UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

BEFORE THE COMMISSION

In the Matter of:	
LOUISIANA ENERGY SERVICES, L.P.	Docket No. 70-3103-ML
(National Enrichment Facility)	ASLBP No. 04-826-01-ML

Deposition of:

GEORGE A. HARPER

ROGER L. PEERY

witnesses of lawful age, taken on behalf of the Nuclear Information & Resource Service and Public Citizen, pursuant to notice, in the New Mexico Environment Department, Office of the Secretary, Conference Room, Harold Runnels Building, 1190 St. Francis Drive, Santa Fe, New Mexico, on Friday, September 17, 2004, at 9:00 a.m., before Carol Oppenheimer, Notary Public, when were present:

APPEARANCES:

On behalf of Nuclear Information & Resource Service and Public Citizen:

LINDSAY A. LOVEJOY, JR., ESQ.

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Santa Fe, New Mexico 87501

U.S. NUCLEAR REGULATORY COMMISSION
In the Matter of LOUISIANA ENERGY SERVICES, LP
Docket No. 70-3103-ML Official Exhibit No. 17
OFFERED by: Applicant/Licensee Intervenor NIRS/PC
NRC Staff Other
IDENTIFIED on Witness/Panel G. Rice
Action Taken: ADMITTED REJECTED WITHDRAWN
Reporter/Clerk

On behalf of the Louisiana Energy Services, L.P.:

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On behalf of the Nuclear Regulatory Commission:

LISA CLARK, ESQ.

Nuclear Regulatory Commission

Also Present:

GEORGE R. (RANDY) CAMPBELL

Lockwood Greene

ROD KRICH

National Enrichment Facility

JOHN W. LAWRENCE, ESQ.

National Enrichment Facility

GEORGE RICE

Expert Witness, Groundwater Hydrologist

MARK S. STRUM

Framatome ANP, Inc.

ALAN TOBLIN

Advanced Technologies and Laboratories International, Inc.

ABE ZEITOUN, Ph.D.

Advanced Technologies and Laboratories International, Inc.

I N D E X

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PROCEEDINGS

Whereupon,

GEORGE A. HARPER

ROGER L. PEERY

having been first duly sworn, were called as a witnesses herein, and were examined and testified as follows:

MR. LOVEJOY: Good morning. Can we mark as Exhibits 1 and 2 these two resumes, please.

(The documents referred to were marked for identification as Exhibits NIRS-HP 1 and 2.)

EXAMINATION

BY MR. LOVEJOY:

Q Okay. For identification, Mr. Peery, is Exhibit 1 your own resume?

A (Mr. Peery) Yes, it is.

Q And, Mr. Harper, is Exhibit 2 your own resume?

A (Mr. Harper) Yes, it is.

Q Okay. Mr. Peery, I take it from looking at your resume, Exhibit 1, that you're now associated with John Shomaker & Associates, a hydrology firm in Albuquerque. Is that right?

A (Mr. Peery) That's correct.

Q And I've just gotten this right now. Can you just tell me for the record what your education is in

scientific fields related to --

A (Mr. Peery) I have a bachelor of science in geology and a master's in water resources.

Q Okay. And since 1992, how have you been employed?

A (Mr. Peery) Since 1992, I've been employed at John Shomaker & Associates as a hydrogeologist.

Q And what kind of tasks have you undertaken there?

A (Mr. Peery) I have been involved with environmental investigations, development of monitoring wells, networks, logging of holes, remediation of environmental sites, water resources work related to well siting, evaluation of water supply, groundwater flow modeling, water planning, regional water planning as well as municipal water planning.

Q Have you had occasion to testify as an expert?

A (Mr. Peery) Yes, I have.

Q Can you name the times, please?

A (Mr. Peery) I can give you rough times. I don't remember exactly.

Q That's fine.

A (Mr. Peery) I believe last year I testified in front of the Office of the State Engineer hearing examiners related to a water rights issue. And I believe

another time in front of the New Mexico Office o State Engineer related to a water issue. That was around 2000. I've also testified in front of the Planning and Zoning Commission and the county commissioners of Santa Fe. That was probably 1995-ish in front of the Socorro County commissioners, I believe, 2000. Sandoval County commissioners, I testified before them on several occasions in the late '90s and 2003 and probably somewhere in early 2000 also.

Q Okay. How large an office is Shomaker & Associates?

A (Mr. Peery) We're currently about 14 people, including support staff.

Q Okay. And what tasks, if any, have you been assigned to undertake with respect to the LES proposal for an enrichment plant?

A (Mr. Peery) To look at the site hydrogeology and to look at water supply issues.

Q When you say, look at hydrogeology, what do you mean? What have you been asked to do?

A (Mr. Peery) Review available data from site reports and permit applications that LES has submitted, and I've also looked at other scientific reports from nearby WCS facility.

Q Okay. Have you been asked to direct or design

any exploration efforts?

A (Mr. Peery) No, I have not.

Q Have you been asked to undertake any data gathering efforts, apart from reviewing reports that have been prepared?

A (Mr. Peery) No.

Q When did you first undertake work on matters involving LES?

A (Mr. Peery) I think we signed a contract with LES approximately three months ago.

Q We being Shomaker & Associates.

A (Mr. Peery) Shomaker & Associates.

Q Okay. Mr. Harper, would you identify Exhibit 2?

A (Mr. Harper) I already have.

Q You did. Okay. So it's still your resume.

A (Mr. Harper) Still my resume.

Q Okay. Would you please describe your scientific and engineering education.

A (Mr. Harper) I have a bachelor of science in civil engineering and a master's of science in civil engineering from the University of Massachusetts at Amherst. I'm a registered professional engineer in three states: Maine, New Hampshire and Massachusetts. And I've worked in the nuclear industry for 25 years, mostly in the

environmental area.

Q What, if any, training have you had in the sphere of hydrology?

A (Mr. Harper) My master's in flow mechanics and hydraulics. As you'll see in my resume, I've taken various hydrology seminars and training courses over the years. I'm also a FERC-approved hydrologist, as my resume documents, and I've done a lot of hydrology and hydraulics work during my career.

Q What is involved in becoming a FERC-approved hydrologist?

A (Mr. Harper) I've been on two of the DM safety committees where by through my experience and record, they have approved me to act as a hydrologist on DM safety studies.

Q Have you ever testified as an expert witness on matters of hydrology?

A (Mr. Harper) Partially. I testified back in the early 1990s before the Vermont Public Utilities Commission on site characterization issues associated with a potential low-level waste facility in Vermont, and my testimony covered all types of environmental issues, including hydrology and groundwater.

Q Okay. Is that the only instance you've testified as expert in hydrology?

A (Mr. Harper) Correct.

Q And where are you employed now?

A (Mr. Harper) I'm with Areva Framatome out of Marlborough, Massachusetts. We provide all types of services to the nuclear industry in the United States and throughout the world.

Q Now, you used the term Areva, A-R-E-V-A. Is that an acronym?

A (Mr. Harper) No. It's our parent company name in France.

Q And is Areva the parent of Framatome?

A (Mr. Harper) Correct.

Q Is Areva a public company?

A (Mr. Harper) It is in the process of becoming publicly traded in Europe.

Q Does Areva have any corporate relationship with LES or any of the partners that make up LES?

A (Mr. Harper) Not to my knowledge.

Q Is the work that Framatome is doing for LES under contractual arrangement?

A (Mr. Harper) Yes, it is.

Q Do you know how long ago that contract was made?

A (Mr. Harper) Yes. The original contract with -- was actually with Urenco back in early 2002.

Q Okay. Can you -- let's start with you, Mr. Harper. Can you please tell me what conclusions or opinions you're going to be expressing in this proceeding?

A (Mr. Harper) I'll be -- I'm here to discuss the three basins that have been designed for the facility, the septic system, potential sources of contamination of liquids that flow into those basins or the septic systems, groundwater monitoring, the New Mexico groundwater discharge permit application that LES has submitted, and the UF_6 feed pump composition.

Q The feed composition, did you say?

A (Mr. Harper) Yes.

Q All right. You're here to testify on those subjects. Well, do you have any expert conclusions that you're going to provide the Atomic Safety and Licensing Board in this case?

A (Mr. Harper) Yes, I do.

Q What are those? You can go down these subjects if you like.

A (Mr. Harper) Okay. Well, in regards to the basins, my conclusion is that the basins have been engineered to the extent to preclude any significant release of contamination to the soils underneath the basins and also to the groundwater; that the groundwater monitoring program has been -- as outlined in the

groundwater discharge permit -- in the environmental report is adequate to monitor the groundwater for the facility. And I guess that's it.

Q Those are the only conclusions you're going to testify to.

A (Mr. Harper) That come to mind right now, yes.

Q Well, if in the course of today's testimony something else comes to mind, can you let me know?

A (Mr. Harper) Sure.

Q Okay. And, Mr. Peery, what conclusions -- rather let's start a little earlier. What subject areas are you here to testify about, are you going to be testifying before the Board about?

A (Mr. Peery) I'll be testifying about the characterization that was performed at the site, the geologic -- type of geologic characterization. I'll be discussing the absence of shallow groundwater at the system; hydraulic properties of the formations at the site; and the absence of fracturing or fast-flow paths, you might -- as referred to yesterday in the Chinle.

Q When you say the absence of fast-flow paths, is it your conclusion that there are no fast-flow paths in the Chinle?

A (Mr. Peery) My conclusion is there's no evidence to support that there are any fractures that are

fast-flow paths in the Chinle.

Q Okay. On the other matters that you're going to be testifying about, what conclusions have you reached?

A (Mr. Peery) I'm sorry. What other matters are you addressing?

Q You said you were going to testify about the characterization at the site, the absence of shallow groundwater, the hydraulic properties of the formations.

A (Mr. Peery) Can we go through those one at a time, please?

Q Please.

A (Mr. Peery) The first one, adequacy of the characterization of the site, the conclusions I reached on that is that the investigation was what would normally be done for site investigation, industry standard for evaluating whether or not there's shallow groundwater present, and also looking at the developed properties of the aquifer at the approximately 220-foot zone.

Q What about that aquifer?

A (Mr. Peery) What do you mean?

Q You just said, and also about the aquifer in the 220-zone. What's your conclusion about that?

A (Mr. Peery) That the aquifer is present under confined conditions; that it has a very low hydraulic conductivity, very low permeability.

Q Okay. You spoke of the absence of shallow groundwater. What is your conclusion in that regard?

A (Mr. Peery) My conclusion is that based on 14 borings that were advanced at the site, that there is no shallow groundwater present at the site. All of the borings were advanced through the shallow sediments, basically alluvial type and Quaternary age sediments, to the top of the redbed which is the Chinle, and there is no evidence to suggest that any water was there.

There was one report of moisture present in one of the borings that was performed as part of the geotechnical investigation, and the presence of just someone logging a cutting as moist is not an indication that there's groundwater present. Normally cuttings are logged in sort of a relative fashion: very dry, dry, moist, slightly moist, moderately moist, very moist, saturated. And there was no indication of very moist or saturated sediments in any of the boreholes.

In fact, that borehole that I mentioned was the only one where moist sediments were actually mentioned. Another boring -- I believe it was B-2 -- had report of slight moisture at a zone from 6 to 14 feet, but that's way above the redbeds, and we had very dry sediments reported on either side of it.

Q So you just -- I'm sorry. Go ahead.

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

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

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

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

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

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

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

Q And what drilling methods were used?

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

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

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

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

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

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

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

Q B-2. Okay.

A (Mr. Peery) From the geotechnical borings.

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

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

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

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

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

A (Mr. Peery) Uh-huh.

