STATE OF CONNECTICUT

SITING COUNCIL

CONNECTICUT LIGHT & POWER COMPANY AND UNITED ILLUMINATING COMPANY	*	APRIL 20, 2004 (10:07 A.M.)
APPLICATION FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION OF A NEW 345-kV ELECTRIC TRANSMISSION LINE AND ASSOCIATED FACILITIES BETWEEN THE SCOVILL ROCK SWITCHING STATION IN MIDDLETOWN AND THE NORWALK SUBSTATION IN NORWALK, CONNECTICUT	*	DOCKET NO. 272

BEFORE: PAMELA B. KATZ, CHAIRMAN

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A PARTY, THE TOWN OF BETHANY

AN INTERVENOR, THE TOWN OF FAIRFIELD

AN INTERVENOR, THE FIRST DISTRICT WATER COMPANY

AN INTERVENOR, NORWALK ASSOCIATION OF SILVERMINE HOMEOWNERS

A PARTY, ROBERT W. MEGNA, STATE REP. 97th DISTRICT

AN INTERVENOR, MARY G. FRITZ, STATE REP. 90th DISTRICT

AN INTERVENOR, AL ADINOLFI, STATE REP. 103rd DISTRICT

AN INTERVENOR, RAYMOND KALINOWSKI, STATE REP. 100th DISTRICT

AN INTERVENOR, THEMIS KLARIDES, STATE REP. 114th DISTRICT

AN INTERVENOR, JOHN E. STRIPP, STATE REP. 135th DISTRICT

AN INTERVENOR, WILLIAM ANISKOVICH, STATE REP. 12th SEN. DISTRICT

AN INTERVENOR, JOSEPH CRISCO, JR., STATE REP. 17th SEN. DISTRICT

AN INTERVENOR, LEONARD FASANO, STATE REP. 34th SEN. DISTRICT

. . .Verbatim proceedings of a hearing before the State of Connecticut Siting Council in the matter of an application by Connecticut Light & Power Company and United Illuminating Company, held at Central Connecticut State University Institute of Technology & Business, 185 Main Street, New Britain, Connecticut, on April 20, 2004 at 10:07 a.m., at which time the parties were represented as hereinbefore set forth . . .

CHAIRMAN PAMELA B. KATZ: I'd like to call this to order, this continuation of a public hearing on Docket 272.

The plan is that today and tomorrow we will be discussing Segments 3 and 4 of the proposed line. This is the area from East Devon to Norwalk. On Thursday we're going to be discussing some of the system alternatives to the proposed transmission line.

At this point, I'd like -- I'm going to ask the court reporter, Tony Vanacore, because Mr. Marconi is in traffic, to please swear in some witnesses. Miss Randell and Mr. Fitzgerald, do you want to identify who is going to be sworn.

MR. ANTHONY FITZGERALD: Yes, please. And

I should probably refer to the hearing program at page 4. And I'll ask the witnesses to stand in the order in which they're listed in the program. First is Jay Williams, Principal Engineer, Power Delivery Consultants; Brian Gregory, Technical Director, Cable Consulting International, Inc.; James Hogan of Burns & McDonnel; and Louise Mango, Phenix Environmental, Inc. The other witnesses have been previously sworn.

CHAIRMAN KATZ: Mr. Vanacore, do you need any spellings?

COURT REPORTER: Yes.

CHAIRMAN KATZ: Why don't you sit down by the microphone and --

COURT REPORTER: Please be seated. Give us your name again and please put your address on the record, and then we'll swear you all at once, starting with --

MR. JAY WILLIAMS: My name is Jay -- excuse me -- Jay, J-a-y, Williams. My company is Power Delivery Consultants, Incorporated. The business address is 28 Lundy Lane, L-u-n-d-y, Lane. The Town is Ballston Lake, B-a-l-l-s-t-o-n, Lake, New York.

MR. BRIAN GREGORY: My name is Brian Gregory, B-r-i-a-n, from the United Kingdom. And I'm the

Technical Director of Cable Consulting International Limited. Our address is P.O. Box 1, 7 Oaks in Kent.

MS. LOUISE MANGO: I am Louise Mango, L-o-u-i-s-e. The last name is M-a-n-g-o. I'm with Phenix Environmental, Inc. It's spelled P-h-e-n-i-x. My address is 3 Orange Pippin Road, Sandy Hook, Connecticut.

MR. JAMES HOGAN: My name is James Hogan with Burns & McDonnel Engineering. Hogan is spelled H-o-g-a-n. And McDonnel is spelled M-c-D-o-n-n-e-l, 9400 Ward Parkway, Kansas City, Missouri.

COURT REPORTER: Would you stand please and raise your right hand -- is that all of them?

MR. FITZGERALD: That's all that have not been previously sworn.

(Whereupon, Jay Williams, Brian Gregory, Louise Mango and James Hogan were duly sworn in.)

COURT REPORTER: Thank you. You may be seated.

CHAIRMAN KATZ: Okay. I'm --

COURT REPORTER: They've been sworn.

CHAIRMAN KATZ: Thank you. Mr. Fitzgerald, do you want to identify which exhibits you'd like to have admitted today.

MR. FITZGERALD: Yes. Mr. Zaklukiewicz,

would you please turn to page 13 of the hearing program, and calling your attention to the -- well just let me make the statement that listed, starting with Item 47, are items that have been submitted to the Council since the last hearings, which include responses to data requests, errata pages, prefiled testimony relating to this hearing -- and directing your attention to Items 47, 48, 49, 50, 51, 54, 55, 56, 57 and 58, are those -- is the -- are the statements made in those documents true and correct to the best of your knowledge and belief?

MR. ROGER ZAKLUKIEWICZ: My name is Roger Zaklukiewicz. And yes, they are.

MR. FITZGERALD: Alright. Now with the qualification we have some errata in the prefiled testimony, which I will ask you to identify in a moment, but passing now to Miss Mango, Miss Mango directing your attention to Item No. 53 on the prehearing program, your prehearing testimony, with the exception of the errata that you will shortly identify, is that testimony true and correct to the best of your belief?

MS. MANGO: Yes, it is.

MR. FITZGERALD: Alright. Now, Mr. Zak and Miss Mango, we have prepared -- or you have prepared some errata sheets related to the prehearing -- the

recently filed prehearing testimony. And I would ask -- we have copies that can be handed out -- and I'd ask that it be marked as an exhibit for identification at this time --

COURT REPORTER: Madam Chair --

CHAIRMAN KATZ: Yeah. Mr. Fitzgerald, we've requested that you move that mic closer so the audience can hear you.

MR. FITZGERALD: I've just handed to Mr. Cunliffe a written errata sheet that will memorialize, I think with one exception, the corrections that the witnesses are about to make to the supplemental prefiled testimony.

CHAIRMAN KATZ: Do you want to make this errata sheet Exhibit 59?

MR. FITZGERALD: Yes, please.

CHAIRMAN KATZ: Okay. And you have copies for the other parties?

MR. FITZGERALD: Yes. They will be served electronically today, but we also have copies that people can help themselves to.

CHAIRMAN KATZ: Thank you.

MR. FITZGERALD: What --

A VOICE: They're being made right now.

MR. FITZGERALD: Copies are being made now I'm informed.

CHAIRMAN KATZ: Okay. So you'll --

MR. FITZGERALD: They will be available for pickup today --

CHAIRMAN KATZ: Your minions can pass them out as they come in --

MR. FITZGERALD: Yeah.

CHAIRMAN KATZ: Great, thank you.

MR. FITZGERALD: Now starting with you, Mr. Zaklukiewicz, would you please review for the Council the corrections to your prefiled testimony of April 8th.

MR. ZAKLUKIEWICZ: Certainly. At the top of page 36 in the sentence which begins given the equipment described above, the enclosed area of Singer Substation will be approximately, and in my testimony it was 1.58 acres, that should read will be approximately 1.5 acres instead of 1.58 acres.

And in the very last sentence on page 39, the sentence which begins for instance, DOT's suggested restriction on hours of operation, that should read DOT's suggested restriction on hours of construction would inhibit continuous splicing operations. So the word operation should be crossed out and the word construction

replacing the word operation. And that is the extent of my changes.

MR. FITZGERALD: Miss Mango, would you please review for the Council the changes in your errata sheet?

MS. MANGO: Yes. I have changes to my prefiled testimony on page 20, the second bullet, which in my testimony encompass lines 488 through 490. It has now been changed to read acquisition of easements over about 49.5 acres of privately owned lands for the expanded overhead right-of-way in Segments 3 and 4, and approximately two to four acres of privately owned land for the Hawthorne Transition Station (in addition to underground easements over approximately 2.4 acres).

I also have revisions to page 22, original lines 547 to 548, which constitutes the third bullet. And that bullet now reads acquisition of easements over about 111.1 acres of privately owned land for the expanded overhead right-of-way in Segments 3 and 4 (in addition to underground easements over approximately one acre).

I also have one small change that was not listed in my errata and that is on page 10, line 241, which presently refers to Volume 11, Map Segment 221, and

that should be Volume 12.

MR. FITZGERALD: Alright. Now, I would ask that the Council accept as full exhibits the items listed on the hearing program as CL&P Exhibit Numbers 47 through 51, and 53 through 59.

CHAIRMAN KATZ: Is there any objection to making those full exhibits? Seeing none, we will make them full exhibits. And please note just for your records that Item 52 will be taken up in May.

(Whereupon, Applicants' Exhibits Nos. 47 through 51 and Nos. 53 through 59 were received into evidence as full exhibits.)

CHAIRMAN KATZ: At this point are there any procedural issues before we proceed with cross-examination of this panel?

MR. FITZGERALD: I think that you were going to interrupt to take --

CHAIRMAN KATZ: Yes. We could -- is the PSEG witness available?

A VOICE: (Indiscernible) --

CHAIRMAN KATZ: Okay. We will wait on that. Cross-examination. First is State Representative Al Adinolfi. Let the record show that Mr. Adinolfi is not present. Second is the Towns, represented by

Attorney Kohler.

MS. JULIE DONALDSON KOHLER: On behalf of Milford, no cross-examination.

CHAIRMAN KATZ: Milford has no cross-examination. Mr. Ball, do -- any cross-examination?

MR. DAVID BALL: Not on behalf of the Town of Woodbridge.

CHAIRMAN KATZ: Not on behalf of the Town of Woodbridge. I think that covers that. Next, the City of Norwalk, cross-examination? Next -- oh -- next is the Town of Westport. Mr. Cederbaum, cross-examination? We could put him at a microphone --

MR. EUGENE CEDERBAUM: Madam --

CHAIRMAN KATZ: We're going to get you a chair --

MR. CEDERBAUM: Madam -- thank you, Madam Chairman, but I wondered if I could --

COURT REPORTER: Sir, would you identify yourself please.

MR. CEDERBAUM: Certainly. Eugene Cederbaum of the firm of Wake, See, Dimes & Bryniczka in Westport representing the Town of Westport.

COURT REPORTER: Could you drop your card off to me before you --

MR. CEDERBAUM: I certainly will. I wonder if I could ask the indulgence of the Council. Mr. Ball and Mr. Frank will be conducting cross-examination on behalf of Wilton and Weston. We have discussed the cross-examination and it seems to make more sense for Westport to supplement that cross-examination after Wilton and Weston. It would probably be quicker and more effective --

CHAIRMAN KATZ: Okay --

MR. CEDERBAUM: -- and more comprehensive.

CHAIRMAN KATZ: -- we can do that.

A VOICE: And assuming it's going to be brief.

CHAIRMAN KATZ: Yes.

MR. CEDERBAUM: Or -- or if it serves the Council's best interests, Wilton and Weston might go in place of us and then we'll finish, however you'd like to --

CHAIRMAN KATZ: We'll take up Westport after Wilton and Weston.

MR. CEDERBAUM: Thank you very much, Madam Chairman.

CHAIRMAN KATZ: Okay, let me just go through the list then and we'll probably be there

shortly. The City of Meriden, Attorney Moore? Let the record show not present. Attorney General Michael Wertheimer --

A VOICE: Assistant Attorney General.

CHAIRMAN KATZ: I'm sorry -- (laughter) --

A VOICE: Let's not get ahead of ourselves -- (laughter) --

MR. MICHAEL WERTHEIMER: No questions, thank you.

CHAIRMAN KATZ: Mr. Wertheimer said no questions, but he appreciates the promotion.

Communities for Responsible Energy? I think we'll be seeing them in May. Office of Consumer Counsel, Mr. Johnson?

MR. BRUCE JOHNSON: I have no questions for this panel from our agency, Your Honor.

CHAIRMAN KATZ: Mr. Johnson said no questions. Woodland Coalition, Attorney Golden.

MR. LAWRENCE GOLDEN: Yes.

CHAIRMAN KATZ: Can we get you a chair down at the end here -- or how -- where do you want to put him?

MS. LINDA RANDELL: We thought we'd move down and --

CHAIRMAN KATZ: Yes -- yes. We're going to put you -- that's better.

(Pause).

CHAIRMAN KATZ: Mr. Golden, if you could just start out for the record identifying yourself.

MR. GOLDEN: Sure. Good morning, panel. My name is Larry Golden and I am counsel for the Woodlands Coalition.

I have a couple of questions about reliability for Segments 3 and 4. In the ISO's testimony, prefiled testimony, Mr. Whitley cautioned about indiscriminately substituting underground cable for overhead transmission lines. I wondered if the Applicants could -- in regard to your proposal, just on 3 and 4, please explain your reasons for choosing underground cable?

MR. ZAKLUKIEWICZ: Certainly. When we reviewed the alternatives for overhead construction in Segments 3 and 4, we were cognizant of the concerns being raised by the Towns, the chief elected officials and the property owners along the existing right-of-way. And it was clear that to extend a 345,000-volt overhead transmission line from the East Devon Substation area to Norwalk would require the taking of properties, the

taking of personal homes and businesses in order to accommodate a 345,000-volt overhead transmission line between East Devon down to the Singer Substation, which is in Bridgeport, and then from the Bridgeport area at Singer Substation to the Norwalk Substation.

We then looked for alternative routes and recognized that the alternatives of going down public corridors, such as highways, such as railroads, were not feasible. We then looked for other alternatives. And one of those of course is to place the transmission line underground. We reviewed in appreciable detail all the different routes that would connect East Devon, Singer, and Norwalk Substations. And in our proposal put forth with the application, we believe -- with a few minor changes to the application, we believe we have an alternative, which is an underground alternative, using high pressure fluid filled cable, approximately eight miles between the East Devon and Singer Substation and approximately 16 miles from Singer to Norwalk Substation, putting in two circuits for each of the legs, and -- that results in a shorter length of line between East Devon, Singer and Norwalk than would be possible with an overhead transmission line. It also precludes the necessity to obtain additional rights-of-way or to take

properties and/or structures.

MR. GOLDEN: And I take it that -- oh, I'm sorry.

MS. ANNE BARTOSEWICZ: In addition, when doing the evaluation between using the overhead rights-of-way and the underground, the cost factor was looked at. And when you added up the costs for the alternatives, they came close to being equal.

MR. BRIAN EMERICK: Madam Chairman.

CHAIRMAN KATZ: Mr. Emerick.

MR. EMERICK: Just a follow-up on cost. The application mentions cost as a factor a number of times. Is there somewhere in the application that identifies the right-of-way costs for A and B? It actually breaks it down specifically?

MS. BARTOSEWICZ: Do you mean the right-of-way acquisition cost?

MR. EMERICK: Right.

MS. BARTOSEWICZ: In -- in the application it does not. In a data request we identified detailed cost estimates, and there is a summary of property costs.

MR. EMERICK: Could you identify what data request that is please?

MR. ZAKLUKIEWICZ: It should be in

Interrogatory DW-031.

MR. EMERICK: And when do we get that? Is that something we just got?

A VOICE: No --

MR. ZAKLUKIEWICZ: No --

MR. EMERICK: It's been --

MR. ZAKLUKIEWICZ: -- it was filed before the previous hearings.

MR. EMERICK: Okay, thank you.

A VOICE: January 7 --

MR. ZAKLUKIEWICZ: January 7th.

MR. EMERICK: Okay, thank you.

MR. GOLDEN: Now in -- and Mr. Zak, I'll direct this one to you -- in Phase I, Configuration X, which was certified by the Council, involves under-grounding -- an underground cable of somewhere between 11 and 12 miles approximately. In this application you have proposed a 24-mile underground cable in Segment 3 and 4. Could you please explain to the Council why you believe that construction of cable of this length will be reliable and will allow you to operate the system reliably?

MR. ZAKLUKIEWICZ: I believe -- when you referenced Docket 217, we're talking about X prime -- X -

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MR. GOLDEN: Correct.

MR. ZAKLUKIEWICZ: Okay. I believe we heard in Docket 217 don't come to us in the docket that we know of today as 272 with alternatives that you could do better to begin with, so I -- I believe we're -- if you will, an analogy, we're kind of like the boxer who sticks his chin out and says hit me. We put forth what we believe to be an alternative which when installed we will be able to operate and be able to operate in a fairly reliable manner. It is, in my judgment, the limit as to what we can operate in a reliable manner. And as the ISO testified at the March hearings, they are still studying specific cases where the system is still not responding in a manner that makes them feel comfortable that it's a reliable system. I personally believe we can overcome those. And what has been proposed in my mind can be built and can be operated.

MR. GOLDEN: Does the -- compared with Phase I, does the difference in topography and the existence of generating stations along the route allow you to construct a longer underground cable?

MR. ZAKLUKIEWICZ: Well it's clear in the 217 docket we had concerns over the weakness of the

Plumtree Substation and the fact that we were hanging a long section of cable onto that system. Where we're looking at the Middletown to Norwalk Project, we are looking at the terminus of the cable systems at Devon and at Singer Substation, those two locations having significant generation located at the terminals of those substations or in close proximity to those substations, which makes the overall system stronger. And by making the system stronger, it alleviates some of the voltage concerns that you would have if you had an extremely weak system, for which there would be virtually no control of the voltages under certain operating conditions.

MR. GOLDEN: Now, Mr. Zak, I referred to this as a 24-mile line. Is it actually two separate lines totaling 24 miles, one from East Devon Substation to the Singer Substation and then one from Singer to Norwalk?

MR. ZAKLUKIEWICZ: That -- that is a correct -- a correct depiction. It's two sections. The first being from East Devon to Singer of eight miles. And there will be two cables, each capable of approximately 600 mVa. And then from Singer to Norwalk, the length of those two cable segments will be approximately 16 miles long, terminating at each of the

locations into circuit breakers with reactors.

MR. EMERICK: Madam Chairman.

CHAIRMAN KATZ: Mr. Emerick.

MR. EMERICK: Yeah. I'm not sure if this is a question better fit for when we do specifically under-grounding, but I'll ask it and maybe we'll defer. In 217 we spent quite a bit of time I guess in process developing what I refer to as the reliability table for cables, or fault rates. Is the information in the table that we developed in that docket still applicable in this docket?

MR. ZAKLUKIEWICZ: I would defer that question to Mr. Gregory who developed that table for us in Docket 217.

MR. GREGORY: Yes, it -- it is still applicable.

MR. EMERICK: Okay. Okay, thank you. One further question. When we talk about cable lengths, while the overall distance is 24 miles, how many actual miles of cable do we have? Isn't is really double that?

MR. ZAKLUKIEWICZ: Yes, it is. There's -- there's two cables in each one of the sections. So in total we would be speaking of 48 miles of high pressure fluid filled cable.

