

1 A (Mr. Peery) Also, nine of the borings were  
2 left open overnight to see if any water would accumulate  
3 in the borings, and none was noted.

4 Q When you talk about shallow groundwater,  
5 what -- can you quantify that?

6 A (Mr. Peery) Well, I guess it's a relative  
7 term, depending where you are in New Mexico, but at this  
8 specific site, the shallow groundwater would normally be  
9 referred to in the upper sediments, above the Chinle  
10 formation.

11 Q And can you quantify the depth of that? Does  
12 that vary a whole lot over the site?

13 A (Mr. Peery) It varies from around 22 feet to  
14 about 55 feet, if I recall.

15 Q Uh-huh. Can you tell us exactly how the report  
16 of moisture in one of the holes that you spoke of -- what  
17 data was that based on?

18 A (Mr. Peery) It was based on the field  
19 geologist's interpretation of the materials that came off  
20 the log from a split-spoon sample.

21 Q And what drilling methods were used?

22 A (Mr. Peery) It was a hollow-stem auger.

23 Q Do you know whether the cuttings themselves  
24 that came up were being logged or recorded in any way when  
25 that hole was made?

In the Matter of LOUISIANA ENERGY SERVICE  
Docket No. 70-3/OS-AL Official Exhibit No. 78  
OFFERED by: Applicant/Licensee Intervenor NEALS/PC  
NRC Staff Other  
IDENTIFIED on \_\_\_\_\_ Witness/Panel \_\_\_\_\_  
Action Taken: ADMITTED REJECTED WITHDRAWN  
Reporter/Clerk \_\_\_\_\_

1           A       (Mr. Peery) I don't have firsthand knowledge  
2 of that, but as a geologist who has performed logging of  
3 numerous holes, you always log everything that comes up  
4 the hole, whether it's a core, a split-spoon or the  
5 cuttings, to verify everything you see coming out of the  
6 hole.

7           Q       Did you check the logs of the cuttings to see  
8 if there was any mention of moisture?

9           A       (Mr. Peery) The mention of moisture was for a  
10 specific zone, and so I assume it's -- everything over  
11 that entire zone was logged as moist, the cuttings and  
12 the --

13          Q       What was -- what's the name of -- the  
14 designation of this hole that we're talking about?

15          A       (Mr. Peery) I believe that one was B-2.

16          Q       B-2. Okay.

17          A       (Mr. Peery) From the geotechnical borings.

18          Q       And what was the depth of the zone? What was  
19 the vertical extent of the zone?

20          A       (Mr. Peery) Approximately 31 to 40 feet, if I  
21 recall correctly. And it's important to point out that  
22 when you have a formation like the Chinle, which is  
23 predominantly a shale or clay material, that you have a  
24 significant amount of porosity in that material, and  
25 therefore having moist samples is not an unusual thing to

1 find in the Chinle or any formation for that matter above  
2 the water table in the vadose zone.

3 The fact that you have such a high porosity in  
4 the fine-grain materials, it allows it to hold onto water  
5 quite readily, but it doesn't allow water to move quickly  
6 through that sediment or to develop necessarily a  
7 saturated zone.

8 Q So the moisture, if we can call it that, was in  
9 a zone of the Chinle. Is that correct?

10 A (Mr. Peery) Uh-huh.

11 Q Can you describe the -- this is sedimentary  
12 rock. Is that right?

13 A (Mr. Peery) Yes.

14 Q And what's the nature of it in the zone that  
15 was moist?

16 A (Mr. Peery) Nature of it's a high-density,  
17 highly plastic clay.

18 Q Okay. You said that you're also going to be  
19 testifying about the hydraulic properties of the  
20 formations. Can you say what your conclusions are in that  
21 regard?

22 A (Mr. Peery) Yes. My conclusions regarding the  
23 Chinle is that it has a very low permeability based on  
24 data from the nearby WC site, which is a very similar  
25 hydrogeologic setting in that it has the same sediments

1 way the samples are collected, you often will see some  
2 increased permeability, because the sample is collected by  
3 pounding a split-spoon into the sediments, so therefore  
4 you can get some more damage to the material that you're  
5 trying to sample, so it tends to potentially give you some  
6 higher permeability readings than you might otherwise have  
7 gotten.

