

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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In the Matter of :
 :
PRIVATE FUEL STORAGE : Docket No. 72-22
L.L.C. : ASLPB No. 97-732-02-ISFSI
 :
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Washington, D.C.

Friday, March 15, 2002

Deposition of

JAMES K. MITCHELL

a witness, called for examination by counsel for Private Fuel Storage, pursuant to notice and agreement of counsel, beginning at approximately 8:30 a.m., at the law offices of Shaw Pittman, 2300 N Street, NW., Washington, D.C., before Barbara A. Huber of Beta Reporting & Videography Services, notary public in and for the District of Columbia, when were present on behalf of the respective parties:

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NUCLEAR REGULATORY COMMISSION

Docket No. _____ Official Exh No. _____
In the matter of PFS
Staff _____ IDENTIFIED
Applicant _____
Intervenor _____
Contractor _____
Contractor's Off't _____
Other _____
Reporter JK

1 characteristic? Is that what you're saying?

2 A That's I think a reasonable way to
3 put it. It's certainly possible to obtain a
4 strength of 250 PSI. But to date, I have
5 seen the results of -- I have not seen the
6 results of any tests that show me that for
7 this soil.

8 Q Again, I'm jumping way ahead, but
9 we my go back to this. I provided to the
10 state at their request earlier this week
11 some preliminary test results of the program
12 that PFS is conducting.

13 Have you seen those?

14 A Yes.

15 Q So you have seen those test
16 results?

17 A I have.

18 Q Going back --

19 A That is, if it's the same set of
20 results -- you know, there may -- I don't
21 know how many sets of results there are, but
22 I have seen one set of results.

1 report on soil cement in developing the site
2 specific procedures for mixed portion and
3 testing, construction and quality control?

4 A I'd have to go back and look at
5 the guidelines in some detail to be sure
6 whether you would follow them exactly in all
7 respects. But I think that there's good
8 guidance there, yes. The same kind of
9 guidance are available through the Portland
10 Cement Association publications and
11 elsewhere.

12 Q Is it, in fact, your understanding
13 that the state-of-the-art report on soil
14 cement references all the publications, such
15 as the Portland cement standard that you
16 talked about?

17 A I think it does. References the
18 AFTM standards that are often used.

19 Q Those would be the standards that
20 you would expect somebody designing or
21 constructing soil cement probably would be
22 follow; is that correct?

1 A Yes, I believe so. Yes, I would.

2 Q As long as we are on that
3 page, 26117, would you take a look at the
4 discussion we just began looking? Take a
5 second to read that, or more than a second.
6 I would like you to take a look at that
7 paragraph on page 26117, and then three
8 paragraphs with bullets that go on
9 page 26118 and 119. Take a second to review
10 those. Let me know when you're finished.

11 A Okay.

12 Q Before we go into the specifics of
13 this bullets, maybe it would be good for the
14 record if we talked about your understanding
15 of what PFS intends to do with soil cement.

16 Are you sufficiently familiar with
17 what you understand to be their intents, so
18 you can describe it for us?

19 A Do you want me to describe it?

20 Q Yes. If you could describe your
21 understanding of what they're trying to do.

22 A They're using it in two ways, my

1 strengths of mixes, if you will, of soil
2 cement underneath the pad, as opposed to
3 elsewhere; is that correct?

4 A Yes.

5 Q So what is your understanding of
6 the compressive strength, if you will, of
7 soil cement that they want to use underneath
8 the pads, as opposed to in other areas?

9 A My understanding if -- is that the
10 strength of the treated soil beneath the
11 pads is low. Is 40 PSI right, the right
12 number? That the soil cement surrounding
13 the building is stronger, 250 PSI.

14 Q The soil cement around the pads is
15 also stronger?

16 A I don't remember on that but I --
17 I don't remember whether it's still the 40
18 or whether it's 250.

19 Q With that background, let's turn
20 to the first bullet on page 26118.

21 In that paragraph, with the first
22 bullet that is entitled, soil/cement mix and

1 procedure development, the first paragraph
2 of that entire section says, The sliding
3 forces due to design bases ground motion
4 will be resisted by bond between the base
5 and sides of the foundation and the soil
6 cement, and by passive resistance of the
7 soil cement acting against the vertical side
8 of the foundation. The soil cement mix will
9 be designed and constructed to exceed the
10 minimum shear resistance requirements.

11 Do you have any reason to believe
12 that this approach as a technical
13 proposition will not be successful if done
14 properly?

15 A I don't have any reason to believe
16 that it wouldn't be successful, no.

17 Q It goes on to say that there be
18 direct shear testing conducted to replicate
19 the soil conditions and to confirm the
20 adequate shear resisting and other strength
21 requirements will be provided by the final
22 soil cement mix.

1 A My response to that is that's
2 important, yes.

3 Q Isn't it true that if PFS performs
4 durability tests as specified in Exhibit 14
5 that demonstrate that the mix that they
6 propose to use passes or survives these
7 durability tests, that that mixture would be
8 qualified, in your opinion, as true soil
9 cement?

10 A Yes.

11 Q If it doesn't, therefore it
12 doesn't qualify as such?

13 A It would not.

14 Q But that's independent of whether
15 the mixture that they intend to use achieves
16 the strength that is specified?