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

A (Mr. Peery) Yes.

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

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

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

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

overlying the redbeds, the Chinle present, and water is found at the same 220-foot zone that I described.

The Chinle has very low permeability. Data from the WCS site reflects permeabilities on the order of 1 times 10 to the minus 8 or minus 9 centimeters per second, which is a very low permeability. And also you couple that with the fact that the borings into the redbeds at the LES site are reported as very dry indicates that there's very limited opportunity for water to move vertically downward, in addition to the fact that the permeabilities recorded at WCS indicate what the Chinle would be in that regional area.

Q And what was your source for the information about permeabilities of the WCS site?

A (Mr. Peery) Various reports starting, I believe, with Rainwater, '93 or '96, and a recent geologic report for the site.

Q Can you identify that any more?

A (Mr. Peery) I believe it was a 2003 geology report for the site, but I don't remember the exact title.

Q And how had permeability data been obtained for use in those reports?

A (Mr. Peery) Primarily the permeability data related to the Chinle is from laboratory permeabilities, and normally when you get laboratory permeabilities, the

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

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

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

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

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

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

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

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

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

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

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

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

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

A (Mr. Peery) Yes.

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

A (Mr. Peery) Yes, I did.

Q And can you tell me what you did?

A (Mr. Peery) Well, the evidence that I did look for was the logging of the moisture content, both at the LES facility and at the WCS facility, and then I looked at the permeability data from the WCS facility, and -- with the intent that if there were very high permeabilities in the lab samples, that that would indicate some sort of fast-flow path fracturing or something, but I didn't see any of that.

Q Did you --

A (Mr. Peery) And let me add something else.

Q Please.

A (Mr. Peery) The aquifer that I described at the zone of 220 foot is -- has a very low permeability. It was reported from a slug test at the LES site to have a permeability or hydraulic conductivity of 3.7 times 10 to the minus 6 centimeters per second, which is very low. In fact, water levels recover quite slowly there, indicating also that it is -- it's a poor aquifer, if you want to call it that.

If there were fracturing in the Chinle -- and the Chinle being a more clay unit than the siltstone present at the 220-ish-foot depth, we would expect those fractures to continue on down into the aquifer that's present at 220 feet, and that would increase the permeability. That aquifer would be -- it would have had

much higher permeabilities than what were documented from field testing.

Q And what was the figure you gave us? Was it 3.7 times 10 to the minus 7?

A (Mr. Peery) Ten to the minus 6 centimeters --

Q Minus 6? Okay.

A (Mr. Peery) -- per second.

Q Okay. Why do you say you would expect the fracturing to be present at depth also?

A (Mr. Peery) Well, it's -- geologically speaking, it's very difficult to fracture an upper part of a formation without some movement that fractures the lower portion of the formation.

Q In your work for LES, did you talk to anybody about how the investigation plans for the LES site had been developed, and, you know, what choices had been made in designing that investigation?

A (Mr. Peery) Before I asked them about that, I reviewed the available reports, which gave a description of how the investigation was designed and developed, and then coupled with that, I've had some recent talk with them about how it was designed.

Q Who did you have these discussions with?

A (Mr. Peery) Actually my discussions were with George Harper on that.

Q Okay. And you say the available reports. Which were those that you reviewed?

A (Mr. Peery) There was a preliminary subsurface investigation report and then the hydrogeologic report, both for the LES facility.

Q And who did the first one?

A (Mr. Peery) I don't recall.

Q And --

A (Mr. Peery) It might have been Lockwood Greene, but I'm not positive.

Q And who did the second one?

A (Mr. Peery) Cook-Joyce did the second one.

Q And what your discussion with Mr. Harper about the planning for those investigations?

A (Mr. Peery) Well, my discussion was that I thought they took a reasonable approach to identify the subsurface conditions at the site. What they did was they built a grid and drilled holes on a grid, rather than just sort of randomly walking around, drilling holes. They actually came up with a plan and followed it to get the site information.

And subsequent to that, when George Harper and I talked, he said they came up with that plan and also used Cook-Joyce because they had done so much work at the nearby WCS facility and had a lot of experience with the

subsurface conditions in the area.

Q What were the dimensions of the grid?

A (Mr. Peery) I think the -- as I recall -- and George Harper would probably be better to ask. But as I recall, it was -- borings were on a three-by-three grid at 1,000-foot spacing. But George could probably address that more accurately.

Q Was that accurate?

A (Mr. Harper) The three-by-three grid and the 1,000-foot spacing is approximately what I recollect.

Q Okay. Did you -- did it occur to you in your work that there might have been some other investigations carried out?

A (Mr. Peery) At the LES site?

Q Yes.

A (Mr. Peery) No, it did not.

Q Okay.

A (Mr. Peery) And I guess I should state my reason for that.

Q All right.

A (Mr. Peery) I've done a significant amount of work in Lea County related to the Lea County Regional Water Plant, and during our investigation and hydrogeologic study for that plant, I didn't recall any activity in that area, both by my driving through the area

or in documents that we uncovered when we were putting together our plan.

Q You didn't encounter any other activities? That's what you're saying?

A (Mr. Peery) Yes. Like I didn't see anything when I drove by the site, so -- there was nobody drilling at the site while I was performing the Lea County plan, so I didn't see anything happening there and I didn't find anything in written documentation.

Q Well, did it occur to you that there might have been certain efforts undertaken which were not?

MR. CURTISS: I think he's answered the question no.

MR. LOVEJOY: Well, I think there's some confusion here. He's said that he was there and nobody was doing anything else.

THE WITNESS: (Mr. Peery) No. That's not exactly what I said. I said -- you asked me if I had -- could you restate the question?

BY MR. LOVEJOY:

Q Well, the question is: In examining the work that was done to investigate the LES site, did it occur to you that there might have been certain efforts undertaken which had not been undertaken?

A (Mr. Peery) And I said no.

Q Yes.

A (Mr. Peery) And I gave my reasons for that, both visual -- having been by the site, I didn't see anything happening -- and doing research for my Lea County study, that didn't turn up any documentation, so, no. It didn't occur to me that there would have been other work done at the site.

Q Okay. Well, as a scientist, did it occur to you that there might have been some efforts undertaken which were not undertaken, that would have made the investigation better?

A (Mr. Peery) Could you --

Q Is my question clear now?

A (Mr. Peery) No. It's not clear to me. I'm sorry.

Q Okay. Well, did it occur to you, as you examined the work done at the site, that there might have been some different or additional drilling done, that might have satisfied you more about knowledge of the subsurface?

A (Mr. Peery) Well, I'm sort of at a little bit of a loss for your question. I'm not sure if you're asking whether or not I think that there was data performed that I didn't evaluate or if --

Q No.

A (Mr. Peery) -- I would have evaluated it differently.

Q I'm asking if you might have evaluated it differently, if you were there to design the exploration.

MR. CURTISS: Let me just clarify the question. I think the witness has said that in reviewing the information that was adduced from the investigation, he indicated that provided an adequate basis for the characterization of the site. And if the question is, Should more have been done, I would advert to his answer to your earlier question, that the information that was performed was adequate.

BY MR. LOVEJOY:

Q So let me just ask you. Did anything occur to you that you think should have been done which was not done?

A (Mr. Peery) No. And, in fact, when I started my testimony, I said I thought the investigation was formed in an adequate way and would generally be considered industry standard for performing a site investigation.

Q Okay. Did you consider at all whether there might have some slant drilling done at the site?

A (Mr. Peery) No. That's not generally industry standard for site investigations.

Q Why do you -- what's the basis for that statement, that it's not industry standard?

A (Mr. Peery) The basis for that is, I guess, my experience as a hydrogeologist over the last 16 years. It's very unusual to perform any sort of slant drilling on sites. Most everything is done by vertical drilling, whether it's for leaky gas station sites, sites associated with contamination in mining industries that I've been involved with, and just about every environmental project I've been involved with was only done vertical boreholes in wells.

Q Has most of the work that you've had experience with involved identifying the extent of contamination that has taken place?

A (Mr. Peery) No. Some of my work has been going to sites to see if there is contamination first, and if there is, then to develop a program to define the extent and nature of that contamination.

Q Did it occur to you that efforts might have been undertaken to identify the age of any of the groundwater found at the LES site?

A (Mr. Peery) No, I didn't. That's generally not an activity that's undertaken, and I'm not sure specifically what groundwater you're referring to.

Q But it didn't occur to you with respect to any

of it.

A (Mr. Peery) Well, what I did is I evaluated the water quality data for the deep aquifer at 220 feet, and the total dissolved solids concentration of that water exceeds 6,000 milligrams per liter, which indicates it's not a particularly young water. In order for water to get that concentration of total dissolved solids, it has to spend a fair amount of time in the aquifer in order to dissolve the minerals into the water, so it indicates a pretty slow movement through the aquifer and a long residence time, so it didn't seem to me reasonable to try to do any age-dating of a water of that nature.

Q How old was that water?

A (Mr. Peery) I don't know how old it is, but it has to be -- I mean, it is not recent. It's old water. Geologically speaking, it's a hard thing to quantify, but it is --

Q Can you tell us what you mean when you say it's old water?

A (Mr. Peery) Oh, tens of thousands of years or more.

Q Did you examine, in your work for LES, the plans for construction of the facility?

A (Mr. Peery) No. Some of the documentation was provided to me, but that's outside my area of expertise.

Q So you didn't look at the sewage system or the various discharge lagoons that were planned to be constructed.

A (Mr. Peery) I know where they are physically on the map and have read about the discharge of the septic and the stormwater detention lagoon and the UBC and the TEEB basins, but in regards to looking at actual design of facility, I didn't look at it in that manner.

Q And you didn't involve yourself in trying to estimate where water might go if it entered those basins? That was outside your assignment?

A (Mr. Peery) Not exactly. I did look at the basins, just in regard to particularly the unlined basin and what might happen with that. But the lining of basins and calculating anything that could potentially happen through basins is outside -- lined basins is outside my area of expertise.

Q Okay. What work did you do with respect to the unlined basin?

A (Mr. Peery) I just looked at it in terms of what kind of water it would receive.

Q The quantity? Quality? What were you looking at?

A (Mr. Peery) Just where the run-off was coming from.

Q Did you seek to quantify the amount that might enter that basin?

A (Mr. Peery) No. It was included in the reports. I didn't try to quantify --

Q It was in the data you had?

A (Mr. Peery) Uh-huh.

Q Well, did you try to project where that water might end up if it entered that basin?

A (Mr. Peery) I didn't do any calculations on that. The sight hydrogeology would indicate that the water from an unlined basin would just have to move out into the alluvial sediments, if you will, and there wouldn't really be an opportunity for it to migrate the Chinle and contaminate anything else because of the low permeabilities at the site. But I didn't attempt to look at where the water might end up in terms of its horizontal extent.

And one of the primary reasons is evaporation rates. Evapo-transpiration rates are so high in this area, they're on the order of about 65 inches per year, so even water that infiltrates into the shallow alluvium has a relatively limited opportunity to migrate, as a lot of it just gets lost.

Q When you talk about the low permeabilities at the site, what bodies -- what rock bodies are you

referring to?

A (Mr. Peery) I'm referring to the Chinle.

Q Okay.

A (Mr. Peery) Well, and I guess the water zone at 220 feet is low permeable.

Q You speak of the alluvium. What is the -- how far down does the alluvium go at this site?

A (Mr. Peery) I addressed that earlier. As I recall, I said from approximately 20 to 55 feet, which is actually a combination of the younger sediments, whether it's the Blackwater Draw eolian sediments, Ogallala sediments, but all the younger sediments sitting on top of the Chinle.