8 Q Isn't it a fact that you could also get lower  
9 permeability readings than you might get in a field test,  
10 using a lab test?

11 A (Mr. Peery) I would say that's dependent on  
12 the nature of the material that you're sampling.

13 Q If there were any fractures or fast-flow paths  
14 in the Chinle and one used a lab sample to test  
15 permeability, isn't it quite possible that you'd miss the  
16 fast-flow paths with the sample you took?

17 A (Mr. Peery) The boreholes that were sampled  
18 and logged, no. I would say no. You would see those as  
19 you drilled down and collect your samples.

20 Q Would they be present in the -- well, strike  
21 that.

22 When you're conducting a lab test, you actually  
23 extract a piece of the formation, and you subject it to  
24 permeability tests of that piece of rock in the lab. Is  
25 that right?

1 A (Mr. Peery) Uh-huh. That's correct.

2 Q And can you tell me the size of the sample that  
3 was taken for testing in the WCS site?

4 A (Mr. Peery) No, I don't recall. Normally  
5 those kind of samples would be on the order of an inch-  
6 and-a-half diameter split-spoons, but I don't know exactly  
7 what was used.

8 Q So if there were fractures at a rate of, say,  
9 five inches apart in the rock body, there's no assurance  
10 that you would capture that characteristic in a sample, is  
11 there?

12 A (Mr. Peery) Possibly not. I should point out  
13 again, though, the fact that the Chinle sediments are  
14 reported as dry to very dry is strong evidence that there  
15 isn't a fast-flow fracture path there. If there were, you  
16 would expect to see those sediments having quite a bit of  
17 moisture in boreholes.

18 Q You said that there's no evidence of fast-flow  
19 paths or fractures. And were you referring to the Chinle  
20 formation --

21 A (Mr. Peery) Yes.

22 Q --when you spoke. And did you look for such  
23 evidence?

24 A (Mr. Peery) Yes, I did.

25 Q And can you tell me what you did?

1 up, and I have -- and it would need to function throughout  
2 the operational life of the plant.

3 Q Do you know anything about any warranties that  
4 manufacturers of liner material might offer for these  
5 basins?

6 A (Mr. Harper) There's information. I believe  
7 it's either in the groundwater discharge permit or the  
8 environmental report, but it attests to the fact that the  
9 liner would be installed in accordance with all the  
10 manufacturer's recommendations so as not to void any  
11 manufacturer warranties.

12 Q Okay. But do you know what kind of warranties  
13 such manufacturers offer?

14 A (Mr. Harper) No, I do not.

15 Q Has any effort been made to estimate the  
16 qualities of the water present in either of these basins,  
17 the TEEB or the UBC basin?

18 A (Mr. Harper) Yes, there has.

19 Q Okay. Can you describe what that work has  
20 involved?

21 A (Mr. Harper) That information is provided in  
22 both the ER and in the groundwater discharge permit plan  
23 application.

24 Q And were you involved in that effort?

25 A (Mr. Harper) To some extent.

1 Q Do you have any understanding yourself of where  
2 the water in MW-2 came from?

3 A (Mr. Peery) Yes. It comes from the siltstone  
4 at the 200 to 230-ish nomaly zone.

5 Q And where did it come from to get into the  
6 siltstone?

7 A (Mr. Peery) Oh, it -- you're -- I'm sorry.  
8 Where did it come from? Where did that aquifer water  
9 develop?

10 Q Yes.

11 A (Mr. Peery) Recharge water over time, and the  
12 nearest recharge area is many tens of miles east -- west  
13 of this location.

14 Q Where is that recharge area?

15 A (Mr. Peery) It's towards the -- I can't tell  
16 you specifically, but it's towards the boundary of Eddy  
17 and Lea County.

18 Q How do you know that that's a recharge area?

19 A (Mr. Peery) The -- with very low  
20 permeabilities overlying that zone, recharge is not from  
21 water falling directly, either -- you know, water directly  
22 overlying that aquifer, so the recharge areas have to be  
23 where that aquifer is closer to the ground surface.

24 Q All right. And you've identified an area. Are  
25 you saying that you're aware that the -- this aquifer is

1 closer to the ground surface at a point near the Eddy  
2 County boundary?

