. So when you read their  
19 conditional letter of approval, it requires online  
20 nitrate and with feedback and feed forward control to  
21 the units. And all of our full-scale systems will do  
22 that.

23           MR. ZAIDI: The effluent that you have measured  
24 and that you have analyzed in all these systems that you  
25 have installed, how often do you monitor that, and have

1 you simply found that you monitor any time and you get  
2 four micrograms per liter?

3 MR. GUARINI: Each one of the units is  
4 monitored on different time scales. It's all set by the  
5 regulatory agencies. Until we got into a steady state  
6 and met our process guarantees and the state's  
7 requirements -- because these are all state-driven  
8 systems -- they were sampled on a daily basis. Right  
9 now it's probably -- it depends on the system -- but I  
10 think Longhorn, which the only one I really know, it's  
11 monthly. They check it obviously for making drinking  
12 water. DHS is not happy with that. That is why we have  
13 the continuous online monitoring.

14 MR. ZAIDI: So you can do online monitoring  
15 by --

16 MR. GUARINI: Yes. It's a new system. It's  
17 not (inaudible) system. It's Dianek. It's based on the  
18 EPH method 314.

19 MR. ZAIDI: How about the second bioreactor  
20 effluent? Do they contain proprietary microbes as part  
21 of the multimedia filter?

22 MR. GUARINI: No. These are actually naturally  
23 occurring micro organisms. In the case of the first  
24 system, the Aerojet system, we actually used sludge from  
25 a food manufacturing plant. There were food-grade micro

1 organisms.

2           You'll see one of the big differences that the  
3 Castaic Lake has compared to our other systems is we  
4 didn't inoculate at all. We were asked to just let the  
5 microbes in the ground water help (inaudible).

6           So obviously pathogens are a concern,  
7 particularly for drinking. And Perry McCardy was  
8 actually on our expert panel at the time, and he  
9 determined in the expert panel report that there were no  
10 pathogens there. We didn't see them, and they never  
11 entered the reactor during the course of the one-year  
12 pilot study.

13           Just to give you an idea -- I'm not going to go  
14 through samples of ground water. There's a number of  
15 different levels of the FBR, the aeration trench which  
16 is used to remove any residual ethanol or acetic acid  
17 that you have into the filter and out of it along the  
18 GAC.

19           I mean we basically did quite a few sampling  
20 points. And then the next slide that we'll show you we  
21 sampled for quite a few different things, and I'm not  
22 going to go through all of these. But clearly this was  
23 a very rigorous test to show without a shadow of a doubt  
24 to Dr. Jacizee (phonetic spelling) And Dr. Yamamoto  
25 there is something they could sign their names to in

1 terms of producing drinking water.

2           And back in April of '02, we ended up -- well,  
3 actually Aerojet ended up getting a letter from  
4 Dr. Jacizee that in the opinion of the Department of  
5 Health Services of California, this biological process  
6 is a stable means of reducing below the protection limit  
7 and producing water that is drinkable. And about that  
8 time I got involved with this in terms of trying to find  
9 the place where we could next take it, which is to take  
10 it from a permitable system (inaudible) producing  
11 drinking water.

12           Next there are a couple of key conditions, and  
13 there are actually 11 conditions in there. We show, I  
14 think, four of them here. Basically anything that you  
15 put into drinking water has to be NSF approved so that  
16 you can drink it. You want to be sure that the  
17 microbes, even though the microbes never see the top,  
18 you still want to be sure there's never anything bad for  
19 you in that water. And that is something that we've  
20 been able to do.

21           As I mentioned earlier, it's very important to  
22 control the system, and we will put an online of nitrate  
23 and perchlorate on the site. Finally, it is to be  
24 followed by a surface treatment plant under Title 22.

25           All right. Now, we get to Castaic Lake. And

1 this is a test -- I'll give you a little bit of the  
2 history because I find it interesting. But my mind  
3 doesn't work like normal people's.

4           Anyway, when we were trying to get to the point  
5 where we were going to steam to produce drinking water,  
6 we looked at something for somebody to basically be a  
7 responder to the program. And I had been given some  
8 people's names at Castaic Lake. And, lo and behold,  
9 they are very understanding of the restraints and the  
10 weaknesses of biological processes, and they were very  
11 interested in testing the fluid bed reactor for their  
12 site. That had happened about two weeks prior to today.

13           And I go into their facility. They had awarded  
14 a contract to Corolla Engineers to do a pilot test of a  
15 number of different technologies, including a few ionic  
16 change resins. Corolla affixed a bioreactor and, of  
17 course, Shaw's fluid at the time. They asked us for all  
18 the pilot units we had available and what we call our  
19 Model 30 unit which is sized to treat 30 gallons per  
20 minute. It's a 20-inch diameter unit. It's the same  
21 unit that we used at Aerojet, same unit at McGregor, at  
22 least design of the unit that we used at JPL. And we  
23 proceeded to get a contract to have them release one of  
24 our 20-inch diameter units which was made (inaudible) in  
25 this pilot test for Castaic Lake.

1           They were also going to test in parallel one of  
2 their own units that I think was three or four inches in  
3 diameter, and we were going to treat somewhere between  
4 215 and 315 gallons a minute. Plus -- I don't  
5 understand them that well. So we decided we were going  
6 to go ahead with this.

7           We actually will to do some modifications to  
8 the unit after it came out of JPL, and we were getting  
9 ready to ship the units when we got a call telling us  
10 that they no longer could get us the amount of water  
11 that we needed to one -- that 20-inch diameter -- and  
12 was there any way possible we could supply them with a  
13 smaller unit.

14           So it just so happened at North Island treating  
15 chlorinated solvents using an anaerobic system to  
16 anaerobically dechlorinate and then (inaudible) an  
17 aerobic system to remove the chlorinated solvents and  
18 actually starting up that full-scale system which is a  
19 little aside. This is when Sam was a lot younger. This  
20 was about 12 years ago.

21           This is a 12-inch diameter, stainless steel  
22 (inaudible) that is made for aerobic treatment of  
23 chemicals. At the time we knew that there would have to  
24 be some modifications, but we didn't really understand  
25 the significance of putting in an aerobic system. So we

1 sent this reactor from North Island to Corolla without  
2 making any adjustments to it with the understanding we  
3 may not get started right away.

4           Meanwhile, running for about a day or two  
5 already and already acclimated (inaudible) as I  
6 mentioned, neither reactor. So they were already up  
7 and running. So this was the closest opportunity to get  
8 a drinking-water system in. So we were kind of excited  
9 to try and be cooperative. These are just a number of  
10 things that they tested for.

11           All right. Now, why is it important that this  
12 system was in an aerobic system? The microbes like to  
13 take the easy way out if they can. Well, it turns out  
14 it's a lot easier for them to breathe in oxygen than it  
15 is for them to breathe in (inaudible). Any time there's  
16 oxygen in the stream, (inaudible) preferentially remove  
17 the oxygen and then worry about nitrate to survival.  
18 It's also important to get rid of the oxygen before you  
19 can get to the nitrate and the perchlorate. And then  
20 sequentially it goes up for (inaudible).

21           Well, it turns out that this reactor is -- we  
22 really didn't find (inaudible). You could see here the  
23 first 50 to 60 days of operation the results were all  
24 over the board, even for oxygen what turns out in our  
25 designs but, in particular, our full-scale units, the

1 recycle line which goes back down into the bottom of the  
2 reactor there is no venting. So oxygen never gets  
3 into that line. So you have a relatively steady state  
4 of concentration of oxygen. And the aerobic system, it  
5 all drops from the top. It goes through some type of  
6 pipes. Everything is vented because we want oxygen. We  
7 want to reoxygenate so everything is vented. It goes  
8 into a solids removal tank, and then it goes back to the  
9 reactor. So unbeknown to us, we were re-adding oxygen  
10 into the system when we didn't think we were.

11           During those first 60 days of Operation Murphy,  
12 everything happened. We had power outages. Our acetic  
13 pump went down. I mean I'm not making excuses. A lot  
14 of things happened that I wish didn't happen. We were  
15 pulling all of our resources into North Island with all  
16 the other work that we had done in perchlorate, all  
17 those other sites that I showed you earlier. We thought  
18 we were going to throw our reactor after two months,  
19 walk out and have a nondetect, although Todd was losing  
20 sleep on a regular basis. (Inaudible.) saying don't  
21 worry about it. Just we didn't inoculate the reactor  
22 the way we did the other ones. Don't worry about it.  
23 As it turns out, that wasn't the case.

24           Another thing that happened -- and I have kind  
25 of a key-event slide later on -- another thing that

1 happened was they actually were not giving us water with  
2 perchlorate in it. They were pulling from a well. I  
3 don't know whether it was on site or off site. They  
4 spiked it with perchlorate. We weren't running the  
5 system. It was being run by somebody else. We would  
6 get data for two or three days, usually somewhere around  
7 seven or ten days after the date it was taken. The  
8 nitrate levels were 15, 15, 15. Then all of a sudden it  
9 was 12, but we forgot it was 15 the week before. And  
10 the next thing we know, the nitrate during the course of  
11 the test was significantly decreasing.

12           Well, shame on us. That should never have  
13 happened, but it did. At points where the nitrate was  
14 coming down, we were still feeding the same amount of  
15 acetic acid. So we were significantly overdosing. In  
16 the past we never had problems with breakthrough. When  
17 we fed a little acetic acid, we didn't realize the  
18 impact that it had.

19           Once again, I'm not making excuses. We screwed  
20 up, you know, but I'm just trying to give you the  
21 reasoning so you understand it. Then later on the  
22 nitrate concentration went back up. And even though we  
23 had this, we still didn't pay as much attention here as  
24 we should have. Nevertheless, we consistently did  
25 remove all the nitrates all below the detection limit --

1 well, most of them are below the detection unit now --  
2 and that's the perchlorate.

3           As I mentioned earlier, if you're putting in  
4 oxygen that you didn't know you had, if you're putting  
5 in too much or too little nitrate and you're not paying  
6 attention to it, which you don't do with a full-scale  
7 system because that is what Dr. Jacizee and  
8 Rich Raverman is going to (inaudible) we were getting,  
9 you know, weeks at a time of good data. And right at  
10 the -- in here -- we had a couple blips of 4.3, 4.5 PPB,  
11 but we had PPB off nondetect.

12           The next slide we weren't getting the  
13 perchlorate (inaudible) measure that low. But this is  
14 all less than four PPB. What you see is a situation  
15 where you're controlling the feed to the reactor and  
16 monitoring the acetic acid. And Murphy wasn't hanging  
17 around. We could get to the grade, the perchlorate  
18 there.

19           One of the things I should say: Early on,  
20 after about 60 or 70 days when we realized the oxygen  
21 was a problem, we installed a nitrogen blanket to try  
22 and get around the problem that we had with adding  
23 oxygen back to the reactor. And it was day 17 where  
24 you start to see a spike again of perchlorate.  
25 Something happened to the nitrogen blanket and, once

1 again, we didn't find out until about seven days into  
2 the test.

3           So, anyway, the good news is -- and fortunately  
4 I spoke to Dr. Jacizee today -- and he agrees this just  
5 shows the world that the conditions that DHS put in  
6 their letter of approval are significant and need to be  
7 addressed. And they will be. And they are in our full-  
8 scale systems. But I'm sure what's going to happen from  
9 Castaic Lake -- I did get a speck for the full-scale  
10 system. I have no idea what that means. But I actually  
11 spoke to the guy yesterday.

12           So next slide.

13           MR. O'KEEFE: Was that at the very end?

14           Was that the last day of operation?

15           MR. GUARINI: No. It went a few more days. We  
16 had two more flips, and those were associated with the  
17 acetic acid pump was starting to give, and we weren't  
18 getting a consistent feed.

19           MR. O'KEEFE: So that was basically your  
20 longest period of stability?

21           UNIDENTIFIED SPEAKER: That system was designed  
22 back in '92. And I guess for a number of reasons either  
23 reliability with the pump or loosing prime where the  
24 pump was, it elevated above the feed time. They did  
25 lose prime on a number of indications. Nowadays we

1 would detect that, but this system did not have the  
2 capability.

3 MR. GUARINI: Next slide.

4 All right. I hate to admit it, but, yeah, the  
5 reactor wasn't the right reactor. But we have great  
6 engineers, and we have some smart people. We should  
7 have noticed that sooner. Once again, not making  
8 excuses for the people like me who aren't smart enough  
9 (inaudible) paying attention to this pilot program. The  
10 other people were being distracted by the North Islands,  
11 the McGregor, the fact that Shaw had just acquired us  
12 and we're all trying to be assimilated and integrated  
13 into a new company. Lots of reasons. As it turned out  
14 we didn't pay proper attention to it. We were arrogant  
15 we thought it was just going to just hit, and it didn't.  
16 I don't know what else to say beyond that.

17 Next slide.

18 Once again, I'm not going to go through a whole  
19 list of everything. This is about bullet things that  
20 happened during the pilot test that affected the  
21 performance. Despite all of these problems, we  
22 consistently got back to nondetect for some period of  
23 time which once again gives credibility to the fact that  
24 these biological systems are much more resilient than a  
25 lot of people give them credit for.

1           The good news -- I already hit the first  
2 point -- we know we can treat that water at  
3 Castaic Lake. And if they did decide they wanted to use  
4 a fluid bed reactor with its ancillary equipment, even  
5 with all those flips, we feel comfortable enough that we  
6 can control the performance, that we would guarantee the  
7 performance of that reactor.