Q So this may be more in Mr. Harper's domain, but, please, if you know the answer, go right ahead. How many septic leach fields are there planned to be in the plant at present?

A (Mr. Harper) Right now we're planning on six systems.

Q Okay. And what is the volume of water that's going to go into these septic systems?

A (Mr. Harper) It's approximately 5,300 gallons per day.

Q And after it's discharged, where is this going to end up? Have you made any calculations?

A (Mr. Harper) The only thing we've looked at is that the -- that amount of water going into the basins per day is -- I'm sorry -- into the leach fields per day is only a very small fraction of the annual rainfall that the site presently sees.

Therefore, it's just a minuscule additional amount of water, what the site sees from rainfall today, and therefore, right now all the infiltration at the site is essentially taken up by evapo-transpiration. Therefore I would assume the same to be the case for the discharge from the leach fields.

Q And beyond that, you've made no calculations of the fate of the water from the leach fields. Is that right?

A (Mr. Harper) Correct.

Q Now, with respect to the unlined basin, the stormwater basin, what's the quantity of water? That's a little hard to predict, but have you assigned a quantity of water flowing into that basin?

A (Mr. Harper) We have, and that information is in the environmental report and the State of New Mexico groundwater discharge permit.

Q And have you made any calculations of the fate of that water?

A (Mr. Harper) Yes, we have.

Q And where are they reflected?

A (Mr. Harper) We did a water balance -- annual water balance for the basins that's summarized in one of the RAI responses to the -- one of the NRC questions on the ER.

Q And do you recall now where it was projected that the water to that basin would go?

A (Mr. Harper) Yes. Our -- for the purpose of the analysis for the water balance and not having the detailed design of the basin available, we assumed that for the water balance calculations, 50 percent infiltrated and that 50 -- approximately 50 percent infiltrated and approximately 50 percent evaporated. And of the amount that infiltrated, it essentially would all go back up through evapo-transpiration.

Q What depth would it reach?

A (Mr. Harper) We -- I --

Q You didn't project it?

A (Mr. Harper) -- did not project that.

Q So your conclusion was that all of it would ultimately go up through plant matter and evaporation and --

A (Mr. Harper) Correct. Yes.

Q Okay. Did you undertake to make measurements of a projected plume associated with the unlined basin?

A (Mr. Harper) No, we did not.

Q Okay. Now, there are two basins that are planned for the plant that would have a liner. Is that right?

A (Mr. Harper) Correct.

Q And one of them -- what is it? It's the TEEB.

A (Mr. Harper) Correct.

Q And that's the Treated Effluent Evaporation Basin. Is that right?

A (Mr. Harper) Very good.

Q Okay. I'm learning. And the other one is the UBC basin. Is that right?

A (Mr. Harper) The UBC stormwater --

Q UBC stormwater basin.

A (Mr. Harper) Retention basin.

Q Okay. Now, with respect to the TEEB, have you made any projections of water going out of that and into the soil and subsurface?

A (Mr. Harper) We have these -- the design of that basin is such as to contain all the water within the basin through the double-lined system with an intermediate leak detection and collection system.

Q Uh-huh. So is the answer that you've not made any calculations involving water leaking from that basin?

A (Mr. Harper) Correct.

Q All right. Okay. Where is the most recent design for that basin recorded? Where is it written down?

A (Mr. Harper) It would be in the Lockwood Greene documents for the basin, and also it is summarized in the groundwater discharge permit plant application that LES filed with the State of New Mexico. And the information in there draws upon the Lockwood Greene documents.

Q Okay. Can you describe the liners, liner or liners that are associated with the TEEB under the current plan.

A (Mr. Harper) Under the current plan they're synthetic membranes, and we've given an example is the groundwater permit of either HDPE or another brand name that I'd have to look in the report. But it's mentioned both in the ER and in the groundwater discharge permit.

Q Uh-huh. And what are the other elements of the containment system for the TEEB? Is there a clay liner? Can you describe the various layers?

A (Mr. Harper) From the bottom up, there would --

Q Yes.

A (Mr. Harper) -- a minimum two-foot layer of clay, and the bottom liner will then sit on top of the clay. And then between -- and then above that liner,

there is a membrane and a series of pipes to collect any leakage through the upper membrane, which would rest on top of that leak collection system. And there's a minimum one foot of clay layer on top of the upper liner for UV protection and to protect it from inadvertent punctures.

Q Now, the -- you spoke of pipes. What's the matrix in which it is planned to in-place these pipes?

A (Mr. Harper) That has not been detailed as I know.

Q Uh-huh. Is there any system planned which would alert you of the fact that there was leakage of the upper liner?

A (Mr. Harper) Yes. That's described in the groundwater permit application. The leak collection system will be routed to a sump, and the sump will have level monitoring, which would then alert the control room.

Q Uh-huh. Have you undertaken any effort to project the performance of this liner system for the TEEB?

A (Mr. Harper) We have made certain commitments that the liner material, when selected, per the vendor information will have a life, a projected life, you know, commensurate with the projection for the facility and that it will meet the minimum thickness requirements from the NMED guidelines and will be engineered and designed and installed in accordance with NMED guidelines.

Q Which guidelines are those?

A (Mr. Harper) They're referenced in the groundwater discharge permit. They're guidelines for liners for the basins.

Q Okay. And what is the -- you said the vendor will project the life commensurate with plant life. And what is that life you're talking about?

A (Mr. Harper) The operational period of the facility is approximately 30 years.

Q Okay. And what year do you expect that the liner will be installed?

A (Mr. Harper) The liners will be installed prior to operation, so I would therefore -- based on the current schedule, I believe that would be sometime in 2008.

Q That it would be installed in 2008 or sometime before 2008?

A (Mr. Harper) Sometime prior to start-up.

Q Okay. Do you know when?

A (Mr. Harper) I believe the projected start-up date right now for the facility is sometime in 2008.

Q Okay. But what's the projected date for installing liners?

A (Mr. Harper) Well, the liners would need to be installed prior to receiving liquid effluent. I don't --

you know, again they haven't been designed or scheduled yet, so I can't tell you when -- actually when the liners will be installed.

Q Okay. And what is the projected date for closure of the facility?

A (Mr. Harper) Closure of the facility would be, as I stated, approximately -- the facility is projected to operate for approximately 30 years from initial start-up.

Q So does that mean the closure date is projected to be 30 years after start-up? Or is it longer?

A (Mr. Harper) I believe it would be approximately 30 years.

Q Okay. And that would make it what year?

A (Mr. Harper) Sometime around the year 2038.

Q Do you know how long it would take to close the facility?

A (Mr. Harper) My recollection from the information in the ER is the decommissioning period is approximately scheduled to occur over nine years.

Q Okay.

A (Mr. Harper) But the decommissioning is phased in where they're decommissioning some of the units while they're still operating other units. So the overall decommissioning phase is approximately nine years.

Q Do you know when the TEEB would be closed?

A (Mr. Harper) It would be closed when it would no longer be needed.

Q And would that be when no part of the plant is operating?

A (Mr. Harper) When it is no longer required for either operation or to support decommissioning.

Q Okay. Well, do you know if that would be at the beginning of the nine-year period or at the end or at some other point, or don't you know?

A (Mr. Harper) It would be at some point during the nine-year period.

Q Can you describe the process of closing the TEEB?

A (Mr. Harper) The process for closing the TEEB is outlined in the groundwater discharge permit application.

Q And just briefly, what do you when you close, the TEEB?

A (Mr. Harper) The plan for closure, for decommissioning is to -- first we will sample the soil, the uppermost soil on top of the liner, segregating any of it that is contaminated, and dispose of it properly.

MR. CURTISS: May I consult with the witness?

(Witness and attorney conferring.)

THE WITNESS: (Mr. Harper) I would like to

clarify a previous statement. The nine-year period for decommissioning --

BY MR. LOVEJOY:

Q Yes. Go ahead.

A (Mr. Harper) -- falls within the 30-year period of -- that I gave for the operation of the plant.

Q Are you saying that the closure process is planned to commence 21 years after operations begin?

A (Mr. Harper) No. I said the closure process for the TEEB would commence when it is no longer needed to support decommissioning.

Q Okay. Well, can you put a number on it as you understand the plan?

A (Mr. Harper) I have not reviewed the decommissioning schedule in detail to provide that --

MR. CURTISS: I think, Lindsay, here, just to clarify for the witness's benefit and for yours, the question that you're raising -- and I don't have an objection, but just to clarify for the record -- is whether the liners will last during the period that they're going to be used, and I think the witness has testified that the liners, in accordance with the discussions that have taken place will last the 30-year period and that the decommissioning of the plant will occur within that 30-year period.

If there's some additional question relative to the liners here, which is the subject of this contention, and whether they will, in fact, last the period of concern that you're articulating here, I think he's in a position to answer that, but he's not a witness that's qualified to answer questions about the details of decommissioning the plant, what's going to occur when.

MR. LOVEJOY: Well, I don't need the details of decommissioning, but the schedule is important if you're talking about projecting the life of some liners, so that's what I want to go to.

BY MR. LOVEJOY:

Q You don't know whether the decommissioning phase is going to be -- whether decommission -- well, strike that. Let me say this.

Is decommissioning going to be completed by the end of the 30-year period, as you understand it?

A (Mr. Harper) I believe LES is applying for a 30-year license, which is from -- covers the period from when nuclear material arrives on site until they finish decommissioning.

Q Okay. You were outlining in a general form what the process is to close the TEEB.

A (Mr. Harper) Right.

Q Would you complete your testimony on that?

A (Mr. Harper) I think I completed the sampling, disposal of the one-foot clay layer above the upper liner.

Q Uh-huh.

A (Mr. Harper) The primary or uppermost liner would then be sampled for potential contamination and disposed of accordingly as low-level waste or, if releasable, it would be disposed of as -- in an ordinary landfill.

We will then proceed to sample the leak detection components and likewise dispose of them accordingly. In similar fashion, sample and dispose of the lower liner as applicable. And then we've committed to test the clay layer under the bottom liner.

Q In closing the TEEB, what would be done with any liquid contained in it?

A (Mr. Harper) It would all be evaporated prior to.

Q Okay. Have you investigated the availability of material with a projected life commensurate with the life of the plant?

A (Mr. Harper) I have not.

Q Well, has anyone undertaking the design effort for LES investigated that?

A (Mr. Harper) Lockwood Greene has done the design of record for the TEEB.

Q Okay. Do you know whether they've investigated the availability of material with a design life commensurate with the life of the plant?

A (Mr. Harper) My understanding is they have performed an assessment and discussed with certain vendors, and the design reflects being able to locate material that will last the design life of the facility.

Q What have you heard about availability of material commensurate with the projected life -- commensurate with the life of the plant?

A (Mr. Harper) We have not picked up -- since there was no material, you know, the actual liner has not been specified, so I don't know anything more about it than what I have just stated.

Q Well, has anyone from Lockwood Greene come to you and said, Well, we've located four or five people that can supply with the liner we --

A (Mr. Harper) You mean, actually to the point of a vendor?

Q Yes.

A (Mr. Harper) I have not had those discussions with Lockwood Greene.

Q Do you know if anyone has attempted to project the probability of leak in either the upper or the lower liner of the TEEB?

A (Mr. Harper) No. I'm not aware of that.

Q Okay. The other lined basin in the current plant is the UBC storage --

A (Mr. Harper) Storage pad stormwater.

Q Stormwater storage basin.

A (Mr. Harper) Retention basin.

Q Okay. And the plan is for that to have a single liner. Is that correct?

A (Mr. Harper) Correct.

Q And where is the latest plan for that basin and its liner laid out?