MR. EMERICK: Okay, thank you.

MR. GOLDEN: In his testimony, Mr. Whitley also expressed some concern of the length of the underground cable not undermine short-circuit mitigation efforts, which are part of the overall Phase II project. Do you have an opinion as to whether your proposal will undermine short-circuit mitigation efforts?

MR. ZAKLUKIEWICZ: The fact that we're placing 345,000-volt transmission facilities in the area will allow the generation at Devon, whether it be the Devon units as we know them today, which are Units 7 and 8 and gas turbines 11, 12, 13 and 14, and the two Milford generating units to be placed within a short distance onto the 345-kV system, which will reduce significantly the short-circuit input from those units. And at the Singer Substation it is our proposal to connect the Bridgeport energy plant directly onto the 345-kV system. And the impedances between the generating -- generator step-up transformers and then the autotransformer, which reduces the voltage from 345 back to 115-kV, will introduce a sufficient amount of impedance into the electrical circuit such that we will reduce to levels which the equipment will operate correctly at the various substations along the route in Southwest Connecticut.

MR. GOLDEN: Alright, thank you. Do you know whether other electric companies in New England are proposing underground 345 lines of comparable length to that proposed in Phase II?

MR. ZAKLUKIEWICZ: I am aware of a proposed 345-kV transmission line in Massachusetts, which is southwest of the city of Boston, which goes into the southeastern corner of Boston.

MR. GOLDEN: And do you know approximately how long that cable will be?

MR. ZAKLUKIEWICZ: I have not read the filing specifically, but I'm being told that is somewheres in the proximity of 18 miles.

MR. JAMES J. MURPHY, JR.: Of what city -- (indiscernible) --

COURT REPORTER: A microphone please.

A VOICE: Boston --

MR. MURPHY: What city, Mr. Zak?

MR. ZAKLUKIEWICZ: This is --

MR. MURPHY: Southwest -- you said southwest of the city. You didn't give us the city.

MR. ZAKLUKIEWICZ: Without going to the map, I would be remiss in knowing exactly the town. We can find that when we break and I can report back on

that.

MR. FITZGERALD: No, I think he just means southwest of what city.

MR. ZAKLUKIEWICZ: Southwest of -- it's southwest of Boston. And it terminates in the southeast corner of Boston proper.

CHAIRMAN KATZ: And is that high pressure fluid filled?

MR. ZAKLUKIEWICZ: To my understanding their intent is to install high pressure fluid filled cable.

MR. EMERICK: Madam Chairman.

CHAIRMAN KATZ: Mr. Emerick.

MR. EMERICK: Yeah. Mr. Zak, is that 18 miles of distance between points or 18 miles of cable, or should it be 36 miles?

MR. ZAKLUKIEWICZ: My understanding is there's actually going to be three sections of cable, three parallel sections of cable. Two of them go from call it Location A, which is southwest of Boston proper, go directly northeast into Boston, and I believe there's a substation in between where the 18 miles is broken. And then the third circuit basically goes northwest of Boston and terminates at another substation. And I

apologize for not having the names of the substations and the exact routes, but we can get that for you.

MR. EMERICK: So given that configuration, how many actual miles of cable do we have?

MR. ZAKLUKIEWICZ: Two of the circuits will be a total of 18 miles, so it would be -- as I understand it these are single -- single cables -- so it would be 18 times 2 is 36, and -- which goes into downtown Boston. And the third circuit, which goes from this location on a common route towards Boston and then veers northwest of Boston, I am not positive of the length of that cable, but I would guess to be somewheres around 10 miles.

MR. FITZGERALD: Mr. Emerick, it may be that one of the other witnesses has some more detailed knowledge about this --

A VOICE: Do you have any --

A VOICE: No. Mr. Zak has a good deal on it.

MR. ZAKLUKIEWICZ: I can -- we can chase that down as a homework assignment during the lunch break or come back and report more specifically tomorrow and possibly have a little map to show you. I realize that the discussion here is not coming across clearly from the

body language.

CHAIRMAN KATZ: We'd be willing to have an update tomorrow morning.

MR. GOLDEN: And just for the record to identify the electric company, would that be N-STAR that has proposed this project?

MR. ZAKLUKIEWICZ: To my knowledge, that is N-STAR, correct.

MR. GOLDEN: And do you know whether they intend to use -- to bury the cable under state roads, state highways?

MR. ZAKLUKIEWICZ: I do not have that detail.

MR. EMERICK: Madam Chair.

CHAIRMAN KATZ: Mr. Emerick.

MR. EMERICK: Mr. Zak, what is -- N-STAR? It's not a name that I'm familiar with --

MR. ZAKLUKIEWICZ: N-STAR is the parent company of what used to be Boston Edison. And when they purchased Commonwealth -- whatever -- they -- the conglomerate name is North Star. It's basically the old -- it's basically the old Boston Edison company, which serves the greater metropolitan Boston area, and then they -- they procured a couple of other smaller utilities

in Massachusetts.

MR. EMERICK: But it is a --

MR. ZAKLUKIEWICZ: It's an electric utility wires company similar to Northeast Utilities.

MR. EMERICK: Thank you.

MR. GOLDEN: Does anyone on the panel know whether N-STAR or its predecessor has experience with HPFF 345 lines?

MR. ZAKLUKIEWICZ: Yes, I know that for a fact.

COURT REPORTER: Excuse me. Was that HBFF?

MR. ZAKLUKIEWICZ: HPFF, high pressure fluid filled cable.

MR. COLIN C. TAIT: How do you spell N-STAR?

MR. ZAKLUKIEWICZ: Capital N, S-T-A-R.

MR. TAIT: All one acronym?

MR. ZAKLUKIEWICZ: Yes.

MR. GOLDEN: And is anyone on the panel aware of the experience that N-STAR has had with 345 cable in terms of failure rates and so on?

MR. WILLIAMS: As Boston Edison they installed their first I believe in the mid to late

1980's, 345 HPFF cable. And they have had -- I don't know of any failures that they have had after the line was initially installed.

CHAIRMAN KATZ: Can the people in the back of the room hear Mr. Williams? I guess so, there's no complaints.

MR. TAIT: And Mr. Williams, how many miles are you talking about?

MR. WILLIAMS: I don't know for sure. I believe it's on the order of 40 -- a total --

MR. MURPHY: Can you get back to us on that?

MR. WILLIAMS: Yes, we can -- we can check that as well.

MR. GOLDEN: Alright, thank you. In question Siting Council Response 6, I'm just seeking an update here, that question asked you about a survey of existing infrastructure. And I believe at the time the company answered -- they indicated that they had performed the infrastructure survey from East Devon to the Fairfield/Westport line and had found no particular problems. I just wondered whether that survey has been completed from the Fairfield/Westport line to the Norwalk Substation? And if you don't know, that's perhaps

something you can -- you can read in at a later date?

MR. JOHN PRETE: Yeah. John Prete -- John Prete from the UI Company.

That's correct, the response does state the company has gone out to all the utilities in the towns between Milford and Norwalk, interrogated also the utilities approaching and put on a form pipe plan as we call it for kind of a conceptual design, and continued that through Fairfield. We have since contacted the towns west of Fairfield and have, essentially, completed most of that -- what we would call data-mining associated with that. And as of yet we have not found anything that seemingly would prevent us from going along that route.

MR. GOLDEN: Alright, thank you. I have some questions now about socialization and what we have come to refer to as gold-plating. Mr. Zak, in your supplemental testimony, I think it's April 8th, you indicated that you expect that the -- all of the costs of the preferred route with the cable technology will be socialized. Can you explain and discuss why you have that expectation?

MR. ZAKLUKIEWICZ: I think as in -- as stated previously, when we looked at the cost of the overhead transmission line on Segments 3 and 4, the cost

of under-grounding between East Devon to Singer, Singer to Norwalk, is approximately the same as what it would cost for the longer combination overhead and underground transmission lines. Therefore, when Northeast Utilities and UI put forth their arguments for cost recovery in the 12-C process and before the ISO New England or the RTO New England, we will argue that the cost difference of going overhead or underground is almost negligible -- as a matter of fact for one of the alternatives presented, the underground solution is a cheaper alternative -- such that there is not a major difference as there typically is between the cost of constructing overhead and the cost of constructing underground, which typically has a premium of three to five times. In this case because of the cost of property, our concern over the taking of properties and structures, this will -- the underground alternative appears to be a prudent alternative for which the cost should be socialized throughout New England.

MR. GOLDEN: And do you know whether -- we had spoken earlier about the N-STAR application. Do you know whether for the same reasons they too expect that the cost of their project will be socialized?

MR. ZAKLUKIEWICZ: Not seeing their application, but I would -- it would be my professional

opinion that naturally they would be looking to have socialized the cost of that transmission line, which they require to provide reliable service to the greater Boston area socialized throughout all of New England as well.

MR. GOLDEN: Alright. I thank the panel very much. That concludes my questions.

CHAIRMAN KATZ: Thank you, Mr. Golden. Next on the list is Mr. MacLeod, ISO New England. Any questions for these witnesses?

MR. ANTHONY MacLEOD: No, we have none.

CHAIRMAN KATZ: Mr. MacLeod said no. DOT, Mr. Walsh, questions for these witnesses?

MR. CHARLES WALSH: Yes.

CHAIRMAN KATZ: Yes, can we have you come up to that seat there.

MR. WALSH: Madam Chairman --

CHAIRMAN KATZ: Yes?

MR. WALSH: I have with me Miss Meskill --

CHAIRMAN KATZ: Yes --

MR. WALSH: -- who's going to be asking questions as well.

CHAIRMAN KATZ: Yes.

COURT REPORTER: I can't hear --

CHAIRMAN KATZ: Mr. Walsh indicated that

the cross-examination will be by both himself and Attorney Meskill --

MR. WALSH: Right --

CHAIRMAN KATZ: -- and so we'll get two chairs up there if we could.

MR. WALSH: Thank you.

(Pause)

CHAIRMAN KATZ: At this point, I'd like to just take a five-minute break so I can consult with Mr. Marconi on where we are. So we're going to be adjourned for five minutes.

(Whereupon, a short recess was taken.)

CHAIRMAN KATZ: Mr. Reif, we're going to put you up here. Mr. Walsh and Miss Meskill --

MR. DAVID REIF: Great, thank you --

CHAIRMAN KATZ: -- have foregone their chairs temporarily. We are going to take -- slightly out of order here, we're going to allow PSEG to put on their witness to -- for some brief -- Mr. Reif, do you want to introduce your witness.

MR. REIF: Yes, Madam Chairman. Our witness is Robert Parnell of PSEG Power Connecticut, LLC, who is the designated witness, and his prefiled testimony.

CHAIRMAN KATZ: Thank you. Could you --

MR. ROBERT L. MARCONI: If you could please rise and raise your right hand.

(Whereupon, Robert Parnell was duly sworn in.)

MR. MARCONI: Please be seated.

CHAIRMAN KATZ: Thank you. Mr. --

COURT REPORTER: Have him put his name on the record please and spell it.

CHAIRMAN KATZ: Could you spell your name please.

MR. ROBERT PARNELL: Robert Parnell, P-a-r-n-e-l-l.

CHAIRMAN KATZ: Thank you. And if you could have your witness verify their prefiled testimony.

MR. REIF: Mr. Parnell, let me show you a copy of what was prefiled as your testimony. Is that your testimony in this matter?

MR. PARNELL: Yes, it is.

MR. REIF: And do you affirm that testimony today and ask that that be adopted as your testimony in this proceeding?

MR. PARNELL: Yes, I do.

CHAIRMAN KATZ: Is there any objection to

making his testimony a full exhibit? Hearing none, we will take it as a full exhibit. And we will make him available for cross-examination.

(Whereupon, PSEG Exhibit No. 1 was received into evidence as a full exhibit.)

CHAIRMAN KATZ: Miss Randell, do you have questions for Mr. Parnell?

MS. RANDELL: No questions based on the prefiled testimony, thank you.

CHAIRMAN KATZ: Thank you. And I'm calling on you representing both Applicants.

MS. RANDELL: Indeed.

CHAIRMAN KATZ: Thank you. Representative Adinolfi, who is absent. The Towns of --

MR. BALL: No questions.

CHAIRMAN KATZ: Mr. Ball, no questions. The City of Norwalk, I'll indicate absent. Mr. Cederbaum?

MR. CEDERBAUM: No questions.

CHAIRMAN KATZ: Mr. Cederbaum says no questions for this witness. The City of Meriden, absent. Mr. Wertheimer, Assistant Attorney General?

MR. WERTHEIMER: Thank you, no questions.

CHAIRMAN KATZ: No questions Mr.

Wertheimer said --

MR. TAIT: You demoted him.

CHAIRMAN KATZ: I demoted him -- (laughter). The Communities for Responsible Energy, absent. Mr. Johnson, any questions for this witness?

MR. JOHNSON: None, Your Honor.

CHAIRMAN KATZ: Mr. Johnson said no questions. Mr. Golden, any questions for this witness?

MR. GOLDEN: No questions.

CHAIRMAN KATZ: Mr. Golden said no questions. Mr. MacLeod, any questions for --

MR. MacLEOD: No questions.

CHAIRMAN KATZ: Mr. MacLeod said no questions. Mr. Walsh, any questions for --

MR. WALSH: No questions.

CHAIRMAN KATZ: Mr. Walsh said no questions. Mr. Lord, I assume no questions?

MR. ANDREW LORD: Correct.

CHAIRMAN KATZ: And the Town of Cheshire, I assume no questions. The City of Middletown, I will assume no questions. The Town of North Haven, I will assume no questions. Mr. Cunliffe?

MR. FRED O. CUNLIFFE: Yes, Madam Chair, I have a couple.

CHAIRMAN KATZ: Please.

MR. CUNLIFFE: In your prefiled testimony, the second to the last question you answered that you agreed to sell a portion of Site 8 to the Applicants. Could you describe what portion that would be?

MR. PARNELL: A portion that would fit the substation as designed, either the westernmost north/south section or the northernmost east/west section.

MR. CUNLIFFE: So as the Applicant has identified in their Volume 6 of the application, Appendix D, there's a table of substation sites, and it identifies 2.825 acres, would it be less than that?

MR. PARNELL: Yes. I believe it's -- I'd defer to Mr. Prete, but I think it's around 1.6 acres total.

MR. CUNLIFFE: Thank you.

MR. PRETE: Actually, for clarification, it's about 1.5 acres.

MR. CUNLIFFE: Those are my questions, thank you.

CHAIRMAN KATZ: Thank you. Council members, questions for Mr. Parnell, PSEG? (No audible response). As -- so as far as you know, Mr. Parnell,

your company, the Applicant and the City are all on the same page for this substation?

MR. PARNELL: Correct.

CHAIRMAN KATZ: Thank you. Any other Council members have questions of this witness?

MR. TAIT: You've discussed this with the City?

MR. PARNELL: Yes.

MR. TAIT: Okay.

MR. PRETE: Mr. Tait, if I could elaborate? We had a meeting with the City, the Director of Planning and Information in the Mayor's Office. They did indeed submit a letter agreeing to this in spades. If you'd like a copy, I'd be happy to get that to you.

MR. TAIT: I think that would be good just to button that one up.

CHAIRMAN KATZ: Right.

MR. PRETE: We'll have that for you after the break --

MR. TAIT: The Chairman wants to make sure that we have no questions on this. Hopefully when the next substation comes up, Norwalk will be here or somebody can speak for the Town of Norwalk.

CHAIRMAN KATZ: I'm hoping Norwalk will be

here to speak to the river crossing too, but we'll wait and see. Any other questions for this witness? Seeing none, thank you, Mr. Reif --

MR. REIF: Thank you, Madam Chairman --

CHAIRMAN KATZ: Yes, Mr. Prete?

MR. PRETE: Madam Chair, if I could just indulge a second? I'd like to commend PSE&G for stepping forward here. I can assure you since UI has owned those sites in the past, that giving up property is not in the business interests personally to that company. They have, quite frankly, stopped a rather hairy and lengthy condemnation process that would put in place I think jeopardy of that December 7th -- or December 20, '07 date. So again outside their business plans, they've done some great things for the ratepayers of Connecticut.

CHAIRMAN KATZ: Thank you. We'll note that.

MR. TAIT: I believe that's on the record, sir.

MR. PRETE: Thank you.

CHAIRMAN KATZ: Thank you, Mr. Reif. Mr. Parnell, you're excused.

MR. REIF: Thank you, Madam Chairman.

MR. PARNELL: Thank you.

CHAIRMAN KATZ: And we'll ask Mr. Walsh and Miss Meskill to come back for cross-examination of the Applicant. Just to give you coming attractions, we're going to proceed to noon today where we'll take our lunch break. After lunch, Mr. Tait will be chairing for the rest of the afternoon. And then tomorrow morning we will resume on the subject at 10:00 a.m.

Okay, for the record if you want to identify yourselves please.

MR. WALSH: Good morning, Madam Chairman. My name is Charles Walsh, Assistant Attorney General, representing the Connecticut Department of Transportation.

MS. EILEEN MESKILL: Assistant Attorney General Eileen Meskill, also representing the Department of Transportation.

CHAIRMAN KATZ: And while we're passing out kudos, I just want to thank DOT for becoming actively involved in this docket. We appreciate your participation.

MR. WALSH: I'd like to start off to ask the Applicants to elaborate upon the purpose of this project with respect to the benefits that they believe will flow from this project for the citizens of

Connecticut as well as Northeast -- or New England. If you could, sir, I believe earlier you said that these costs will be socialized throughout New England. Mr. Zak, do you believe that this project will, in fact, be beneficial for all the ratepayers in New England?

MR. ZAKLUKIEWICZ: Yes, I do.

MR. WALSH: Do you believe that there will be any specific benefits that the Connecticut Department of Transportation will receive as a result of this project?

MR. ZAKLUKIEWICZ: Besides keeping the lights on in the highway system? (Laughter).

MR. WALSH: That's -- that's always a good purpose, thank you. But other than that, you can't think of anything else, is that correct, sir?

MR. ZAKLUKIEWICZ: Well, I think we've elaborated in the application this is a project that has required now -- this is a project that from a reliability standpoint is in desperate need of being constructed besides the reliability benefits to the State of Connecticut and to the residents and to the commercial and industrial segments of the State for which the economy is a big issue. The project brings those reliability benefits.

And secondly, we have all seen in our bills -- last year the congestion cost, which in the year 2003 I think equated to somewheres around 170 million dollars, a portion of that is as a result of having inadequate transmission availability in the State of Connecticut. And as locational installed capacity charges become fully implemented in the next four to five years, the cost to Connecticut ratepayers, residential, commercial and industrial will be enormous unless this project or other projects are constructed.

Clearly, it's -- it's a need of being built today. And secondly, as we all know, the socialization cost will be extremely difficult if the project is not completed prior to December 20th of the year 2007.

MR. WALSH: Do you believe that the Connecticut Department of Transportation should bear some of the costs of this project?

MR. ZAKLUKIEWICZ: I -- I -- the answer to that would be no more so than any other ratepayer within the State of Connecticut.

MR. WALSH: So the burden upon the DOT would be reflected in their electric bill, is that correct?

CHAIRMAN KATZ: Mr. Walsh, pull your mic a little closer.

MR. WALSH: Yeah. I'm sorry.

MR. ZAKLUKIEWICZ: I'm not certain I understand that question.