8           The next slide is just reminding people this  
9 was actually -- most of this work was done by  
10 U. S. Filter in conjunction with Envirogen and the  
11 former company. This is the unit that is way out at  
12 JPL. It's 20 inches in diameter by 15 feet high. The  
13 recycle is submerged and goes back down to the  
14 reactor. We ran this for quite a few months.

15           The next slide shows a nitrate data. What we  
16 did -- I guess we ran about a month at some relatively  
17 high nitrate. To be honest with you, I'm not sure why  
18 it shut down here other than the fact that it will show  
19 for a substantial period of time you can run the  
20 reactor in recycle to not feed an electron donor and  
21 (inaudible) electronic and start up when you do have  
22 nitrate and perchlorate and get nondetect so these  
23 microbes stay happy and working.

24           We then reduced the ethanol. No. 11 gives you  
25 a more comfortable feeling that you're really getting

1 biological degradation. So always good to allow the  
2 reactor to go to breakthrough, and we did that here.

3           The other thing once again, ethanol or acetic  
4 acid consumption is one of the main consumables, one of  
5 the main operating costs. So it's always good to know  
6 how little you can add to still get to where you want to  
7 go. You can see they had a significant amount of time  
8 getting rid of all the nitrate. Here they actually  
9 started spiking up perchlorate and still maintained a  
10 great performance all below four parts per billion in the  
11 effluent.

12           And the last slide is what I've been saying all  
13 along: A lot of people believe, including me, that the  
14 FBPBR system can produce safe drinking water. It's not  
15 a silver bullet. You're going to find sites where  
16 technically doesn't work. You're going to find  
17 (inaudible) cost effective. If that's a concern, as in  
18 many places it is, but if you apply it properly, as I  
19 believe this application is, it will work. And we have  
20 a report that U. S. Filter published. So though that --

21           MR. O'KEEFE: I'd like a copy of that report.

22           MR. GUARINI: Sure.

23           MR. ZAIDI: Can I have a copy, too?

24           MR. GUARINI: I don't know if you can answer  
25 them, but you can answer --

1           Oh, of the report. I thought you were going to  
2 ask questions.

3           MR. ZAIDI: Of the report.

4           MR. SORSHER: When you're feeding in excess  
5 ethanol or acetic acid, is there any condition -- I  
6 suppose some control -- so you don't form sulfides. Or  
7 how much sulfide is typically formed at all, if any?

8           MR. GUARINI: Very little. We typically run  
9 somewhere around 5 to 20 percent excess of electron  
10 donor. And on a bad day you can go up on top of one of  
11 the reactors and know that you're getting a little bit  
12 of sulfate reduction, but most times you don't get to  
13 that point. And a lot of it has to do with how much  
14 electron donor you have.

15          MR. SORSHER: If you have other organics in the  
16 water, you form any -- what's the word -- the organic  
17 sulfides or complexes or anything like that?

18          MR. GUARINI: No. We haven't seen that. And  
19 if you look at some of the things Aerojet did, they did  
20 have to test for a lot of that stuff. There is TCE up  
21 at Aerojet. It doesn't get affected by the bioreaction,  
22 but it also doesn't inhibit the bioreaction in  
23 perchlorate and nitrate. It depends on the design. It  
24 can be open, and many reactors are, but out at the  
25 other sites we have covers on them with a vent

1 basically. And we do -- we can supply -- if that's a  
2 concern, we can supply a system that captures the vent  
3 and treats H2S or whatever is being formed.

4 MR. SORSHER: The other questions I have is  
5 regarding the ethanol. What concentration do you use?

6 MR. GUARINI: Well, it takes three drink -- no.  
7 We use -- I'm not sure.

8 Is it 50, Sam?

9 MR. FISCH: At Aerojet they use ethanol because  
10 of the large volume of water and the relatively fair  
11 amount of ethanol in the storage tank, and they use a  
12 high concentration. It's 90 some-odd proof.

13 MR. GUARINI: Probably glacial. Probably like  
14 95, I would assume.

15 MR. SORSHER: You know -- you know, is there  
16 issues with flammability?

17 Also, is there a security tax?

18 MR. GUARINI: One of the reasons why we've gone  
19 to acetic acid approval for NSF for drinking water is we  
20 thought ethanol is more problematic but it's less  
21 expense (inaudible) probably better off spending the  
22 extra money for drinking water systems, we will use  
23 acetic acid.

24 MR. SORSHER: I see.

25 MR. O'KEEFE: So that's the intention?

1 MR. GUARINI: That was the intention.

2 MR. O'KEEFE: Was there mention about a  
3 corn-syrup solution?

4 What was that about?

5 MR. SLATEN: I don't know. What was the --

6 MR. GUARINI: I think what it was was the  
7 in-situ demonstration.

8 MR. FIELDS: I think there was some confusion  
9 where they took the corn syrup and thought that was  
10 going to be done.

11 MR. GUARINI: We actually looked at that. As  
12 an aside, we looked at AMMR because we wanted to once  
13 again save money on feed costs, and we fed molasses. We  
14 had reactors in parallel. And what we found is you're  
15 better off with a lower carbon molecule. You have less  
16 by-products formed. You have more specificity --  
17 whatever that word is if I could say it -- specificity  
18 on producing what you want to produce and getting the  
19 results you want when you use acetic acid or ethanol.

20 MR. RIPPERDA: acetic acid at both the OU-1 and  
21 OU-3?

22 MR. GUARINI: And Longhorn is using McGregor,  
23 also. There are at least three operations of  
24 (inaudible) that works as well as ethanol. All the  
25 constructed sites now, with the exception of the OU-1

1 area, are using ethanol.

2 MR. SORSHER: Getting back to the sulfate  
3 again, JPL has a pretty high sulfate level in their  
4 water, I think. Were there odors noticed during the  
5 pilot test?

6 MR. GUARINI: Alan, I don't remember. Spent  
7 most of the time out there at the site when we were  
8 running that. So I'll get back. May even be addressed  
9 in the report I forgot.

10 MR. FIELDS: I thought you had it in one of the  
11 slides.

12 MR. GUARINI: Ethanol we found -- and I would  
13 like to acknowledge if you could just get back to the  
14 last slide.

15 We found in many laboratory experiments and the  
16 field tests both were pretty much interchangeable,  
17 acetic acid and ethanol.

18 I always feel a little bit embarrassed about  
19 being the guy in front of the room when I am with people  
20 who think I'm smarter than I am. I like to acknowledge  
21 the people that really did the work, and these are the  
22 people that have been involved -- I think most of you --  
23 Perry Russel Trodes, Robert Clark, Mike McGuire,  
24 Rick, and Gary Yamamoto. They were all involved with  
25 the DAS testing and approval. A lot of the work that we

1 have was paid for by the Army and the Army Corps of  
2 Engineers and the Navy. Of course, Castaic Lake has  
3 been great, and Corolla Engineers has been a pleasure to  
4 work with, and I would like to acknowledge their efforts  
5 in getting me up here and hopefully answering your  
6 questions

7 MR. TAKARA: The Castaic Lake, was it  
8 determined that the microbes were not a contributing  
9 factor to some of the problems you're experiencing?

10 MR. GUARINI: It wasn't a biological problem;  
11 it was mechanical.

12 MR. O'KEEFE: Because the other system, the  
13 fixed-bed system, was using the indigenous?

14 MR. GUARINI: To be honest with you, people  
15 will say jokes, you know, the packed-bed reactor worked  
16 well and yours had problems and everything (inaudible).  
17 And if they weren't there, we would have just walked  
18 away and say we can't work at this site. It just  
19 doesn't work. Or we would have said you can't go draw  
20 false conclusions.

21 MR. O'KEEFE: I have a general comment for the  
22 group, not Shaw specifically. But the operating  
23 parameters are site specific. So DHS wants to get very  
24 much involved in the start-up testing demonstration of  
25 the full-scale system to make sure -- and this is during

1 the period where reinjection will be occurring to make  
2 sure it's being looked at carefully for our concerns and  
3 for the ultimate permit for the drinking water usage.

4 MR. SLATEN: Makes sense.

5 MR. BOMAN: Would DHS be looking at OU-1 as  
6 kind of a pilot for OU-3?

7 MR. O'KEEFE: Not really. We probably just --

8 MR. BOMAN: The question is do you need to be  
9 involved? Do you want to be involved in OU-1 so that  
10 would help you with OU-2?

11 MR. O'KEEFE: It's a different scale.

12 MR. SORSHER: A different concentration.

13 MR. O'KEEFE: Different concentration, but the  
14 previous pilot the concentration didn't seem to be a  
15 factor on performance.

16 MR. GUARINI: No.

17 MR. FIELDS: The OU-1 system will be fairly  
18 close in design with the Trident filter and part of the  
19 conditional acceptance.

20 MR. BOMAN: I'm wondering if the nitrates may  
21 be a little different.

22 MR. FIELDS: But at least will be a good next  
23 step after the small-scale pilot to this one and then --

24 MR. TAKARA: What nitrates are you having over  
25 at JPL? What level of nitrates?

1 MR. FIELDS: I don't recall.

2 MR. RIPPERDA: It was low PPM.

3 MR. GUARINI: But not variable. Castaic was 20  
4 down to 5. But once again they were bringing,  
5 I think, 3500 gallons of water every Monday to the site,  
6 and I assume it all came from the same well. But if the  
7 well had been shut off -- I'm a chemical engineer so I  
8 don't understand subsurface wells at all -- obviously  
9 variability that you wouldn't expect in a full-scale  
10 (inaudible).

11 MR. O'KEEFE: In that area the nitrate areas  
12 are seasonably variable.

13 MR. SLATEN: For my purposes, you know, I have  
14 people like the reporter asking me how many other places  
15 in the state do they have these and how long have they  
16 been running and things like that.

17 Could I could get someone to get me a page  
18 sheet of things I don't know. Certainly I don't want to  
19 make stuff up.

20 MR. GUARINI: I'm in the process of doing that  
21 for two other projects. So I will make sure you get a  
22 copy of that.

23 MR. SLATEN: Where and how high the levels are.  
24 Like a one-pager. If they ask me, you know, where else  
25 in California, where else in the country are these

1 running, how many of them are up and running and how  
2 long, if any, have been used for drinking-water supply.  
3 Those are the main questions I'd like to be able to  
4 answer.

5 MR. RIPPERDA: You want that for biological?

6 MR. SLATEN: Yeah.

7 MR. RIPPERDA: If you could supply -- it's not  
8 your job to know about the ion exchange, but you must  
9 kind of know what's all there.

10 MR. GUARINI: (Inaudible) that was the way my  
11 charter was. Our strength was we were a small business.  
12 We didn't have time to focus on everything. At Shaw we  
13 want to be sure that -- not that we didn't want to be  
14 sure, but they really want to be sure what they supply  
15 with the right technology for the problem definition  
16 that we're treating. And they have actually supplied, I  
17 think, three or four ion exchange systems, not on  
18 drinking water (inaudible) to DOD facilities to remove  
19 perchlorate and nitrate.

20 So if I do have some information, I'll share  
21 it. But I'll let you know how comfortable I feel with  
22 the data.

23 MR. RIPPERDA: Just none of ion exchange  
24 treatment systems that actually exist for drinking  
25 water.

1           MR. GUARINI: There is a finite number of them.  
2 So it shouldn't be too hard.

3           MR. RIPPERDA: The number of biological systems  
4 of drinking water?

5           MR. GUARINI: Right now very finite.

6           MR. RIPPERDA: Zero; right?

7           MR. O'KEEFE: Gary Yamamoto has a list of ion  
8 exchange treatment plans that are permanent in  
9 California for perchlorate removal.

10           I have a question: Does your technology have  
11 any other applications, such as, nitrate removal, or are  
12 you just specifically marketing for perchlorate?

13           MR. GUARINI: This type of reactor design  
14 removes nitrate also. There's a system installed near  
15 Modesto for nitrate removal. This is a farming area; so  
16 nitrate levels are in the 40 to 60 PPM range.

17           The other thing that we use this for, as I  
18 mentioned earlier, is chlorinated solvents, and we're in  
19 the process of starting up a system with two 14-footers  
20 to treat chlorinated solvents down in North Island in  
21 the San Diego area.

22           MR. O'KEEFE: Back to my question I keep  
23 asking: Is there any of your systems used directly for  
24 drinking-water purposes?

25           MR. GUARINI: No. No.

1           MR. O'KEEFE:  And the Longhorn one, the  
2 drinking-water reservoir, was that a raw or treated or  
3 finished water reservoir?

4           MR. GUARINI:  Raw-water reservoir.

5           MR. O'KEEFE:  So it goes through a full surface  
6 water treatment --

7           MR. GUARINI:  I assume it does.  I never looked  
8 into it.

9           MR. RIPPERDA:  When you have highly variable  
10 nitrate, do you just adjust the electron donor, or do  
11 you adjust, maybe, adding a little oxygen?

12           MR. GUARINI:  No.  We do it through electron  
13 donor; right.  We usually try -- and whatever oxygen is  
14 coming out of the ground is what we feed the reactor.  
15 There's none in the recycle.  In the case of Aerojet,  
16 now they're treating 1325 gallons of water from the  
17 ground.  So they only have, like, 500 gallons of  
18 recycle.

19           In the case of Longhorn, the fluidization rate  
20 at the bottom of that reactor is 200 gallons a minute,  
21 and the net feed is 30 gallons to 250 gallons.  So the  
22 recycle is 150 to 170 gallons a minute.  So you have  
23 more recycle coming in, but the oxygen in the recycle is  
24 as close to zero as it could get.  But it does come in  
25 from the ground water.