A (Mr. Harper) In Lockwood Greene documents.

Q And do you know whether those documents were produced to us in this litigation?

A (Mr. Harper) I cannot remember without seeing them. I'd have to review the list again.

Q Okay. Is the plan as contained in those documents also in the groundwater discharge permit application?

A (Mr. Harper) Features of it are.

Q What features? What part's in that application and what part's not?

A (Mr. Harper) Well, the Lockwood -- we have provided a -- you know, a synopsis of the design in the groundwater permit, but it's not to the same level

potentially that's in the Lockwood Greene documents.

Q Okay. With respect to the UBC basin, has any effort been undertaken to estimate where water would go or water and contaminants therein, if there were a leak in that basin?

A (Mr. Harper) No.

Q Can you describe from your memory what the current plan is with respect to the liner of that basin?

A (Mr. Harper) It's a single-lined basin, and the liner would be placed on suitable material, and then similar to the TEEB, would have a soil cover for UV protection.

Q When you say, suitable material, can you elaborate?

A (Mr. Harper) The information in the groundwater discharge permit reflects a clay-like material obtainable on site or nearby.

Q And with respect to the liner of that basin, what is the expected life of that liner?

A (Mr. Harper) It would be similar to my previous testimony for the TEEB. It will be selected to last the operational life of the UBC.

Q What's the operational life of the UBC basin?

A (Mr. Harper) Well, similar to the TEEB, it will need to be initial operation sometime prior to start-

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

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

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

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

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

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

A (Mr. Harper) Yes, there has.

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

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

Q And were you involved in that effort?

A (Mr. Harper) To some extent.

Q Beyond what's reported in those two applications, has there been any effort to estimate the quality of that water?

A (Mr. Harper) Not to my knowledge.

Q Okay. You said that you were also here to testify about the constituents in UF_6 feed material. What facts or opinions are you here to give us about that?

A (Mr. Harper) The UF_6 feed material for the plant will contain only natural UF_6 and any daughter products of uranium.

Q Now, how do you know that?

A (Mr. Harper) Based on the -- I've been working on the project for several years now, and that's just information that I have picked up throughout my involvement with the project.

Q Okay. Where is the feed material going to arrive from?

A (Mr. Harper) The feed material arrive -- that's described in the environmental report.

Q Do you remember where, what plants it's coming from?

A (Mr. Harper) Off the top of my head, no.

Q Okay. Well, how do you know that it's only going to contain natural UF_6? Do you remember some reports about the constituents in the feed, or are there

some documents? What's the basis for your statement?

A (Mr. Harper) It's based on information that I believe is documented in the environmental report.

Q Okay. And beyond that you don't recall?

A (Mr. Harper) Not off the top of my head.

Q All right.

MR. LOVEJOY: Okay. We can take a short break now if you'd like.

MR. CURTISS: That would be fine.

(Whereupon, a short recess was taken.)

THE WITNESS: (Mr. Harper) I would like to supplement my last -- one of my earlier responses.

BY MR. LOVEJOY:

Q Yes.

A (Mr. Harper) In regards to the UF_6 feed, the UF_6 as described in the license application, the site will not accept any feed material that is not ASTM certified as natural uranium, natural uranium hexafluoride.

Q Okay. Thanks. How does feed material achieve an ASTM certification?

A (Mr. Harper) That is outside my area of expertise.

Q Has any estimation been made of the contaminants that would be present or could be present in the unlined stormwater basin or in the sewage leach

fields?

A (Mr. Harper) In the ER and, I believe, in the groundwater discharge permit, we make note that the in-flow to the unlined stormwater basin would be typical of an industrial site, would receive run-off from roofs, paved areas, and areas in the immediate vicinity around the buildings, and that it would contain -- potentially contain some oil and grease that one would typically see from parking lot areas. There are no process activities that occur in the drainage area to that basin. There's no chemical process activity in that area.

Q And --

A (Mr. Harper) Other than inside the buildings, so --

Q Are you saying that the areas inside the buildings would not be drained to the basis?

A (Mr. Harper) Correct.

Q Okay.

A (Mr. Harper) Only the roofs.

Q Now, with respect to the septic systems, what contaminants are projected?

A (Mr. Harper) The design calls for only domestic sewage, domestic waste going to the septic system, essentially toilets.

Q Okay.

A (Mr. Harper) And we have made a statement in the ER that it would be just typical of that type of normal sanitary waste.

Q Would there be any showers drained to the septic systems?

A (Mr. Harper) Showers and hand-wash all goes to the Treated Effluent Evaporative Basin.

Q In the plant, are there planned to be specific decontamination rooms in case of inadvertent contamination of somebody?

A (Mr. Harper) I have not reviewed that portion of the application recently. I can't recall. I would assume so, but I can't recall, other than to make note again that only sanitary wastes are going to the septic system.

Q Okay. Let me ask -- and this may be for you, Mr. Peery. Have any tests been done on the hydraulic properties of rock bodies above the Chinle?

A (Mr. Peery) No, they have not.

Q And there have been some tests of hydraulic properties of the Chinle. Is that correct?

A (Mr. Peery) Yes.

Q And how many holes have been tested?

A (Mr. Peery) Oh, the hydraulic properties of the Chinle? That data comes from the nearby WCS site, and

I don't know exactly how many holes have been drilled over there, but I think it's over 200.

Q So on the LES site, there've been no tests of hydraulic properties of the Chinle?

A (Mr. Peery) Not of the Chinle above the 220-foot aquifer zone. Now, that siltstone at 220, 230 foot, has had a test on Monitor Well 2 for hydraulic properties.

Q Okay. What tests were done? Do you remember?

A (Mr. Peery) On the LES site?

Q Yes.

A (Mr. Peery) It was a rising-head slug test, an MW-2.

Q Just that one test?

A (Mr. Peery) Yes.

Q Can you describe that test?

A (Mr. Peery) A rising-head slug test essentially is where a volume of water or an object placed in the water is displaced from the water column, which causes the water column in the well to drop down, and then you monitor the subsequent rise of the water level until it gets back to a higher point, essentially where you started the test at.

Q You measure the time of it. Is that correct?

A (Mr. Peery) Yes. The change in elevation of the water or depths of water versus time.

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

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

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

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

Q Yes.

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

Q Where is that recharge area?

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

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

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

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

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

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

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

A (Mr. Peery) Yes, I did.

Q And did you reach any conclusion about that?

A (Mr. Peery) Yes, I did.

Q What's your conclusion?

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

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

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

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

MW-2 that showed --

A (Mr. Peery) Yes, it was.

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

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

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

A (Mr. Peery) Yes.

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

A (Mr. Peery) Correct.

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

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

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

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

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

Is that -- are you aware of that?

A (Mr. Peery) Yes, I am.

Q Do you agree with that?

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

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

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

Q And what standard is that?

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

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

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

Q A cap of 1,000?

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

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

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

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

A (Mr. Peery) No.

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

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

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

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

Q Down gradient.

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

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

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

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

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

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

BY MR. LOVEJOY:

Q Would you please take a look at Exhibit 3.

MR. LOVEJOY: We can give each witness a copy, but we really need to have one official exhibit.

BY MR. LOVEJOY:

Q Has either one of you seen this document before?

A (Mr. Harper) I have.

Q You have? Mr. Peery, have you?

A (Mr. Peery) I have not reviewed this document.

Q Okay. Mr. Harper, did you see this at or about the date it has, which is August 5 of '03?

A (Mr. Harper) Yes, I did.

Q And what was the purpose of this document?

A (Mr. Harper) I haven't looked at it in a while, so --

Q Okay.

A (Mr. Harper) -- if you'll give me a minute here. (Perusing document.) I think it's clearly stated in the purpose of the document on page 1.

Q Okay. What language are you referring to?

A (Mr. Harper) "The objective of the study is to evaluate and present potential options for treatment of the low-level waste generated through the normal operations of the NEF to remove uranium."

Q Okay. There's a reference right after that, under Purpose, to new MCL requirements for uranium in

drinking water under EPA standards. Do you see that?

A (Mr. Harper) Yes.

Q Do you know whether the NEF as planned would comply with those standards now, as now planned?

A (Mr. Harper) I'd have to go back and review the report. I haven't read the report in over a year.

Q Uh-huh. The page that has the stamped number LES-905 has a signature on it. Can you read that?

A (Mr. Harper) Yes, I can.

Q Whose signature is that?

A (Mr. Harper) Based on the initials and the signature, I believe it is John Shaw.

Q And does he work for Lockwood Greene?

A (Mr. Harper) Yes, he does.

Q Where are they based, Lockwood Greene?

A (Mr. Harper) They're based out of Spartanburg, South Carolina.

Q Was the work done, that Lockwood Greene did for LES in connection with the NEF, to your knowledge, done at the Spartanburg location?

A (Mr. Harper) That was their principal office for this job. Yes.

Q What was Mr. Shaw's -- what is his expertise? Do you know? What is his training?

A (Mr. Harper) I do not know, other than the

fact I know he's a trained engineer.

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

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

Do you agree with that statement?

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

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

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

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

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

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

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

Q Okay.

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

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

BY MR. LOVEJOY:

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

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

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

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

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

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

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

there's some text I want to ask you about, the first paragraph there. You can --

A (Mr. Harper) Page 5?

Q Page 5. It's LES-928. Under Lined Basin, it says, "The basin should be double-lined. The liner could consist of a layer of clay and a HDPE" --

A (Mr. Harper) Could you stop? Where are yo now?

Q Under 2.3.2.3 --

A (Mr. Harper) Okay.

Q -- Lined Basin.

A (Mr. Harper) Yes.

Q "The basin should be double-lined. The liner could consist of a layer of clay and a HDPE liner on top or two layers of HDPE. Basin design will be done after all geological information is obtained. The liner type and design may be contingent on whether or not the State or the NRC may require leak monitoring or just groundwater monitoring."

As the terms are used here, do you understand what's meant by "leak monitoring" and "groundwater monitoring"?

A (Mr. Harper) Yes, I do.

Q What is leak monitoring, and what's groundwater monitoring, as used in this document?

A (Mr. Harper) I would interpret leak monitor to apply to a system similar to what we have now in the design of the TEEB, which is a -- you know, the leak-detection system, which would be designed to monitor a leak through the liner. Groundwater monitoring I would interpret to mean putting in some groundwater monitoring wells in the vicinity of the basin and monitoring the groundwater.

Q At some point, did you learn that you were going to have leak monitoring rather than just groundwater monitoring in the system, in the plant?

A (Mr. Harper) The -- well, the final design or the design of record for the TEEB does have a leak detection system, and as outlined in the ER in the groundwater permit application, we have designed a groundwater monitoring program.

Q So you're going to have both.

A (Mr. Harper) We're going to have both.

Q Okay. Did you hear at some point whether the State or the NRC required leak monitoring?

A (Mr. Harper) We based on our decisions on providing leak detection in groundwater monitoring as a result of our overall design and a look at all the regulations and requirements. At no point am I aware of either the State or the NRC directing that we had to have

either of those.

Q Okay.

A (Mr. Harper) Other than it is -- you know, it is called out for and discussed, especially groundwater monitoring, in the groundwater discharge permit plan.

Q Okay.

MR. LOVEJOY: Let's mark this, please.

(The document referred to was marked for identification as Exhibit NIRS-HP 5.)

BY MR. LOVEJOY:

Q Let me ask each of you to look at -- I'm captioning my exhibits HP, with your initials, Number 5.

A (Mr. Harper) Okay.

Q Look at Exhibit 5, please, and identify it if you can.