MR. WALSH: I'm saying that outside of the costs that the DOT would receive in their electric bill each month, that there would be no other cost that the DOT should bear with respect to this project, is that correct?

MR. ZAKLUKIEWICZ: If -- if you're referring to having the public utilities be in the roadways of the State of Connecticut and if you're saying that the future DOT costs -- DOT is the Connecticut Department of Transportation -- costs could be higher as a result of the transmission lines being in the state highway system, those -- those are I believe a right which we currently have to be in the state highway system, and those costs are incurred by the state highway system by local sewer lines, by local gas pipelines, by local water lines and so forth. So if you're trying to separate out the electric utility, I would have to say we are -- we see ourselves no differently than any of the other benefits of the local towns along any highway

system.

MR. WALSH: Are you aware of any other project of this magnitude that would have such an impact on the transportation system in the State of Connecticut by any other utility?

MR. ZAKLUKIEWICZ: Not to this date, because prior to this time we have always constructed overhead transmission lines as opposed to having to construct transmission lines underground.

MR. WALSH: So it is your belief that some of this cost will be borne by the DOT based upon your belief that there is a right to occupy the right-of-ways -- the highway right-of-way, is that correct?

MR. ZAKLUKIEWICZ: You've made the assumption that there's an increased cost. I have not been shown any data that clearly defines that there will be an increased cost in operating the Department of Transportation's infrastructure as a result of underground transmission lines in state highways.

MR. WALSH: By the use of the state highway right-of-way, the Applicants are avoiding the additional acquisition cost for additional right-of-way in either Alternative A and B?

MR. ZAKLUKIEWICZ: That is correct.

MR. WALSH: With respect to the acquisitions that are listed in either Alternative A and B, the costs that you spoke of earlier, I believe in response to the interrogatories, the costs in there were costs for easements, those were not for acquisition of the property and fee, is that correct?

MR. ZAKLUKIEWICZ: Those were costs for easements and cost for procurement of personal -- of personal properties and structures along that right-of-way should we have to take the property and the home is beneath the expanded transmission right-of-way. It would be -- it would be a combined cost of both the easement and the cost of procuring personal structures and tearing those structures down.

MR. WALSH: Did the Applicants look at the possibility of installing an underground transmission line in a right-of-way acquired by the Applicants?

MR. ZAKLUKIEWICZ: Yes, we have.

MR. WALSH: And what was the result of your research in that area?

MR. ZAKLUKIEWICZ: The existing rights-of-way along the route that we're proposing to install underground, I can -- at a high level, I will -- I will give you a high level answer and then I will turn to John

Prete and Anne Bartosewicz who can expand on that, but there are significant wetlands along that transmission right-of-way, there are also extensive rock outcroppings, and the terrain along the transmission right-of-way is not conducive to installing high pressure fluid filled pipe type cable. John.

MR. PRETE: Do you want some more detail than that?

MR. WALSH: If you'd like to elaborate on that, that would be fine?

MR. PRETE: No, I think he did a great job. (Laughter).

MR. WALSH: Thank you --

MR. PHILIP T. ASHTON: I have a question, Mr. Zak -- if I can share a mic -- come on, Colin -- you say that wetlands and so forth are not conducive -- and rock are not conducive to the installation of high pressure fluid filled cables. Isn't it true that many facilities go through wetlands on a routine basis? Why is it so uniquely deleterious in the case of the transmission line we're talking about here?

MR. ZAKLUKIEWICZ: Well in an overhead transmission line you can have wetlands in a transmission right-of-way and we will -- in the engineering design

process we will locate the structures, these are for the overhead structures which hold the wires up in the air, in locations where there are no wetlands or the impact on the wetlands will be minimal. Outcroppings, the wires basically go over the top of those rock outcroppings.

In the case of underground transmission down a right-of-way, you have to have a continuous trench open approximately three to five foot deep. You have to place the trench through -- or in some areas there's no way of avoiding a wetland, so the trench actually goes through the wetlands, you have no alternative but to go through the rock and the outcroppings. The environmental impacts on the environment are just extreme relative to what those impacts would be for an overhead transmission line.

In addition, there has to be a continuous roadway such that you can access every foot of that underground transmission lines, as opposed to an overhead transmission line you only have to access where you have the transmission structures. And depending on the terrain and all, some of those spans can be up to twelve, thirteen-hundred foot, typically they're at the seven to eight-hundred foot location. So you have a significant difference on the impact of where an underground

transmission line would be relative to the requirements for an underground transmission line on that right-of-way.

MR. ASHTON: Well, conceding that there are some differences, would you characterize the environmental impact of a natural gas transmission line as being severe, which there are I think fifteen hundred miles or something like that of transmission lines in the State of Connecticut, and would they be materially different?

MS. MANGO: I know Mr. Ashton has lots of experience with gas transmission lines, and my background is also in that, so I think the first thing that you have to take into consideration is in terms of the use of an existing overhead right-of-way for an underground pipeline or cable, if one were to locate a gas transmission line, something that we're always asked to look at, can you co-locate with an overhead transmission line or an existing right-of-way. And one of the problems with an overhead transmission line is that in fact they're designed to span areas that an underground cable or an underground pipeline must traverse. And if we were to site a gas pipeline for example or even an underground cable along an overhead right-of-way in this

particular segments, 3 and 4, the existing overhead right-of-way would not be our preferred location simply for the fact that it does have spans, it spans areas of existing development, for example along Main Street in Bridgeport, it spans rock outcrops, it goes -- the towers would be located on top of existing rock abutments that the pipeline or a cable would have to blast through. If we had to pick a greenfields location for a cable, it would be on a much more gently sloping route, something that would be easier to dig for example.

And in terms of your basic question, can gas pipelines be operated and constructed in an environmentally sound manner, you know, obviously, yes, they can, and they have been for years. But avoidance of wetland impacts, avoidance of rock outcrops, minimization of blasting, minimization of impacts to groundwater through terrain, those are all considerations that are taken into account during the routing process.

MR. ASHTON: (Indiscernible) -- back to Mrs. Mango, I am aware -- well aware that she has a highly credible background in gas facilities also. But Mrs. Mango, wouldn't you agree that in certain instances directional drilling could avoid the impact of going through a rock ridge for example, that you directionally

drill through that rock ridge and minimize impact?

MS. MANGO: That could certainly be the case. And that was done in the case of the -- I believe it was the Yankee Gas Meriden Pipeline. They drilled through a rock ridge. And that was one rock ridge. And in fact, that was a relatively short pipeline. And they --

MR. ASHTON: But my -- my --

MS. MANGO: -- they did co-locate. So yes, there are techniques for minimizing impacts. I think when you look at the right-of-way that we have on Segments 3 and 4, we have something like 85 wetlands. They're generally small. We have a number of stream crossings. You could do directional drills in those locations or in any one of those locations, but then it's going to increase your costs.

MR. ASHTON: Well, I understand that there's a cost factor to it, which may be -- may or not be -- may or may not be positive -- but wouldn't you also agree that pipeline structures, be they gas or electric, what have you, or underground facilities, or water, what have you, have gone through wetlands, and wetlands have been restored so that the impact is not necessarily permanent?

MS. MANGO: I would absolutely agree with that.

MR. ASHTON: Okay.

MR. ZAKLUKIEWICZ: I think one other feature, which we need to talk about, is the fact that on a transmission line underground, approximately every eighteen hundred feet you need to install a large vault -- -

MR. ASHTON: Um-hmm --

MR. ZAKLUKIEWICZ: -- for the splicing. This does not -- this does not occur in a pipeline or a gas pipeline. So when you think about it, you need to bring in heavy equipment to haul that 8-foot by 8-foot by 30-foot vault, place it in place, have the equipment near then to also do the splicing later on, and access to it.

And what has been another requirement -- gas basically -- and I may be wrong on this -- altitude changes do not affect gas as long as there's sufficient pressure with the compressors. In the case of a gas pipeline -- I mean in the case of electric pipelines, elevation differences severely impact the reliability of an underground transmission line, whether it be HPFF or whether it be a cross-link polyethylene. So the fact that I may be able to construct this, if my elevation

changes are such that the reliability of the underground transmission line is compromised, then that is an unacceptable position to be in and would not be one in which the utilities would endorse.

MR. ASHTON: And that gets back to what I think I recall the discussion of thermal mechanical bending in Docket 217, is that right?

MR. ZAKLUKIEWICZ: That is correct.

CHAIRMAN KATZ: Back to you, Mr. Walsh.

MR. WALSH: Thank you. To follow up on Mr. Ashton's questions, could you please describe the difference between the XLPE and the HPFF cables?

MR. FITZGERALD: Excuse me. You're just asking for a physical description --

MR. WALSH: Well, I'd like a description of --

MR. FITZGERALD: -- or performance --

MR. WALSH: An overall description of the physical differences as well as the performance, as well --

CHAIRMAN KATZ: We're going to ask you to briefly summarize --

MR. WALSH: If you could --

CHAIRMAN KATZ: -- since a more detailed

thing has been prefiled --

MR. WALSH: I apologize that I -- that I have not participated in 217.

CHAIRMAN KATZ: Right. But -- but it is -- it is included in the filing, so I'm just going to ask you to briefly summarize.

MR. ZAKLUKIEWICZ: A very high level and I'll turn it over to Jay Williams. A high pressure fluid filled cable is a paper insulated cable. It requires an insulated fluid under pressure, approximately 200 psi, to operate correctly.

Cross-link polyethylene is a -- is a cable which is surrounded by a -- call it a plastic for the insulating material. It would be installed in a duct bank -- concrete encased duct bank as opposed to the high pressure fluid filled cable, which would be installed in 8-inch -- our proposal is to install that cable in 8-inch pipes under pressure.

MR. WALSH: Could you describe for me what's the length of the cable on a spool of XLPE versus HPFF cable, as well as the diameter of that spool?

MR. ZAKLUKIEWICZ: Certainly. Jay Williams. (Laughter).

MR. WILLIAMS: That was a good summary.

To answer your question for the HPFF cable, the distance between the splice locations depends upon the terrain, whether you have ups and downs and bends and so forth, and it ranges perhaps from fifteen hundred feet to three thousand feet, the shorter length being if you have a lot of dips and bends, the longer length if you're fairly straight. The reel for that cable is -- the total reel diameter is a little bit less than 12 feet.

For the cross-link polyethylene, the distance that you can pull the cable is lower because the cable itself is a larger diameter. And the distance that you would have between splices would probably be a maximum of about 2,000 feet, and ranging between fourteen hundred and 2,000 feet. The reel size would be about the same as that of the pipe type cable because the reel size is governed by shipping limitations as opposed to how much cable you can get on the reel.

MR. WALSH: And I believe I heard testimony to the effect that the XLPE was installed in a duct bank. Can you just briefly tell me what the size of the duct bank is for the XLPE?

MR. WILLIAMS: If I can refer to the sections here -- I can give you the conceptual size that we had determined when we listed the different cable

types --

MR. WALSH: Can you please refer to what document you're looking at, sir?

MR. WILLIAMS: I'm sorry --

MR. ZAKLUKIEWICZ: Volume 6 of the filing.

MR. WALSH: Thank you.

MR. WILLIAMS: Volume 6, the third section, which is on underground, on page 6, we show dimensions of the cross-link polyethylene of approximately a 40-inch trench width and a concrete envelop surrounding these plastic ducts of a height of about 23 inches.

MR. WALSH: So it would be approximately 40 inches wide, 23 inches high?

MR. WILLIAMS: Yes. That's the concrete envelop that surrounds the ducts that the cables are in.

MR. WALSH: And could you please describe the installation for the HPFF, the size of that structure in the right-of-way?

MR. WILLIAMS: The same -- the same page, page 6 of that document shows a 48-inch wide trench with a 28-inch high depth of the control backfill which is around the cable pipes.

MR. WALSH: Twenty-eight inch high?

MR. WILLIAMS: Twenty-eight inches --

MR. WALSH: I thought I heard somebody testify earlier it would be 4-feet by 5-feet. Did I --

MR. WILLIAMS: Well, I'm giving you -- the dimension I'm giving you is that of the envelop that surrounds the cable --

MR. WALSH: Okay --

MR. WILLIAMS: -- the duct package itself. And then the depth below the street surface depends upon -- you want it as generally shallow as possible -- but the depth below the street surface depends upon other utilities and other considerations. Both dimensions I gave you are strictly the duct package.

MR. WALSH: Thank you. Could you explain to me the importance of the depth of the burial of the facility? Is there some significance to the depth of the burial with respect to the operation of the cable?

MR. FITZGERALD: Excuse me. Are you talking both types now, one type --

MR. WALSH: Either or. We can start with the HPFF.

MR. WILLIAMS: The cables -- in contrast many of the other buried utilities generate heat. And the amount of heat that the cables generate is a function

of the loading on them. The dissipation of that heat is what determines how much power you can carry through the cables. And generally the heat that is generated by the cables needs to flow to the surface of the earth. So in general, the deeper the cables are buried, if they have a 4-foot cover instead of a 2-foot cover, the lower the power transfer that is possible on the cables. That's the primary concern in terms of operating the cables.

MR. WALSH: What is the significance of the fluid that is contained within the high pressure pipe?

MR. WILLIAMS: The fluid's primary purpose is to provide electrical strength to the wrapped layers of paper type insulation that make up the high voltage insulation between the conductor and its grounded shield.

MR. WALSH: The fluid -- does the fluid provide any benefit to heat dissipation with respect to the heat generated by the high pressure fluid filled transmission line?

MR. WILLIAMS: In a static system, that is a system where the fluid is pressurized to 200 psi to maintain the electrical strength, the presence of the fluid gives a modest increase to the heat transfer versus say nitrogen, which could be used for lower voltages

because liquid transfers heat better, so it gives a several percent increase in the heat transfer versus say the air in the cross-link polyethylene cable.

MR. WALSH: With respect to the high pressure fluid filled cable, would it be possible to cool the fluid along the route such that it would provide for better heat dissipation along the way?

MR. WILLIAMS: Cooling the fluid was done by several utilities back in the early 70's as a way to get additional power transfer out of the cable system. That is not routinely used because it's energy inefficient and very high maintenance and a lower liability system.

CHAIRMAN KATZ: Mr. Williams --

MR. WILLIAMS: Yes?

CHAIRMAN KATZ: -- does the heat from the cable have an impact over the road surface above it?

MR. WILLIAMS: The -- there is a very minor temperature increase above the road -- on the road surface above the cables just like there is with buried distribution of perhaps one or two or three centigrade degrees, yes.

CHAIRMAN KATZ: One or two?

MR. WILLIAMS: Degrees centigrade.

CHAIRMAN KATZ: Centigrade --

MR. WILLIAMS: Yes.

CHAIRMAN KATZ: Thank you.

MR. BRIAN O'NEILL: Doesn't that have -- doesn't that have a direct correlation to how deep it's place?

MR. WILLIAMS: Yes. Yes, if the cable were buried deeper, as I indicated, it's harder for that heat to reach the surface, therefore this one or two or three degree centigrade I mentioned might be half of that value depending upon the burial depth, that's correct.

MR. O'NEILL: Thank you.

MR. WALSH: But -- but that could not be dissipated by having additional cooling along the length of the line, is that correct?

MR. WILLIAMS: As I said, it can be done. And it was done in the early 70's until the industry determined that it was not an efficient way to design or operate the cables.

MR. WALSH: And when you say efficient, meaning financially or from a power standpoint?

MR. WILLIAMS: An energy standpoint -- well, which also translates to financial for the energy cost for running the equipment and the capital costs for

the equipment itself. But the cable system naturally cooled, which is how the vast majority of them are installed, is fairly energy efficient. When you add the cooling equipment, you add an awful lot more mechanical equipment that requires energy to operate.

MR. WALSH: Could you please describe for me the installation process -- I'm sorry, was there --

CHAIRMAN KATZ: Yes? Oh -- Mr. Emerick.

MR. EMERICK: Just a question before we move off the temperature increases on the pavement surface. If we're raising the pavement surface one to three degrees centigrade over the pipe, what's -- what's the width of that increase?

MR. WILLIAMS: That -- that's a good question. The response I gave was immediately over the centerline of the pipes. That dissipates going out from that area very rapidly. I don't have figures or a graph, but I would think at the edge of the trench if it were -- this is maximum loading incidentally, which cables do not always operate at, cables generally operate lower than maximum loading -- so at maximum loading you might have a three centigrade degree increase over the centerline of the trench. When you get to the edge of the trench, it may be half of that. When you're a few feet farther

away, it's probably immeasurable.

MR. TAIT: And the trench is four feet?

MR. WILLIAMS: Yes.

MR. TAIT: And how far down would you have no heat at all?

MR. WILLIAMS: Well, absolutely zero heat would be, you know, very, very, very deep --

MR. TAIT: Okay. As a practical matter, getting it down below one --

MR. WILLIAMS: Getting down below one, again it would depend upon the power that the cable system is carrying and the characteristics of the soil and so forth, but several feet deeper I would imagine would get you down below one.

CHAIRMAN KATZ: Do some transportation operators, municipalities, states, like the fact that the pavement is warmer and therefore perhaps more melting or --

MR. TAIT: Plowable.

MR. WILLIAMS: I've never heard anyone express a like or dislike of it. It's just a fact of what happens. Let me also point out that the surface of the streets heats up by a greater temperature increase just because of the sun coming out. So this one to three

degrees often is swamped if it's a sunny day.

CHAIRMAN KATZ: Okay, thank you --

MR. EMERICK: Just to follow up --

CHAIRMAN KATZ: Yes.

MR. EMERICK: -- on I guess the temperature increase, I guess I'm thinking of my driveway and what happens in the wintertime, and you know, if you have shade and sun, you have obviously a point at which you'll get thawing and another point where you'll get freezing, and if that is mirrored onto a roadway, is there any kind of an operational situation where right over the roadway we have melting but we get a few feet off of that centerline and just enough of a temperature change that you get freezing, so that it represents an operational difficulty or constraint?

MR. WILLIAMS: I've never heard of that happening or that concern. It's just as you indicated on your driveway, if you shovel just a very thin patch and you're down to -- that section heats up a little bit more and it eventually works it way outward. So it's a common phenomenon and I don't think it's unique to cable systems. And as far as I know, it's never been a concern in terms of freezing and thawing on the surface.

MR. ZAKLUKIEWICZ: In our industry, Mr.

Emerick, we have never heard of any concerns with a one or two degree temperature difference where the cables are heavily loaded and that impacted on thawing and creating a hazardous condition on the roadways.

MR. EMERICK: Thank you.

MR. ASHTON: Is there any impact on thermal transfer -- efficiency of heat transfer from the cable to the surrounding environment as the depth varies? In other words is there a risk of drying out the medium which impedes heat transfer or does that vary by depth, or what information can you -- what light can you shed on that as to how that affects the depth of burial?

MR. WILLIAMS: For any of the trench configurations we would put in a material called a fluidized thermal backfill, which is very stable thermally, and it is designed that regardless of the loading on the cables, that is we design it for the cables having their maximum loading, which seldom occurs, that that material will not dry out. At the edge of that material, which will be at the edge of the envelop I've been speaking about around the cables, the temperature gradient is low enough that the chances of drying out any reasonable soil are extremely small. And that would be regardless whether your shallow or deep.

MR. ASHTON: So the depth does not affect the heat transfer capability, is that fair to say?

MR. WILLIAMS: The depth does not affect the heat transfer capability of the envelop within the trench. But if that envelop is buried deeper, then the heat has to travel farther to reach the surface of the earth and the cables will be de-rated.