1           MR. SLATEN:  So you're going to be around today  
2 if people need to catch you?

3           MR. GUARINI:  If anybody needs a business card,  
4 they can pay me by how many of these I give out.

5           So happy to share them with you.

6           Sorry, Mohammed.  Oh, you want one?

7           MR. O'KEEFE:  I'd like to give you one pilot  
8 study report.

9           MR. GUARINI:  Sure.

10          Thank you very much for your time.  I  
11 appreciate it.

12          MR. BOMAN:  We've been sitting for a couple of  
13 hours.  I think people are ready for a break.  We'll be  
14 getting sandwiches delivered after a little bit.  So  
15 we'll take a break and start back.  And the sandwiches  
16 will just show up whenever they show up.

17                       (A brief recess was taken.)

18          MR. SLATEN:  I guess, if we're ready, we can talk  
19 about OU-3 work.  Just last week Mark came down --

20           That was last week; right?

21          MR. RIPPERDA:  Right.

22          MR. SLATEN:  After being out in the Pacific for  
23 something; right?

24          MR. RIPPERDA:  In Guam.

25          MR. SLATEN:  Mark came back and asked for a

1 meeting with the City of Pasadena and with DHS and with  
2 NASA to talk about where we are on OU-3. So you'll need  
3 to just go on from here and talk about what went on last  
4 week; okay?

5           You know, we went down to Pasadena's offices  
6 talking about ways that we can move things along faster  
7 and just kind of did some brainstorming, had some ideas  
8 about how we could do that, and one of the things that  
9 we talked about was a lot of the time -- the next six or  
10 eight months on OU-3 -- was going to be tied up in the  
11 contracting process. That best value award that was  
12 going through the Navy, you know, goes out for proposals  
13 and there's evaluations we were working on to get one of  
14 the Pasadena's -- somebody that could kind of work for  
15 Pasadena -- and report to them, get them on the source  
16 evaluation board.

17           We worked through that issue, but the idea came  
18 up: Is there a way that we wouldn't have to spend so  
19 much time going through the contract process? The  
20 response is, yeah, if we use the exact electric  
21 (inaudible) which is doing OU-1. And just expanded, we  
22 could cut half a year or more probably off of getting  
23 the system up and running. So we talked a little bit  
24 about that.

25           I've been talking about that now internally

1 with the Navy and NASA and had a conference call  
2 yesterday with NASA's contracts people, and it sounds  
3 like that could work. The contract is appropriate.  
4 It's big enough. It's appropriate. It's already in  
5 place. There could be economies of scale of using that,  
6 economies of scale of maybe using the same contractor  
7 and probably using the same contractor to put in both  
8 systems if that's the way the contracting works now.  
9 What would be a six-week or eight-week or maybe more  
10 process of going through the contracting, the way it was  
11 proposed might be cut down to a couple of weeks of kind  
12 of an accelerated proposal that would be contracted out  
13 through Battelle that we haven't had much to do with.  
14 We would just tell them build it this way or give us a  
15 performance that's this or something.

16           And so what that would have to mean, though, is  
17 we go ahead and decide on the technology now. This  
18 would also be a little bit of a catch-22 where we have  
19 about putting the action memo -- the EE/CA action memo.  
20 It would save some time in this kind of an order of  
21 things as in the critical path of what comes first, EE/CA  
22 action first or contracting.

23           The Navy had a little bit of trouble going the  
24 other way before we had the technology chosen. The Navy  
25 was a little reluctant to release any kind of contract

1 bid proposal stuff. So there was -- going this way has  
2 several kinds of advantages. What it adds up to is it  
3 might shave a year off -- it could shave a year or maybe  
4 even 18 months -- depending how we work through things  
5 of getting the system up and running, OU-3.

6           What would it mean? The big advantage is the  
7 timing discharge. And we talked about Pasadena, that  
8 they wouldn't be intimately involved in this, that whole  
9 contracting process that we were talking about. So  
10 that's one disadvantage.

11           For NASA it's taking a little bit more risk on  
12 (inaudible) thinking that we will make it work. But  
13 basically the risk is on us to get a system that does  
14 work. What it does with the 97005 stuff, I guess you  
15 run is concurrently but separately. It's not as much of  
16 a front anymore. The advantage to that disadvantage, I  
17 guess, is we go ahead and choose a technology, and later  
18 we're going to have to defend it in effect. The  
19 advantage is the earlier we start it makes it easier to  
20 put in some of those 97005 documents. So we got real  
21 information on some pumps, etcetera. Later, we have  
22 real information about its actual performance, I mean  
23 historical data before we go final on the permit.

24           So we talked all that through last week. And  
25 at least among those that were there, we agreed it

1 sounded like a good idea. And I got a letter from  
2 Phyllis Curie yesterday from the City of Pasadena that  
3 says, "Good. Go forward. Take this approach. We  
4 approve it."

5 I have copies of the letter if people would  
6 like to see it. It seems pretty straight forward to me.

7 Who all wants a copy? Probably got about 15.  
8 That's it. Two pages.

9 I have some that don't say "Copy" that are  
10 clean.

11 Here's what I think could happen here. My NASA  
12 kind of described this back -- what was going on to my  
13 NASA management -- back in Washington, and they said,  
14 "You do not have permission to do this yet. You do not  
15 have upper management permission to do this. You need  
16 to gauge the response from Pasadena," which we started  
17 to do, "and from the other stakeholders," us basically,  
18 and whether we think that this is an acceptable idea.  
19 Then I have to report back to them what the response is,  
20 and then I can get permission. That can happen fairly  
21 quickly, but I'm not authorized to do this on my own.  
22 So I wouldn't take unilateral -- even if I did have  
23 authorization, I wouldn't take unilateral action on this  
24 without weighing in with everybody. But I think this is  
25 a good way to go.

1           I guess what I'd like to talk about today and  
2 what people want to hear about are the pros and cons and  
3 kind of anything more about the concept and talk about  
4 whether people would support this as an idea for  
5 acceleration. Gary people may be reading the letter. I  
6 think Gary probably didn't draft the letter.

7           Didn't you get it from Phyllis?

8           MR. TAKARA: Yes.

9           MR. SLATEN: Do you have anything?

10          MR. TAKARA: Actually Sean is the one that  
11 spoke to Phyllis on this. The approach -- again the  
12 letter states that we're open to (inaudible) ion exchange  
13 or biological. We have no preference. All we request,  
14 however, is that the water treated from the system meets  
15 the department health standards and that come to some  
16 kind of agreement memorialized as quickly as possible so  
17 we can put this behind us and move forward with the  
18 actual treatment.

19          Our main concern is just continuing quickly,  
20 and then we'll prevent some of this contamination from  
21 shifting over from our east-side wells. And hopefully,  
22 as Steve said, this could speed up the whole process by  
23 a year.

24          What is NASA's proposal of getting the speed  
25 back? Is it just from the agencies? From the public?

1 What does headquarters --

2 MR. SLATEN: Mostly this here in this room.  
3 We're not going to be able to go out and take a vote or  
4 anything. It has been biological in the news for the  
5 last couple of months. We talked about it at a public  
6 meeting, and it's been in several articles. And we've  
7 had some good questions about it, but no resolution to  
8 the idea. Now, that's not a mandate. That's not a  
9 clear mandate that everybody is going to love it, but,  
10 you know, we got to gauge whether that's enough of a  
11 public feedback that we're willing to proceed ahead at  
12 some risk.

13 MR. RIPPERDA: At what point will NASA  
14 management be happy?

15 MR. SLATEN: I don't know. Depending on kind  
16 of what I hear here, I'll go back and tomorrow I will  
17 tell them and I will see if they're happy, if that makes  
18 them happy.

19 MS. FELLOWS: We have published the action memo  
20 for comments.

21 MR. RIPPERDA: For moving forward, you know,  
22 the things you have to do, the action memo -- obviously  
23 a whole new action memo to the action memo we have now.

24 MR. SLATEN: It would stay something entirely  
25 different.

1           MR. RIPPERDA: I take it that you will reissue  
2 it, and that you can do -- whether or not (inaudible)  
3 public comment period. And I would think at the end of  
4 that period NASA would say, yes, this is what we want to  
5 do or not.

6           MR. SLATEN: That's the official one. But  
7 the -- turn me on right now.

8           MR. RIPPERDA: For NASA headquarters, for you  
9 to (inaudible) regional board, City of Pasadena, this  
10 sounds like a good way to go.

11          MR. SLATEN: We should realize the risk of it,  
12 though, is that we sort of stopped pursuing the other  
13 route. To put it another way, stopped going down the --  
14 letting the contract for the other, the slower route,  
15 start pursuing this route which means start getting some  
16 design stuff drawn up. And I will be spending money on  
17 the design that's not guaranteed yet that I will get to  
18 use. And EE/CA, hoping that it goes that way, the public  
19 would accept it. If they don't, I have wasted a couple  
20 of months -- a couple of months further behind sort of  
21 than I was already.

22          So there is some risk here that if this all  
23 goes to hell in a hand basket when we publish the EE/CA,  
24 then I got to start over on the old approach.

25          MR. RIPPERDA: But the EE/CA was general enough

1 that you don't have --

2 MR. SLATEN: Don't have to change it. I think  
3 the EE/CA should be the same, but the action memo would  
4 reflect the new thought.

5 MR. BURIL: Just a question in terms of --  
6 isn't this tantamount to going to (inaudible)?

7 MR. RIPPERDA: We've had this discussion before  
8 about action memos versus rods, and the action memo is a  
9 decision document. This is being done as a removal  
10 action. So whether we're speeding it up by just saying,  
11 yeah, the biological system is what we're going to  
12 select in the action memo, or we're going to do the way  
13 they're going to do that's not any different under the  
14 way Steve had been talking about today.

15 You know, the bigger picture of this is doing a  
16 cleanup. This big okay to do under removal action  
17 authority --

18 MR. BURIL: Okay.

19 MR. RIPPERDA: It's a borderline, but there's  
20 not a hard-and-fast rule that says you can't. And, you  
21 know, we (inaudible) NASA. And it's come up at these  
22 meetings where I've said, "I'm okay with doing this  
23 under removal action authority." And nobody else has  
24 complained.

25 And so, yeah, EMS, as a general rule, doesn't

1 like to see this big a project happen under removal  
2 action authority, but we're not going to say no.

3 MR. BURIL: Is there a general opinion  
4 regarding the amount of public relations work we've done  
5 already as being adequate to take this step?

6 MR. RIPPERDA: Certainly the one round of  
7 public meetings we just held is pretty minimal. I've  
8 been talking with Merrilee and Steve, and I want to see  
9 another public meeting that happens, you know, within  
10 the action memo public meeting comment period. There's  
11 not a regulatory requirement for a public meeting to be  
12 held for action memo, but I would certainly like to see  
13 a little more effort than the bare minimum. So we've  
14 talked about having a public meeting in that period.  
15 Whether it be kind of done together with Merrilee's  
16 health meetings -- and she's shaking her head violently  
17 no --

18 MR. SLATEN: My guess is we go ahead and do  
19 this first one for the accelerated action and push back  
20 the health a little bit.

21 MS. FELLOWS: I want to give the people that  
22 have health concerns very specialized attention and make  
23 sure it's focused on that.

24 MR. RIPPERDA: So in which case, yeah, Merrilee  
25 and I have talked about the downside of having two

1 meetings with different focuses really close together  
2 and people being slightly confused and in kind of an  
3 information overload. They might go to the wrong one or  
4 go to both and be bored or whatever because we're kind  
5 of cramming through, I don't know, a \$20 million or, you  
6 know, something-like-that system that ultimately is  
7 hopefully going to be used for public water consumption.

8 I do want to have an action memo meeting, but  
9 then there's the whole DHS permit (inaudible). Before  
10 it gets -- DHS is like the last bastion of (inaudible)  
11 to the public. So the reason to have an action memo  
12 public meeting is exactly the kind of -- you know,  
13 protects NASA, protects all of us that before we commit  
14 to spending this much money, we've gotten the public  
15 input even though the public has another chance at the  
16 permit meeting.

17 MR. BURIL: Is there a precedent for this  
18 within EPA?

19 MR. RIPPERDA: I don't know. I'm sure there  
20 is, but I haven't, like, looked into it. There is a  
21 dollar amount maximum allowable when EPA is a lead  
22 agency and we're spending the trust fund, the soup fund  
23 money. And this is certainly bigger than that, but this  
24 rule doesn't apply to a federal facility PRP.

25 MR. SLATEN: Their questions were valid last

1 week when we were going the slow route. The only thing  
2 that has changed now is just me trying to find a way to  
3 get it in farther.

4 MR. BURIL: My only concern would be whether or  
5 not a third party outside this room would consider this  
6 as a mechanism to circumvent the process.

7 MS. FELLOWS: That's why we feel so strongly  
8 trying to have an action memo meeting, even though it's  
9 difficult to pull off. I think it's important.

10 MR. ZAIDI: Action memo meeting is a very good  
11 idea. We finalize -- all the agencies sit down with  
12 NASA and finalize our comments, and we decide on the  
13 system. And then in that meeting, also, we can invite  
14 Chuck to present that system -- Shaw system --  
15 technically proficient people who are asking performance  
16 (inaudible) public meetings. But they are satisfied  
17 right there. And then we can circulate some kind of  
18 question among the audience as to whether the public was  
19 satisfied or not. And that will push us forward as far  
20 as action memo goes.