A (Mr. Harper) It is the draft report that was prepared by contractor to -- the MACTEC contractor to Lockwood Greene on the preliminary subsurface geotechnical exploration.

Q Was there a final version of this report prepared?

A (Mr. Harper) Yes, I believe there was.

Q Mr. Peery, have you seen this report?

A (Mr. Peery) Yes, I have.

Q Okay. Did you see a final version also?

A (Mr. Peery) I don't recall.

Q Okay. Over on page 5 of the report -- Mr. Peery, maybe I should ask you this -- there's a paragraph starting, "Based on the information." Why don't you read that.

A (Mr. Peery) "Based on the information from geotechnical" --

Q Well, you can just read it to yourself. It's in the record.

A (Mr. Peery) (Perusing document.) Okay.

Q Did you review this document as part of your review of the geological investigations made for the LES site?

A (Mr. Peery) Yes, I did.

Q Okay. There's a reference here to an investigation done by Weaver Boos & Gordon. Did you examine that, that report?

A (Mr. Peery) I'd have to see the title of that report. I don't remember exactly that reference offhand without seeing the title of the report.

Q Do you know anything about that investigation referred to, other than seeing this reference?

A (Mr. Peery) Well, again, I'd really need to see what the title of that report was.

Q Okay. Then the paragraph also refers to piezometers installed for a project in Andrews County, Texas, and there's a reference to Jack H. Holt, Ph.D. & Associates. Did you review any materials about that investigation?

A (Mr. Peery) Okay. Let me clarify the Weaver Boos report first. It's in the references here, and I have not reviewed that report. (Perusing document.) I would have to see the Holt report. It's possible that I saw that, but I don't recall.

Q In hydrology, what is the function of piezometers?

A (Mr. Peery) Piezometers specifically are to monitor water levels.

Q Did you -- apart from this reference, were you aware that piezometers had indicated a depth to groundwater of about 150 to 188 feet for a project in Andrews County?

A (Mr. Peery) Yes. I am aware of that, but I think I should clarify that their -- the depth to water is actually the potentiometric surface elevation, so it's the -- if a well is completed in a confined aquifer, such as see at the 220-foot zone at the LES site and at the WCS site for that matter, the water in the aquifer actually rises about the top of the aquifer, because the overlying

Chinle has such a low permeability that it holds the water into this little zone of aquifer, and so when a hole goes into it, the water level can then rise up to what is called the potentiometric surface elevation.

These depth to waters of 150 to 188 feet correspond well with the potentiometric surface elevation or the depth to the water, if you will, in these confined aquifer wells.

Q How do you know that the water under the LES site was in a confined aquifer?

A (Mr. Peery) The sediments above the aquifer were dry, and the water level in MW-2 started off quite low in the aquifer and continued to rise up to a depth of about 120 feet below ground surface.

Q Okay. Now, the MACTEC contractor did some drilling on the LES site, did they not?

A (Mr. Peery) Yes, they did.

Q However, on page 8, under Groundwater Conditions, the first paragraph says, "Groundwater was not observed in the test borings at the time of drilling. Also, it was reported that groundwater was not encountered in borings drilled at the site by others for water well development to depths of 220 feet."

Do you know anything about those borings drilled for water well development? Did you hear anything

about that in your investigations?

A (Mr. Peery) No. Other than this reference, I haven't heard anything about that.

Q Did you make any inquiry about those wells?

A (Mr. Peery) I'm assuming that this isn't the monitoring wells. No, I did not.

Q Then it says, "For safety reasons, the borings drilled as part of MACTEC's scope of work were backfilled promptly after drilling. Consequently, long-term measurements for the presence or absence of groundwater were not obtained." Did you express any opinion about the fact that those MACTEC wells were backfilled promptly after drilling?

A (Mr. Peery) Any opinion related to what? Safety reasons?

Q No, not safety, but the opinion addressed to the data which might have been obtained if they had not been backfilled.

A (Mr. Peery) I did, specifically related to the moist sediments in, I believe it is, B-2 of MACTEC's drilling, and as my earlier testimony reflects, the occurrence of moist samples doesn't indicate anything in terms of additional data to be gained.

Q Well, you didn't tell anybody, It's too bad they filled them right up again, because we might have had

some groundwater data?

A (Mr. Peery) No, I did not say that.

Q Okay. What are the safety reasons that support backfilling these holes?

A (Mr. Peery) I can speculate why they did it. I know why I would do it on a site. I can only speculate why --

Q Why would you do it?

A (Mr. Peery) I would do it to keep people from falling in the hole. You don't want people to trip or animals to fall inside these kind of things.

Q Over on the page stamped LES-750, there is a plan view of the site. Can you identify that?

A (Mr. Peery) I'm sorry. What page?

Q LES-750. It says, Figure 2: Boring location plan.

A (Mr. Peery) Okay. I see that figure.

Q Okay. Are these -- are the -- do the circles with, let's say, black and white pie sections marked on them, do they indicate the wells drilled by MACTEC or under their supervision?

A (Mr. Peery) My understanding, based on this boring and what I've read, is, yes, that's correct. They're actually borings, not wells.

Q Okay. And are you making a distinction? What

would be a well but not a boring?

A (Mr. Peery) Casing, actual physical casing of the well.

Q Oh, okay. The completed well.

A (Mr. Peery) Yes.

Q And where was moisture detected as among these holes?

A (Mr. Peery) I believe it's B-2.

Q Okay.

MR. LOVEJOY: Let's move on. That's November 19. This would be 6.

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

BY MR. LOVEJOY:

Q Would both witnesses please look at this, what's been marked Exhibit 6, and state whether you've seen it before.

A (Mr. Peery) I've seen this before.

A (Mr. Harper) I have also seen it before.

Q Okay. Is this a report prepared in connection with the hydrogeologic investigation of the LES site?

A (Mr. Peery) Yes, it is.

Q I'll state for the record that this has in the upper right corner an ML number which indicates how it was

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

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

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

A (Mr. Peery) Yes, they did.

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

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

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

A (Mr. Peery) Yes.

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

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

Q And at what depths did they find groundwater?

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

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

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

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

A (Mr. Peery) Yes, it does.

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

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

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

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

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

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

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

geophysical logs. The design consisted of the placement of the screen interval across the 230-foot zone that is approximately 15 feet in thickness."

Do you know why monitoring screens were not set at any shallower zones?

A (Mr. Peery) Based on my understanding of this report, there wasn't water present above this zone as determined by drilling these three monitoring wells in the geophysical logs.

Q Over on page 8 under, Data Analysis -- well, in connection with this, do you know what well development efforts were conducted with respect to the monitoring wells?

A (Mr. Peery) I believe it's spelled out here fairly clearly, but to the best of my memory, they tried to develop the wells and were having a difficult time getting some water in, and they put some water in the wells to try to induce flow, so they could sort of surge the formation with some water, try to develop the formation, and then recovered that water.

Q Now, are you talking about MW-1, MW-2 -- and was it in MW-3?

A (Mr. Peery) Yes. I think it's spelled out in here, but that's generally what I recall.

Q Where is that spelled out? Can you find it? I

can tell you that on Table 2, there's reference to development in the footnote.

A (Mr. Peery) (Perusing document.) No. I'm not finding that. I don't see a reference in this reference to the development of the wells.

Q Okay. What efforts in the way of well development would industry practice have called for at this site?

A (Mr. Peery) There would -- industry practice would normally allow several things to occur. I think the first thing that would generally occur would be to attempt to bail and swab the screen section or the bailing could actually do some swabbing of the screen section to try to induce flow from the formation into the well, try to repair the formation damage that occurs during drilling.

If that's unsuccessful, it's not uncommon for people to attempt to introduce water into the well, using various methods, sometimes pouring it in the well and then swabbing it, as I previously described, or using a jetting technique to try to repair the formation damage, and subsequently bailing that water from the well.

Q What formation damage are you referring to?

A (Mr. Peery) Formation damage occurs when a hole is drilled into the ground by any method.

Q What kind of damage?

A (Mr. Peery) It tends to smear the side walls of the formation, and development is undertaken to remove that material, the fine-grain sediments that are generated during drilling, so that water can enter the well.

Q On page 8, there's a reference in the fourth paragraph to recovery rates of groundwater in Monitor Well MW-2. Is that the reference to the testing that you spoke of several minutes ago?

A (Mr. Peery) Yes, it is.

Q What kind of a test do you call that, just for shorthand?

A (Mr. Peery) Slug test.

Q Slug test? Okay.

A (Mr. Peery) And they give a reference here for the type of --

Q Oh, yes. Sorry. And in Table 2, would you look at that, please.

A (Mr. Peery) Yes. I'm at Table 2.

Q Do you see the references to water levels, groundwater level data with respect to Monitor Well MW-2?

A (Mr. Peery) Yes.

Q And those dates indicate the measurements were made. Is that right?

A (Mr. Peery) Yes. The dates are the corresponding -- for the corresponding water level.

Q Does this show the gradually-increasing water level in MW-2 that you spoke about before?

A (Mr. Peery) Yes.

Q And what do you infer from this?

A (Mr. Peery) What I infer from this is that the well was completed in a confined aquifer.

Q Now --

A (Mr. Peery) As evidenced by the fact that the water level is roughly 100 feet above the top of the screen.

Q Now, what do the indications in Monitor Well MW-1 report, the DTW TOC? Is that depth to water?

A (Mr. Peery) Yes.

Q And what is TOC?

A (Mr. Peery) Top of casing.

Q Okay. So that's the difference from the top of the casing to the depth of the water?

A (Mr. Peery) Yes.

Q And what do those numbers mean here under MW-1?

A (Mr. Peery) It reports that the well is dry for quite a number of measurements, September 22 through the October 15 measurements. There's some water measured for several of the following measurements to November 10, and then it appears they have N/As at the last couple of measurements.

Q What does N/A mean? Does it mean no test was taken?

A (Mr. Peery) It doesn't reference it at the bottom of the table.

Q Okay. And what's the significance of a report of water present in MW-1 at 212, 215 feet in October of '03?

A (Mr. Peery) That's just the fact that they measured some water in there, and I don't recall if this was after their development technique or attempts, or if they put some water in the borehole and there was some residual water left or not.

Q Okay. And do you know the significance of the water levels reported for MW-3 in October 16 through November 19?

A (Mr. Peery) Yes. And upon a little further evaluation of this table, it's -- the last footnote on this table says, "Monitor Wells MW-1 and -3 were surged five times using 12 to 13 gallons of DI" -- which I assume would be deionized -- "water from 10/16 to 10/20."

So the corresponding depth-to-water measurements prior to -- I should say, the water level measurements prior to 10/16 were dry, and then there's some reports of water in these holes after they added water to them and attempt to develop them, so the

conclusion I would draw is that this water is most likely deionized water that they couldn't retrieve after their development attempts.

Q What does the word "surged" mean here?

A (Mr. Peery) Surged normally means a bailer or other device placed in the well, and it moved up and down through the screen section to try to force water through the gravel pack and formation to repair formation damage, just mechanical action.

MR. LOVEJOY: Let's mark this.

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

BY MR. LOVEJOY:

Q Would you both, please, look at Exhibit 7 and tell me whether you've seen that before.

A (Mr. Harper) I have.

Q Okay. This is addressed to you, isn't it, Mr. Harper?

A (Mr. Harper) Correct.

Q Okay. And this is dated in March of this year. Is that about when you received it?

A (Mr. Harper) Yes. That's correct.

Q Okay. Would you look at the second page where there's a diagram of, to my understanding, a basin liner.

A (Mr. Harper) Yes.

Q Does that diagram show the present plan that LES intends to use for a basin liner of the TEEB?