3 A (Mr. Peery) I would have to verify the depth  
4 to the aquifer in that area. And, in fact, some of the  
5 water in that aquifer is probably quite ancient water that  
6 has not recharged in, as I said, a very, very long time.

7 Q Uh-huh. Okay. Did you see a report of a  
8 pesticide being detected in MW-2?

9 A (Mr. Peery) Yes, I did.

10 Q And did you reach any conclusion about that?

11 A (Mr. Peery) Yes, I did.

12 Q What's your conclusion?

13 A (Mr. Peery) My conclusion is that the  
14 contamination identified in that sample was probably a  
15 result of something introduced either during drilling or  
16 possibly a laboratory error, and that is based on  
17 subsequent samples not having any contamination in them.

18 Q Well, do you know anything about the history of  
19 the sample that contained a pesticide that leads you to  
20 think it became inadvertently contaminated, either in the  
21 lab or at this site?

22 A (Mr. Peery) Could you restate that question,  
23 please?

24 Q Well, do you know anything about how that  
25 sample was taken, the first one -- was it the first one in



1 MW-2 that showed --

2 A (Mr. Peery) Yes, it was.

3 Q -- pesticide? Do you know anything about how  
4 that sample was taken that would lead you to think it was  
5 contaminated inadvertently by a pesticide?

6 A (Mr. Peery) No. I don't know how -- exactly  
7 how the sample was collected.

8 Q But you've rejected that as an accurate sample.

9 A (Mr. Peery) Yes.

10 Q And you've rejected it because two later  
11 samples showed no pesticide.

12 A (Mr. Peery) Correct.

13 Q And there's no other basis for your rejection.

14 A (Mr. Peery) The other basis for the rejection  
15 would be the potential source for a pesticide to be in  
16 that lower aquifer that isn't being recharged from  
17 anywhere in the immediate vicinity. There's no mechanism  
18 to get a pesticide into the aquifer there.

19 Q So you rejected the possibility that there was  
20 a mechanism to get the pesticide into the aquifer.

21 A (Mr. Peery) After the subsequent samples came  
22 back clean.

23 Q I believe there's a statement in the  
24 environmental report -- we can find it if we need to --  
25 that the water in the Santa Rosa Aquifer is not potable.

1 Is that -- are you aware of that?

2 A (Mr. Peery) Yes, I am.

3 Q Do you agree with that?

4 A (Mr. Peery) Yes, I do. Yes.

5 Q Can you explain why that's so in your mind?

6 A (Mr. Peery) The total dissolved-solids  
7 concentration of water produced from the Santa Rosa  
8 Aquifer is above the drinking water standard.

9 Q And what standard is that?

10 A (Mr. Peery) The EPA drinking water standard.

11 Q And what's -- can you quantify it?

12 A (Mr. Peery) It's 500 milligrams per liter with  
13 a cap of 1,000. It's an aesthetic standard.

14 Q A cap of 1,000?

15 A (Mr. Peery) Yes. It's 500 to 1,000.

16 Q Okay. And what is the depth of the water in  
17 the Santa Rosa Aquifer underneath the LES site?

18 A (Mr. Peery) It would be approximately 1,100  
19 feet.

20 Q Do you know the speed at which water is  
21 traveling in that aquifer?

22 A (Mr. Peery) No.

23 Q Do you know where that water is going to emerge  
24 on the surface, if anywhere?

25 A (Mr. Peery) No, I don't.

1 Q Do you know if that aquifer is pumped anywhere  
2 downstream from the LES site?

3 A (Mr. Peery) I believe that -- downstream?

4 Q Down gradient.

5 A (Mr. Peery) Yes. I don't know of wells  
6 specifically completed in there. There may be some  
7 domestic or windmill wells, but I don't know of any that  
8 are specifically completed in there, that I can recall.

9 Q Do you know if that aquifer is used for stock  
10 watering, the down gradient?

11 A (Mr. Peery) It likely is. If wells are,  
12 indeed, completed in it, it would likely be for stock  
13 watering, because of the low yield of the well, of the  
14 aquifer.

15 MR. LOVEJOY: Let's pass out one for each  
16 lawyer and one for the witnesses. I guess the panel only  
17 gets one, because there has to be one exhibit.