21 MS. FELLOWS: I didn't quite understand the  
22 timing.

23 MR. RIPPERDA: Just to finish up your --

24 MR. BURIL: Yeah. My management shares with  
25 our attorneys. And my management, whether or not

1 they're entirely happy, they'd rather go forward with  
2 this than wait for the whole feasibility study ROD  
3 process which would take another year on top of  
4 everything that is happening.

5           So EPA feels strongly enough that (inaudible).  
6 We'll kind of do things a little differently than we  
7 would normally do, like, to save that year's worth of  
8 time to do that year's feasibility (inaudible). For  
9 now -- for timing -- Steve's got an issue in action  
10 memos. Got to give the regulators 30 days to review it.  
11 At that time there's a 30-day public comment period. So  
12 if you assume it's going to take Steve a month to write  
13 it, a month for us to comment, let's say two weeks for  
14 them to respond to comments, that's 60 -- that's, you  
15 know, 85. That's about three months out for a public  
16 meeting on the action memo.

17           MR. O'KEEFE: But if Merrilee was going to  
18 proceed with the end of March, beginning of April with a  
19 health meeting, why doesn't she just continue along that  
20 route?

21           MS. FELLOWS: Now that's impossible. It's got  
22 to slip -- we're just not ready to go at the end of  
23 March.

24           MR. O'KEEFE: It sounds like you'll have at  
25 least six weeks.

1           MR. RIPPERDA: To me the end of March, middle  
2 of April.

3           MS. FELLOWS: End of March and middle of April  
4 depends on how sure I am. We know we can't do it tax  
5 week. Then we start scootching up on this. We really  
6 are offering a meeting while there is still time for the  
7 public to come I work with. We will do that.

8           MR. RIPPERDA: But it's got to be within the  
9 official comment period, and that's going to be some  
10 time probably mid May to mid June. And so the action  
11 memo public meeting, you know, if everything happens  
12 quickly, like best possible way, you'd be holding it in  
13 early June.

14           What's the --

15           MS. FELLOWS: That's five weeks from the other  
16 one. We do get them put up against each other. We want  
17 to make sure people keep coming. You know, you're  
18 wearing us out. So we're blowing it off. But I just  
19 haven't looked at the calendar.

20           MR. RIPPERDA: Personally I would refer to that  
21 (inaudible) and get complaints addressed. And I want  
22 that out of the way before we try to talk about, you  
23 know, engineering solutions. And if it happens within a  
24 month to six weeks, you know, I'd say okay because the  
25 people who really have concerns and complaints are going

1 to have their chance to come and, like, you know --  
2 well, so they're within a month of each other.

3 MS. FELLOWS: And I have talked about this, in  
4 fact, a month a part. That wears people out. Now that  
5 I thought about it some -- well, I'd rather do that than  
6 put the whole process off a couple months. I agree with  
7 that.

8 Let's get back to Steve's comment: The whole  
9 idea of this is to hurry. Is it really going to take as  
10 long --

11 MR. SLATEN: Let's go back to the calendar one  
12 more time.

13 One thing I would like to do is ride hard at  
14 least on the things that we have control over to see how  
15 quickly I can get them done.

16 That said, I'd like to -- to do this I think  
17 makes sense to get it started. There is economies of  
18 scale while certain contractors are out doing different  
19 things, well drilling, different things going on. If we  
20 wait (inaudible) what and when those are.

21 We got one contractor out building something  
22 coming up to this summer. And so there's probably  
23 economies of scale getting started on some other  
24 parts -- OU-3 parts -- of it as well.

25 All that said, I guess one thing that I would

1 ask, since people have already seen the EE/CA, they  
2 haven't seen the action memo yet, I'm wondering if a  
3 full 30-day RPM review would be necessary for the new  
4 action memo that describes the new accelerated process.

5 MR. ZAIDI: The thing is we are working -- I'm  
6 working another 55 sites. This is not my only project;  
7 it's just one of my projects. So we can, of course,  
8 maybe prioritize this such an urgent matter. But I  
9 think 30 days is reasonable time to be given.

10 MS. FELLOWS: So you're saying it doesn't take  
11 you 30 days to respond, but you need some flexibility?

12 MR. ZAIDI: My management wants me to focus on  
13 other projects that they think are more -- well, you  
14 don't have CEOs I got.

15 MR. SLATEN: Okay. I mean whatever, 30 days  
16 according to the agreement, 30 days for, I think, a  
17 document like this. It says 30 days or less if agreed  
18 by the parties or something.

19 MR. ZAIDI: I do it sooner, but I think it's  
20 better go 30 days.

21 MR. RIPPERDA: Shaving two weeks out of the  
22 process can't be a make-or-break thing.

23 MR. SLATEN: I'm going to be looking to shave a  
24 day or a week off whenever I have control of it. I'm  
25 just looking for if there's any other possibilities.

1 MS. FELLOWS: So do you think -- assuming NASA  
2 approves this -- is it going to really take you a month  
3 to do a revised action memo?

4 MR. SLATEN: That's what Keith told me this  
5 morning.

6 MR. FIELDS: That's one of those --

7 MS. FELLOWS: He was doing a Mohammed on you.

8 MR. SLATEN: That's where I'm going to be  
9 pressuring Keith.

10 MR. FIELDS: Always try to start at a good  
11 point.

12 MR. SLATEN: That's my first place. Keith will  
13 be hearing from me.

14 MS. FELLOWS: Frankly, for Mohammed's request,  
15 you know, earlier at some point before he gets it, we're  
16 going to have to figure out the time line because we are  
17 to start advertising and setting up meetings so you'll  
18 know how long you'll have. You're not to be under the  
19 gun. Won't help me to be. A public meeting to get it  
20 done faster.

21 MR. ZAIDI: I will do my best. Put down 30  
22 days if you're holding somebody responsible for that.

23 MS. FELLOWS: Yeah. What I'm saying, once we  
24 say to you you have 30 days, I'm going to plan from the  
25 30 days. You know, I can't have a moving target.

1 Whenever we have all the responses, it's going to be  
2 from the 30-day thing.

3 MR. SLATEN: Back through the calendar. So if  
4 we worked on it right now, and Keith stuck to his 30  
5 days but I get him to shave off a week because we're  
6 already almost a week into this month, that would mean  
7 by April 1, if I could send it out to RPM, review the  
8 revised action memo, plus what I would throw in, answers  
9 and comments on the existing EE/CA because we got comments  
10 from everybody. If that takes 30 days, that takes us  
11 through to the 1st of May. If I were able to get it  
12 public noticed almost -- no. I got to incorporate  
13 comments. Gets us into May, just mid May, I guess,  
14 before I could publish. If I pushed it right --

15 MR. RIPPERDA: And there's another step there,  
16 and that is draft, draft, final, final. So 30 days for  
17 regulated for us to review, too. Two weeks for you to  
18 respond to comments. And then, you know, technically  
19 under the FAA, there's another 30 days for us to review  
20 your response to comments which is called the draft  
21 final stage. And then after that it goes final.

22 So, you know, at that point we might all be  
23 able to shave two weeks off to just look at your  
24 response to comments.

25 UNIDENTIFIED SPEAKER: Is this document

1 considered a secondary document?

2 MR. RIPPERDA: Yeah.

3 MS. FELLOWS: So then after you guys review and  
4 if you have any major changes to his comments, then he  
5 incorporates them again. Then it goes to public  
6 comment.

7 UNIDENTIFIED SPEAKER: WMA in the Pasadena - I  
8 mean if you're going to want to speed things up.

9 MR. RIPPERDA: We're going to include Pasadena  
10 and DHS in the regulator period.

11 MS. FELLOWS: Okay. All right. So it does  
12 look like they'd be far enough apart.

13 MR. RIPPERDA: If you want to save time. I  
14 don't know at what point you lose the ability to use the  
15 existing OU-1 contract. I guess you can use the  
16 contract --

17 MR. SLATEN: Mobilization of contractors and  
18 such.

19 MR. RIPPERDA: But your contractor is going to  
20 be finished. Now it's a matter of how fast you do this  
21 accelerated OU-3. Your drilling contractor is going to  
22 be done.

23 MR. FIELDS: There's some things we could start  
24 even electrical piping. But, you know, kind of starting  
25 to consider all those together.

1           MR. SLATEN: I guess I'll be proceeding at risk  
2 having plans and papers drawn up and all that to get  
3 ready to go this way. I'm going to go ahead and run  
4 that concurrently with the administrative process of  
5 approval. But at what point I do -- is there any point  
6 where I've gone too far? Can I break ground before  
7 we've -- before we have final approval knowing I'm  
8 proceeding at risk breaking ground but spending millions  
9 of dollars on plans and everything anyway?

10           MR. BOMAN: Go for it.

11           MR. SLATEN: At what point? If there is some  
12 point that I've gone too far before I have approval, you  
13 know, a physical construction --

14           MR. RIPPERDA: I'll have to talk about this  
15 with my lawyer and management who would probably be more  
16 nervous about it than I would be. I would like to say  
17 drill your wells and everything, but we're going to make  
18 you move them or we're going to (inaudible).

19           I'll check with my lawyer and my boss. I would  
20 think drilling wells would be going too far. I would  
21 think doing electrical and surface pipes and building  
22 pads, things like that, would be okay. But actually  
23 buying the treatment system or drilling wells would be  
24 too much. That's my guess.

25           MR. BURIL: Are you saying that anything that

1 could be used, any technology that's applied to this  
2 situation, would be okay?

3 MR. RIPPERDA: Yeah. That's my guess. And  
4 certainly it's not just the action memo that you need to  
5 get out for comment and agreement. You need to have a  
6 work plan. You know, it's kind of the same problem we  
7 just hit with the OU-1 stuff, and you got comments.

8 MR. ZAIDI: Different (inaudible). Oh, it's  
9 too late. You got the wells in. That's not going to be  
10 acceptable for this one. So you're kind of proceeding  
11 at your risk to pay your contractor money to produce a  
12 work plan including locations of monitoring wells, the  
13 installation, design of the extraction and injection  
14 wells, location of extraction and injection wells.  
15 Monitoring all of that, you should be issuing that about  
16 the same time as the action memo so that the regulators  
17 have a chance to review that because you can't move  
18 forward with any well installation until you get  
19 approval from the regional board on all that stuff.

20 MR. SLATEN: We do have some more to talk  
21 about -- about the next step in the monitoring well  
22 installation stuff -- after we get through this.

23 MR. RIPPERDA: That is probably the Sunset  
24 well, and that's important.

25 MR. SLATEN: Access agreement.

1           MR. RIPPERDA: And your EE/CA had in it  
2 monitoring wells near the new injection wells. So  
3 that's going to be in a work plan before you can go out  
4 and start drilling your wells. So you got to have  
5 Battelle issue you a working plan for purely the OU-3  
6 stuff around the same time as the action memo. That's  
7 another whole big thing for Battelle to be doing.

8           MS. FELLOWS: And we still have to deal with  
9 JPL facilities, too.

10          MR. ZAIDI: I'm willing to have meetings and  
11 personal meetings with Steve, Mark, Pete so we can  
12 quickly decide. You know, I'm not too far from here.  
13 So I can come over and discuss this. And whatever our  
14 mutual agreement is, we can finalize it.

15          MR. SLATEN: I come to realize, even with  
16 working with Pasadena, us writing back and forth, just  
17 doesn't work. It's not fast enough. We're going to be  
18 meeting just more face to face. But in real time you  
19 can work so much more out.

20          MR. ZAIDI: This first and work plan later. We  
21 never allow it to (inaudible).

22          MR. RIPPERDA: So back to your first question:  
23 It sounds like all the regulators are in agreement with  
24 your approach, and you can go to NASA headquarters and  
25 say you got concept buy-in, and then you need to write a

1 new action memo, and you need to write a work plan and  
2 get both of those out to the regulators.

3 MR. SLATEN: All right. It seems to me like  
4 the water companies would probably -- this would  
5 probably be okay with them because it's accelerating,  
6 pulling back on the plume and starting to get in their  
7 best interests.

8 Is there any issue with the water companies  
9 that I'm not aware of that would affect trying to  
10 accelerate what we were going to do already?

11 MR. TAKARA: Is this plan to be brought up with  
12 the Raymond Basin at any time?

13 MR. SLATEN: People, you all have a better feel  
14 for how things work here than I do.

15 Who else do I need to inform and get some  
16 feedback from?

17 MS. FELLOWS: Probably looking at me.

18 MR. TAKARA: Have you spoken to Lincoln?

19 MR. SLATEN: Not specifically about that,  
20 although I get the feeling from him anything we do to  
21 accelerate --

22 MS. FELLOWS: He's pressing us to accelerate  
23 every single day.

24 MR. RIPPERDA: I don't think trying to educate  
25 everybody about your own internal (inaudible) trying to

1 speed things up and how you need to send a letter to  
2 Raymond Basin and to any individual water companies  
3 saying we want to get, you know, the off-site treatment  
4 system up and running by whatever the time line is.

5 MR. SLATEN: What is means is choosing the  
6 technology now.

7 MR. RIPPERDA: We're proposing to (inaudible)  
8 biological the treatment system, or we proposed to  
9 produce air into the Arroyo -- inject it with a little  
10 map here on our site -- and you have to formally ask the  
11 Raymond Basin for permission. And you may have to use  
12 Pasadena's water rights, however that works.

13 MR. SLATEN: That is no different than -- they  
14 don't care about my internal contracting difference if  
15 we go ahead and propose FBR and go ahead and shave  
16 off --

17 MR. RIPPERDA: So you send that letter to Bob  
18 at his water company and also send it to the Raymond  
19 Basin Executive Committee, and that's it.