A (Mr. Harper) No, it does not.

Q Okay. How does the present plan vary from what we see here?

A (Mr. Harper) The present plan is described in the ER and in the groundwater discharge permit.

Q And how does that vary from this?

A (Mr. Harper) The text description on the top half of the page is pretty much in accordance with the design as specified in the license application, the groundwater discharge permit. The figure is a representation that Lockwood Greene put together, and this was developed as part of the preparation of the -- of information that was developed during the preparation of the groundwater discharge permit. But this figure is not an actual representation of the design.

Q Well, how does it vary from the design?

A (Mr. Harper) Well, the basin has not been designed completely to the level of detail that this little schematic is attempting to represent, so this is not -- I would not consider this design to be -- it was not prepared as part of the true design package for the TEEB. It more or less was prepared as an informational

package.

Q Okay. So are you saying that LES is not committed to follow this design?

A (Mr. Harper) We're committed to follow the design that's in the groundwater discharge permit application.

Q Okay.

A (Mr. Harper) And in the license application.

MR. LOVEJOY: This is 8.

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

BY MR. LOVEJOY:

Q Mr. Harper, would you look at Number 8 and tell us if you've seen this before.

A (Mr. Harper) Yes, I have.

Q Is this something you received around March 1 of this year?

A (Mr. Harper) Yes, it is.

Q And looking at the second page, can you say whether the diagram represents the liner plan that LES is going to follow with respect to the UBC basin?

A (Mr. Harper) It does with respect to the description of the -- from the bottom up, the compacted clay layer, two-foot thick.

Q Uh-huh.

A (Mr. Harper) It also does with regards to the one-foot thick protective layer on top of the geosynthetic liner. But the details provided for the geosynthetic liner are beyond those that are presently specified in the design of the basin.

Q Okay.

A (Mr. Harper) Again, this was prepared as -- during the -- this was prepared during the preparation of the groundwater discharge permit, but is not an official design document.

Q Did you consider including this in the groundwater discharge permit application?

A (Mr. Harper) These were developed while we were working with Lockwood Greene to develop the information required for the groundwater discharge permit application. This was -- it evolved during the development of the permit application.

Q Okay. Well, did you discuss with others working on that application whether this should be included in that application?

A (Mr. Harper) Not whether this should specifically be included.

Q Well, did you -- sorry. Go ahead.

A (Mr. Harper) We have included -- what we

included in the groundwater discharge permit adequately reflects the current design for the system.

Q Well, do you remember discussing with others involved in preparing that application whether you should include more detail, such as is shown in this diagram in the application?

A (Mr. Harper) In the groundwater permit application?

Q Yes.

A (Mr. Harper) We were -- I did review other permit applications, and we feel that what we've provided in the application is adequate.

Q But the question was: Do you remember discussing with others working on that whether you should put in more detail, such as is shown in this diagram?

A (Mr. Harper) No. We believed that the text description adequately defines the proposed system. I'm referring to the text description from the permit application.

MR. LOVEJOY: Can we mark this one? 172. I guess this is Number 9.

(The document referred to was marked for identification as Exhibit NIRS-HP 9.)

BY MR. LOVEJOY:

Q Mr. Harper, I'll ask you to look at Number 9 and state whether you saw this around March 1 of this year.

A (Mr. Harper) (Perusing document.) Yes, I believe I did.

Q This is from someone named Carroll Walker to you, and the text says, "How close is this to what you need?" Do you remember requesting something from Carroll Walker to which this is a response?

A (Mr. Harper) We went down and met with the Lockwood Greene staff during the early preparation phase for the groundwater discharge permit, and these emails were in response to some preliminary information that Lockwood Greene was putting together to support the permit development.

Q Okay.

A (Mr. Harper) And I would also like to point out this email was a earlier version of the two exhibits ago.

Q This was an earlier version of what?

A (Mr. Harper) Of the exhibit that starts on page LES-168.

Q That's Exhibit 7?

A (Mr. Harper) Yes. You'll notice there the first line of that email says, "Treated Effluent Basin

(REVISED)."

Q Okay. Well, do you remember how you responded to Exhibit 9 and the question, "How close is this to what you need?"?

A (Mr. Harper) It was likely there was -- we had a former discussion. I can't remember the exact details. I'd have to go back and do a line-by-line comparison and see what if any changes there are between the two emails. But since they look quite similar and there's the "Revised" note on Exhibit 7, I'm assuming it was a follow-up email, and given the timing of the emails also.

Q Does Exhibit 9 show a -- what I would call a two-layer liner system for a basin? Is there's a reference to 60 mil HDPE liner, and then a 60 mil HDPE liner, secondary liner.

A (Mr. Harper) Correct. It is a representation of a -- of what a double-lined system could look like.

Q Okay. And do you remember discussing with the Lockwood Greene people the possibility of having a double liner for the UBC storage pads, stormwater retention basin?

A (Mr. Harper) No. At no time did we -- in fact, I do note the difference on Exhibit -- Exhibit 9 says, "Treated Effluent Evaporative Basin and UBC Storage Pad Stormwater Retention Basin." You'll then notice on

Exhibit 7 that the "UBC Storage Pad Stormwater Retention Basin" has been deleted in the revised version.

Q Uh-huh. I see that. And the question is: Did you discuss with them having a double-lined system for the UBC storage pad stormwater retention basin as shown in Number 9?

A (Mr. Harper) I believe that upon review of the Exhibit 9, it's likely I had a discussion with Lockwood Greene, pointing out the mistake in Exhibit 9, that said that this applied to the UBC storage pad stormwater retention basin.

Q Had they misunderstood your instructions?

A (Mr. Harper) I'm not sure.

Q Was there a contractor working for LES or maybe for Framatome named GL Environmental, Inc., that worked on the LES project?

A (Mr. Harper) Yes, there is.

Q And where are they based?

A (Mr. Harper) They're based out of, I believe it is, Rio Rancho, New Mexico.

Q And what were their functions in connection with the LES project for New Mexico?

A (Mr. Harper) It provided some various environmental-related services. Some examples would be endangered species surveys, archaeological evaluations of

the site.

Q Who were the individuals at GL Environmental that did work on this project?

A (Mr. Harper) Any aspect of the project?

Q Yes.

A (Mr. Harper) Denise Gallegos, Tim Leftwich.

Q Anybody else?

A (Mr. Harper) That is all.

Q And what is the professional training of Denise Gallegos?

A (Mr. Harper) I have not reviewed her resume.

Q Okay. And what is the professional training of Tim Leftwich?

A (Mr. Harper) I have not reviewed his resume.

Q Okay. GL Environmental did work in connection with the groundwater discharge permit, did they not?

A (Mr. Harper) They did -- they performed a review o the draft permit application that we put together.

Q And did you receive the results of that review?

A (Mr. Harper) Yes, we did.

Q Did you yourself in your job review the review and decide what action to take?

A (Mr. Harper) Yes, I did.

Q Okay.

MR. LOVEJOY: Let's mark this. This would be 10.

(The document referred to was marked for identification as Exhibit NIRS-HP 10.)

BY MR. LOVEJOY:

Q Do you have Number 10, Mr. Harper?

A (Mr. Harper) Yes, I do.

Q Can you tell us whether you've seen this one before.

A (Mr. Harper) Yes, I have.

Q Did you see this around April 6 of this year?

A (Mr. Harper) Yes, I did.

Q Yes. Do you remember receiving this and reviewing the contents?

A (Mr. Harper) Yes, I did.

Q Did you respond to this?

A (Mr. Harper) I do not believe I responded to it, other than to review the comments.

Q Do you remember what action you took based on these comments?

A (Mr. Harper) Without going back and reading right here, I would -- I believe in some cases, we incorporated those comments and suggestions into the permit.

Q Do you remember what instances those were?

A (Mr. Harper) Not specifically without -- I'd have to do a comparison between --

Q Okay. Would you read the text on the page that has LES-122 on it. Just read to yourself the entry under, Groundwater Conditions.

A (Mr. Harper) (Perusing document.) Yes.

Q It says, "Copies of drill logs should be provided and referenced. Under 'Groundwater Conditions,' will information on the fault under NEF be provided?" Do you know what fault is referred to?

A (Mr. Harper) Yes, I do. But it is not properly characterized in the comment here.

Q Okay. What fault is referred to?

A (Mr. Harper) Given the timing here, I believe it was back just before this email was sent to me, there was a fault identified on the WCS property

Q And how did you learn about that fault?

A (Mr. Harper) It was either conveyed to me by WCS and/or Cook-Joyce. I'm not sure who without going back and --

Q So you got information orally?

A (Mr. Harper) It was probably orally. Yes.

Q Was there anything in writing about it?

A (Mr. Harper) No. Other than I did receive

some photographs also.

Q What were the photographs of?

A (Mr. Harper) I forget the exact year, but a number of years ago, during excavation at the WCS property, there was a fault in some very -- I believe in a Triassic formation was noted during excavation for one of their burial pits.

Q And what were you told about the fault when you first learned about it?

A (Mr. Harper) I was told that WCS was undertaking an evaluation of the fault.

Q And that was in 2004 you were told that?

A (Mr. Harper) That's correct.

Q Did you ever hear of any of the outcome of that evaluation?

A (Mr. Harper) Yes. Back in the end of May, LES, which I was a part of the team, accompanied the NRC to the site to visit the fault or to inspect the fault, I should say. And then we have subsequently received and provided a report to the NRC on the characterization of the fault.

Q Did you learn anything about the results of the WCS evaluation of the fault?

A (Mr. Harper) I have reviewed their report that was submitted to the State of Texas.

Q Who did that report?

A (Mr. Harper) Cook-Joyce and a company by the name of Enterra.

Q Do you have a copy of that report?

A (Mr. Harper) Yes, I do.

MR. LOVEJOY: We're going to be requesting a copy of that report.

MR. CURTISS: Okay. We'll see if we've provided it already, but --

THE WITNESS: (Mr. Harper) It was submitted to the NRC.

MR. LOVEJOY: Is this in the ADAMS system?

MR. KRICH: Should be. I haven't checked the last couple days, but I believe it is.

MR. LOVEJOY: Was it submitted recently?

MR. KRICH: Yes. In the last two weeks. In August actually.

THE WITNESS: (Mr. Harper) Correct. Yes. With the last round of our --

MR. KRICH: It was submitted at the end of August.

BY MR. LOVEJOY:

Q So you and some others visited the site of the fault in May of this year.

A (Mr. Harper) That's correct.

Q And who was there at that time?

A (Mr. Harper) There was one person from the NRC Washington office.

Q Who was that?

A (Mr. Harper) Herman Graves.

Q Herman --

A (Mr. Harper) Graves.

Q Herman Graves. Who else was on this visit?

A (Mr. Harper) There was three contractors to the NRC.

Q And who were they?

A (Mr. Harper) I couldn't accurately give you their names right now, but I --

Q Okay. Do you have it written down somewhere?

A (Mr. Harper) Yes, I do.

Q And where did you go? You went to the site of the fault?

A (Mr. Harper) We went to the site of the fault. That's correct.

Q Were there people there from WCS to show you the site?

A (Mr. Harper) We were showed the excavation by staff from Cook-Joyce and from Enterra.

Q Do you remember any of those folks' names?

A (Mr. Harper) Yes. From Cook-Joyce it would

have been Doug Granger.

Q Doug Ranger?

A (Mr. Harper) Granger, G. I believe Steve Cook was there.

Q He's the Cook in Cook-Joyce?

A (Mr. Harper) He's the Cook in Cook-Joyce. And a gentleman by the name of Gerry Grizak, Gerry with a G, Grizak with a G.