18 We should mark this Exhibit 3. We should mark  
19 the official exhibit. I'm sorry. There's a process we  
20 need to follow.

21 (The document referred to was  
22 marked for identification as  
23 Exhibit NIRS-HP 3.)

24 BY MR. LOVEJOY:

25 Q Would you please take a look at Exhibit 3.

1 fact I know he's a trained engineer.

2 Q Okay. Over on page LES-909, under the caption,  
3 Unlined Basin, the second paragraph has certain language  
4 in it. I'll read it to you.

5 It says, "There are two major factors  
6 considered for this decision" -- referring to the unlined  
7 basin. "First, for an unlined basin, the uranium will  
8 permeate into the soil. At the end of the life of the  
9 plant, the contaminated soil will have to be disposed of.  
10 The depth to which the uranium will permeate into the soil  
11 is difficult, if not impossible, to calculate at this  
12 time."

13 Do you agree with that statement?

14 A (Mr. Harper) At the time this report was  
15 written, I don't believe there was sufficient design  
16 detail available.

17 Q I see. So at the time it was true.

18 A (Mr. Harper) Yes. I believe it was a true  
19 statement at the time.

20 Q Okay. And what work was done since this report  
21 was prepared on the question addressed there?

22 A (Mr. Harper) Explicitly on estimating the  
23 depth of --

24 Q The depth to which the uranium will penetrate  
25 into the soil.

1 A (Mr. Harper) I'm not aware of any additional  
2 work that was done in this area.

3 Q Okay.

4 MR. LOVEJOY: This will be Exhibit 4. Here's  
5 another copy.

6 (The document referred to was  
7 marked for identification as  
8 Exhibit NIRS-HP 4.)

9 BY MR. LOVEJOY:

10 Q Would you, both witnesses, please take a look  
11 at Exhibit 4 and state whether you've seen this one  
12 before, either of you.

13 A (Mr. Peery) I don't recall reviewing that  
14 report.

15 Q Okay. Mr. Harper, have you seen this?

16 A (Mr. Harper) I have most likely seen this  
17 report.

18 Q Okay. Can you tell from any of the marks on  
19 this whether it came your way at or about the date it was  
20 produced?

21 A (Mr. Harper) Well, I'm not listed on the  
22 distribution list there, but it did come to -- it was  
23 copied to Framatome, and it's quite likely that I did  
24 review this. Thus, they sent it as a --

25 Q Okay. Over on page 5, under, Lined Basin,

1 retrieved from NRC's computer system. I put that there.

2 Was this report prepared as part of the basis  
3 for -- no. Strike that. I've asked that.

4 In preparation of this report, did the Cook-  
5 Joyce firm conduct some drilling on the LES site?

6 A (Mr. Peery) Yes, they did.

7 Q And what -- do you recall what boreholes were  
8 made?

9 A (Mr. Peery) They drilled nine boreholes and  
10 installed three monitoring wells.

11 Q These were in addition -- the three wells were  
12 in addition to the boreholes?

13 A (Mr. Peery) Yes.

14 Q And did they locate groundwater in the wells  
15 they drilled?

16 A (Mr. Peery) They were -- reported groundwater  
17 in Monitor Well 2.

18 Q And at what depths did they find groundwater?

19 A (Mr. Peery) I'd have to look specifically at  
20 what they said, but it's in the aquifer, currently  
21 referred to as the one at about 220, 230 foot down the  
22 siltstone.

23 Q At the bottom of page 3 of this report, the  
24 statement appears, "Groundwater has not been identified in  
25 the 125-foot silty sandstone zone. Groundwater in the

1 180-foot zone is present at some locations but not  
2 continuously across the WCS property." And it says,  
3 "Groundwater is present in a 230-foot across the entire  
4 portion of the WCS property that's been investigated."

5 Does that refresh your recollection as to where  
6 they found groundwater, the Cook-Joyce firm?

7 A (Mr. Peery) Yes, it does.

8 Q Okay. Where did they -- where to your  
9 recollection now did they find groundwater?

10 A (Mr. Peery) According to this, the 180-foot  
11 zone, it says it's present in some locations. Where I  
12 recalled they actually found water is in Monitor Well 2 at  
13 that 230-foot zone.