20 MR. BOMAN: To Rubio, Los Flores. Pasadena has  
21 already sent you a letter.

22 Anybody else, Linda?

23 And then just the Raymond Basin.

24 MR. O'KEEFE: I just want to point out, since  
25 everything is moving pretty fast with our 97-005 policy

1 writers for the OU-3 project, although OU-1 is probably  
2 exempt from EE/CA, now might be a good time to get that  
3 started.

4 MR. SLATEN: At what point does it need to be  
5 done?

6 MR. O'KEEFE: For the permit. But you usually  
7 would do it in the design phases of a project.

8 MR. RIPPERDA: You can tell all of us, Keith.

9 MR. FIELDS: The first step? EE/CA's initial  
10 study, we've already done a draft -- internal draft,  
11 initial study -- that has been sent to NASA.

12 MR. RIPPERDA: They can do the OU-3 part with  
13 injection without EE/CA because that's a circle action,  
14 but they haven't started anyway.

15 MR. FELLOWS: That's agreed.

16 MR. O'KEEFE: All the 97-005, that's a  
17 significant process that we don't want to lose steam on  
18 either. So we're trying to make sure we're pursuing  
19 those separately and concurrently.

20 MR. SLATEN: Okay.

21 UNIDENTIFIED SPEAKER: One question for the  
22 health meetings. We're a small outfit and customer.  
23 About these meetings earlier (inaudible) lead time as  
24 possible because we need to send notice without billing.  
25 Otherwise we have to spend \$1500 or so on another

1 special mailing.

2 MS. FELLOWS: We will either get it in your  
3 billing or pay for your separate mail.

4 UNIDENTIFIED SPEAKER: They read meters around  
5 the 22nd or 23rd, and we get them out usually by the  
6 first of the month. If we can get something out, notice  
7 (inaudible) really helpful for us.

8 MS. FELLOWS: So we have it in the first week  
9 in April.

10 MR. RIPPERDA: The 22nd. Then it goes out  
11 around the 1st.

12 MS. FELLOWS: It's tricky, but I'll pay  
13 attention to it.

14 UNIDENTIFIED SPEAKER: But it's sure helpful.  
15 People will call me, "How come you didn't tell me about  
16 the meeting?"

17 MS. FELLOWS: That's our objective.

18 UNIDENTIFIED SPEAKER: I can put notices or  
19 flyers in the post office. That's a shotgun approach.

20 MS. FELLOWS: But we'll help you do all that.  
21 I'll just call you up, and we can talk about the  
22 different --

23 MR. SLATEN: Is it preferable to put it in the  
24 bill or -- if we paid it, would you just as soon  
25 (inaudible).

1 MS. FELLOWS: Where your --

2 UNIDENTIFIED SPEAKER: (Inaudible).

3 MS. FELLOWS: Separate mailer, which we're  
4 planning to do, are they going to see it? Do you really  
5 need one in your bill? They will know it's coming from  
6 you?

7 I know I throw my bill stuffers away.

8 UNIDENTIFIED SPEAKER: We do that (inaudible)  
9 that it's important to them and will actually --

10 MS. FELLOWS: Tied it to the bill or something  
11 separate?

12 UNIDENTIFIED SPEAKER: Separately you'll get  
13 their attention. Some people, those that bother, will.  
14 So either way will be fine.

15 Logistically we just go down to Kinko's and  
16 make a quick 1500 copies and send them out. There's  
17 some postage involved, but it isn't big, big bucks.  
18 It's the stuffing part. We may need them to stuff it,  
19 too, and just get them out. If we have to do a separate  
20 billing --

21 MS. FELLOWS: I'll call you next week.

22 MR. SLATEN: Well, if we're ready to move on,  
23 you have to turn your thing back on because we've got  
24 some stuff to talk about on the kind of the waterway we  
25 know about, water quality and leading up to kind of

1 what's the next step in the monitoring well network  
2 installation.

3           Maybe I will save this one for last. Everybody  
4 is kind of tired. So we won't spend three hours, but I  
5 think there will be some good discussion here.

6           So go ahead and flip away. You see JPL, and  
7 you see this perchlorate levels; right?

8           MR. FIELDS: Yeah. I added this one.

9           MR. SLATEN: Because I hadn't seen this one  
10 before.

11           MR. FIELDS: I added it this morning. This is  
12 April, May, 2003.

13           MR. SLATEN: I can see my house. It's right  
14 there.

15           MR. FIELDS: There was a request -- there was a  
16 request by Mark -- to provide some maps and some  
17 concentrations of perchlorate, understanding the first  
18 thought was to go through what we know about perchlorate  
19 in the basin.

20           We kind of have two points of reference. The  
21 one is the NASA monitoring well network, and the other  
22 is the production wells within the basin. So this sort  
23 of represent NASA's monitoring network and it indicates  
24 what we all kind of know is there's relatively high  
25 concentrations around MW-16, 7 and 24, which is the

1 expanded treatment (inaudible) as MW-20 is the furthest  
2 downgradient well. But then NASA's network --

3 MR. BURIL: What screen is that in?

4 MR. FIELDS: That is in screen four layer  
5 three.

6 MR. ZAIDI: Concentration --

7 MR. SLATEN: Let's keep going. We got a lot  
8 more that shows stuff like that.

9 MR. ZAIDI: There's a lower concentration of  
10 5.8 and 4.1 before we get to the Arroyo; right? Then it  
11 raises up again?

12 Is it part of the same JPL or coming from  
13 somewhere else?

14 MR. FIELDS: I hesitate because it's fairly  
15 complicated. Just there's multilevel monitoring wells,  
16 too, and also single-level monitoring wells that are  
17 mixed in here. Like MW-7 -- I showed the result from  
18 MW-7. On the others I pulled up the maximum. So some  
19 of these -- and it's not completely clear exactly where  
20 the plume is going -- but we have tried to model it on  
21 sort of a surface-plan view and then also three  
22 dimensionally. I think maybe the point from this one --  
23 in fact, there are -- we've had detections in 17 and 2  
24 within the monitoring well network. 124 was the  
25 highest.

1           MR. SLATEN: We'll get some more of the  
2 forensic to tell you why we think that's our  
3 perchlorate.

4           MR. FIELDS: The next thought on that --

5           MR. BURIL: Your head is in the way.

6           MR. FIELDS: April 2003, to reinforce that  
7 concept. This is a 3-D picture of what we're looking  
8 at. This is more of what it looks like when we map that  
9 data with a C-23 conceptualization. You can see this is  
10 MW-20. This is 19. This is 21. This is 17, and this  
11 is 18. So here is 17, 18, 19, 20, 21.

12           MR. SLATEN: We took out the other slides for  
13 perchlorate at other points in time; right?

14           MR. FIELDS: I kind of wanted to show -- one is  
15 April and August. August -- interestingly in August it  
16 was not detected in MW-20 for perchlorate.

17           MR. SLATEN: Perchlorate is not behaving well  
18 in its carbon tet. When you do it over time, it's a  
19 credible, believable thing. There is so much jumping  
20 around of perchlorate in either some laboratory --

21           MR. BURIL: I was just going to ask how do you  
22 feel about your QA.

23           MR. SLATEN: There's enough jumping around of  
24 it to make you wonder what is real and what's not. How  
25 much is real and so forth. So that needs more work.

1 There is nothing really we can do today to say about it  
2 except it is kind of fishy the way perchlorate comes and  
3 goes (inaudible) the next month and things like that.

4 MR. FIELDS: As you know, the pumping, I think,  
5 of these within the basin may have something. Although,  
6 first cut, if there wasn't a good correlation with  
7 pumping, and it changes almost too rapidly for that. I  
8 mean the EPA method 314, there is a lot of discussion  
9 around that right now and interference with high ionic  
10 strength water. So that's something that's going to be  
11 kind of flushed out as we move forward.

12 But the reason why we're jumping around is not  
13 completely there --

14 MR. BURIL: How many times have you seen that?

15 MR. FIELDS: Three over the -- since  
16 October 2002. So, like, 50 nondetect, 80 nondetect,  
17 124. So it's, like, bounded by nondetects.

18 I have a graph in here that we could look at  
19 later.

20 MR. BURIL: Sample techniques.

21 MR. SLATEN: What can you be sure of?

22 MR. FIELDS: We're not sure, yeah. There's a  
23 lot of things that need to be looked into that I think  
24 kind of need to be rolled into this OU-3 intersection.

25 MR. SLATEN: Let's move on.

1           MR. FIELDS:  Then this, the jewel 3-D type  
2 plume.

3           The point that I just wanted to show on this  
4 just for conceptualizing when we talk about multilevels  
5 -- you probably can't see this -- MW-20 has five points  
6 that are represented here.  And so when we're comparing,  
7 what we're looking at previously is where these  
8 multilevel wells get discreet.  And now what we're going  
9 to be looking at with a production well (inaudible), for  
10 example, Arroyo was screened for several hundred feet.  
11 So when we're looking at results from a production well,  
12 we don't know where within that stratograph -- the unit  
13 we're getting the concentrations.  And, you know, it's  
14 sort of a blended sample of wherever the pump is located  
15 and how permeable the aquifer is right there.

16           Just to conceptualize, there's a difference in  
17 the data that we're looking at when we go to the  
18 production wells.

19           I don't intend for anybody to read these  
20 graphs, but I was trying to introduce there's five  
21 areas -- six areas -- you're looking at here.  This is  
22 JPL facility.  This is valley wells that are sort of  
23 upgrading the JPL facility.  There's Arroyo well 52,  
24 Ventura, the Monk Hill, City of Pasadena wells, Rubio  
25 Canyon, Los Flores wells, Sunset reservoir wells and

1 other City of Pasadena wells. The data that we will be  
2 looking (inaudible) pulled it off there in February of  
3 '04. So it's fairly up to date based on what the  
4 purveyors have submitted to DHS.

5           So I thought that we could look -- I  
6 highlighted this photograph. And then you can see the  
7 next slide is that graph in a larger view.

8           MR. BURIL: Can you back up to that graph  
9 location, the furthest east location? I can't read it  
10 from here.

11           MR. FIELDS: There's a (inaudible) and I  
12 believe Chapman are the ones that are reported in the  
13 DHS data base and have had low level.

14           MR. O'KEEFE: Just looking at the website of  
15 our data base, just like range of values of key text  
16 throughout California. If you really wanted to get to  
17 the source data, I can get you that.

18           MR. FIELDS: And we may unless the source data  
19 varies much more widely than these. We have data from  
20 '97 to 2004, which gives us a good kind of -- the  
21 individual results.

22           MR. O'KEEFE: It just gives you ranges;  
23 correct?

24           MR. FIELDS: It gives dates and results.

25           MR. SORSHER: Did you get the CD or actual --

1 MR. FIELDS: Yeah. You can download from the  
2 website.

3 MR. SLATEN: On 12/6/99 a specific couple of  
4 specific samples.

5 MR. SORSHER: Instead of them burning CDs,  
6 people ask for them. People can just download it now, I  
7 guess.

8 MR. O'KEEFE: Not that I'm aware of.

9 MR. FIELDS: I'm telling you I went to the DHS  
10 website. We downloaded. It was updated through  
11 February '04.

12 MR. O'KEEFE: That was on for perchlorate data.  
13 The orange vertical, is that Highway 39 there?

14 MS. FELLOWS: Rosemead.

15 MR. SLATEN: And down that way is where the San  
16 Marino wells apparently are.

17 MR. FIELDS: And to put it into context, this  
18 blue line is the Raymond Basin. This light blue line  
19 maybe -- I'm color blind -- is the Monk Hill sub-basin.  
20 And just, I mean, we're looking basin scale with this  
21 data.

22 I'm going to quit doing that. I drove people crazy  
23 yesterday.

24 MR. SLATEN: I'm used to it now.

25 MR. FIELDS: These are valley water wells in

1 the four to ten range as reported by DHS. There's  
2 perchlorate throughout the basin.

3           Next is the Rubio Canyon/Los Flores. Again  
4 four to ten range on these.

5           I tried the scale on the left. The  
6 concentration scale I kept the same so that we could --  
7 as you're looking at it, it makes a little more sense.

8           Here is Arroyo, the Monk Hill, City of Pasadena  
9 wells. There is only a few data points from Arroyo well  
10 which was enacted in 1987 when we first started  
11 monitoring. One hit was actually off the chart a little  
12 bit maybe. But since I was just trying to keep  
13 consistent with that scale, there was a couple of  
14 deductions. By that time, the well had been inactive  
15 for a long time. Those rules I wouldn't consider valid  
16 as when it was pumping consistently.

17           So you can see Arroyo well, well 52, the two  
18 wells that are part of the removal action have  
19 concentrations in the 15 to 50 range. And Ventura and  
20 Windsor are less than 15. Typically in the four-to-ten  
21 range.

22           Now, looking at Sunset wells, which Sunset  
23 reservoir wells -- hopefully I'm referring to those  
24 right -- what we're seeing here there's five wells in  
25 that area, and they're ranging from the 4 to 15

1 typically. There's been a couple points that exceed  
2 that 4-to-15 range, but over the past three to four  
3 years were in that range.