MR. ZAKLUKIEWICZ: I think, Mr. Ashton, it's fair to say the deeper we go, the wider the trench, the more thermal backfill we need to place in that trench around the cable system, whether we're talking HPFF or cross-link polyethylene, to dissipate the heat generated within the cable, otherwise we seriously de-rate the cable capability both in terms of its normal carrying capability and its emergency carrying capability should there be contingencies on the system where you would now ask that transmission path to carry more power than normal.

MR. ASHTON: Okay, you've anticipated my subsequent question. Thank you.

COURT REPORTER: One moment please. (Pause). Thank you.

MR. ZAKLUKIEWICZ: So to answer Mr. Walsh's question, if we need to go further than

approximately from the top of the duct bank or the top of the pipes, approximately three, four below grade, the trench opening then from what is depicted on page 6 of the PDC filing in Volume 6 increases, and that 48-inch opening for HPFF cable is making the assumption that there will be somewheres between 20 and 60 inches from the top of the installation to the grade.

CHAIRMAN KATZ: Mr. Emerick, you have a question?

MR. EMERICK: Yeah. Just a question on the thermal backfill -- and I gather we don't want this thermal backfill to dry out. Recognizing that it's underneath an impervious surface, obviously groundwater movement is altered in this area, stormwater is moved off, but yet we're adding heat continuously. I'm curious as to how this material doesn't dry out? And are we just talking about some kind of specialized sand?

MR. WILLIAMS: The material that would probably be used and is most often used for surrounding the cable system is -- the fluidized thermal backfill is a specially formulated material, it is like a weak mixed concrete --

MR. ZAKLUKIEWICZ: Concrete --

MR. WILLIAMS: -- with a range of

aggregate sizes in the concrete to improve its heat transfer. So it is very low strength, perhaps 100 psi concrete material versus the 3,000 psi that you might have in structures.

The moisture is chemically bound in the concrete. And the situation you explained is actually incredibly complex because the street surface actually retards the evaporation of moisture and there's -- even in urban areas there's a lot of moisture in the ground, so that the moisture level underneath the street level could actually be higher than if you're under a grass level. So the -- it's not necessarily true that the presence of the street would retard moisture and give a problem for the cables. It may be the other way around.

MR. EMERICK: Okay, thank you.

CHAIRMAN KATZ: Mr. Walsh.

MR. WALSH: Thank you. The Council has anticipated a number of my questions. If I may, I'd just like to ask Miss Mango a follow-up to that. Is it your experience that a surface such as a street would in fact retard evaporation more so or would that have a tendency to dry out the soil below it as opposed to a vegetated surface area?

MS. MANGO: Well, you know, it would

depend on the soil. And I really have no experience whatsoever in that. It would depend on the type of soil, the underlying soil material I would think.

MR. WALSH: And you have no experience with soils?

MS. MANGO: Not with soil underneath layers of asphalt and how dry it might be.

MR. WALSH: Alright, thank you. I'd like to go back to the installation process, if I may, with respect to the high pressure fluid filled transmission line. What would be entailed to install this facility within a highway right-of-way?

MR. WILLIAMS: We actually have in --

MR. PRETE: It would be volume -- while Jay is looking through that, if you could turn to Volume 1, page J-11, it goes into a great deal of detail -- with a graphic no less -- it walks through the installation of that pipe type cable system.

CHAIRMAN KATZ: Mr. Walsh, does your question have anything to do with a state highway or a residential street, or --

MR. WALSH: Well with regard to any highway, whether it's a state highway or a municipal street. I'm interested in ascertaining (1) the time the

trench is going to be left open -- from the time of opening to the time that the trench is filled, as well as the amount of space that's going to be required in the right-of-way with regard to the open trench, as well as the ancillary equipment that's going to be needed and the space that equipment is going to be taking up within the right-of-way to install that facility.

MR. PRETE: I'd like to take a stab, if you don't mind, at that picture, if you could turn to that graphic. The installation of the pipe type cable system that we're referring to in the application, although be it 345-kV, is no different than pipe type cable systems that have been put in various roadways over the last 10 years. And specifically from experience, before the Council in 1990 there was a project called Grand Gulf (phonetic) where we installed about seven miles of this pipe type cable system.

So with all that, typically what you do is certainly work with the appropriate town officials for a traffic and control plan such that all the needs can be met. And certainly as we met with the towns, that's something we intend to do wholeheartedly.

You then proceed in a manner -- and I'll talk about commercial primarily -- you proceed in a

manner that -- at least from the town's point of view, nighttime construction would be a preference because the traffic flow would be a great deal less -- you map out perhaps a couple of blocks and you would proceed to saw-cut the appropriate width of the trench. And in doing so, you could probably do two to three blocks, maybe around twelve hundred to 2,000 feet. Then on or about rush-hour thereafter, you would proceed as the graphic shows. And you typically -- as Mr. Zak has testified, the trench width is roughly four feet, so you would have kind of straddling this particular trench either a track machine or a backhoe. And that particular device would proceed and lift the appropriate asphalt and concrete in state roads. And adjacent to that would be a dump truck. So as you then excavate this particular asphalt, you would put it in a dump truck and they would march along to where the appropriate landfill would be.

Right -- right after that you would then excavate the trench itself. And as you excavate the trench, certainly you would have prior to that a number of things. You would have formed pipe plans that give you an idea of where utilities are today. You would have already by state law called -- what we call is Call Before You Dig to make sure they appropriately mark the

roadway with various colors that I'm sure a lot of the Council members have seen reflecting which utility was indeed potential that you'd want to take care. So as you start trenching in the areas that you see utilities, you'd probably throw in a few men or women and have them hand-dig around these utilities to make sure the drawings are appropriate and you don't certainly from a safety point of view end up in a larger scale problem, you can foresee that. So you trench perhaps twelve hundred to thirteen, fifteen hundred feet on that given night.

Proceeding the trenching, you would then have a pipe crew ready to install piping by essentially taking the 40 to 50-foot lengths, welding the sections together and dropping them in the appropriate configuration that we just walked through.

On that given night as well, you would do X-rays to the appropriate welds and make sure they're secure. And then proceed, as Mr. Williams has testified, with backfilling with the thermalized backfill, in this case again a lean concrete I think is his description, which I think is very fair. As you proceed to fill the trench with the lean concrete, you would immediately backfill with excavated material, so that you would bring the roadway up to the surface -- on or about to the

surface level with appropriate camping for compaction. And then as you can put a cold patch on, which is a requirement I understand across both city and state. And to the extent there's open trench that you need to take care of, we would steel plate as we appropriately have done in many times, and prepare the road surface so that rush-hour the next morning is free and clear.

CHAIRMAN KATZ: Mr. Prete, that description that you just gave for installation, it sounds like -- I'm going to mention Lincoln Street because we heard from residents at the public hearing -- is this something you can do on Lincoln Street in a 24-hour period?

MR. PRETE: Ma'am, I don't know exactly the length of Lincoln Street, but if it's within the 12 to fifteen hundred foot span, I don't see any reason why you couldn't do it at all. Again, I think --

CHAIRMAN KATZ: Okay, if you could answer that question maybe after lunch --

MR. PRETE: Sure --

CHAIRMAN KATZ: -- after you've had a chance --

MR. PRETE: Sure.

CHAIRMAN KATZ: Thank you.

MR. WALSH: Is it --

MR. ASHTON: Along that same vein, would you characterize the physical construction of the trench, the installation of the pipe and manholes, not the cable splicing, as materially different from any of the other normal activities that go on in the installation of water mains, sewer lines, what have you?

MR. PRETE: On a high level, not at all. I would say they're exactly the same.

MR. ASHTON: Thank you.

MR. WILLIAMS: Can I expand on -- (indiscernible) -- a little bit, John?

MR. PRETE: If you want to.

MR. WILLIAMS: Just to the point that we're very particular on bending radii because we cannot put in 90-degree bends and so forth the way that operators of other pipe systems in the streets can. So we're very particular for that and for the thermal reasons that Mr. Prete mentioned.

MR. ASHTON: But again I go back to my basic question, is that materially different as far as the civil work goes associated with the installation of a system? A slightly different bending radii, maybe a slightly different depth, but is it radically different,

is it materially different?

MR. PRETE: No.

MR. ASHTON: Thank you.

MR. WALSH: I'd like to follow up on that if I might. You're saying that construction that's going to require a 4-foot wide by 5-foot deep trench that's approximately 24 inches wide by several feet thick installation with backfill material is no different than any other installation in the State of Connecticut that you've seen with respect to utility installations?

MR. PRETE: I think Mr. Ashton was right on point that we have distribution duct banks. For instance to take one of the examples Mr. Ashton said, the trench size would be very little from the point of view of the width and depth. And indeed a duct bank is a duct bank, so you would put, you know, perhaps not six-inch pipe, but five. But as far as the size of that particular trench, I can give you some examples where we've done that time and time again, so --

MR. WALSH: And -- and with respect to any obstructions that you run into along the way, I believe you said that you were going to hand-dig around any existing utilities that you find. Using this diagram as an example, we're assuming that there would be water

hookups, sewer hookups, gas, other utilities going to each one of these. Is it your testimony that you will be able to hand-dig around a sixteen hundred -- hand-dig around any utilities that you find within the roadway as well as excavating complete a sixteen hundred foot section within the nighttime construction period, is that your testimony?

MR. PRETE: Yes, it is, but I would preface it by saying that the first thing you do is take an intelligent look at all the drawings that the utilities and the city has as to where the utilities are presently located. You take a prudent approach then to route the particular line in the best area that has the least amount of conflicts. And yes at that point in time, then what we would need to do is take a look as to where the crossings are and take a very safe and appropriate approach. And hand digging if that what's necessary, that's what will be done.

MR. WALSH: And when you hand-dig around these obstructions -- I heard testimony with regard to the concern about the flexibility of the pipe, the bending radii -- will the pipe be sufficiently flexible that it will be able to get around any obstructions that are currently existing in the right-of-way?

MR. PRETE: I think you're painting a picture like an accordion that bends. And indeed this does not. That's why you need to open up the trench of about twelve to thirteen hundred feet to find out exactly what you need to do prior to ending up with that conflict. And you can do gentle bends as you approach these type of crossings if need be.

MR. O'NEILL: Mr. Prete -- excuse me -- at the present time are there any underground utility lines along DOT right-of-ways in the State of Connecticut?

MR. PRETE: I'm sorry, I didn't get your question.

MR. O'NEILL: Are there presently any underground utility lines underneath DOT roads at this point in time in Connecticut?

MR. PRETE: Speaking for UI, absolutely.

MR. O'NEILL: Where are they located?

MR. PRETE: Some are located on the Post Road, Route 1, Route 10. I can get a number of them if you'd like --

MR. O'NEILL: And how old are those lines?

MR. PRETE: I'm sorry?

MR. O'NEILL: How old are those lines?

MR. PRETE: Some could be --

MR. O'NEILL: Approximately?

MR. PRETE: -- as old as 30 years. Some could be as recent as 10.

MR. O'NEILL: Have there been any problems coordinating these efforts with DOT in the past?

MR. PRETE: Mr. O'Neill, none whatsoever.

MR. O'NEILL: Thank you.

MR. WALSH: Are there -- are there any -- other than one transmission line in the New Haven area, are you aware of any transmission lines that are in state highway rights-of-way? (Pause). If you know, Mr. Prete. Is there somebody else that you would like to have come up to testify?

MR. PRETE: Yeah -- well, actually not come up -- I think Mr. Reed might be able to answer some of that question.

MR. RICHARD REED: In North Haven along Route 5 we have a 115-kV high pressure gas filled cable.

COURT REPORTER: Sir, would you identify yourself please.

MR. REED: Richard Reed, R-e-e-d.

COURT REPORTER: Thank you.

MR. WALSH: Has Mr. Reed been sworn already, Madam Chairperson --

MR. REED: Yes, I have.

MR. WALSH: Okay, thank you. I'm sorry, you said there's 115-kV --

MR. REED: A 115-kV high pressure gas filled cable on Route 5 in North Haven on State Street.

MR. WALSH: And do you know what the length of that cable is, sir? (Pause). Is there -- is there some -- is there somebody else you'd like to have testify?

MR. REED: Approximately, a half mile.

MR. WALSH: A half a mile?

MR. REED: Yep.

MR. ASHTON: If the question were expanded to include distribution, would your answer be the same or different?

MR. PRETE: It would be entirely different and there would be a lot more locations that we'd be able to converse --

MR. ASHTON: And from a practical standpoint --

COURT REPORTER: A microphone please.

MR. ASHTON: From -- from a practical standpoint, what's the difference between -- and I'm thinking practical i.e. installation standpoint, what's

the difference between distribution and transmission, if any?

MR. PRETE: From a practical standpoint, Mr. Ashton, I don't believe there is any.

MR. ASHTON: Thank you.

MR. EMERICK: Is there a time difference in the installation of distribution and transmission?

MR. PRETE: If there is, it's not really notable. I mean you're going to spend a little time with the pipe to X-ray it and weld it, but for all intents and purposes the timing is virtually the same.

MR. EMERICK: So if we're doing a thousand feet of distribution and a thousand feet of transmission, the same time?

MR. PRETE: Again, a thousand feet I need to make a clarification, I don't think I had finished the total construction -- that would be our preference is to open up a trench of about a thousand feet on a continuous basis. Our expectations of total construction from start to finish is about 200 feet per day. So about a mile would take about five weeks from start to finish. But you'd want to progress so that you can -- as to the question I was asked, you want to make sure that what's in front of you, you can accommodate, so you're opening

up a trench so that you're getting kind of a bird's eye view as to exactly what you need to do with this pipe. But again, as we had stated, that if you do not put cold patch or tar back on the road before the end of the day, then you'd steel plate it so that appropriate traffic can occur for the next day.

MR. REED: I'd like to clarify. Mr. Prete is talking about civil construction. When you actually get into the splicing itself, the splicing on 345-kV does take quite a bit longer than the 115-kV distribution cable.

CHAIRMAN KATZ: Yeah, but you're not opening -- or keeping the road open to do the splicing --

MR. REED: Correct. I just wanted to make a clarification that we would be there with the splicing vans for a longer period of time, but the road would not be opened up.

CHAIRMAN KATZ: Okay.

MR. WALSH: But while you're splicing, traffic is still going to have to be diverted around that splicing truck, correct?

MR. REED: Correct.

MR. ASHTON: If that -- that would assume then that the splice is in, in fact, the travel-way. And

would it not be possible in many locations to set the splicing chamber just off to the edge of the right-of-way?

MR. PRETE: Mr. Ashton, when you say the right-of-way, in between --

MR. ASHTON: Travel -- the traveled portion.

MR. PRETE: Again, I think to answer your question -- and I don't mean to be dodging it at all -- it would depend on the physical location within the curve lines. If there's more utilities that are perhaps in the parking lane on Route 1, it would be very hard to put a splicing chamber --

MR. ASHTON: Obviously, there are a lot of it depends, but my point is, is it not practical to locate in a given situation the splicing chamber just off the right-of-way so that the cable follows along the edge of the traveled portion, that the splicing chamber is just outside of the traveled portion?

MR. PRETE: Certainly we could work with DOT --

MR. ASHTON: Wouldn't that be a reasonable way to go --

MR. PRETE: We -- we could certainly work

in that vein to the extent we could.

MR. ASHTON: Thank you.

MR. WALSH: Thank you. With respect to any conflicts that you said you would have to hand-dig, how would you go about discovering those conflicts in opening the trench without running into the possibility of actually severing some of those connections that are out there?

MR. PRETE: Are you aware of Call Before You Dig?

MR. WALSH: Yes, I am.

MR. PRETE: That would be one very important way that we would be able to identify exactly where the utilities are. And since you're aware, I won't go into a lot of detail, but the utilities go out as well as the State or the city and they actually mark on the pavement the location of the appropriate facility that they have. And we would give indeed C-DOT, or Call Before You Dig a print that shows exactly where our construction anticipation is, they would go out and mark it. Once they mark it, we have a great and firm idea as to exactly where those particular utilities are, and we take care as we approach them.

MR. TAIT: Mr. Prete -- (indiscernible) --

any other sewer line --

MR. PRETE: You guys are doing a good job in keeping me honest. No, sir, there isn't.

MR. WALSH: Are you aware of any incidences where Call Before You Dig may not identify utilities where certain utilities are severed in the course of trenching or construction activities in the right-of-way?

MR. PRETE: Sure, those have occurred.

MR. WALSH: To the extent that that did occur, would UI notify the owner of that facility that the facility had been damaged so that the owner of that facility would be able to instruct the Applicants as to how to repair it properly?

MR. PRETE: Absolutely. And in fact, the utilities have been very cooperative. In areas that are more concerned than not, they might even have a utility representative there at the time that we're constructing around that, so that many of these individuals know specifically what is happening in the field. So they would actually partner with us to do that.

MR. WALSH: Let me ask a question about any future construction the DOT may need to do along its right-of-way. For example, if the DOT needed to put a

new drainage structure in to improve environmental conditions in a certain area of the highway and yet your transmission line facility is blocking the connection to a storm sewer, could you detail the steps that would have to be taken to allow the DOT to connect its new drainage line to the existing storm sewer system?

MR. PRETE: Certainly, I'd be happy to. We fully expect to give as built drawings to C-DOT as we complete our particular installation, and certainly you'd have a great idea as to where the utility was located in that vein. And we'd work with you certainly as you start to design your new system in such a way as to explain where we are, why we're there, and certainly engineer a solution in those conflicts if they indeed occur.

MR. WALSH: If there's a need for the drainage system to go perpendicular to the existing transmission line, what would it entail for either the transmission line to be moved or some other reconciliation of the conflict between these two structures?

MR. PRETE: Well, I think that the best reconciliation is to design around it before you have to go in and meet the conflict, which I think is quite simple to do. To the extent that it would require the

relocation of the transmission, that would be very difficult.

MR. WALSH: And when you say very difficult, it would also be very costly?

MR. ZAKLUKIEWICZ: Yes.

MR. PRETE: What he said. Yes.

MR. REED: I'd like to add -- I've worked with the DOT for -- (indiscernible) --

COURT REPORTER: Hold it, hold it -- hold on -- a microphone --

A VOICE: Mr. Reed --

CHAIRMAN KATZ: Start again please.

MR. REED: I've worked with the DOT for 33 years in this business and we have had many occasions where we've had conflicts. We have always been able to work them out with the DOT. One way or another, if it's easier for us to move, we will move. If it's easier for the DOT to just slightly redesign their facilities, they will do it. But in 33 years, I cannot remember a time that we have not been able to work things out with the DOT. We work in the city streets every day, we work in the state highways every day, and we have always been able to work these things out with the DOT.

MR. WALSH: Do you know, Mr. Reed, what

the cost of moving this transmission facility would be if, in fact, the conflict had to be resolved by moving the transmission line as it sits in the highway right-of-way?

MR. REED: That's a -- that's a very difficult question. It's like asking how long is a string. I mean it depends on what the conflict is. If it's a longitudinal conflict where we might have to move a thousand feet of the line, that's a different issue. We have done this. In one case in regard to the Boulevard Bridge in New Haven a number of years ago, we had to relocate approximately 2,000 feet of 115-kV high pressure gas filled cable, and the cost of that was -- and again this was 20 years ago, but it was in the order of probably a half a million dollars to do that.