14 Q Okay. Do you know what drilling techniques  
15 were used by Cook-Joyce, what methods?

16 A (Mr. Peery) As I recall, the B-1 through -9  
17 borings were hollow-stem auger, and the monitoring wells  
18 were direct air rotary.

19 Q Did they use no fluids at all in their air  
20 rotary drilling?

21 A (Mr. Peery) I do not recall the mention of  
22 using fluids when they drilled.

23 Q Over on page 5, they talk about monitor well  
24 drilling and installation program. It says, "The three  
25 monitor wells were designed based on the results of the

1 In the absence of that, I think we're going to  
2 have to say if you think you're entitled to pursue the  
3 seismic issue at some point, feel free to seek to bring it  
4 before the Board in the manners that are permitted, and if  
5 it's -- you're successful on that, we'll get the right  
6 panel here on that, but this is not the panel to go into  
7 the detailed questioning of the seismic issue.

8 If you have a view about that and questions  
9 that relate to the groundwater that will be the nexus that  
10 we get to see in the line of questioning that you pursued,  
11 please outline that for us, and you can start questioning  
12 about this.

13 But in the absence of that, I propose to move  
14 on to your next line of inquiry, as these are not the  
15 folks to talk about seismic absent a connection to the  
16 groundwater issue.

17 BY MR. LOVEJOY:

18 Q Mr. Peery, as a hydrologist, would you consider  
19 a fault line to be at least potentially a fast-flow path?

20 A (Mr. Peery) Potentially. Faults can be --  
21 faults can create fracturing, but faults can also create  
22 gouge within the fault itself, making it a low-permeable  
23 barrier as well.

24 Q So if you were investigating the hydrology of a  
25 particular site, would you wish to know whether there was



1 a fault present beneath or near the site?

2 A (Mr. Peery) Yes.

3 Q You would. Okay. When did you complete you  
4 investigations of the LES site?

5 A (Mr. Peery) I didn't actually perform  
6 investigations as such. I performed a review of the  
7 investigations at the site.

8 Q And when was that, did you finish that?

9 A (Mr. Peery) Oh, earlier this week.

10 Q And you've not seen the report that was  
11 submitted to NRC concerning this fault.

12 A (Mr. Peery) I have not.

13 Q Would you like to see that?

14 A (Mr. Peery) Yes, I would.

15 Q Why is that?

16 A (Mr. Peery) I want to see what extra  
17 information was discovered relating to the fault. It's  
18 interesting in that there was a fault discovered at the  
19 site, and the data collected at the WCS facility clearly  
20 shows low permeability throughout the Chinle formation, so  
21 I'm interested to see what happens with the fault.

22 Q Are you going to pursue that investigation?

23 A (Mr. Peery) Yes.

24 Q Okay.

25 MR. LOVEJOY: Let's mark this one. Is this 11

1 specifically here it says they did not take any credit for  
2 evapo-transpiration. This would appear to be an  
3 evaluation that assumes that all -- that the evapo-  
4 transpiration is not accounted for in the analysis, so I  
5 would not agree with it.

6 Q Can I ask each of you witnesses: Have you ever  
7 known a liner of a basin to leak?

8 A (Mr. Peery) I don't have a lot of experience  
9 with lined sites.

10 Q Okay. Mr. Harper?

11 A (Mr. Harper) During my career as an engineer,  
12 I believe at some points I have read articles over heard  
13 cases where liners have leaked.

14 Q Can you remember the causes that were  
15 attributed to those leakages?

16 A (Mr. Harper) Since I don't have any particular  
17 examples, I -- they would just be this -- I would assume  
18 the usual suite of potential reasons why a liner could  
19 leak.

20 Q What's the usual suite?

21 A (Mr. Harper) Improper installation, for  
22 example.

23 Q Anything else?

24 A (Mr. Harper) Some type of a puncture due to  
25 poor maintenance practice or burrowing animals, something

1 else, would be a potential.

2 MR. LOVEJOY: Okay. I'm done.

3 MR. CURTISS: Okay.

4 MR. LOVEJOY: We'll go off the record here.

5 (Whereupon, the taking of the instant  
6 deposition was concluded.)

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