4 And, lastly, the further east wells, City of  
5 Pasadena wells, even out there in the, you know,  
6 sub-fours to almost ten range. So --

7 MR. BOMAN: Tens must be a lab error.

8 Can you erase that one? I don't think we need  
9 that.

10 MR. O'KEEFE: Our data show less than detection  
11 limit for the low values, or did it show a true value?

12 MR. FIELDS: Interestingly, yeah, they show, as  
13 you can see from this graph here, we're sub-fours on  
14 this.

15 MR. SLATEN: Twos and threes it looks like.

16 MR. FIELDS: It doesn't provide that level with  
17 detail in the data base, but they're estimated values.

18 MR. O'KEEFE: Well, it's a matter of whatever  
19 the lab submits.

20 MR. BOMAN: Yeah. See, that's our own lab.

21 And so when the level went down to more (inaudible).

22 MR. SLATEN: When was that?

23 MR. BOMAN: January 2002, when we went to four  
24 parts per billion as opposed to 18. From there on out we  
25 went nondetect. But before that we were actually giving

1 the real number that we were guessing at or, you know,  
2 estimated number what we with getting there.

3 MR. FIELDS: Yeah. You know, whatever that  
4 data was just pulled off the website just to give us a  
5 sense, I think, of the levels throughout the basin.

6 MR. BURIL: Could you back up to the map one  
7 more time?

8 Could you help orient me here with street names  
9 just a little bit, that vertical line with the arrow?

10 MR. FIELDS: This one? I'm going to guess  
11 Lake.

12 MR. BURIL: And the next one over is Hill?

13 MS. FELLOWS: First the Craig site. Is that at  
14 Craig Street?

15 MR. BOMAN: That is Alan or Hill. Probably  
16 Alan.

17 MS. FELLOWS: That's my thought, too.

18 And then you got Eaton and Conway under that.

19 MR. BURIL: Eaton Canyon is right under where  
20 the Arroyo is.

21 MS. FELLOWS: Right.

22 MR. SLATEN: On the big void shot under Eaton  
23 Canyon, I guess nobody --

24 MR. BURIL: That was going to be the next  
25 question of mine. Does (inaudible) have a well out

1 there? Does anybody know?

2 MR. BOMAN: (Inaudible) has one off of  
3 New York.

4 MR. BURIL: New York and what?

5 MR. BOMAN: If this is Eaton Canyon --

6 MS. FELLOWS: To the west of --

7 MR. BOMAN: So right there would be a well.  
8 Then they have another well down here on New York.

9 MR. FIELDS: There's a recent report by Geo  
10 Science submitted to the Raymond Basin Management Board,  
11 and they're looking at a report for conjunctive use.  
12 They do identify this area -- sort of an area -- they  
13 don't have data on.

14 MR. BURIL: Has anyone looked at the  
15 (inaudible) data?

16 MR. FIELDS: It could be in the data base, and  
17 I missed it if they haven't detected perchlorate.

18 MR. O'KEEFE: I suspect it hasn't been detected  
19 there, but certainly if anybody asks we can provide that  
20 information.

21 MR. FIELDS: The next step may be --

22 MR. BURIL: That area that we're talking about  
23 is all I'm asking.

24 MR. FIELDS: Ground water flow, just so we --  
25 you can correct me if you think I'm incorrect on this

1 area -- but it flows -- you know, kind of flows west to  
2 east, south near the JPL facility. And then it turns  
3 south, pretty much dead south towards these Sunset  
4 reservoir wells. Sort of an easterly component heading  
5 out to the east.

6 MR. O'KEEFE: It follows the 210.

7 MR. FIELDS: Yeah. It follows the 210.

8 UNIDENTIFIED SPEAKER: For the past year all  
9 the purveyors in the Raymond Basin have been sending  
10 their well data to Stetson Engineering for their water  
11 quality study which contracted to do for the Raymond  
12 Basin. So we submit -- I submit mine every month. A  
13 lot of them do it quarterly. But we started around last  
14 March or April. I believe we have a little more  
15 protected data there which may help you.

16 MR. FIELDS: Actually we have been in close  
17 coordination with the Raymond Basin and Geo Science, and  
18 they've shared data bases back and forth. I chose to  
19 give you this data base because it was from a DHS web  
20 site, and I just thought it was a good, valid set of  
21 data.

22 MS. FELLOWS: So (inaudible) must be submitting  
23 data on that, too, then.

24 UNIDENTIFIED SPEAKER: I assume, yes.

25 MR. FIELDS: We can look at that because we

1 have that entire data base.

2 MR. SORSHER: Where are those two monitoring  
3 wells that have the fluctuating levels --

4 MR. FIELDS: To put it in perspective, MW-20 is  
5 maybe a thousand feet to the west of Rubio Canyon/Los  
6 Flores. And then MW-17 is up here closer to Arroyo. So  
7 the data set we have before -- yeah, that's a good  
8 point. I should have put something like that in there  
9 sort of like in this area.

10 MR. ZAIDI: You have 20. What you have in  
11 MW-7? They're same or different level?

12 MR. FIELDS: I apologize. Can you ask your  
13 question again?

14 MR. ZAIDI: The screen seven --

15 MR. FIELDS: Seven on site.

16 MR. ZAIDI: Probably in the shallowest.

17 MR. FIELDS: Fifty to 100 feet.

18 MR. ZAIDI: This MW-20, is this the same?

19 MR. FIELDS: Goes down 800 to 1000 feet.

20 MR. BURIL: But it's separated by several  
21 hundred feet.

22 MR. FIELDS: But there's five screened  
23 intervals that go down as deep as 800 or 1,000 feet.

24 MR. O'KEEFE: The other one that was --

25 MR. ZAIDI: Seven.

1 MR. FIELDS: Seven.

2 MR. ZAIDI: MW-20 you said intervals. And so  
3 this reading of 139 or 136, that was for accumulative  
4 sample?

5 MR. BURIL: No.

6 MR. FIELDS: I just took the max, and it was  
7 nondetect in all except screen four which is in a deeper  
8 portion and then nondetect in five.

9 MR. ZAIDI: How did the screen concentration  
10 get to the source? Do you have any (inaudible)?

11 MR. FIELDS: In the source?

12 In general, the plume is shallower in the  
13 source and moves out and down as it goes -- probably  
14 moving down because of pumping and things in the path.  
15 Or maybe -- you know, but there's the hydrostatic units.  
16 They're not separated by a confining layer. There is  
17 obviously flow which is going vertical. Kind of starts  
18 shallow and goes deeper.

19 MR. ZAIDI: So basically with (inaudible) or 26  
20 or not. That's what I'm trying to establish.

21 MR. SLATEN: Next we'll talk about water types;  
22 right?

23 Is it time to go do that?

24 MR. FIELDS: We can try to head back.

25 So then what we're talking about is moving

1 forward with some initial investigation. So we're  
2 looking at what tools we currently have available to us  
3 to evaluate the source of perchlorate.

4           He know that there's low levels pretty much  
5 throughout the basin. That's pretty much determining to  
6 what point are those levels associated with releases  
7 from the JPL facility. So there's a couple of tools  
8 that we have to do that.

9           One that kind of helps us understand this is  
10 water type. We've all talked about water types to a  
11 certain degree, I think one or two. There are sources  
12 that water originates locally. One is sort of mountain  
13 recharge off the San Gabriel mountains. One is sort of  
14 an older water deeper in the aquifer. These water types  
15 are found beneath the JPL facility (inaudible) levels.  
16 And a good job was done in the OU-3 correlating type  
17 three with injection with MDW water and the valley  
18 wells. So we see, you know, Colorado River water has  
19 high chloride. It's different from the lower surface  
20 chloride water that originates locally.

21           So that's just one tool that we would use in  
22 evaluating NASA's responsibility for perchlorate.

23           MR. SLATEN: What about La Canada's septic  
24 tanks?

25           MR. FIELDS: Co-location with other chemicals,

1 La Canada's unsewered areas, there's been related to us  
2 that that's associated within perchlorate concentrations  
3 with La Canada. Maybe nitrate, particularly with the  
4 co-location with VOCs. To a certain extent carbon  
5 tetrachloride is not detected with the basin based on  
6 the data we have outside of a plume that's associated  
7 with JPL. In one sense, carbon tetrachloride is sort of  
8 a tracer with perchlorate. We all know that perchlorate  
9 travels more readily in water than carbon tetrachloride.  
10 So a perchlorate plume could travel ahead. But if you  
11 see them both together, that's a good indication that it  
12 may be associated with a source originating from NASA.  
13 And what we're seeing is the Arroyo well, Well 52, and  
14 the Lincoln Avenue wells. We don't see carbon  
15 tetrachloride outside of those points to a significant  
16 degree.

17           Then the other side is the PCE. Historically  
18 JPL has very low levels of PCE. However, upgrading and  
19 (inaudible) unsewered areas in La Canada, PCE is higher  
20 concentrations in those.

21           So the occurrence of a PCE chlorate, but no  
22 carbon tetrachloride draws into question NASA's  
23 responsibility because the PCE in carbon tetrachloride  
24 would move at the same rate because the retardation, the  
25 rate at which they move and are held back within the

1 aquifer, based on carbon, a natural organic matter, is  
2 about the same. All these tools have to be used in  
3 connection with each other.

4           And the third tool we have is ground water  
5 modeling and (inaudible). But that's what we're talking  
6 about, is getting what additional field data do we want  
7 to correlate with all these items. But the ground  
8 water, NASA has several models. We developed a model  
9 for OU-1 to help us simulate our extraction. There is a  
10 Monk Hill model that was (inaudible) by the C. H. Toom  
11 Hill that helps us in the Monk Hill area. And then we  
12 expanded a basin scale model. All these are now models  
13 to help us understand flow outside the Monk Hill Basin.

14           I put up the Raymond Basin that Geo Science is  
15 developing. We're working very closing with them  
16 sharing data. We're trying to get the information we  
17 can. We want to make sure that the assumptions that go  
18 into both of those models are similar so when we do some  
19 similar work, we're going to get similar results.

20           The next thing I want to do is kind of take  
21 these current tools that we have and apply them to some  
22 data that we do have from Geo Science to data base on a  
23 couple of the well areas. And the first one would be  
24 Rubio Canyon/Los Flores. And what we see here is Rubio  
25 Canyon 4. Rubio 7 does not have any detections of

1 perchlorate, but Rubio 4 does. And the maximum PCE has  
2 been nondetect (inaudible) and the water type is a one,  
3 two. The modeling that we've done so far which  
4 indicates particles originate at JPL and could reach  
5 that well, as well as particles originating from the  
6 valley company area based on (inaudible). So somewhat  
7 inclusive on ground water modeling. So that is sort of  
8 the data we have on that one.

9           Los Flores, 17.2 PCE, no detections of carbon  
10 tetrachloride at one, three water-type close proximity.  
11 And this is just -- a I put an MW-20 here just for  
12 comparison. The highest hit we've seen on any of the  
13 screens is .30. The water type tends to vary with  
14 depth. Historically the upper portion of that well and  
15 the lower portions are one/two type water. So from that  
16 well, which is the closest well to these wells, they see  
17 a lower rate. Upper portions, we have perchlorate  
18 detections associated with the type one/two. So there  
19 have been some questions that come up on these wells,  
20 what portion of that water are they pulling from. The  
21 perchlorate detections were observed. South of Lincoln  
22 Avenue has detections. Also, carbon tetrachloride  
23 modeling shows it comes from JPL.

24           Those pieces of data apply to Lincoln Avenue.  
25 Three provide fairly strong indication that those are

1 from JPL. Same thing for Sunset wells I selected. Same  
2 here. All these wells have had detections of  
3 perchlorate. They have detections of PCE. None of them  
4 have had detections of (inaudible) and the water type  
5 has been varying from three, one, three, two, three. So  
6 there are some higher chloride, higher sulfate  
7 concentrations in this water. That's from the Sunset  
8 reservoir area which causes some -- indicates we need to  
9 collect more data to more fully understand that.

10           And then the ground water modeling data  
11 indicates that a particle could in fact travel -- the  
12 minimum travel time between JPL and these wells was  
13 calculated at 41 years. The average travel time was  
14 calculated at 70 some years. And just because a  
15 particle can travel that far in 40 years at a minimum  
16 doesn't mean enough particles travel that far because  
17 there's a lot of production wells in between the Arroyo  
18 and Well 52 in particular. Historically they have done  
19 a good job.

20           So the modeling certainly causes some  
21 uncertainty, too. While the travel time, we want to  
22 continue to work that with Geo Science to make sure that  
23 particle travel and the travel times are consistent  
24 between the two models. And if they're not, figure out  
25 why.

1 MR. ZAIDI: (Inaudible).

2 MR. O'KEEFE: The aquifer?

3 MR. ZAIDI: Yeah. So -- and the (inaudible)  
4 pretty good, too; right?

5 MR. FIELDS: This is a productive aquifer.  
6 That's accounted for in these models certainly.

7 Now, there's some interesting data here that  
8 I'm going to show next, and it's a couple of these  
9 Sunset reservoir wells. And we went back to some DWP  
10 reports back to the '20s, looked at water quality,  
11 particularly sulfate, and we found that there has been a  
12 shift with time. Not that we know the reason for this  
13 shift, but the sulfate concentrations have increased  
14 since the '60s. Arroyo Well put this on here, too.  
15 Looks like there's some increase, but maybe not as much  
16 as these wells. We plotted this up here, too. If, in  
17 fact, there's Colorado River source which has been  
18 related in this is kind of where the Colorado River is  
19 with regard to sulfate.

20 A similar trend with chloride. You see  
21 (inaudible) wells beginning in the '60s and then TDS.  
22 The data wasn't available, but beginning about '60,  
23 those are increasing as well within that.

24 So sulfate up here.

25 I apologize. That should be TDS. That's

1 correct. That's not.