17 A Yes.

18 Q You testified earlier that you see
19 no problem with the ability to get the 250
20 PSI mix as such?

21 A My opinion is that it should be
22 possible, but I would like to see it

1 demonstrated.

2 Q Also you would like to see
3 demonstrated that in addition to having 250
4 PSI, it meets the durability test?

5 A That's correct.

6 Q Let's move to paragraph 13 in your
7 declaration.

8 It starts with, It is not
9 surprising that no site specific testing has
10 been done to date to obtain the strength and
11 durability properties of the cement-treated
12 soil.

13 Do you see that?

14 A I see that. But what I heard I
15 don't believe is what I said.

16 Q Did I misread it?

17 A I believe you said it is not
18 surprising. It's an important distinction.
19 Because I said it is surprising.

20 Q If I did that, it was a Freudian
21 slip, as they call it.

22 What I'm asking you, actually,

1 some thermal studies that would tell us.

2 Q If, in fact, there was some heat
3 that was being moved downwards by the
4 mechanism that we just described, then would
5 that heat tend to move the moisture away the
6 top layer or towards the top layer?

7 A I would expect it to move it away.
8 I'd be very interested in seeing the thermal
9 results of this. It's an interesting issue.

10 Q Of course, this is not something
11 that you have analyzed to date?

12 A I have not analyzed. But I have,
13 in the past, done both experimental and
14 theoretical research on the heat flow around
15 buried things.

16 Q This mechanism that I described to
17 you is one that you have reason to believe
18 its possible, or at least it's --

19 A Well, the heat transfer and the
20 temperature. Oh, yes.

21 Q Now, let's go back to
22 paragraph 14. Because I think in addition

1 Q What will your comments be on that
2 particular issue?

3 A Well, we have no data to
4 demonstrate what the modulus is at this
5 point. If the material is a soil cement, I
6 would be seriously concerned about whether
7 the modulus could ever be that low. That's
8 a very low value for soil cement.

9 But, also, as I think I understand
10 it now, the rules of the game have changed a
11 little bit since I first did this. The
12 material beneath the pads will not
13 necessarily be a soil cement. It will be a
14 cement-treated soil.

15 I think at this point it's a
16 question of: All right. For the cement
17 treatment that you're now going to use or
18 it's being proposed for use, will the
19 modulus be within that design limit? To
20 that question, I have no answer. Because I
21 don't see any data.

22 Q Let's talk about that question.

1 First, as a technical engineering
2 matter, is it within what is achievable,
3 given the state-of-the-art, to build a
4 cement-treated soil moisture will that have
5 a Youngs modulus of 75,000 PSI or less?

6 A I can only say it potentially is.
7 But it's going to be an issue of how much
8 cement for this soil and what placement
9 condition. Because the placement condition
10 can be tremendously important in determining
11 the strength and stiffness, as well as the
12 cement content. It's at the low end of
13 modulus values for this kind of a material,
14 where we just don't have much data.

15 I was looking at information on
16 this, and trying to see do we have good data
17 points down in that modulus range. That's
18 about where you go off the chart.

19 Q Now, assuming that, in fact, the
20 design intent is carried out to have
21 cement-treated soil with a strength of 40
22 PSI, do you believe that that's in the range

1 of values that, subject to proven by
2 testing, could yield a modulus of 70,000 PSI
3 or less?

4 A I think it is potentially
5 possible. I'm trying to remember a number.
6 I think it might be in that ACI report,
7 about modulus value is a function of cement
8 content for fine grain soils. It's way down
9 in the lower left corner.

10 Q How would you go, first of all,
11 about testing the soil, the cement-treated
12 soil mixture that you intend to use, to
13 determine whether it meets the upper bound
14 limitations of the Youngs modulus? What
15 kind of test would you expected that would
16 be performed?

17 A I think the -- I would test soil
18 from the site over a range of proposed
19 cement and water contents. I would have
20 specimens -- cured specimens, for which I
21 could determine both the strength and the
22 modulus.

1 There are different ways that you
2 can get the modulus: From strength test,
3 from some dynamic tests that are possible.
4 Then you simply -- you have to find a
5 condition that will give you this strength,
6 which is 40 PSI compressor strength; and for
7 those materials, what range of conditions
8 will give you a modulus that is less
9 than 75,000 PSI.

10 Q That would you determine through a
11 testing program under the lines that you
12 talked about?

13 A Testing program, yes.

14 Q Now, as to the second part --
15 which I thought that you mentioned as being
16 pretty important -- what do you mean by
17 placement conditions?

18 What is it that you would like to
19 see in order to assure yourself that even if
20 you have been able to through testing to
21 determine that you have a cement-treated
22 soil mix that emits a 75,000 PSI limit, what

1 surrounding field, the strain will be
2 considerably less. So a comprehensive
3 response of all that would have to take all
4 that into account.

5 Q Fair enough. Let me ask you a
6 more general question. We have been talking
7 about the various issues that you have
8 identified in your declaration, and in
9 subsections C and D of Contention QQ,
10 subsection C and D of part C of Contention
11 QQ.

12 Would it be fair to characterize
13 your responses as indicating that many of
14 these issues are in the nature of things
15 that you would like to see proved through
16 testing, as opposed to being unachievable
17 technically?

18 A Yes.

19 MR. TRAVIESO-DIAZ: I have nothing
20 else.

21 MR. TURK: I may have none, or
22 very, very little.