MR. WALSH: With respect to let's say a simple drainage line, if the DOT wants to put an 8-inch reinforced concrete drainage line from a catch basin to across the street to connect to a storm sewer line and yet it was a conflict with your transmission line, what would it cost to move that transmission line such that the DOT could access that storm sewer?

MR. REED: From a practical point of view --

MR. WALSH: Yes.

MR. REED: -- the DOT would probably work with us to come up with a little different design than force us to move a 345-kV transmission line. DOT works with us constantly. And there are many things -- many more things you could probably do with something like that than you could move the transmission line. And the DOT has in the past many times redone their design slightly so that they could avoid moving it. Again, we do this every day with street widenings, whatever. We work together to come up with the lowest cost for the people in Connecticut.

MR. WALSH: So is it -- I'm sorry.

MR. O'NEILL: Excuse me -- (indiscernible) -- if we were to look at a cross section of a road and look at the substrata, are there accepted norms for structural engineering which would indicate different levels of the roadway that would be appropriate for drains as opposed to sewer lines as opposed to utility installations?

MR. REED: I think there's more -- there's some general practices around. Storm sewers would usually go deeper. But we try to -- we all try to co-exist. Many of the streets are very crowded. Especially

as you get into a downtown area, the streets are very crowded. We try to stay out of each other's way. Many times we're at the same depth in many areas and we will come to crossings and we will try to avoid each other. Again, it's just -- it's a constant thing that goes on day after day.

MR. O'NEILL: Well, we look at -- if we examine a labyrinth, such as the streets under New York City for example, and somehow they co-exist --

MR. REED: Yes, they do --

MR. O'NEILL: -- and they've been built over the course of a 150 years or more. So obviously there's a coordinating agency involved and these things are done on a routine basis, are they not?

MR. REED: Yes, they are. And actually, Mr. Williams used to be a cable engineer for Con-Ed and he could probably elaborate on that much more than I can about what it's like trying to build something in New York City.

CHAIRMAN KATZ: Well, now that we're streetwise, I think we're going to adjourn for lunch. We're going to resume at 1:00 o'clock where Mr. Walsh will continue cross-examination. Following Mr. Walsh, we have cross-examination by Mr. Reif, Mr. Ball and Mr.

Cederbaum. And Mr. Fitzgerald, I think you indicated you were going to get into the record this afternoon the Milford Mayor's remarks on the East Devon Substation?

MR. FITZGERALD: The Milford Mayor's remarks? I thought -- we spoke about a letter from Bridgeport and a letter from Westport, which we said we would file as a supplement to our return of the municipal consultation materials. I don't know what you're --

MS. RANDELL: My recollection of the prehearing conference is that we were going to deal with --

COURT REPORTER: A microphone please.

MS. RANDELL: Sorry, Tony. My recollection of the prehearing conference is that we were going to deal with a letter from the City of Bridgeport with respect to Singer Substation and a letter from the City of Milford --

A VOICE: Oh, I'm sorry --

MS. RANDELL: -- as a supplement to the municipal filing. I actually do have copies of the City's letter to Mr. Prete dated April 5, which I'd be happy to hand out to the Council members now.

CHAIRMAN KATZ: Yes, if you could do that. And then I'd like to after lunch have -- make sure that

Council members who have any questions about the East Devon Substation, that we have an opportunity to explore that. Mr. Cederbaum?

MR. CEDERBAUM: Excuse me, Madam Chairman. And I believe that at the prehearing conference the submission by the Town of Westport was accepted as a limited appearance.

CHAIRMAN KATZ: Yes. We're just going to ask you to put that the record when we get to that.

MR. CEDERBAUM: Okay, very good. Thank you.

CHAIRMAN KATZ: Any other procedural matters before the lunch break? Hearing none, we are adjourned until 1:00 o'clock.

(Whereupon, a luncheon recess was taken.)

ACTING CHAIRMAN TAIT: I'd like to call the afternoon session to order. Mr. Fitzgerald, you would like to be recognized?

MR. FITZGERALD: Thank you, Mr. Tait. I just wanted to let people know that as promised this morning, we do have copies of the letter from the City of Bridgeport, which is -- which can be picked up. They're over on the table there. We also have copies of Mr. Zak's supplemental testimony that was filed yesterday.

It's being served in the normal way, but there are copies that people can pick up on the table.

We also have on the table just as a little show and tell exhibit for anyone who's interested, a slice of the actual HPFF cable that would be used in this proposal.

And Mr. Zak does have some further information about the N-STAR project, which he could provide now or later at your --

ACTING CHAIRMAN TAIT: I have a letter dated April 5, 2004 to Mr. Prete. Is that the letter you're referring to?

MR. FITZGERALD: Yes, Mr. Tait.

ACTING CHAIRMAN TAIT: And I think it ought to be put into evidence as Applicant's No. 60, am I correct --

MR. FITZGERALD: Well --

ACTING CHAIRMAN TAIT: -- or how would like to handle that?

MR. FITZGERALD: It could -- yeah, I -- it's actually a continuation of the municipal consultation process, but --

ACTING CHAIRMAN TAIT: And does that -- does that have a docket number --

MR. FITZGERALD: It has a -- there is a --

ACTING CHAIRMAN TAIT: -- or an exhibit number --

MR. FITZGERALD: -- a very large group exhibit, which is --

ACTING CHAIRMAN TAIT: We'll handle it any way you would like us to--

MR. FITZGERALD: -- numbered municipal consultation materials, No. 4. I think that it could just be -- the letter could just be added to the end of the --

ACTING CHAIRMAN TAIT: Will the record reflect that this letter is being added to the municipal consultation filing --

MS. RANDELL: I suppose we'll do whatever is easiest at this point. If you think it would be easiest, we could ask Mr. Prete to say yes he did receive this letter and we could make it a separate free-standing exhibit.

ACTING CHAIRMAN TAIT: I doubt that anybody has an objection. Does anybody object to it going in? Hearing none, whatever suits your -- let's put it in as part of the municipal consultations --

MS. RANDELL: Fine.

MR. FITZGERALD: And we have a -- we have a Westport letter as well --

ACTING CHAIRMAN TAIT: Yeah, okay --

MR. FITZGERALD: -- that's coming up.

(Whereupon, a letter from the City of Bridgeport to J. Prete was added to Applicants' Exhibit No. 4 previously marked.)

ACTING CHAIRMAN TAIT: Okay. And I guess, Mr. Zak, we would like to be updated on the N-STAR.

MR. ZAKLUKIEWICZ: Certainly. A couple of pieces of information. No. 1, existing today in the North Star service territory, they have 36 miles in total of 345-kV HPFF cable.

ACTING CHAIRMAN TAIT: That's existing?

MR. ZAKLUKIEWICZ: That is existing and in service. What is being proposed is two cables from an area not specifically designated in Stoughton, Mass, and that's spelled S-t-o-u-g-h-t-o-n, which is south of Boston downtown proper, to a substation called K Street, which is the location of the new Boston generating facilities in downtown Boston. Each of those two cables, and they're HPFF cables, are 15.4 miles in length. Along a portion of that same right-of-way will be a third cable, which will go from the same station in the Town of

Stoughton, Mass. to Hyde Park, and Hyde Park is in the southwest corner of Boston proper, and that cable will be approximately 11.3 miles --

ACTING CHAIRMAN TAIT: I thought all Bostonians were proper -- (laughter) --

MR. ZAKLUKIEWICZ: Excuse me?

ACTING CHAIRMAN TAIT: I thought all Bostonians were proper.

MR. ZAKLUKIEWICZ: You got me there, Mr. Tait.

ACTING CHAIRMAN TAIT: Is there an improper Bostonian -- but continue.

MR. GERALD J. HEFFERNAN: Excuse me. The longest continuous span is 38 miles?

MR. ZAKLUKIEWICZ: No, the -- the existing 36 miles I think is made up of approximately six or eight cables -- cable lines that make up the existing 36 miles today that is in place.

MR. ASHTON: Mr. Zak, just a clarification. The six or eight cable miles are circuits terminal to terminal, aggregating a total of 36 miles, is that fair?

MR. ZAKLUKIEWICZ: Thirty-six miles, correct --

MR. ASHTON: Okay, so it's --

MR. ZAKLUKIEWICZ: -- those are in total.

MR. ASHTON: It's a number of circuits added --

MR. ZAKLUKIEWICZ: It's a multiple number of circuits and they're either six or eight, which make up those -- that total length of 36 miles, Mr. Heffernan.

MR. HEFFERNAN: Thank you.

MR. ZAKLUKIEWICZ: And -- and just to clarify, the initial project is to install a cable from Stoughton, Mass. to K Street, install a second cable at the same time from Stoughton, Mass. to Hyde Park, install the pipe for a -- this third cable that I spoke to, which would go from Stoughton to K Street in downtown Boston, that would be installed in the future in the year 2007 or 2009 or 2010. So there would be a duct bank, three pipes installed, two of them would initially have cables in it, the third would be a spare pipe for the pull-in when it's necessary to install the cable in the third pipe.

MR. DANIEL P. LYNCH, JR.: Just for clarification, Mr. Zak, they're all fluid cables?

MR. ZAKLUKIEWICZ: These are all HPFF and steel pipe.

ACTING CHAIRMAN TAIT: Thank you for your

update. Mr. Walsh, thank you for waiting, and you're on.

MR. WALSH: Thank you.

ACTING CHAIRMAN TAIT: I think for everybody's benefit, we're on page 15 of the hearing program, down to No. 17.

MR. WALSH: Thank you. I'd like to direct a question to Mr. Reed where I left off I believe. Mr. Reed had previously discussed the coordination between the DOT and the Applicants with regard to past utility relocations, is that correct?

MR. REED: Yes, sir.

MR. WALSH: And in your experience of about 33 years of working on behalf of utilities with the DOT, that you've been able to work out any conflicts in the past. Is that an accurate statement?

MR. REED: Yes, it is.

ACTING CHAIRMAN TAIT: Mr. Reed, those 33 years was with the Applicant and not with the DOT?

MR. REED: With United Illuminating Company, yes.

ACTING CHAIRMAN TAIT: Alright.

MR. WALSH: During that time are you familiar with the Q Bridge project in New Haven, sir?

MR. REED: Very familiar.

MR. WALSH: Are you aware of the fact that as part of this coordination between the DOT and United Illuminating that the DOT was reimbursing United Illuminating to the cost of 4.7 million dollars for a 115-kilovolt cable associated with that project?

MR. REED: I am aware of the reimbursement. It's more than a 115-kV cable though. There are a number of transmission lines involved in that project.

MR. REED: If you would like to elaborate on that, that would be fine?

MR. REED: Sure. There is a 345-kV overhead transmission line that crosses I-95, which has a structure being relocated. There's a double circuit 115-kV line that crosses New Haven Harbor, we are locating a number of structures there. There is a double circuit, high pressure fluid filled cable that runs from our Grand Avenue to West River Substation that are being relocated. And there's also a low pressure oil filled cable that's being relocated as part of that project.

MR. WALSH: With respect to those cables, there's one high pressure fluid filled cable?

MR. REED: There's a double circuit, two cables of high pressure fluid filled.

MR. WALSH: And do you know what the cost to relocate those were as part of that total relocation cost?

MR. REED: I do not, but we could get that information.

MR. WALSH: Would it be fair to say that the relocation of the high pressure fluid filled cable was more than the cost of the 115-kilovolt overhead relocation?

MR. REED: Subject to check, I'd said that you're probably right. There was more of that that had to be relocated.

MR. EMERICK: Colin.

ACTING CHAIRMAN TAIT: Brian.

MR. EMERICK: Yeah. Mr. Reed, could you clarify, we're talking about a variety of different structures that were relocated as a result of a 95 widening?

MR. REED: Yes.

MR. EMERICK: Some of those were I assume in a DOT right-of-way and others were not in the right-of-way but had to be relocated --

MR. REED: That's -- that is correct --

MR. EMERICK: -- at least in my mind it's

rather confusing when we're talking about costs as to where you sought reimbursement for things out of the right-of-way versus things in the right-of-way. So just so the record is clear, maybe we should distinguish -- I think what Mr. Walsh is going to in terms of where costs were recovered and where they weren't.

MR. REED: There are -- basically, being a limited access highway as I-95 is, we are entitled by statute to approximately a hundred percent reimbursement of any relocation that we have to do because of that project. And the transmission lines and the -- the overhead transmission lines and the underground transmission lines are not all today within the right-of-way of that limited access highway. I'm not sure if I answered your question or not.

COURT REPORTER: A microphone please --

MR. HEFFERNAN: In or out of the right-of-way -- (indiscernible) --

MR. REED: There's both --

MR. HEFFERNAN: yeah --

MR. REED: -- they are both in and out of the right-of-way.

COURT REPORTER: I didn't hear that question at all, I'm sorry. Could you repeat that --

MR. HEFFERNAN: No, I just said the recovery was for both in or out of the right-of-way is my understanding.

MR. REED: And the answer is both.

COURT REPORTER: Thank you.

MR. REED: Through that, we have been able to work out any differences we've had with the DOT.

MR. WALSH: And I heard earlier testimony to the extent that with regard to the proposed facility that's going to be placed along the preferred route in this docket, that through advanced planning, the DOT and the Applicants would be able to hopefully work out any conflicts that would necessitate the relocation of the proposed facility, is that correct?

MR. REED: Again, based on my experience with the DOT, we have been able to work out conflicts where they existed.

MR. WALSH: With respect to any future road construction that would necessitate the movement of this structure, what would you estimate the cost to be if in fact a section of this facility had to be moved? And let's use the number of fifteen hundred feet for example from one vault to another?

MR. REED: I don't think I could sit here

and estimate that. We could get a number.

MR. ASHTON: Mr. Reed, wouldn't that depend a little bit on how far it's got to be moved --

MR. REED: It --

MR. ASHTON: -- and that type of thing?

MR. REED: It absolutely does. It depends on how far it has to be moved, how many manholes are in the splicing chambers. It would depend on an awful lot of things. I mean if -- we could assume a whole bunch of things to come up with that estimate, but it's going to be very very site specific.

MR. WALSH: Well, could you give me a general estimate as to what it would cost to install this facility within a fifteen hundred foot stretch between two vaults?

MR. PRETE: John Prete -- I've got speaker 13 I guess, I'm not very happy with that number -- (laughter) -- yes, regarding the question. If you look in the application, and very simply put, I think that the direct cost of the entire 24 miles is approximately 177 million. So if you rough that out, I think it's about eight million a mile --

MR. ASHTON: But that would include splicing chambers and terminals and so forth, would it

not? This is a case -- the question was just between splicing chambers --

MR. PRETE: Right. I would --

MR. ASHTON: -- so it's a dollars per foot for pipe and cable --

MR. PRETE: Right, I was going to get there --

MR. ASHTON: -- and so --

MR. PRETE: -- I figured that if you're going to remove something in the middle, that you'd have to splice as well. So, I guess in fairness to the assumption, that if you're going to move a cable, you're going to have to splice either end --

MR. ASHTON: In an existing splicing chambers to --

MR. PRETE: Potentially. I mean that would be the optimum way to do it, and probably the least costly.

MR. ASHTON: Well, that's the way the question I think was posed, so that --

MR. PRETE: Then it would be south of eight million, perhaps in the area of four to six.

MR. WALSH: Is that per mile or per fifteen hundred foot section?

MR. PRETE: That's per mile.

MR. ASHTON: So roughly divide by three for this question.

MR. PRETE: Yes.

MR. WALSH: So getting back to my earlier question, if the DOT did in fact have to move a part of the transmission facility within the right-of-way due to a drainage feature, would that be a fair estimate of approximately two million dollars to simply put in a drainage pipe?

MR. PRETE: Without any other assumptions or any work, that would probably be a fair number.

MR. WALSH: And who would bear the cost of moving that facility, sir, if you know?

MR. PRETE: I do not know.

MR. REED: Again, depending on whether it was a limited access highway or basically a Route 1 type, the State statutes do set those limits, a hundred percent for limited access highway, 50 percent bearing by the State on non-limited access highways.

MR. WALSH: So is it your testimony that if the State were to simply put in a drainage pipe and it required the movement of a structure, it would cost the State 50 percent of two millions dollars, is that

correct?

MR. REED: I apologize, could you repeat the question?

MR. WALSH: If the State needed to put in a drainage pipe that necessitated the movement of the proposed facility, that the State's cost to put in that drainage pipe would be 50 percent of two million dollars or one million dollars?

MR. REED: No, I would not assume that because again I would say that, first of all, we would try to minimize the conflicts --

MR. WALSH: It -- well, I'd like to assume there's a conflict --

MR. REED: If you're saying --

MR. WALSH: -- that it has to be moved.

MR. REED: That is a stretch, because if you're talking fifteen hundred feet --

ACTING CHAIRMAN TAIT: It's his question.

MR. REED: Okay, I'll answer his question.

MR. WALSH: Thank you.

MR. REED: Yes, we would expect the State to reimburse us.

MR. WALSH: So it would cost one million dollars for the State to put in a drainage feature, a

drainage pipe?

ACTING CHAIRMAN TAIT: Under those assumptions.

MR. WALSH: Under those assumptions.

MR. REED: With all those assumptions, including the fact that we had to move it the entire distance, yes.

MR. WALSH: Thank you.

MR. ASHTON: Does that assume the State pays for this out of State funds and not out of any federal support funds?

MR. REED: It really doesn't make a difference to us. (Laughter).

ACTING CHAIRMAN TAIT: Mr. Walsh.

MR. REED: I believe --

COURT REPORTER: One moment --

MR. REED: -- I believe that the DOT would be able to answer --

ACTING CHAIRMAN TAIT: One moment.

(Pause)

COURT REPORTER: Thank you.

ACTING CHAIRMAN TAIT: Mr. Walsh, from your line of questioning, is DOT more concerned about their budget or the safety and the operation of the

highway with the -- are you worried about --

MR. WALSH: It's -- it's a two-fold -- it's a two-fold concern.

ACTING CHAIRMAN TAIT: What is your major concern, the cost?

MR. WALSH: I believe it's two-fold. One is the operational efficiency of the highway system in the State of Connecticut, so that the traveling public can efficiently move from one point to another. And the other is in fact to protect the public with regard to construction projects of state highways around the State of Connecticut.

ACTING CHAIRMAN TAIT: It seems to me the public is going to pay for this either through their rates or through their taxes. I don't know which one is more regressive. But I just wanted to get your position out in the open.

MR. WALSH: Thank you. With regard to the installation, I believe earlier, Mr. Prete, you indicated that there would be a four-foot trench in the right-of-way, in the highway. With ancillary equipment, wouldn't that approximate almost 24 feet with the trench and the associated equipment along the highway in order to install the pipe and to open the trench during

construction?

MR. PRETE: Yes, as I -- as I was explaining the construction method, that's correct, that's exactly what I was trying to explain. So you did a better job.

MR. WALSH: So there would -- so it would take up approximately 24 feet of the right-of-way?

MR. PRETE: Yes.

MR. WALSH: Thank you. With regard to splicing in the vaults, it's my understanding that once splicing begins, that it must be a continuous operation, and that it could not be discontinued. Is that a correct assumption?

MR. ZAKLUKIEWICZ: That is correct.

MR. WALSH: And I heard earlier -- I believe the testimony was that it would take approximately a month to splice the cable in the vault, is that correct?