2           So within the Sunset reservoir wells, which is  
3 a particular interest to additional investigation, there  
4 is some data that indicates there's been somewhat of a  
5 shift from the '20s, '40s, '50s in water quality, and we  
6 don't know the cause of that shift, but we think that's  
7 part of this additional investigation, too, is  
8 understanding that and understanding water quality  
9 versus depth and perchlorate concentrations versus water  
10 quality and (inaudible).

11           MR. BURIL: Have you been given any research  
12 when Colorado River water was being brought to Southern  
13 California and was put into residential use?

14           MR. FIELDS: The connection to the Sunset  
15 reservoir of MWD (inaudible) was made in 1941.

16           Then, lastly, is the Riley wells. And they  
17 have typically -- they have fairly high levels of PCE  
18 that associated with La Canada sources -- dry cleaner  
19 sites and some unsewered areas.

20           Nondetects typically -- there was one sample  
21 of, like, .06, which is just above the detection limit  
22 of four and consistently water type three. And the  
23 modeling that we did -- and I know Richard Atwater isn't  
24 here and he -- if he can provide the data that he  
25 references to this would be great, but we could not

1 simulate a flow reversal of significant time frame for a  
2 particle to originate at JPL facility and get to the  
3 valley water company wells. It was a three-year-plus  
4 travel time assuming a very significant gradients of  
5 flow reversal. That's never been seen.

6 MR. BURIL: Just to augment, we did some actual  
7 ground water level testing some years ago before  
8 (inaudible) took over the program and measured water  
9 levels static. They were left a day, and a day and a  
10 half to (inaudible) even with the valley service water  
11 wells running. And those wells to the west of us off  
12 that, the grading was still to the east.

13 MR. FIELDS: Right. And if you look in between  
14 those wells and JPL facilities, it's sort of flat  
15 because that's flowing sort of southeast, and JPL is  
16 sort of flowing south. And the bulk of the water from  
17 valley wells is going to the south of the JPL facility.

18 So the pieces of clay that we have for the  
19 valley wells indicate that those three items that we  
20 talked about that indicate valley wells are not the  
21 responsibility of JPL.

22 And so -- I mean just I want to use all this  
23 data for us to determine where to put production or  
24 additional monitoring wells. And so, you know, trying  
25 to take what data we do know and then identify our data

1 gaps and uncertainties and try to supplement that with  
2 additional monitoring wells.

3 MR. ZAIDI: East of Arroyo which might have got  
4 the basin into four segments as we go eastward.

5 MR. FIELDS: I'm sorry. I don't understand.

6 MR. ZAIDI: Faults.

7 MR. FIELDS: There is a fault. I believe this  
8 line here is a basin scale. That's maybe greenish.  
9 It's our basin scale model, and we cut it off right  
10 here.

11 And I believe that is a fault; is that correct?  
12 Isn't there a fault in this area?

13 MR. ZAIDI: Smaller close to --

14 MR. FIELDS: There's the JPL fault that is sort  
15 of up in this area.

16 MR. BURIL: That green area approximately?

17 MR. FIELDS: That actually is pretty doggone  
18 close.

19 MR. ZAIDI: Faults which are, like, east?

20 MR. FIELDS: This is a north-south fault

21 There are some (inaudible) off of this  
22 east-west fault, but they have not been mapped any  
23 further than a very small area up here.

24 MR. ZAIDI: Different fault blocks or  
25 sub-basins would (inaudible) and that might also

1 increase in that monitoring.

2 I'm just throwing it out. I don't know if  
3 sudden increase after you're getting from 5,000 to 8,000  
4 and then sudden increase of the monitoring wells from  
5 136. It could be some kind of barrier. Or if it's  
6 continuous to the source than the same horizon, we have  
7 much higher concentration there than --

8 MR. FIELDS: There has been efforts to try to  
9 identify fault locations going back to, I think, the  
10 '40's and '50's. But the data that we have does not  
11 indicate faults other than the JPL and some of these  
12 over here. I think that's a good idea of why some of  
13 these concentrations may not make sense, but the data  
14 that he have right now we can't move in that direction.

15 MR. ZAIDI: I understand.

16 MR. FIELDS: So we put this map together to  
17 kind -- there's two areas that are based on our initial  
18 evaluations that we wanted to talk about today where we  
19 think additional wells -- monitoring wells -- might be  
20 appropriate, multilevel monitoring wells so we can  
21 coordinate for perchlorate with depth, and that will  
22 give us a better understanding of where NASA's  
23 responsibility is.

24 So these green areas are the two areas that  
25 we're thinking about a well or wells. There's been

1 discussions with the City of Pasadena on a well near  
2 Sunset reservoir. And since we do have detections of  
3 perchlorate in one, two water deep within the aquifer in  
4 MD-20, the leading edge, this is sort of the idea of  
5 some leading edge delineation work. And the idea here  
6 is maybe they start them here and then work together.  
7 If, depending on the results of this and the results of  
8 this, maybe this next phase is wells in here.

9           But the first thought was to kind of start at  
10 these two points, particularly with the Sunset reservoir  
11 wells and try to get an idea of, you know, a multilevel  
12 well there and maybe one up closer to Rubio Canyon/Los  
13 Flores and 20.

14           MR. TAKARA: The Atlanta well could be an ideal  
15 site for an additional monitoring well.

16           MR. FIELDS: Where is the Atlanta well.

17           MR. TAKARA: Off the Woodbury.

18           MR. FIELDS: In fact, just as a little bit of  
19 background, putting in multilevel monitoring wells is  
20 expensive because you have to go 1,000 feet deep or so.  
21 And the first thought we had was maybe we can use  
22 production wells that are screened at multiple levels.  
23 To get discreet, we did try that at the Arroyo well 351.  
24 We had to pull the pump. Pulling the pumps out and  
25 everything is a serious operation anyway, and it renders

1 the well inoperable until that is put back.

2           So we looked at those two wells. We also  
3 looked at the Atlanta well. Then there was a well we'll  
4 call the Casitas well. I believe, we weren't able to  
5 get into Atlanta. We met obstruction right about where  
6 the screen is, and the data we got back from Arroyo well  
7 and 152 was not valid or good data. We showed that  
8 there is -- actually, the screens were basically plugged  
9 up, and there was just a very small trickle of water  
10 coming in at one location.

11           So the data wasn't valid. We had kind of  
12 thought that it was sort of a long shot whether that  
13 would work, but we thought it was worth while to try to  
14 take the less costly approach before we looked into a  
15 more extensive well monitoring (inaudible) samples from  
16 production wells trying to identify the best location  
17 for multilevel --

18           MR. RIPPERDA: Are you thinking about putting  
19 two wells initially, and then one well -

20           MR. SLATEN: I guess the way we're going to do  
21 it we're going to take all of this and put it to an RI  
22 addendum and write it up as a proposal for this whole  
23 next phase, which I guess then would set the stage for  
24 other wells to come as more of a quicker proposal.

25           MR. RIPPERDA: So you're going to provide all

1 this information with narrative scripts and RI addendum  
2 and recommend your first set of locations?

3           So you're going to go out and install a well  
4 and then issue an RI addendum?

5           MR. FIELDS: We're saying RI addendum. A work  
6 plan will kind of give us all the information we have  
7 about our current conceptual site model trying to take  
8 all the information we have shown here. And there's  
9 also obviously more information than that and try to  
10 build an understanding of what we know, identify what we  
11 don't know (inaudible). Then also have some of the  
12 other items. Maybe do a revised sampling analysis plan  
13 rather than referring back to the original one as new  
14 chemicals -- maybe we want to add things like that.

15           MR. RIPPERDA: Unfortunately, after years of  
16 meetings, this is the first time I have to leave early  
17 because I have an appointment back in San Francisco at  
18 5:00 o'clock. For the first time we actually have  
19 something really exciting at the end of the meeting.

20           Thank you very much, Keith. This was good  
21 information.

22           And you guys can just set the next meeting and  
23 let me know.

24           MR. BOMAN: I guess we're not -- we're  
25 thinking the proposal of three wells and probably two

1 and one is where we're leaning right now, but we don't  
2 know exactly until we kind of write it all up and put it  
3 down on paper and propose it.

4 MR. BURIL: Have you thought at all about  
5 fertilizer use in that whole white area there? I guess  
6 that's the golf course and so forth.

7 MR. BOMAN: I think about it every day.

8 MR. FIELDS: What fertilizer was used there,  
9 what water was used to irrigate all that for how long,  
10 that is something we have thought about. And I do not  
11 have data on it, but it's sort of the next point of  
12 question.

13 And, also, there's some work done by Geo  
14 Science that shows some significant increases in water  
15 levels around the Sunset reservoir area. And I think  
16 that's sort of a data point we need to try to look into  
17 further, too, to understand why if other areas are kind  
18 of receding in ground water levels, why this area --

19 MR. SLATEN: Let's put one right there. It's  
20 all these things that we have to think about now. Is it  
21 important that we want to make sure that we try to catch  
22 the golf course influence, or is it more important -- so  
23 all that stuff we're going to have to be thinking about  
24 now. I wonder about the golf course. Of course, every  
25 golf course I've every known about was impacted by

1 chemicals, lots of different chemicals.

2 MS. FELLOWS: You're not used to golf courses  
3 in deserts.

4 MR. O'KEEFE: There was a recent news article  
5 about lower level for perchlorates being found in the  
6 Fontana/Riverside area some of which are not directly  
7 associated with any military contract or aerospace  
8 facilities, and it points towards citrus groves and that  
9 historical agricultural uses of those areas.

10 MR. FIELDS: There was a Chilean fertilizer  
11 that evidently was used in that area.

12 MR. ZAIDI: From the early data, we have some  
13 (inaudible) probably get background of concentration of  
14 both JPL and, also, in this area.

15 MR. FIELDS: Yeah. The day that -- that I was  
16 showing going back pretty much to whether the method  
17 that came back before then, the detection was 400 or  
18 something.

19 MR. SLATEN: I do think -- I mean I didn't  
20 mention it -- the data on TDV and other things -- that  
21 goes back to the teens is interesting in some of these  
22 areas because it's climbing. There is some impact there  
23 from some --

24 MR. FIELDS: Not native course, a background of  
25 nitrate or other related fertilizers and then before

1 putting in these wells and water purveyors so you're not  
2 really putting wells where you're not responsible.

3           It's a background. Naturally there was some  
4 source JPL responsibility.

5           MR. SLATEN: Kind of two reasons to put in a  
6 well. One reason, to get down and try to define the  
7 leading edge of your plume. And we can understand that  
8 that's a valid reason.

9           Another reason for me to go down by Sunset is  
10 find out whether or not we're going to have to add that  
11 to what we're going to pay somebody for impacting their  
12 resource.

13           It's kind of two different philosophies for  
14 putting in a well, and I'm not sure which one is the  
15 best driver. I mean it's important to rule in or out  
16 our impact to the Sunset reservoir. It's also important  
17 to completely define the leading edge of our chemicals  
18 so we know how to respect it, how to design our final  
19 remedy and things like that.

20           MR. ZAIDI: Because I had questions about  
21 Sunset reservoir.

22           Why do you think the plume is coming that way  
23 and how much of the responsibility of JPL and all that  
24 stuff?

25           MR. FIELDS: All important questions.

1           MR. SLATEN: To which we don't know the answer  
2 to, and we don't want to spend a half million dollars to  
3 put in a well that's not going to answer any questions  
4 or raise more questions.

5           MR. ZAIDI: Exactly.

6           MR. BURIL: I would suggest that you get  
7 consideration for the idea of maybe identifying some  
8 other sources irrespective of the fact that you got a  
9 minimum travel time from JPL to the Sunset area. That's  
10 pretty high concentration down there.

11          MR. FIELDS: That's another important thing is  
12 not only saying this is our -- you sort of have to say  
13 this is the extent of the plume that we know, and there  
14 are concentrations over here. There has to be. What  
15 else would cause that?

16          MR. SLATEN: It's like it's a puzzle that we  
17 might have to prove ourselves innocent by proving  
18 somebody else guilty. It's not a good position to be  
19 in.

20           Do I go into a golf course and drill a  
21 two-foot-deep hole and find perchlorate? Okay. That  
22 must be where Sunset comes from and that a clear enough  
23 cause and effect --

24          MR. FIELDS: There has been some injection  
25 (inaudible) down in the reservoir area. Whether or not

1 that injection has been enough injection to cause those  
2 concentrations is not known.

3 MR. O'KEEFE: Usually when you get in this  
4 discussion, the Raymond Basin Board starts to get very  
5 upset with that assumption that MWD may have impact.

6 Is anyone here representing the board?

7 MR. BOMAN: Linda.

8 MR. O'KEEFE: It usually seems to be a very  
9 sensitive topic.

10 MS. FELLOWS: They are sensitive issues, but we  
11 need to talk about what to do next.

12 MR. BOMAN: We've got a sensitive issue, too,  
13 and we've got to figure out what's ours and what's not  
14 ours and we pay for ours.

15 I don't want to step on anybody else's toes,  
16 but facts are facts. And there's a lot of Colorado  
17 River water that's come into this area.

18 MR. ZAIDI: Also from JPL. I think gradient  
19 must be just based on topographic data. It should be  
20 pretty steep -- right? -- the hydraulic?

21 MR. FIELDS: Between JPL and Sunset reservoir?

22 MR. SLATEN: Yes.

23 MR. FIELDS: Yeah. It's pretty steep. You  
24 know, there's water-level data. It's just that there's  
25 a lot of water-level data, historical data. And

1 definitely on the models that the City of Pasadena has  
2 developed and, also, the Battelle and (inaudible) tells,  
3 you know, if you release a particle here, it goes here.  
4 I mean that is the flow path.