Q Who's he with? Cook-Joyce?

A (Mr. Harper) He's with Enterra.

Q Enterra?

A (Mr. Harper) Yes. And Dan Green, who is a contractor to LES.

Q Okay. So what did you see when you looked at the site of the fault?

A (Mr. Harper) We first observed the excavation from the top side, which pointed out the fault in the mapping activities that were going on in the excavation, and then we drove down into the excavation. It's quite deep. It's quite a large excavation. They had opened up a large face of the redbeds, the Chinle redbeds, and they were doing detailed mapping of the fault.

Q How deep was this excavation?

A (Mr. Harper) I'll estimate it 70 feet, if not deeper. It was fairly deep. The actual -- there's more

information in the report that was submitted to the NRC.

Q Okay. Was the report that was submitted to the NRC, was this the report by Cook-Joyce and Enterra?

A (Mr. Harper) Yes, it was. We submitted the section of the report -- this was a report that was generated for WCS as part of one of their license applications. We submitted just the portion on the fault investigation to the NRC, because that was the issue that we were responding to.

Q What prompted this submission?

A (Mr. Harper) A request from the NRC.

Q What had they requested?

A (Mr. Harper) They requested that we would provide them with a copy of the report when it was completed.

Q How did they know there was a report?

A (Mr. Harper) They accompanied us on the May site inspection.

Q Okay. Well, how did they find out that there was a fault to inspect?

A (Mr. Harper) That I do not know.

Q Okay. Do you remember what conclusions were reached in the report?

A (Mr. Harper) The main focus of the report was to determine the age of the fault and whether or not it

was considered active or capable, and the report concludes that the fault was -- I believe it was Triassic-aged or earlier. It's on the order of hundreds of millions of years old.

Q Was there a determination whether it was -- strike that.

The age of the fault was Triassic. Are you distinguishing between the age of the fault and the age of the strata?

A (Mr. Harper) The purpose of the investigation was to determine the age of the fault displacement.

Q And what was the age of the strata?

A (Mr. Harper) I'd have to go back and read the report. It was at least that old, since the fault was in it. But I don't -- again, I used -- it's Triassic or Jurassic. It was pre-Quaternary, I believe.

Q Was there any discussion in the report about the -- whether the fault was active or capable, as you use it?

A (Mr. Harper) I believe a summary that -- I believe it is -- it concluded that the fault was very old. That was gist.

MR. CURTISS: Lindsay, let me raise a question here in terms of a form of an objection.

MR. LOVEJOY: Yes.

MR. CURTISS: If you're endeavoring to tie this back in some way to the groundwater question that you're raising, these are the witnesses that can address that. If you're, as you appear to be, pursuing of line of inquiry that goes to a seismic issue -- and my understanding is that the individuals who accompanied -- who visited this fault were seismic experts and looked at it for that reason -- I think we would interpose an objection.

At this point, you're entitled to pursue this line of questioning, but if and to the extent that the questions here can be linked to the groundwater issue that's properly within the scope of this contention, this is the panel that can address it.

MR. LOVEJOY: Good.

MR. CURTISS: But if you're seeking to address issues related to seismic -- and it appears that that's the direction that the question is going -- I would submit (a) this is not the panel, and (b) your contention doesn't encompass that. So we would hope that if you could link it back to the groundwater question, feel free to do that. In the alternative, we would object to a seismic inquiry, because that's not an issue that's before the board.

MR. LOVEJOY: Well, it may touch on both issues. That's the thing, so I'm going to be asking these

folks about the hydrologic aspects of this, and I think that's --

MR. CURTISS: That's a fair question, and to the extent that it's related to that, I think that's an appropriate question. But to the extent that it's not, I think we would object and just for the record note that.

MR. LOVEJOY: Okay.

BY MR. LOVEJOY:

Q You say the reported concluded that the fault was very old. Did the report conclude whether the fault was possibly still active or not, or did --

A (Mr. Harper) I can't remember. I'd have to look at the report again.

Q Okay.

A (Mr. Harper) It was more focused on the age.

Q Okay. Mr. Peery, have you received any information about this fault in connection with your work?

A (Mr. Peery) No, I have not.

Q Has any effort been undertaken to examine the question of this fault from the standpoint of flow paths for water?

A (Mr. Harper) Not to my knowledge.

Q Is there any reason why that was not examined?

A (Mr. Harper) The focus of the investigation was seismic-related.

Q Was there any reason it was considered inappropriate to investigate this from a hydrologic standpoint?

A (Mr. Harper) I'm only aware of the evaluation that was done in regards to the -- whether it was a capable fault or not. I'm not aware of any other studies they did while the excavation was open.

Q Is this fault mentioned in any version of the environmental report?

A (Mr. Harper) The report was issued in, I believe it was, sometime -- August, late August of '04, so it has not been -- it is not mentioned in the ER, but it has been -- it is part of the license application in that we have submitted formal RAIs to the NRC.

MR. CURTISS: Let's take a break here, Lindsay, and you're still going to pursue this, or if you're at the conclusions of your questions and are prepared to move on, that's fine. If not, we'll take a break, and we'll discuss whether we have the right people here, and whether this is relevant to the issues that we think you've raised here.

So we'll take a brief break --

MR. LOVEJOY: Do you want to take a break?

MR. CURTISS: Yes. Five minutes.

MR. LOVEJOY: Okay.

(Whereupon, a short recess was taken.)

MR. CURTISS: I think we can discuss an approach to go forward here, and propose an approach. This panel that we have here is able to answer any questions that you have -- and we'll stay as long as you wish -- on the groundwater contamination issues that are the subject of the deposition this morning.

If you are able to articulate for us the nexus that you see between the seismic issue that you've been discussing in the past 45 minutes or so and that was the subject of an early objection from me, on the ground that, at least at that point, I didn't see the nexus -- but also allowing the possibility that you might, in your questioning, get to that point of establishing nexus.

I think we're to the point now where we get to see what you view the nexus to be between the seismic issue and the groundwater contamination contention that these folks are the experts on.

If at some point you think you -- and we're I think perfectly willing to listen to how you might articulate that nexus and get into the questions of these experts, who are experts on the groundwater issue as to the relationship between the seismic inquiry that you've undertaken and the groundwater issue that they're experts on.

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

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

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

BY MR. LOVEJOY:

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

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

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

a fault present beneath or near the site?

A (Mr. Peery) Yes.

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

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

Q And when was that, did you finish that?

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

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

A (Mr. Peery) I have not.

Q Would you like to see that?

A (Mr. Peery) Yes, I would.

Q Why is that?

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

Q Are you going to pursue that investigation?

A (Mr. Peery) Yes.

Q Okay.

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

now?

THE REPORTER: Yes.

(The document referred to was marked for identification as Exhibit NIRS-HP 11.)

BY MR. LOVEJOY:

Q Would you both please look at Number 11 and state whether you can identify this as something you've seen before.

A (Mr. Peery) Yes. I've seen this.

A (Mr. Harper) And I have seen this before.

Q Okay. What -- are wells indicated on the diagram that's page 2? I see it's got some groundwater monitoring well locations.

A (Mr. Harper) This is a figure that was prepared in response to the RAIs that we received from the NRC where we were providing the latest information on the locations for the groundwater monitoring wells for the site.

Q Does this describe wells that exist now?

A (Mr. Harper) No.

Q Are these wells planned to be --

A (Mr. Harper) These are planned.

Q Okay. So the references here to MW-1, MW-2, and MW-3, do they bear any relation to the MW-1, MW-2, and

MW-3 that were drilled and reported on by Cook-Joyce?

A (Mr. Harper) No. No, they do not.

Q Okay.

MR. LOVEJOY: This is 12.

(The document referred to was marked for identification as Exhibit NIRS-HP 12.)

BY MR. LOVEJOY:

Q Would you look at Number 12 and each of you please state whether you've seen this before.

A (Mr. Peery) I've seen this before.

A (Mr. Harper) And I have seen this before also.

Q And, Mr. Harper, can you tell why this was created? Do you know?

A (Mr. Harper) It appears that this figure was created to -- for inclusion in the groundwater discharge permit application, although I can't tell by looking at the document here if it is the final version of the figure.

Q Okay. There's a legend which refers to number 1, soil sample; number 2, vegetation sample; and number 3, water sample/sediment sample.

A (Mr. Harper) Yes.

Q Are these identified to identify proposed sampling locations for use under the discharge permit?

A (Mr. Harper) Yes, they are.

Q Do you know the frequency of the samples that was proposed?

A (Mr. Harper) I'd have to check the permit.

Q Okay.

A (Mr. Harper) They may vary for different media.

MR. LOVEJOY: This will be 13.

(The document referred to was marked for identification as Exhibit NIRS-HP 13.)

BY MR. LOVEJOY:

Q Mr. Harper, Mr. Peery, could you identify Exhibit 13?

A (Mr. Peery) Exhibit 13 is LES Boring and Monitor Well Survey Data table.

Q Okay. Mr. Harper, do you recognize this as something you've seen?

A (Mr. Harper) I'm not sure if I have seen this information in this particular form right here, but I'm familiar with the information.

Q What wells does this refer to?

A (Mr. Harper) The BH-1 through the BH-9 would be the nine shallow groundwater borings.

Q And the MW-1, -2 and -3, are those the wells

that were drilled --

A (Mr. Harper) The three --

Q -- under Cook-Joyce's supervision?

A (Mr. Harper) Right. The three deep wells.

Q Okay. Good.

MR. LOVEJOY: This is 14.

(The document referred to was marked for identification as Exhibit NIRS-HP 14.)

BY MR. LOVEJOY:

Q Would you each please say if you've seen this document before.

A (Mr. Peery) I have not reviewed this document.

Q Mr. Harper, do you --

A (Mr. Harper) I have seen this document.

Q Okay. Do you know what the date of this document is approximately?

A (Mr. Harper) This document was prepared -- originally prepared in support of the Rev. 0 license application.

Q And that was submitted in December of '03. Is that right?

A (Mr. Harper) Correct.

Q Was it shortly before that date?

A (Mr. Harper) The calculation was originally

performed sometime before that date.

Q Okay. Over on page 4 of 40 in the lower right corner --

A (Mr. Harper) I'd like to make one --

Q Please. Go ahead.

A (Mr. Harper) Supplement my previous response. Even though the calculation was prepared prior to the application submittal, it was not formalized until recently.

Q What was the formalizing process you're talking about?

A (Mr. Harper) It was essentially just to get the cover sheets on and it all signed and dated.

Q Has that been submitted to NRC now?

A (Mr. Harper) This calculation?

Q Yes.

A (Mr. Harper) No, it has not.

Q Over on page 4 of 40, under the caption, Radioactivity Estimate, why don't you read the first paragraph there.

A (Mr. Harper) (Perusing document.)

Q It says -- well, under the major caption, Inputs and Assumptions, it says, "The radioactivity present on the surface of cylinders is the maximum allowable for standard offsite transport per 49 CFR 173."

And it goes on.

Did you give instructions to someone preparing an estimate of contamination that --

A (Mr. Harper) Where did you just read that statement?

Q It's under, Radioactivity Estimate.

A (Mr. Harper) Okay.

Q Did you give instructions to use the maximum allowable, as it's stated here, in estimating radioactivity that would be present on the cylinders in storage?

A (Mr. Harper) No, I did not.

Q Well, do you know who did? Do you know why that rule is chosen?

A (Mr. Harper) It was an assumption that was -- a conservative assumption that was proposed by the author in conjunction with discussions with other staff of Framatome.

Q The author is Mr. Bellini?

A (Mr. Harper) Mr. Bellini. Correct.