MR. ZAKLUKIEWICZ: Cables -- three-phrase cables, for a single cable would take somewheres between five and seven days to make up the splices on a single cable. And since we're talking about two cables going into the same manhole, we would be talking somewheres between 10 to 14 days of continuous 24-hour a day work

going on once the splicing commences. So there will be six splices made up in that -- in each manhole.

MR. WALSH: Is it -- is it five to seven days per -- per each of the six splices, is that correct?

MR. ZAKLUKIEWICZ: Five to seven days for each cable --

MR. WALSH: Cable being the three --

MR. ZAKLUKIEWICZ: Cable meaning the three conductors in the cable, and recognizing we're talking here of two cables such that you would then double that time to somewheres between 10 to 14 days, work that would be going on 24 hours a day in each vault doing the splicing.

MR. WALSH: And again to the extent that these were not located off the travel portion, rather they were located in the travel portion of the highway, that would require the closure of at least one lane of traffic, correct?

MR. ZAKLUKIEWICZ: That would require the closing of the lane of traffic over the manhole itself for which the splicing van would be located which provides the materials for the splicing, but more importantly provides the air filtration and humidity controls such that the splicing has to be done in

basically a clean room atmosphere. So when I vary between 10 and 14 days, some of that period may be -- it may take us two days to dry out the manhole before or that vault before splicing can actually commence.

ACTING CHAIRMAN TAIT: Brian.

MR. EMERICK: Yeah. Mr. Zak, just a point of clarification. Is it just efficient to make it a 24-hour a day operation or is it technically impossible to break that up into segments?

MR. ZAKLUKIEWICZ: Virtually technically impossible. You can stop the splicing, move the van out, bring the van back in at some period thereafter. What the risk is is that you now inject water vapor and impurities into the splicing that has started and you would then -- if that was the case where we had to break down each day, you would probably take Mr. Gregory's numbers and multiply the potential faults that we would incur by maybe a factor of 10 or more because of the probability of having a successful splice will be very very small.

MR. EMERICK: Thank you --

MR. ZAKLUKIEWICZ: It's a continuous operation.

ACTING CHAIRMAN TAIT: Fred.

MR. CUNLIFFE: If Mr. Gregory would just verify the 10 fold factor in the fault rate if that were the case in the disjointed splicing?

MR. GREGORY: I don't think I could be that specific, a 10 fold increase. It would increase the risk, yes.

ACTING CHAIRMAN TAIT: Significantly?

MR. GREGORY: Significantly --

ACTING CHAIRMAN TAIT: Thank you --

MR. GREGORY: -- both on electrical disturbance and on overheating due to absorption of moisture.

MR. ASHTON: The point really is you're trying to make, I assume, Mr. Zaklukiewicz, is that once you start this process in a clean environment, in a clean room environment, like in an operating theatre in a hospital, you don't want to go out for coffee breaks and stop the procedure halfway through, you carry it forward to completion, isn't that correct?

MR. ZAKLUKIEWICZ: That is correct. I maybe exaggerated a little bit on the 10 and I may be under on the 10 --

MR. ASHTON: We know you would never --

MR. ZAKLUKIEWICZ: -- and it may be

actually higher --

MR. ASHTON: We know you would never --

MR. ZAKLUKIEWICZ: -- significant is a better description.

ACTING CHAIRMAN TAIT: Mr. Walsh.

MR. WALSH: Thank you. If any conflicts existed or any problems arose, would it be possible to make splices outside of the vault?

MR. ZAKLUKIEWICZ: No.

MR. WALSH: So if there was a dig-in or any other problem with respect to the transmission line, it would require a replacement of that section and re-splicing in the vault, is that correct?

MR. ZAKLUKIEWICZ: If there was a dig-in of the cable part way between two of the vaults --

MR. WALSH: Correct.

MR. ZAKLUKIEWICZ: -- a decision would have to be made on whether I install a vault in the location where the dig-in occurred or do I turn around and repair the pipe and pull in new sections of cable between the two existing vaults that are in place. That decision would have to be made on a point-by-point basis recognizing that if I'm fairly close to one end, I may just want to do that and now have to splice in a very

short piece of cable as opposed to an entire length.

MR. ASHTON: And wouldn't that be presumptive that there is damage to the cable itself? If it was just a puncture leak in the pipe, couldn't you not just splice or put a repair on the pipe itself --

MR. ZAKLUKIEWICZ: If only --

MR. ASHTON: -- and go back in business?

MR. ZAKLUKIEWICZ: If only the casing of the pipe was broken and there was no fault of the cable, then we would make repairs to the pipe and we would dig in where the pipe has been breached, make the repairs to the pipe, put the mastic coating back over for the cathodic protection, and turn around and put the cable back in service.

MR. WALSH: To the extent there was damage to the cable, there's the possibility that in the future there may be more vaults installed then as currently planned during the initial installation, is that correct?

MR. ZAKLUKIEWICZ: I think we would work with all the parties involved and come up with the most expedient and least expensive repair that can be made, recognizing all the other system conditions that have to be taken into account.

MR. WALSH: But it would -- it would be a

possibility that additional vaults would be placed in the highway right-of-way if, in fact, there was a break in the cable, is that correct?

MR. ZAKLUKIEWICZ: Not necessarily. You could always pull the cable, break the splices at the vaults and pull in new cable between the two vault sections.

MR. WALSH: Or you could put a new vault in, correct?

MR. ZAKLUKIEWICZ: That would be an option of which we would discuss with the State and the towns.

MR. WALSH: Thank you.

MR. ASHTON: Which is the more probable? Let's assume for argument's sake that a pipe has been severely gouged and penetrated the cable and shorted it out at a given location, what would your best guess -- what do you think the odds are of putting in a new splicing chamber or putting in -- pulling in a new piece of cable and pipe -- repair the pipe? Mr. Williams, I see you're itching.

MR. WILLIAMS: I used to do this type of repair with Con-Edison --

MR. ASHTON: I understand.

MR. WILLIAMS: -- and so -- a buried

splice is not desired because you don't have the good clean room conditions that you would have in a proper vault, but if there is a situation as you described, sometimes there's just not --

COURT REPORTER: Wait, excuse me --

MR. WILLIAMS: I'm sorry. If we have the situation that you described, there may not be the opportunity or the time to put in a proper vault. And it is possible to put in plywood sheathing, plastic sheathing on the inside of that, do your proper air filtering and dehumidification and so forth, make a splice and put a buried splice casing at that location. Utilities such as Con-Ed that don't have much room in the streets do that when they need to.

MR. WALSH: Thank you. With respect to the installation, I believe that in your testimony there was a number of these facilities that are being installed around the country and around the world right now, 345-kilovolt high pressure fluid filled pipelines, is that correct?

MR. ZAKLUKIEWICZ: That is correct, but I'll address those questions to Mr. Gregory.

MR. GREGORY: Could you repeat the question, I don't think it is correct.

MR. WALSH: My question is whether or not there are a number of other 345-kV high pressure fluid filled transmission lines being constructed or in the planning stages around the United States at this point in time?

MR. GREGORY: Oh, the U.S.A., I thought you said around the world.

MR. WALSH: I changed the question slightly -- (laughter).

MR. GREGORY: I'm traveling quickly here, mentally. Well, I'm going to pass that over to Jay Williams -- (laughter) -- because I'm not aware of any -- and incidentally, around the world the answer is no.

MR. WILLIAMS: I get the parochial questions I guess. The answer probably is explained right there on the end of that table where the sample -- if you got a chance to look -- was February 2004, that's from a Commonwealth Edison project that is currently underway. So there is at least one other one, 345-kV pipe type currently underway, and others perhaps as well.

MR. ASHTON: Did we mention the Boston --

A VOICE: Right --

MR. ASHTON: -- project?

MR. WILLIAMS: Yes --

MR. ZAKLUKIEWICZ: That is in siting at this time. It's just being presented --

ACTING CHAIRMAN TAIT: Mr. Williams, could you just --

MR. ZAKLUKIEWICZ: -- to the siting council at the end of the year in Massachusetts.

ACTING CHAIRMAN TAIT: Could you describe the Con-Edison proposal you're aware of?

A VOICE: The common --

MR. ASHTON: The Commonwealth --

ACTING CHAIRMAN TAIT: Commonwealth Edison, the one you just mentioned that you know of.

MR. WILLIAMS: I will confess to only having known about it for about the past half-hour after inquiring where that sample came from, so I don't know -- I don't know details. I know that within the last couple of years Commonwealth Edison has installed --

ACTING CHAIRMAN TAIT: Can we leave this as a homework assignment --

MR. WILLIAMS: Sure --

ACTING CHAIRMAN TAIT: -- to get us more information on that. Mr. Walsh.

MR. WALSH: Thank you. With respect to procurement of materials for this installation, is there

significant lead time necessary to procure the materials to construct this 345-kV HPFF transmission line?

MR. ZAKLUKIEWICZ: Yes.

MR. WALSH: Could you elaborate upon what the timeframes are with respect to procuring those materials?

MR. ZAKLUKIEWICZ: We would go out for a request for a proposal form to a number of different entities, which are typically combined cable manufacturers and construction companies for which the selected bidder then would commence the design and the construction of the cable. And the cable which is manufactured would be delivered to the site in the exact lengths required between manholes, so it would combine with the engineering that is being done in the field. In other words, if you were doing an 8-mile project between East Devon and Singer, then the engineering would have to be done beforehand such that the exact cable lengths would agree upon the cables -- the distance between the vaults and agree with the schedule for construction such that they both line up. And manufacturing of additional cable for that same 8-mile section would continue while the portions of the manufactured cable are being delivered and actually physically installed. So it would

be an ongoing process. It's not one where you wait for all eight miles of the cable to be constructed.

MR. WALSH: Do you know what the -- is there currently a lead time on the manufacturing of the cable?

MR. WILLIAMS: Yes. The lead time for cable of this type typically runs about six months.

MR. WALSH: About six months?

MR. WILLIAMS: Yes.

MR. ASHTON: Mr. Zaklukiewicz, if I could pick up a question from that line of interrogatory, let's assume that the system is installed and operational, what, if any, spare materials would UI and NU hold to cover the possibility of a major fault/dig-in?

MR. ZAKLUKIEWICZ: For this -- for this length of cable, the total distance from East Devon to Singer, Singer to Norwalk, we would probably have two sections of cable to cover the longest length between manholes or vaults, such that for any failures we would have cable on hand and available to make repairs.

MR. ASHTON: So is it fair to say that lead time is not an issue in the event of a fault in the cable --

MR. ZAKLUKIEWICZ: Lead time --

MR. ASHTON: -- a fault repair?

MR. ZAKLUKIEWICZ: -- should not be a problem for a fault on the cable.

MR. ASHTON: Thank you.

MR. WALSH: And with regard to any repairs that need to be made, what would be the steps necessary to replace the cable in a pipe that's already in the ground?

MR. FITZGERALD: Didn't we just cover that?

MR. WALSH: I believe we discussed whether or not there was a break and whether or not a vault would be necessary, but I'm not sure that we went into the specifics of --

MR. ZAKLUKIEWICZ: First --

MR. WALSH: -- reloading a new cable into the pipe and what that would entail.

MR. ZAKLUKIEWICZ: Rich, do you want to go through that?

MR. REED: Sure. Again depending on what the fault was, but if we take the assumption that we pull in new cable, certainly we'd take the time to find the fault, which could be --

ACTING CHAIRMAN TAIT: How long does that

take or what are the parameters? How quickly or how long might it take to find the fault?

MR. REED: If we -- sometimes there are -- it becomes obvious, we do have relaying that can kind of point to about a distance away from a substation how long the fault is. We would certainly hope to find the fault within, you know, six to eight hours. We haven't had anything longer than that. I don't know if Roger has on the NU system. But we can usually find it fairly quickly.

MR. ASHTON: If it's a dig-in, how long does it take you to find it?

MR. REED: We know where it is when it's a dig-in. (Laughter). So again, once we found out where the fault was, whether it was by dig-in or the cable itself actually faulted, we would have to make some judgment calls, as Roger had said is do we put a splice chamber over the existing or do we try to repair the pipe the pull out the old cable and pull in a new cable. Sometimes when you have a fault, the old cable may not be able to be pulled out, so you might have to do something right there. Again, within that time, you could be talking days. The splices at either end, again if it's a three-phase splice, we're talking about five to seven

days for each splice. So it could be a considerable amount of time.

ACTING CHAIRMAN TAIT: The worse case scenario?

MR. REED: I -- I'm going to ask for some help from the Con-Ed folks because they've had more failures than we've had -- (laughter) -- or the ex-Con-Ed folks. So, I'm going to ask Jay if he wouldn't mind making a response to that.

MR. WILLIAMS: The time that Con-Ed states an answer to that is about 30 days from the initial tripping of the line until it is back in service, including all the steps that Mr. Reed described. This would be for a major incident as opposed to a single splice; in other words, maybe a quarter of that line.

MR. ASHTON: Mr. Reed, you said that in the event of a fault, you may not be able to pull the cable out. Could you elaborate and explain please?

MR. REED: Depending on how bad the fault is, the cable may have actually welded itself to the pipe.

MR. ASHTON: In that case would it not be possible to cut out a piece of the pipe and then the cable comes loose, the bad section of pipe comes out, you

put a new piece of pipe in and now you've got a clean duct again?

MR. REED: It could be. Again it depends. Again, we have to make a judgment call as to, you know, how bad is the fault, how much cable do we actually have to fix. At times it may be actually better to try to pull a new cable in, but it's going to depend on how bad the fault is and what the damage is --

MR. ASHTON: Thank you --

MR. REED: -- there are a number of different scenarios.

MR. EDWARD S. WILENSKY: With a fault, when you have that fault, what happens with the power that's flowing through that line, through that cable? I mean are you down in power for X amount of time or --

MR. REED: That cable would be de-energized almost instantaneously within cycles. If we had a fault, the relaying would take that circuit out of service within cycles.

MR. WILENSKY: And so then, therefore, there would be no power flowing through there and then power would be down to the area that that is going to, is that -- what happens there with the power?

MR. ZAKLUKIEWICZ: One half of the circuit

-- one of the two cables would be permanently removed from service, Mr. Wilensky, until the repairs are totally made. And you -- you actually pull in new cable, you've got to pull back cable, you've got to refill it with the insulated fluid, and then you test energize it. So for that 30 days you would be relying on the second good cable to carry the load into the area, which may mean in our case that you would -- dependent on the time of the year and what is the magnitude of the load, you would end up in a case where you would have to run generation maybe out of rate that would not be running because the load and the capability of the transmission system exceeds the combination of the generation that has bid in economically in the transport capability of the system.

In our case where we're talking about the Middletown to Norwalk project being part of the loop, it is our -- our feeling that when we lose one portion of the loop, the power now will go around the system and come back in the alternate route, and that is the basis for installing the loop to begin with, so where typically we would have the majority of the power flowing on the Middletown to Norwalk lines. And in our testimony in 217 docket, we said those lines because Long Mountain and Plumtree are relatively weak, we would not expect to see

heavy flows on those lines except in those timeframes when we had say the loop open between Middletown and Norwalk, now the power will flow from the eastern part of the State through the 345-kV overhead systems from Beseck to Southington to Frost Bridge to Long Mountain to Plumtree down into the Norwalk area on those 345-kV lines, which are typically not heavily loaded, to make up the difference. There would still be flow on the Middletown to Norwalk, the single cable section, just as there was before but we would inject reactors into the line to minimize the amount of flow such that we do not overload the remaining cable with the second cable out of service while repairs are being made.

MR. WILENSKY: Thank you for that explanation, I appreciate it. Thank you.

ACTING CHAIRMAN TAIT: Mr. Walsh --

MR. O'NEILL: Uh --

ACTING CHAIRMAN TAIT: Oh, I'm sorry --

MR. O'NEILL: May I ask a question, Mr. Chairman?

ACTING CHAIRMAN TAIT: Yes.

MR. O'NEILL: Does the proposed installation incorporate the same degree of redundancy and design as the Con-Ed model for underground cabling?

MR. WILLIAMS: Con-Ed routinely installs a pair of cables in a common trench just for that reason, so that there will not be a major disruption of power if one of the lines fails. Yes, that's quite common.

MR. O'NEILL: Thank you.

MR. WALSH: With respect to that -- with respect to the possibility of a fault, it's your testimony that we could expect a fault on the system I believe it's once every four years, is that correct?

MR. PRETE: I believe -- if you're referring to the data that was presented in Docket 217 by Mr. Gregory, which is a half a fault every hundred miles per year, that would equate to what number you've just given, which would be --

MR. WALSH: Well on page 27 of the testimony, it does state that based upon the fault history, that we could expect one fault every four years --

MR. PRETE: I was just giving you --

MR. WALSH: -- based on this docket.

MR. PRETE: I was just giving you some background --

MR. WALSH: Correct --

MR. PRETE: -- on where that number came -

-

MR. WALSH: Correct. But is that a correct -- is that correct that it's one every four years?

MR. PRETE: Yes.

MR. WALSH: Thank you. And that means that it could be up to 30 days that it would take to repair this fault, the worse case scenario, so I've heard, correct?

MR. ZAKLUKIEWICZ: That is correct.

MR. WALSH: Thank you. With respect to the fluidized thermal backfill, I'd like to discuss that. Is there a difference between the thermal sand and the fluidized thermal backfill that's discussed in some of the application materials?

MR. WILLIAMS: Yes. They are -- they are different materials. I described the fluidized thermal backfill earlier as a very weak mixed concrete with a definite aggregate size. The thermal sand is -- does not have cement in it. It is sand of definite gradation of particle sizes and fines. And it -- actually when it is compacted, it compacts to be just about as hard as the fluidized thermal backfill, but they are different materials.

MR. WALSH: And what -- what are the properties that either the thermal sand or the fluidized thermal backfill have that make it desirable for use in this type of facility?

MR. WILLIAMS: The definition of one of these thermally controlled backfills is that it maintains a very good thermal conductivity even under high heat load from the cables. So that's why we specify these thermal backfills.

MR. ZAKLUKIEWICZ: If I may, Mr. Walsh? The other reason to use the thermal backfill, the weak mortar mix is -- our sense is we can minimize the amount of time it takes to cover the HPFF pipes without having to place sand, compact it, place more sand, compact it. By having the equivalent of cement trucks there, you actually pour and there's no compacting involved. And our reestablishing the roadbed quicker is one of the reasons we would go in some cases to the more expensive thermal backfill.

MR. WALSH: Is it my understanding that the primary purpose for using it though is to conduct the heat away from the transmission line, correct?

MR. ZAKLUKIEWICZ: That is correct.

MR. WALSH: Is there any porosity or

anything that would allow infiltration by water into this thermal sand or fluidized thermal backfill that makes it a desirable material to use in construction of the transmission line?

MR. WILLIAMS: Could you repeat the first part of that please?

MR. WALSH: Is there a certain amount of porosity in either the thermal sand or the fluidized thermal backfill that would allow for infiltration of water to help dissipate the heat as a way to help keep the transmission line cool?

MR. WILLIAMS: There is very slow penetration of moisture vapor both into and out of the fluidized thermal backfill. It's designed mainly to keep the moisture in. If it dries, it will re-wet, but it will re-wet slowly.

MR. WALSH: Do --

A VOICE: Did you say fluidized?

MR. WILLIAMS: Yes. Fluidized, yes.

MR. WALSH: Do you know what some of the constituents are of the fluidized thermal backfill?

MR. WILLIAMS: Yes.

MR. WALSH: Could you please describe them for us?