5 MR. ZAIDI: Say it again. Source area?

6 MR. FIELDS: If you release something around  
7 this Arroyo, a particle within the model, it heads this  
8 direction. So I mean there is the flow pattern, but --

9 MR. BOMAN: Why argue? Let's move on now.

10 MS. FELLOWS: Because it takes 71 years to do  
11 it.

12 MR. ZAIDI: That's more southward.

13 MR. FIELDS: The gradient kind of flows this  
14 way and then turns south here. And it's pretty much due  
15 south in this area.

16 MR. ZAIDI: I would say there must be a big  
17 change there. The gradient don't change ordinarily like  
18 that. There must be some kind of barrier.

19 MR. BOMAN: There is -- that's why the two sub  
20 areas -- the Monk Hill -- there is outcroppings of  
21 bedrock which makes that --

22 MR. SLATEN: If you go back a billion years,  
23 that was the river flow. If you look at the bedrock,  
24 there is kind of like -- almost like a river, a  
25 valley -- that takes that direction.

1           MR. FIELDS: We don't have it on a graph, but  
2 all the models you'll see, particularly the one at Monk  
3 Hill was developed -- you can see the Monk Hill  
4 protrudes up --

5           MR. ZAIDI: So the formations are kind of rigid  
6 kind of?

7           MR. BOMAN: Yeah.

8           MR. FIELDS: I think the bedrock actually comes  
9 up above the ground water.

10          MR. ZAIDI: So maybe this is a hydraulic  
11 barrier then all coming -- everything coming from JPL  
12 should be stopping there.

13          MR. FIELDS: It's -- it sort of splits. It's a  
14 hill that comes up going out both sides.

15          MR. ZAIDI: If this is the hill, that's JPL.  
16 This is one basin. And because of this hydraulic  
17 barrier, yes, anything up here will --

18          MR. FIELDS: It's more like -- I wish I  
19 could -- if this is the Raymond Basin like this, this is  
20 Monk Hill. Let's say it's like that. So water comes  
21 down and flows to this side, and water flows to this  
22 side and it flows across here or whatever it -- it's  
23 sort of a hill that protrudes up. It's not a barrier  
24 like you're thinking. It's an island. That's a good  
25 analogy.

1           MR. SLATEN: Point to Monk Hill on there,  
2 please.

3           MR. FIELDS: Where that Monk Hill would be, I  
4 believe, it's in this area.

5           Is this right?

6           MS. FELLOWS: Uh-huh.

7           MR. FIELDS: This is sort of the boundary of  
8 Monk Hill.

9           MR. SLATEN: Is the Monk Hill very well defined  
10 so where we would need to put further monitoring wells  
11 would be --

12           Your previous slide had one that showed where  
13 the Monk Hill barrier was, the light blue.

14           MR. FIELDS: I think this is the Monk Hill  
15 boundary of the sub basin. The actual Monk Hill is, I  
16 think, in here.

17           MR. BOMAN: Somewhere in there, yeah.

18           MS. FELLOWS: Further north.

19           MR. FIELDS: I like the idea of looking at  
20 this. That compound would be a nice location for one of  
21 the hills.

22           MR. SLATEN: So you're saying the Monk Hill is  
23 here?

24           MR. FIELDS: Yeah. I think the Atlanta well  
25 would be to the west of the Monk Hill.

1           So the next step would be that we're going to  
2 put together a work plan and distribute that. And then  
3 start moving forward concurrently hopefully with the  
4 city on identifying locations if the city has good  
5 locations like the Sunset reservoir area and then  
6 Atlanta well, and then looking for other locations as  
7 well. If there's none --

8           MR. BURIL: Keith, you found the Sunset  
9 reservoir (inaudible) high-water level?

10          MR. FIELDS: Uh-huh.

11          MR. BURIL: Have you done any correlation in  
12 the golf course area?

13          MR. FIELDS: This is data that we got within  
14 the past several weeks. So we have not done the  
15 correlation yet.

16          MR. BOMAN: You got to realize we haven't  
17 pumped any on the west side, or very little. We pushed  
18 on the west side. Plus, that water that comes from Monk  
19 Hill, we haven't been pumping that water either. So  
20 it's almost like that's where the river is going, and  
21 it's building up down there when it gets down closer to  
22 the fault.

23                 Where there's -- on the east side there's --  
24 we've seen a drop quite a bit where we've been pumping.

25          MR. FIELDS: Another interesting thing that I

1 had talked about -- probably Steve and I haven't talked  
2 about this yet -- but looking and trying to determine a  
3 retardation factor for perchlorate. We know that, you  
4 know, there's in the literature the rate at which it's  
5 slowed down by natural organic matter (inaudible) that  
6 makes a value -- makes it significant how perchlorate  
7 travels.

8           So that's another test we may want to consider.  
9 We brought it up in the past talking with NASA. But if  
10 we just looked at literature values, it could change  
11 value types to an average of 71 if it took the high end  
12 of the end of the literature, you're (inaudible).

13           MR. BURIL: Is there any well in the golf  
14 course area of any kind?

15           MR. BOMAN: Not that I know of.

16           MR. FIELDS: Are they irrigating with potable  
17 water, or do they have their own production wells or do  
18 they use an MWD connection?

19           MR. BOMAN: Yeah. It's potable water, and it's  
20 a little more clay in that area, too. I don't know if  
21 that has any effect.

22           MR. FIELDS: It's impeding downward migration  
23 definitely.

24           MR. TAKARA: Monitor Well 19, how many sample  
25 points are there?

1 MR. FIELDS: Five.

2 MR. TAKARA: Are you picking up any perchlorate  
3 in the first sample?

4 MR. FIELDS: The highest levels?

5 MR. TAKARA: The highest levels.

6 MR. FIELDS: In the highest level of 21, there  
7 has been perchlorate if you go back in the '97, '98  
8 timeframe with a water quality three type. So there is  
9 with time. Some of those concentrations are changes  
10 and, also, the water type that is associated with that  
11 perchlorate is changing. So there's some interesting --  
12 and for some reason that stops in 90. Then there starts  
13 to be a pickup of perchlorate in the lower levels.  
14 They're 1 in 98. Then they started -- then we didn't  
15 see anything for a long time. Then there was a hit in  
16 2002.

17 MR. BURIL: What was that one there?

18 MR. FIELDS: I'm sorry?

19 MR. BURIL: I didn't see that one multiline  
20 draft that was there.

21 MR. FIELDS: We actually had decided --

22 MR. SLATEN: I didn't want you to see it. At  
23 any time something that has to do with interference of  
24 perchlorate in the laboratory detection method, you know  
25 what your TDS is.

1           MR. FIELDS: It has to do with ionic strength.  
2 If you have chloride, there's the way those come out on  
3 that. 314 method is interference.

4           MR. SLATEN: But this is really new stuff that  
5 people are just starting to look in to, and it's not  
6 worth us getting wrapped around.

7           MR. FIELDS: But it is an issue that is kind of  
8 gaining some interest.

9           MR. SLATEN: You'll probably be hearing about  
10 these types of things in the literature next year.

11           MR. TAKARA: Monitoring Well 20, how that data,  
12 the perchlorate levels in the screens from the '97/'98  
13 period transition, just to give you from '94 we shut off  
14 (inaudible) 1994 -- summer of 1994 -- and we shifted a  
15 large focus of our energies of using that surface water  
16 to recharge ground water recharge.

17           So around 1998 we started to receive large  
18 amounts of ground water credit. So I'm not sure if this  
19 plays any part of it out of the Monk Hill. If I recall,  
20 we did a lot more pumping from those wells than we did  
21 in the earlier '92, '93, '94 periods. So I'm not sure  
22 if that's drawing a lot more -- I know the deep ones,  
23 and they're pulling -- I'm not sure what deposit levels  
24 they're pulling from. I know we're pumping a lot more  
25 water.

1           MR. FIELDS: One thing we have are water master  
2 reports back to '85 to understand further back and  
3 understand the pumping rates within these wells for  
4 ground water modeling and just for an understanding of  
5 how much was extracted and when beyond that.

6           So that's something we need to work on getting,  
7 and the water master reports would certainly reflect  
8 that.

9           MR. ZAIDI: Department of Oil Conservation,  
10 maybe some sized lines that run across Sunset reservoir  
11 area that you can look them up. Maybe there are some  
12 segments. That surface may be flat and may not be such  
13 outcrops but in the subsurface.

14          MR. FIELDS: I'll talk to our modelers and see  
15 what they come across in the past. This basin has been  
16 modeled several times, and my guess is that a lot of  
17 those documents -- historical documents -- have been  
18 evaluated, but I will check.

19          This was the MW-21. See screen one back until  
20 2000 sometime had, like, in the 87th perchlorate dropped  
21 down more recently. And here are those hits that I was  
22 telling you about, Chuck.

23          Fifty and 60 manage and 124, but each time it  
24 goes back to nondetect it doesn't make a lot of sense,  
25 and that's in screen four. And then there was that blip

1 in '98.

2 MR. BURIL: Is there any water-type analysis  
3 associated with those blips and those valleys?

4 MR. FIELDS: They're all one, two water types.

5 MS. FELLOWS: All screens?

6 MR. FIELDS: The deeper screens are one, two,  
7 yeah. We actually -- these will be in that work plan,  
8 but we have a lot of these -- sorry about that -- a lot  
9 of these cross sections that have perchlorate, carbon  
10 tetrachloride and then PC data. And then this red is a  
11 type one. The blue is a type two. And then a white is  
12 type three. And if it's split, it's fourth. We have  
13 tried to look at depths with quality and within several  
14 cross sections.

15 MR. ZAIDI: Might be useful in defining the  
16 pathway.

17 MR. FIELDS: We are talking about 40-year  
18 travel times or 100-year travel times for certain types  
19 of these things. I don't know. Maybe you could let me  
20 know what you're thinking at some point on the tracer  
21 tests on how we would use that in a near term.

22 MR. ZAIDI: Well, in the immediate JPL area,  
23 Arroyo area, if we can monitor by injecting a source  
24 area and finding out -- give us flow direction and  
25 follow it (inaudible) actual other than estimated from

1 or whatever, you know, because to date I don't think we  
2 have probably most accurate estimation of velocity. And  
3 depending on the hyperability, these very permeable.  
4 And the fact that we can produce these oil wells it  
5 means it's very (inaudible) and maybe if we can test  
6 maybe give us some actual numbers of velocity.

7 MR. FIELDS: We can look into that. What I'm  
8 recalling is that it's still -- if we release something  
9 near MW-7, it would be 20 years before it got to the  
10 Arroyo well, Well 52.

11 MR. BURIL: Ten years based on pumping at the  
12 time.

13 MR. FIELDS: Okay. So I mean it's -- I don't  
14 know enough about tracer tests to know that it's even  
15 applicable in that time frame.

16 MR. ZAIDI: I'm saying --

17 MR. FIELDS: It's something to look in to.

18 MR. BURIL: Just to share a little bit with  
19 you, we looked at the same kind of thing back in the mid  
20 '90s. That's about the time perchlorate showed up. At  
21 the time it was the consensus of the people perchlorate  
22 was one of the best tracers we had.

23 MR. FIELDS: That's a good point, although now  
24 it's sort of everywhere.

25 MR. BURIL: In the (inaudible) it's not

1 retarded to any great degree. It's conservative and  
2 easily detected.

3 MR. FIELDS: There's also some studies that  
4 we've done in our lab that perchlorate is retarded to a  
5 certain degree with the presence of chlorinated VOCs. So  
6 there's a lot of things to consider with that.

7 MR. BOMAN: Yeah, it has been. It's -- it's  
8 sort of used at chlorinated sites. Perchlorate was  
9 identified as a pretty good tracer for that because it's  
10 going to move ahead more quickly than the TCE and carbon  
11 tetrachloride.

12 MR. SLATEN: How close are we to being done?

13 MR. FIELDS: That's all we have.

14 MR. SLATEN: I guess we're done.

15 The 97-005 stuff, the status of that is we sent  
16 back out some stuff -- I sent back out some stuff last  
17 week.

18 MR. O'KEEFE: We haven't really begun yet.

19 MR. BOMAN: So we'll just keep working on that.  
20 We'll talk about it next month, I guess. I didn't ask  
21 for a certain turnaround.

22 MR. O'KEEFE: We're going to need at least 30  
23 more days.

24 MR. TAKARA: And it's on the website. So we  
25 can download it.

1 MR. SLATEN: Is there anything else?  
2 MR. O'KEEFE: Are we setting another meeting  
3 date?  
4 MR. FIELDS: The standard protocol is a  
5 quarterly.  
6 MR. SLATEN: But next month is by phone, the  
7 first Thursday, at 10:00.  
8 MR. TAKARA: Your agenda set April 8th for  
9 9:00 A.M.  
10 MR. SLATEN: Let's go April 8th at 9:00 A.M.  
11 That's a Thursday.  
12 MR. TAKARA: I think that's a Thursday.  
13 MR. SLATEN: Telephone. Quarterly we're back  
14 here. So I'm sorry --  
15 MS. FELLOWS: We'll send an e-mail to get  
16 everybody on it this time.  
17 MR. SLATEN: We'll send out an e-mail about a  
18 week ahead.  
19 Thanks.  
20 (At 2:17 P.M. the proceedings were  
21 concluded.)  
22  
23  
24  
25

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

3

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