Q Okay. Do you know whether calculations were done assuming a greater amount of radioactivity than that allowable for transportation?

A (Mr. Harper) I am not aware of it.

Q Okay.

MR. LOVEJOY: Let's mark this.

(The document referred to was marked for identification as Exhibit NIRS-HP 15.)

BY MR. LOVEJOY:

Q Have you seen Number 15, Mr. Harper, and you too, Mr. Peery, if you might have seen this?

A (Mr. Peery) I have not reviewed this document.

A (Mr. Harper) I have seen it before.

Q Do you know what the date of this document is?

A (Mr. Harper) This calculation was originally prepared in support of our submitting the responses to the round NRC RAIs. I believe it was originally prepared back in the July time frame.

Q July of '04?

A (Mr. Harper) July of '04.

Q And this is marked, Draft. Do you know if this was ever completed?

A (Mr. Harper) The calculation, I believe, has been signed or is awaiting final sign-off right now.

Q Well, has this or a version of this document been submitted to NRC in response to an RAI?

A (Mr. Harper) A summary of it was supplied as part of the RAI.

Q When was that?

A (Mr. Harper) I'd like to also add. These types of calculations are not routinely submitted to the NRC.

Q When was the summary submitted?

A (Mr. Harper) July of '04 time frame.

Q Okay. That's all I have on that one. Now, I copied part of the latest environmental report. Draft 2. Some of the pages are marked December '03, rather than bring the whole thing.

A (Mr. Harper).

MR. LOVEJOY: This would be 16?

(The document referred to was marked for identification as Exhibit NIRS-HP-16.)

BY MR. LOVEJOY:

Q I just have a couple of questions about this. Certainly, Mr. Harper, you've reviewed the environmental report in various versions as it's been submitted. Is that right?

A (Mr. Harper) Correct.

Q Now, Mr. Peery, have you?

A (Mr. Peery) I've reviewed sections related to the site hydrogeology.

Q Did you review Section 3.4?

A (Mr. Peery) Yes.

Q Did you comment on it, or did you --

A (Mr. Peery) I haven't provided any comments to anyone.

Q Okay. Over on page 3.4-5, there's a paragraph a little over halfway down. It says, "The first presence of saturated porous media," and it goes on. Why don't you take a look at that one, Mr. Peery. I'm going to ask you just a couple of questions.

A (Mr. Peery) (Perusing document.)

Q Okay. There's a reference to intersecting of saturated porous media 200 to 300 below land surface. Do you know what intersections that refers to?

A (Mr. Peery) As I recall, that's the zone I previously described as the 220- to 230-foot zone.

Q That was encountered in MW-2 also?

A (Mr. Peery) Yes.

Q Okay. Then there's a reference to a zone -- it says, "Similarly. there is a 30.5-meter, 100-foot, thick water-bearing layer at about 183 meters, 600 feet, below ground surface," and a reference, I take it, to Cook-Joyce.

Do you know what data supports that statement?

A (Mr. Peery) I don't recall that offhand. I don't recall offhand.

Q Okay. And then in the next paragraph, it says,

"The first occurrence of a well-defined aquifer is approximately 244 meters, 800 feet below land surface." Do you know what supports that statement?

A (Mr. Harper) Could I speak to that statement?

Q Of course.

A (Mr. Harper) In the Revision 2 to the ER, we revised the discussion on the Santa Rosa formation, and this particular passage that describes it here was either missed during the revision or somehow got -- did not get typed and incorporated.

Q Well, is the statement now incorrect in your view?

A (Mr. Harper) Based on the February 2004 information from the Cook-Joyce report, we have revised that statement, and it is revised in other sections here. I'm just trying to put my -- (Perusing document.)

Q Do you want to find places where it's stated as revised?

A (Mr. Harper) (Perusing document.) On page 3.4-13 --

Q Would you point to what you're talking about?

A (Mr. Harper) The third paragraph from the top --

Q Yes.

A (Mr. Harper) -- starts off, "The first

occurrence."

Q Yes.

A (Mr. Harper) So that prior passage on the prior page should read similar to that passage, and that change is in progress for the next revision of the ER.

Q So are you saying that the Santa Rosa should be identified as occurring 340 meters or 1,115 feet below land surface, rather than 244 meters or 800 feet?

A (Mr. Harper) Correct.

Q Do you know how to figure 800 feet or 244 meters got into the text originally?

A (Mr. Harper) I believe it's based on some early information that we obtained during the original development of the ER.

Q What information was that?

A (Mr. Harper) I believe it was information that was informally provided or, let's say, verbally provided, based on discussions with WCS personnel.

Q So you were told by WCS personnel that the Santa Rosa was found at 800 feet?

A (Mr. Harper) I believe that is probably the case.

Q Okay.

A (Mr. Harper) And I'm also not sure -- well, let's say I would like to -- I'm not sure if they were

referring, now when I read this passage, the physical location of the Santa Rosa or the piezometric surface of the Santa Rosa, which may describe the difference, assuming it's a confined aquifer and the piezometric surface is higher than the physical location of the Santa Rosa formation itself.

Q Okay. I have a couple of questions about the text of the draft EIS.

MR. LOVEJOY: I didn't run a full copy of this, and you can either show the witness the text, or I will show him the text.

BY MR. LOVEJOY:

Q Let's first identify the map on page 3-36. Now, I realize this is not an LES document, but based on your knowledge of the site and the work that's been done there, can you state what's depicted in Figure 3-21?

MR. CURTISS: Can the record reflect that the witnesses are looking at page 3-36 of the draft environmental impact statement published by the NRC.

THE WITNESS: (Mr. Harper) This is your note there on the very small text, near the bottom of the legend there, the source of the ER report December 2003. And what we're looking at here is the borings that have been -- that were performed prior to December 2003 on the site. So you see the nine shallow groundwater borings,

the five geotechnical borings, and the location of the three monitoring wells.

BY MR. LOVEJOY:

Q You called them geotechnical borings. Under whose supervision were they made?

A (Mr. Harper) Those are MACTEC borings.

Q Those are the earlier ones --

A (Mr. Harper) Correct.

Q -- and then the Cook-Joyce.

A (Mr. Harper) Yes. The sole purpose of those borings was to collect geotechnical information.

Q Okay. Would you look at page 4-13 of the DEIS, please. There is a discussion of a site stormwater detention basin, and the second paragraph has some text that I'll just read and I'd like your comments on.

"A conservative estimate of the impact from this basin assumes that the local groundwater velocity at the plume coming from the site stormwater detention basin could be 252 meters at .16 mile per year. The cross-section perpendicular to the flow direction of this plume would be 2,850 square meters, 30,700 square feet. The depth of the plume would be about 2.85 meters, 9.3 feet, for a nominal plume width of 1,000 meters, 3,280 feet."

Do you know of the calculations which gave rise to these figures?

A (Mr. Harper) I do not.

A (Mr. Peery) I do not.

Q Okay. Over on the next page, 4-14, in the first paragraph on that page, there's a discussion of septic tanks and leach field. At the end of that first paragraph, it says, "The local groundwater velocity of the plumes coming from the septic system would then be about 252 meters, .16 mile, per year. The total cross-section perpendicular to the flow direction of the septic system plumes would be 116 square meters, 1,250 square feet. The depth of the plumes was calculated to be about 1.16 meters, 3.8 feet, for a nominal total plume width of 100 meters, 328 feet."

Do you know the origin of those figures, either one of you?

A (Mr. Peery) I do not.

A (Mr. Harper) I do not, either.

Q That's all I have on that.

MR. LOVEJOY: If we can have a minute or two with my technical advisor, we may be able to end this.

(Whereupon, a short recess was taken.)

THE REPORTER: We're back on the record.

MR. LOVEJOY: Thank you.

BY MR. LOVEJOY:

Q Mr. Harper, we just looked at the discussion in

the draft EIS of plumes associated with the site stormwater detention basin and the septic tanks and leach fields. From reading those, can you tell whether you would agree or disagree with those analyses?

MR. CURTISS: Could we have a page reference there?

BY MR. LOVEJOY:

Q On page 4-13 and 4-14.

A (Mr. Harper) The first one's on 4-13?

Q Yes.

A (Mr. Harper) I guess I make two points. First, I would have to see the calculation to understand the basis for the assumptions made and the inputs. And, number two, for the site stormwater detention basin, it's not clear in this calculation if they're taking any credit for evapo-transpiration, and that may be a -- if they're not, that would be a very overly conservative assumption in my belief.

Q And what's your view of the discussion of the septic tanks and leach fields on 4-14?

A (Mr. Harper) Based on the sentence there in the middle of the paragraph -- "A conservative estimate of the impact from septic systems assumes all of the infiltrating water was transported down gradient." So, again, without seeing the calculation and also -- and

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

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

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

Q Okay. Mr. Harper?

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

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

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

Q What's the usual suite?

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

Q Anything else?

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

else, would be a potential.

MR. LOVEJOY: Okay. I'm done.

MR. CURTISS: Okay.

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

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

CERTIFICATE

This is to certify that the foregoing proceedings in the matter of: The Deposition of George A. Harper Roger L. Peery

held on: September 17, 2004

at the location of: Santa Fe, NM

were duly recorded and accurately transcribed under my direction; further, that said proceedings are a true and accurate record of the testimony given by said witness; and that I am neither counsel for, related to, nor employed by any of the parties to this action in which this deposition was taken; and further that I am not a relative nor an employee of any of the parties nor counsel employed by the parties, and I am not financially or otherwise interested in the outcome of the action.

Carol Oppenheimer

Carol Oppenheimer

AUTHENTICATION BY SIGNATURE

I, the undersigned, do hereby certify by my signature hereunder that I have read the foregoing deposition of testimony given by me on September 17, 2004, and find said transcription to be a true and accurate record, as corrected.

George A. Harper

Sworn to and subscribed before me this 28th day of October, 2004.

Barbara Ann Lema
Notary Public

My commission expires August 29, 2010.

Barbara Ann Lema, Notary Public
Commonwealth of Massachusetts
My Commission Expires 8/29/2010

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ERRATA

ERRATA

RE THE DEPOSITION OF George A. Harper
(deponent's name)

TAKEN ON Sept. 17, 2004
(date)

IN THE MATTER OF

LES (party) v. NIRS/PC (party)

DOCKET NO. _____

IN _____
(name of court)

PAGE NO.	LINE NO.	CORRECTION
10	12	"DM" should be "dam"
10	14	"DM" should be "dam"
12	10	"pump" was probably an "ah"
13	1	"--" should be "and"
37	13	"is" should be "in"
38	1	"membrane" refers to the "upper liner"
38	2	"membrane" refers to "liner"
63	7	"yo" should be "you"
64	21	first use of "on" should be ~~deleted~~ GAH 10/28/04 deleted
64	22	"in" should be "and"
85	6	"formes" should be "phone"
87	18	"o" should be "of"

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PAGE NO.	LINE NO.	CORRECTION
91	3	"Enterra" should be "Intera"
92	23	"Enterra" should be "Intera"
93	11	"Enterra" should be "Intera"
93	17	"in" should be "and"
94	3	"Enterra" should be "Intera"
95	22	"gist" should be "it"
108	13	Insert "of" after "round"
113	20	"This is your" prosasly should be "There is a"
117	12	"over" prosasly should be "or"

AUTHENTICATION BY SIGNATURE

I, the undersigned, do hereby certify by my signature hereunder that I have read the foregoing deposition of testimony given by me on September 17, 2004, and find said transcription to be a true and accurate record, as corrected.

_____
Roger L. Peery

Sworn to and subscribed before me this _____day of _____, 20__ __.

_____
Notary Public

My commission expires _____.