MR. WILLIAMS: Sure. I don't know by percentages, but there is stone aggregate of a given size; there is a small amount of cement to give it the small strength we mentioned that it has; sand; a fluidizer, which is commonly fly ash; and then water.

MR. WALSH: You said there's fly ask in there?

MR. WILLIAMS: Yes.

MR. WALSH: And is that from coal ash, from a -- what would be the source of that material, do you know?

MR. WILLIAMS: I don't know. It's provided by the ready mix suppliers. I don't know what their source is.

MR. WALSH: Do you know if there are any environmental issues with the use of coal ash or fly ash in a material of this type?

MR. WILLIAMS: The fluidized thermal backfill that I described is used around the country. I don't know of any objections to it for environmental reasons. It's basically a concrete. The fly ash is a very small percentage just to make it flow more easily.

MR. WALSH: Can you discuss the structural characteristics of the fluidized thermal backfill? I

believe you said it was a 100 -- I'm sorry -- 100 psi was that correct?

MR. WILLIAMS: Yes.

MR. WALSH: Is that going to have a deleterious effect upon the traveled portion of the roadway being that it will be sitting underneath the area where the cars are going to be traveling?

MR. WILLIAMS: It's not my expertise, but I understand that that is greater strength than the soil that would have been removed from the trench.

MR. WALSH: Does anybody have any expertise on the panel on that issue with regard to the fluidized thermal backfill and the effect upon the structure of the roadway?

MR. ZAKLUKIEWICZ: I think in our discussions with the DOT, we agreed that we would go over the properties of the thermal backfill with the DOT to ensure that they are satisfied with what we are using, and we would make changes to the requirements of the thermal backfill to meet the requirements of the DOT 100 percent --

MR. WALSH: So --

MR. ZAKLUKIEWICZ: -- so what is typically installed, we may modify to meet the requirements of the

Connecticut DOT in the installations of the thermal fill.

MR. WALSH: If there was a conflict between what the DOT required for a road base versus what is required for thermal properties of the fluidized thermal backfill, would the Applicant still cede to the DOT's wishes in placing the DOT required filled material into the roadbed?

MR. ZAKLUKIEWICZ: I'm confident that between ourselves and the DOT, we will come to an agreement of what we need to use to accommodate both needs. It may mean that we need to widen a little bit to trench because the properties of the thermal backfill are not what we would like, so therefore you need to make up for that heat dissipation with volume. And that would be one of the compromises we would have to make if we're moved in that direction. But I feel comfortable, as Rich Reed as indicated, that we will come to agreement with C-DOT, and I do not foresee that to be an issue.

MR. ASHTON: Mr. Gregory, if I could, dissipation of heat from a cable system, in a HPFF or a self-contained, or whatever, is not a U.S. problem, this is an international problem with high voltage cables -- with cables. Are you aware anywhere in the world that the choice of thermal backfill has proven a problem?

MR. GREGORY: No, I know of no problem. It's extensively used around the world.

MR. ASHTON: Thank you.

MR. PRETE: Mr. Walsh, I would add as well that the cables that I had referred to earlier in my testimony, in the 90's the Grand Gulf cable, we actually met with C-DOT and they had no problem with the thermalized backfill, which is exactly the same backfill we're proposing here for the lines that were put across and along some of the state roads.

MR. O'NEILL: Mr. Reed, I believe this question would be for you -- I'm sure I'll be redirected if it's not -- (laughter) -- the Federal Highway Administration or the Federal Department of Transportation must have some sort of guidelines for best management practices for installation of utilities under roadbeds, do they not?

MR. PRETE: Yes, sir.

MR. O'NEILL: Are they a matter of record here?

MR. PRETE: I don't believe they would be.

MR. O'NEILL: If they're not -- (pause) --

ACTING CHAIRMAN TAIT: As far as you know do they -- do you comply with those guidelines?

MR. PRETE: Absolutely. As we said before -- Mr. Ashton pointed out a couple of times up side each of my head, this is no different than the many miles and miles of duct bank and other electrical lines that we have in state roads and have had over the last 30 years. So it's essentially the same.

MR. O'NEILL: Thank you.

MR. PRETE: You're welcome.

MR. WALSH: With respect to that question, I believe -- are you referring to distribution lines that are in state highways?

MR. PRETE: Yes.

MR. WALSH: What is the cost of the installation of a distribution line compared to the cost of installation of this facility?

MR. PRETE: I'm not sure I have those numbers at my fingertips. I don't know if Rich does --

MR. REED: No, I -- I don't, but we could -- we could get those.

ACTING CHAIRMAN TAIT: Order of magnitude?

MR. REED: We will try to get you an order of magnitude before the day is out.

ACTING CHAIRMAN TAIT: Thank you.

MR. PRETE: We would get those as

construction -- orders of magnitude of construction of the system itself.

ACTING CHAIRMAN TAIT: I'm trying to get --

MR. WALSH: I'm trying to get a handle on what the difference is -- you're saying that this is no different than anything else that's been done in the past and I'm trying to get an understanding as to what your costs are with respect to a distribution line in a state highway versus the cost of this proposed facility for a similar length of section.

MR. PRETE: Okay.

MR. WALSH: What is the volume of material that is going to be removed to accommodate this facility over the course of the 24-mile stretch that is going to be placed underground?

MR. ZAKLUKIEWICZ: I do not believe we've calculated that, recognizing that there are different depths at which you will have to be at. And not having the Siting Council tell us that we're going to be at three foot from the top of the pipes or four foot or five foot is going to make all the difference in the world over the volume.

MR. WALSH: Well assuming that we're going

to have the dimensions that were described earlier by one of the witnesses where I believe they discussed what the size of the duct was with regard to the high pressure fluid filled, if there is some calculations with regard to the volume of material that's going to be excavated out of the highway right-of-way, if somebody could give me an estimate as far as per linear foot?

MR. PRETE: The envelop of construction I believe you're referring to is 5-foot by 4-foot, which would be 20-foot, so --

MR. WALSH: So it would be 20 -- 20 cubic feet of material per --

MR. PRETE: Per foot --

MR. WALSH: -- per foot --

MR. PRETE: Right --

MR. WALSH: -- per linear foot --

MR. PRETE: Right --

MR. WALSH: -- over a 24-mile section?

MR. PRETE: That's correct.

MR. WALSH: And what is the proposal for disposing of that material?

MR. ZAKLUKIEWICZ: The contract for which we would let the RFP out is that would be the responsibility of the contractor performing the work. We

know in certain towns that they have asked for clean fill, and we would -- we would dispose of it not on any properties owned by C-DOT or the State of Connecticut, that would be a requirement of Northeast Utilities and UI to dispose of that material properly.

MR. WALSH: So -- so the Applicants would be disposing of any and all excavated materials as part of the project, is that correct?

MR. ZAKLUKIEWICZ: That is correct. And we would be doing testing of that material also.

MR. ASHTON: Mr. --

MR. WALSH: So if -- if --

MR. ASHTON: Excuse me, if I may. Mr. Zak, has the company -- either UI or NU had any experience with where they installed a cable facility of any voltage and found that the material that they were penetrating was in fact -- didn't meet the standards as thermal -- high thermal conductivity?

MR. PRETE: Speaking for UI, that was not the case, it didn't meet the characteristics of what Mr. Williams describes as a thermal backfill --

MR. ASHTON: Okay --

MR. PRETE: -- but of course what goes on the thermal backfill was indeed reused.

MR. ASHTON: Go ahead.

MR. WALSH: Thank you. You said the material would be tested before it was shipped off-site I believe. If material was found to be contaminated, would the Applicants then use a proper disposal site in order to take care of that contaminated material?

MR. ZAKLUKIEWICZ: The answer to that is yes.

MR. WALSH: And would the Applicants be the ones that bear the cost of disposal of that contaminated material?

MR. ZAKLUKIEWICZ: I think that -- that issue is negotiable.

MR. WALSH: Is that a no that the Applicants would not be 100 percent --

MR. ZAKLUKIEWICZ: I am -- I am not committing that Northeast Utilities digging in a street is going to accept ownership of all materials in the subsurface below the --

MR. WALSH: I believe earlier you testified that this was going to be a project that was beneficial to Northeast Utilities and that the only benefit to the State of Connecticut was that we'd be able to keep the lights on on our highways. Being that is the

case, what is the benefit to the Department of Transportation in having to dispose of contaminated soils that are being excavated solely for the benefit of the Applicants in this matter?

MR. ZAKLUKIEWICZ: Well, I'd like to say besides keeping the lights on, I think we use a lot of power keeping the railroads running, and we move some hundred odd thousand people --

ACTING CHAIRMAN TAIT: Why don't you simplify that question and get to the nuts of what you're --

MR. WALSH: The bottom line is, is there some reason why the Department of Transportation should bear the cost of disposing of contaminated materials that are being excavated solely for a project --

ACTING CHAIRMAN TAIT: Don't load that question, just ask -- I'm not even sure I've heard testimony that you would be required to pay for it. Ask that question.

MR. WALSH: Are --

ACTING CHAIRMAN TAIT: If you find --

MR. WALSH: If you find --

A VOICE: (Indiscernible) -- lease agreement --

ACTING CHAIRMAN TAIT: Mr. Zak, if you find in excavation that there's contaminated materials, what do you propose to do with them?

MR. ZAKLUKIEWICZ: We --

ACTING CHAIRMAN TAIT: And who is going to pay for the disposal?

MR. ZAKLUKIEWICZ: No. 1 -- I can answer the first part of it, in that we would take any contaminated material, store it properly and dispose of it properly. Secondly, I'm assuming there would be discussions going on as to who owned the material to begin with and who should pay for the total disposal costs.

ACTING CHAIRMAN TAIT: And that might involve DEP and all --

MR. ZAKLUKIEWICZ: That could involve the DEP, that could involve the towns --

ACTING CHAIRMAN TAIT: CERCLA and all the rest of --

MR. ZAKLUKIEWICZ: -- that could involve some of the --

ACTING CHAIRMAN TAIT: To assess the responsibility --

MR. ZAKLUKIEWICZ: -- industries that were

located previously alongside the roadway who were responsible for the contamination to begin with.

ACTING CHAIRMAN TAIT: And they might contribute to the cost of doing that and it might be a shared cost and it might be -- it's unknown at this point?

MR. ZAKLUKIEWICZ: In this hypothetical question, the answer would be that would be yes.

MR. HEFFERNAN: Just -- a question of the Applicant. I keep on hearing that if there's some kind of conflict between the Applicant and C-DOT, that we can work it out. And the question to me becomes does that include finances whereby DOT -- and it becomes obvious that DOT has to incur some extra costs because this line is there placed where it is that they wouldn't have had to incur if the line wasn't there, or does the Applicant say, hey, wait a minute, just take a look at the statute and this is what the deal is. I mean do you -- do you work out the finances if --

MR. ZAKLUKIEWICZ: I think we have been trying with the C-DOT to come up with a co-location agreement that will address many of the questions being raised here. And we are waiting at this time for C-DOT to give us a draft of that co-location agreement.

COURT REPORTER: One moment please. (Pause). Thank you.

ACTING CHAIRMAN TAIT: Mr. Ashton.

MR. EMERICK: Mr. Chairman --

MR. ASHTON: Mr. Prete and Mr. Zaklukiewicz, are you aware of any instance where you have been unable to reach agreement with Conn-DOT on costs of work where you have a mutual interface that have resulted in any litigation?

MR. PRETE: I am not aware of any.

MR. ASHTON: Mr. Zak?

MR. ZAKLUKIEWICZ: I am not aware of any.

MR. ASHTON: Thank you.

ACTING CHAIRMAN TAIT: Brian.

MR. EMERICK: Yeah, a question on costs in terms of handling contaminated materials. Given the fact that your proposal was based on at least cost considerations of looking at A and B versus the proposed route and given the fact that we have, and I kind of thumbed it out, two and a half million yards of material that would -- or cubic feet of material that we're going to be removing here along a highway, an urbanized area, a lot of gas stations, etcetera, and I would think there's a fair probability that we're going to be hitting

contaminated material along some portion of that route, that the handling of contaminated materials can be very costly. And I was wondering in your cost factor of the project, whether the handling of those materials at all figured into the project budget?

MS. BARTOSEWICZ: Yes, they're in the cost estimate for the underground route. There's a 20 percent cost value for handling of contaminated soils.

MR. EMERICK: Twenty percent of what?

MS. BARTOSEWICZ: Of the total amount of cubic yards that we just talked about earlier.

ACTING CHAIRMAN TAIT: You're assuming 20 percent will be contaminated?

MS. BARTOSEWICZ: Correct. In our estimate that's the assumption.

ACTING CHAIRMAN TAIT: And you've also included the estimate of what it cost to dispose of that?

MS. BARTOSEWICZ: Correct.

ACTING CHAIRMAN TAIT: As if you were going to pay 100 percent of it?

MR. PRETE: Yeah, I would -- I would clarify what Ann was saying, is that the 20 percent is for a number of contingencies of which the contaminated soil would be one of them.

ACTING CHAIRMAN TAIT: Okay.

MR. EMERICK: And what is the dollar amount attached to the 20 percent?

MR. PRETE: It would be the 20 percent of about 177 million of direct dollars associated with the underground transmission line.

MR. EMERICK: So it's 34 million?

MR. PRETE: Plus or minus.

MR. EMERICK: Okay, thank you.

ACTING CHAIRMAN TAIT: And in that figure is the disposal of this contaminated material --

MR. ZAKLUKIEWICZ: That is --

ACTING CHAIRMAN TAIT: -- as if you would be wholly responsible for --

MR. ZAKLUKIEWICZ: That is correct. And recognize there's a wide range of disposing of contaminated material; is it -- is it from a gas station or do we have asbestos, or something else from --

ACTING CHAIRMAN TAIT: But the assumption is --

MR. ZAKLUKIEWICZ: -- or some of the more hazardous materials.

ACTING CHAIRMAN TAIT: In your estimates right now the assumption is that you would bear the

entire cost, where in actuality you may have contributions or other people who would pay for the cost who were responsible for it --

MR. ZAKLUKIEWICZ: Yes --

ACTING CHAIRMAN TAIT: -- is that correct?

MR. PRETE: Yes.

MR. EMERICK: Mr. Chairman.

ACTING CHAIRMAN TAIT: Yes.

MR. EMERICK: Just to follow up, we've heard a lot of experience from UI in terms of their implementation of various under-grounding projects. I assume that some of those projects have led to the discovery and excavation of contaminated material. Is that true?

MR. REED: Yes, we have found contaminated material in some of the projects that we've worked on, and we have taken proper care of it and disposed of it properly.

MR. EMERICK: And how were the costs on those particular cases handled?

MR. REED: We have handled those costs.

MR. EMERICK: So why is this case different?

MR. REED: This is a wide -- not

necessarily just dealing with the State, it's a multitude of projects that we've --

MR. EMERICK: Well on state roadways where you've had other projects, excavation of contaminated materials, what's been the fate of the material and how were the costs recovered or paid for?

MR. REED: I can't come up with an example on a state road that we've done this.

ACTING CHAIRMAN TAIT: How about Mr. Zak, have you had --

MR. ZAKLUKIEWICZ: CL&P has very few transmission cables on state roads, so I've been allowing UI to respond. So basically, the majority of ours are in streets, in city owned and town streets.

ACTING CHAIRMAN TAIT: But in distribution you're going to still be digging up contaminated materials?

MR. REED: Possibly.

MR. ZAKLUKIEWICZ: Yes -- yes, we --

ACTING CHAIRMAN TAIT: And how did you handle those, both UI and then CL&P?

MR. REED: In general, we have taken care of the disposal of the materials when we've been digging in city streets and have found it.

ACTING CHAIRMAN TAIT: And you've assumed the cost of disposal?

MR. REED: Yes, we have.

ACTING CHAIRMAN TAIT: Okay.

MR. EMERICK: Mr. Chairman --

ACTING CHAIRMAN TAIT: CL&P?

MR. ZAKLUKIEWICZ: And I believe that's -- that's the case. I believe, upon check, Mr. Tait, that that has been the case for the distribution also.

ACTING CHAIRMAN TAIT: Okay.

MR. EMERICK: Chair -- Mr. Tait. Could you just check your -- I mean I'm sitting here a bit wondering whether you haven't had an excavation project in a state roadway in your service area that hasn't resulted in contaminated material and how you've handled it, and I think you're saying you can't think of any. And I'm just -- I guess I'm not sure how many route miles there are of state highway in your service area, but I would think there's got to be cases there.

MR. REED: Well, there's quite a bit of state highway in the UI territory, not as much as in NU, but there's quite a bit. I just don't recall a case with an underground distribution line where we have had to take materials out that were contaminated. That doesn't

mean it hasn't happened. I just -- I just don't recall any.

MR. EMERICK: Well, could you check with some of your cohorts --

MR. REED: Yes -- yes, we will --

MR. EMERICK: -- and see if, in fact, that's happened, and how was the cost issue handled?

MR. REED: Yes, we will.

MR. EMERICK: Thank you.

ACTING CHAIRMAN TAIT: Mr. Zak --

A VOICE: Jerry has a question --

ACTING CHAIRMAN TAIT: -- Mr. Ashton -- how about gas lines -- I know you don't have gas lines, but NU has gas lines. You might inquire have they had that same problem with excavation.

MR. ZAKLUKIEWICZ: I will inquire of Mr. Welch at Yankee Gas.

ACTING CHAIRMAN TAIT: Thank you. Jerry --

MS. BARTOSEWICZ: I would like to clarify so that we understand the cost in the estimate. There's $424,000.00 in the underground estimate for disposal of contaminated material. It is 20 percent of the total amount of excavation that would be in the underground

project.

MR. ASHTON: Four hundred thousand?

MS. BARTOSEWICZ: Yes, in the estimate.

ACTING CHAIRMAN TAIT: That you think it will cost you to dispose of contaminated materials?

MS. BARTOSEWICZ: Of 20 percent of the total amount of excavated material.

ACTING CHAIRMAN TAIT: Which will be contaminated, that's the cost of disposing of it?

MS. BARTOSEWICZ: That's the cost in the estimate.

ACTING CHAIRMAN TAIT: Yeah. Jerry --

MR. REED: I have been told of one instance in which we did work with the State in agreement about removing contaminated soils. It was the Forbes Avenue Bridge in New Haven where the State agreed to remove and dispose of the spoils so that we could get going on the project. The State did remove it at their cost. That's just one example that we have. I will find others if they exist.

MR. EMERICK: Is that a relocation spawned by another state project or was that --

MR. REED: It was the rebuilding of the Tomlinson Bridge in New Haven and we had distribution

cables that were in the way of the new bridge. And the State agreed to remove all the contaminated soils themselves, we did not have to do that.

MR. EMERICK: I think probably a better example is if you have any examples where you're either installing or relocating a utility that you've initiated as opposed to the State asking you to do for their needs.

MR. REED: Okay.

MR. ZAKLUKIEWICZ: We will make those calls at break or at the end of the day and try to get back to you with specific responses in the morning.

ACTING CHAIRMAN TAIT: Jerry.

MR. HEFFERNAN: Yeah, just to follow up. Mr. Ashton asked a question before if there was ever a situation where you couldn't resolve a cost issue with C-DOT. And the answer was no, we were always able to resolve it. And I'm wondering if the reason you were always able to resolve it is because the law was very clear. On the incident that Mr. Reed spoke about before, it just seemed that there was an awful lot of money at stake, but the law basically said this is what you have to pay. I mean what -- what I'm getting at -- Mr. Walsh was talking before --

MR. ZAKLUKIEWICZ: I --

MR. HEFFERNAN: -- you obviously said we could always go to agreement on this, and he feels that some things I guess you might not come to agreement that he's trying to get straightened out, like having to move this cable. If it has to be moved for a project for them, does the law state that they have to pay X amount of dollars or is that something that could be negotiable even if the law does say you have to do it?

MR. ZAKLUKIEWICZ: That's right --

ACTING CHAIRMAN TAIT: I'm not aware of what the law says at this point --

MR. HEFFERNAN: Yeah --

ACTING CHAIRMAN TAIT: -- could Mr. Fitzgerald help us as to the law involved here.

MR. FITZGERALD: Well, it's been -- Mr. Walsh probably knows more about that than anybody else in the room, but I think the earlier testimony was that if it's in a limited access right-of-way, the State's obligation is a hundred percent reimbursement. If it's in a non-limited access highway, the State's obligation is 50 percent.

ACTING CHAIRMAN TAIT: Is that your understanding, Mr. Walsh?

MR. WALSH: Provided there's no agreement

between the parties to the contrary, that would be correct.

ACTING CHAIRMAN TAIT: Could you cite the statute for the record?

MR. WALSH: It's 13a 126.

ACTING CHAIRMAN TAIT: Thank you.

MR. EMERICK: Mr. Walsh, though, is that in response to a DOT initiated project, a DOT --

MR. WALSH: Yes. That is if, in fact, the Department of Transportation issues an order to the utility to remove, relocate, or adjust its facilities within or outside the state highway right-of-way. I do not believe it applies to a utility initiated project such as this.

MR. EMERICK: So you believe it doesn't apply to a project like this where we have contaminated materials?

MR. WALSH: That would be my contention, yes.

MS. RANDELL: Mr. Tait, we do happen to have 13a 126 here with us. Would you like a copy? Should we provide you with copies?

ACTING CHAIRMAN TAIT: I think it would be helpful -- are there DOT regulations on this thing?

MS. RANDELL: We have those too.

ACTING CHAIRMAN TAIT: I think -- give us a packet of the applicable statutes and regulations --

MR. WALSH: I believe some of that material may have already been provided to you with respect to Mr. Green's testimony for Thursday.

ACTING CHAIRMAN TAIT: Oh, okay.

MR. WALSH: And I will provide you additional --

ACTING CHAIRMAN TAIT: You might supplement it with --

MR. WALSH: -- additional materials.

ACTING CHAIRMAN TAIT: We do thank you.

MR. WALSH: You're welcome.

ACTING CHAIRMAN TAIT: If -- you're on.

MR. ASHTON: I think it's perhaps incumbent to get something on the record -- I don't want Mr. Fitzgerald with his long legs to take a flyer, the skirt in front of the table has dropped down and I don't want it to get tangled around your feet so you go head over heels -- I'm not worried about Miss Randell, but -- (laughter) --

MS. RANDELL: I think my skirt may be almost as long as his trousers. (Laughter).

MR. WALSH: With respect to the proposed route, have the Applicants investigated the number of properties along that route that are subject to the Department of Environmental Protection cleanup orders?

MS. MANGO: No, we have not done that as of yet.

MR. WALSH: Do you intend to do so at some point in time?

MS. MANGO: I would think that that would be something the companies would want to do. It would be like a phase 1 assessment to determine the status of properties along the proposed route, yes.

MR. WALSH: Would that be done prior to the development and management plan submission to the Siting Council?

MS. MANGO: Yes.

MR. WALSH: I'd like to talk about -- or ask some questions about some of the river crossings and the trenchless technology that's going to be utilized along that portion of the route. Could somebody briefly just go over what those technologies are and how those are going to be implemented?

MR. FITZGERALD: If I may just interrupt. We do have a consultant, Mr. John Hair, here, who is --

that is his specific area, and perhaps we should swear him in in case and bring him up to the table in case some of these questions go beyond the grasp of the more general witnesses that we have here.

ACTING CHAIRMAN TAIT: Is that helpful to you, Mr. --

MR. WALSH: That may be, yes.

ACTING CHAIRMAN TAIT: Why don't we do so then.

MR. MARCONI: Okay, if you could please state your full name and address for the record and spell it.

MR. JOHN HAIR: John Hair, H-a-i-r, 2143 South Owasso Avenue, O-w-a-s-s-o, Tulsa, Oklahoma.

MR. MARCONI: Okay. And sir, please raise your right hand.

(Whereupon, John Hair was duly sworn in.)

MR. MARCONI: Please be seated.

MR. WALSH: I'd like to just repeat the question. Could somebody please --

MR. REED: Mr. Tait --

MR. WALSH: -- address the -- I'm sorry.

MR. REED: Before we -- we do have the resume of Mr. Hair. I only have one copy of it though.

I'd be happy to have someone make the Council copies and include Mr. Hair's resume in the record or -- or we could ask Mr. Hair to just give a one-minute summary of what it says for ease.

ACTING CHAIRMAN TAIT: Why don't we do that --

MR. WALSH: That would be fine --

ACTING CHAIRMAN TAIT: -- to expedite things. And provide copies for tomorrow.

MR. REED: Okay, fine. Thank you.

MR. MARCONI: Is there any objection to having it in as an exhibit?

MR. HAIR: So you just need a summary of my background now?

ACTING CHAIRMAN TAIT: Yes, just --

MR. HAIR: I'm a -- I'm a civil engineer. My special area of expertise is in horizontal directional drilling as it relates to buried utility construction. I've been a consultant for 17 years. Before that, I was employed by contractors and pipeline operating companies. I am a licensed engineer in the State of Connecticut.

ACTING CHAIRMAN TAIT: Does anybody have an objection to having his resume go in as Applicant's

Exhibit No. 60? Fine.

(Whereupon, Applicants' Exhibit No. 60 was received into evidence as a full exhibit.)

MR. LYNCH: (Indiscernible) -- see you in Phase I, 217 --

COURT REPORTER: Wait a minute, hold it, hold it --

MR. LYNCH: I'm sorry. You've been before us before, haven't you, Mr. Hair?

MR. HAIR: Yes. But not on any of this business.

MR. FITZGERALD: (Indiscernible) -- (laughter) --

MR. LYNCH: We won't go there.

ACTING CHAIRMAN TAIT: Mr. Walsh, he's your witness.

MR. WALSH: Thank you. Mr. Hair, could you please describe the technology that's going to be utilized to have this transmission facility go underneath some of the rivers in Connecticut?

MR. HAIR: Yes, sir. We are considering really two -- two trenchless excavation techniques, that would horizontal directional drilling and boring and jacking. I might, as an aside, add with respect to

boring and jacking, we may -- or we are also considering micro-tunneling, which is very similar to boring and jacking but is much more -- involves much more sophisticated equipment, close face boring machines, steerable boring machines. But I think for purposes of this hearing, we can consider micro-tunneling a boring and jacking method. Would you like a more detailed --

MR. WALSH: If you could just describe the differences between the horizontal directional drilling versus the boring and jacking? And you're saying that the micro-tunneling is similar to the boring and jacking, is that correct?

MR. HAIR: Yes, sir, that's correct.

MR. WALSH: If you could just describe the main differences between those, I'd appreciate it?

MR. HAIR: Okay. Horizontal directional drilling is a surface-to-surface process. And by that I mean the equipment is set up on the ground surface. A pilot hole is drilled. It can be drilled directionally so it can go down in an inverted arc and come up at a point on the other side of the obstacle or the waterway. This hole is then rimmed out to an appropriate size and the ducts are pulls into the hole. So the main -- the main factors to consider in terms of the difference from

boring and jacking is that it is a steerable drilling process and it's a surface-to-surface process.

ACTING CHAIRMAN TAIT: By -- you can direct the drill --

MR. HAIR: Yes, sir --

ACTING CHAIRMAN TAIT: -- down and up and --

MR. HAIR: Absolutely. It can be steered, yes, sir. Boring and jacking -- and also -- and I also mentioned micro-tunneling. Micro-tunneling can be steered but it's more steered in a straight line. It's designed to go -- to be steered straight as opposed to being accidentally deflected.

Boring and jacking is more a straight line process that involves construction of pits on either side of the obstacle and then a thrusting and simultaneously installing of pipe by use of a jacking process with perhaps either a continuous flight auger to bring spoil out or some type of slurry system to make what might be considered a small tunnel under the waterway.

MR. WALSH: And what would the diameter of that tunnel be, either using the horizontal directional drilling or the boring and jacking, if you know?

MR. HAIR: Okay. For boring and jacking

we are looking at a 60-inch tunnel, which would involve some type of casing. It can either be a steel pipe, a steel jacking pipe, or another type of material such as concrete or even clay.

For horizontal directional drilling we are looking at two bored holes separated, these holes would be 36 inches in diameter and they would contain in each a bundle of three pipes or three of those eight-inch pipes bundled together, perhaps tied together, perhaps not, in each 36-inch hole.

MR. WILENSKY: Why is the hole so much larger than the pipes -- I gather from what you're saying, the dimensions you're using, the hole seems much larger than the pipes that are going through the holes. And why is that?

MR. HAIR: Well, that's really to facilitate being able to pull the pipes into the hole. In the industry there is a rule of thumb that the actual hole that is made needs to be either 12 inches or roughly 150 percent larger than the diameter of the pipe that's going to go in the hole. In this case we have a bundle of pipes that have an effective diameter approaching 24 inches, so that's where we get to 36. We might be able to do it with a 30-inch hole, but that's because the --

that's just enough clearance to allow the ducts or pipeline to be pulled into the hole.

MR. WILENSKY: Once you dig through that hole and you create that hole, is there anything that goes around the inside perimeter of that hole to protect the wall of the hole?

MR. HAIR: No, sir. No, sir. And whether or not an open hole is maintained depends on what type of soil we're drilling in. If we're drilling in rock, we open a hole up and it stays open. If we're drilling in let's say a sand or a cohesion-less type soil, we may have a hole, it may collapse, it may be in a fluidized state for a short period of time which allows us to pull the pipe through it. That may have been more of an answer than you wanted --

MR. WILENSKY: But if it collapses on the pipe, does that create a problem? In other words, what is inside the hole is sand we'll say, and that sand comes around and encompasses the pipe, does that create -- and the hole is not the 12-inch of separation, does that create a problem?

MR. HAIR: Well, it can create a problem, but the thing that you should bear in mind is while we're pulling the pipe in, we're pumping drilling mud, the

bentonite drilling mud, which has been a topic of detailed discussion in other hearings. And so it is -- it's this drilling fluid in that hole that allows us to pull the pipe through the soil even if it does collapse. And if the soil is composed of larger grain material, gravel and cobble-size material, it can be a problem. It is possible and it does occur that pipelines or bundles of ducts can get stuck during pull-back, in which case you pull them out or undertake some remedial measure or start over.

MR. WILENSKY: Is there a lubricant that goes into that opening -- there is a lubricant that goes in there, I gather?

MR. HAIR: The bentonite drilling mud is the lubricant.

MR. WILENSKY: Yeah. Okay, thank you. Thank you very much.

ACTING CHAIRMAN TAIT: Mr. Walsh.

MR. WALSH: Thank you. You mentioned that there would be some sort of a drilling fluid used or drilling mud, is that correct?

MR. HAIR: Yes, sir, that's correct.

MR. WALSH: How -- how deep is this hole below the bed of the river or the water crossing

normally? Is -- is there a standard depth that you use or how do you go about steering the tool through the bottom of the substrate of the water body?

MR. HAIR: Well, the design criteria that we've established for this project initially is 15 feet of separation from the design pilot hole for the HDD crossings. In many cases it will be deeper because of the subsurface conditions. And by that I mean if we have a case where we've only got 10 feet or 15 feet of overburden above bedrock between the bottom of the waterway, we'll dive down deeper into the rock. But for the shorter crossings that we're contemplating here, 15 feet, which is the minimum separation, for the boring and jacking or micro-tunnel crossings, at this point in time we've established a criteria of twice the diameter. So we're looking at something like a cover in that case of eight to ten feet. This is all subject to detail design.

MR. WALSH: When you're using the drilling fluids is there any concern about fracturing the overburden formations above it such that the drilling mud could seep into the water body?

MR. HAIR: Yes. And I'd like to -- I'd like to give you a little detailed answer. The term fracturing or frac-out (phonetic) is often used. It does

not necessarily describe what is happening. I don't want to spend a lot of time arguing over what the term is, but we -- we don't actually cause the fracture I don't believe -- and this is my technical opinion -- we don't actually cause fractures, but there may be preexisting fractures that will allow the mud to flow into a water body. Obviously, we can't predict or control the makeup and nature of the subsurface, so that we run that risk every time we drill.

MR. WALSH: Is this drilling fluid pumped under pressure?

MR. HAIR: Yes, it is under pressure. It's not under very much pressure once it leaves the drill pipe and bit.

MR. WALSH: What is the pressure of the fluid as it's going down the drill pipe?

MR. HAIR: Well, that would vary depending on how long it's being pumped, but you're generally going to see on a mud gauge up at the rig, at the discharge of the pump, somewhere around, I don't know, 200, 300, 400 psi. And then the pressure outside of the pipe and once it passes through the bit and the nozzle will be just very slightly over hydrostatic.

MR. WALSH: Are there any other additives

to the mud other than the bentonite?

MR. HAIR: Well, there can be. Now there's -- a lot of misunderstanding involved the type of -- the type of bentonite drilling muds that are used now, but typically most have extenders in them, which are polymers, such as carboxyl methyl cellulose, commonly referred to as CMC, and these are polymers which allow the mud to function with less bentonite. So that when you -- when you asked me the question are there additives, I'm going to answer the question that way. If you go buy a sack of high yield bentonite, it's not going to say it has an additive in it, but in order for it to be high yield bentonite, it's going to have a little bit of a cellulosic polymer or some type of extending polymer. It doesn't have to, but it typically will.

MR. WALSH: Have you ever run into a situation where the drilling fluid becomes too thick?

MR. HAIR: Well, yes, it can be too thick --

MR. WALSH: And what would you do to remedy that situation? Are there certain things that you would add to the drilling fluid to thin it out?

MR. WALSH: In the horizontal directional drilling industry -- when you say too thick, I mean -- I

think what you mean is the viscosity is too --

MR. WALSH: Correct.

MR. HAIR: No, we -- when you're talking about using dispersants, I think most drilling contractors would just stop adding gel, or the bentonite, and would just drill with water. Normally when you build viscosity, it's because you're drilling through a clay formation which is -- the bentonite is sodium montmorillonite, it's clay -- so if you're drilling in a native clay, you can actually build viscosity, make your own mud.

MR. WALSH: But isn't it possible that there are certain materials that you could add to the mud to thin it out and that some drilling contractors would in fact use to thin it out if it was too thick?

MR. HAIR: It's possible, but drilling contractors, at least on the jobs we work on, only put in the mud what they are allowed to put in the mud. So if it's -- if it's a harmful additive, it's not used. And that's why I say most people would just use water to thin the mud.

MR. WALSH: With respect to your earlier statement, you said you don't believe that the drilling mud causes fractures. Are you aware of drilling mud

being used to induce fractures in other industries, such as the oil and gas industry?

MR. HAIR: Well, I'm vaguely aware of frac-jobs in oil and gas production. I don't know if they used fresh water, bentonite muds to do that. I'm not sure what kind of fluids they used.

MR. WALSH: But -- but they do use a fluid to fracture the formation, is that correct?

MR. HAIR: Yes, I believe so.

MR. WALSH: So there is a possibility here that the fluids could, in fact, fracture the bottom of the riverbed and leak up into the riverbed with the bentonite and other materials reaching the riverbed or streambed here, is that not a possibility?

MR. FITZGERALD: Objection. That's a -- that's a double question.

MR. WALSH: I'll rephrase it. Isn't it possible for drilling fluids to fracture the formation during the installation of this facility under the riverbed?

MR. HAIR: It's a possibility. But what my answer to you earlier was I think that rarely occurs -

-

MR. WALSH: Okay --

MR. HAIR: -- but it is a possibility.

MR. WALSH: And if that possibility occurred, would it also be possible for the drilling fluids to migrate up into the body of water overlying that underground crossing?

MR. WALSH: Yes. And I believe what I answered before is even if that doesn't occur, that can still happen, we can still have mud flow into a waterway.

MR. WALSH: You indicated that the depth for the horizontal directional drilling would be about 15 feet below the seafloor or the floor of the body of water that you're going under, is that correct?

MR. HAIR: Well, I indicated that that was the design criteria as a minimum we had established for this project. It can be greater. It's not going to be less.

MR. WALSH: And with regard to boring and jacking, it could be eight to ten feet, that would be the design criteria, correct?

MR. HAIR: Yes, sir, at this stage.

MR. WALSH: Could -- could somebody on the panel explain to me how you can have a high pressure fluid filled transmission line at a depth of 15 feet or 8 to 10 feet below the level of the surface when we were

told that for purposes of heat dispersion that you could not bury that deep?

MR. PRETE: Jay.

MR. WILLIAMS: Okay. I'll explain -- would you like to ask the question again --

MR. WALSH: Well, I'd like to know -- we were told earlier that -- that the deeper that the cable was buried on land, that there was a problem with heat dissipation, and yet we're being told here that this is going to be 15 feet below the bottom of the stream crossings or eight to ten feet if you use jacking and boring. How does that -- that doesn't seem consistent with what I heard earlier about the ability of the cable to dissipate heat when in fact it needed to be closer to the surface.

MR. WILLIAMS: It is definitely more difficult to dissipate the heat when you have a bore and jack or directional drill. And what we do is we deal with that -- in the case of the directional drill for example, there would be two bores, each containing one of the two cable lines, so the cable lines would be approximately 15 to 20 feet apart. The heating effect of one cable on another, which reduces the rating of each cable, would be greatly reduced because of that spacing.

So that reduced heating effect would allow us to, depending upon the specific installation conditions, maintain the rating of the cable. So that happens because we are in effect on both sides of the street, on either side of the street far apart.

MR. WALSH: Would there be anything that would preclude the Applicants from utilizing these trenchless technologies under the state highway rights-of-way rather than having to use a trench for the installation of the high pressure fluid filled transmission line?

MR. WILLIAMS: There are a host of technical and cost implications of doing that. Mr. Hair may want to address those because to establish a directional drill, it's not just drilling a hole in the ground, there's a very large setup area required and -- it's a major undertaking as opposed to digging a trench with a backhoe.

MR. WALSH: Well, it's my understanding from what I've seen of the diagram in the application that there's a column of approximately six to eight hundred feet that's going to be required for the installation of the trench technology. So are you saying that the horizontal directional drilling would require

more space than that six to eight hundred feet along the state highway right-of-way?

MR. HAIR: Well, I'd ask the other members of the panel to correct me if I'm wrong, but the open trench is -- when the -- when the trench is opened up, it's going to be opened up and then closed fairly quickly. What you need to recognize is when we have to set the equipment up, either the micro-tunneling equipment or the drilling equipment, we're going to take a certain amount of space and be there a number of days. So it's not going to progress down the road like the open trench would.

MR. WALSH: And how many days would that take, if you could --

MR. HAIR: Well, it would vary depending on the soil conditions and the length, but I mean we could easily be in a location installing a substantial crossing for four to six weeks.

MR. O'NEILL: Mr. --

MR. ASHTON: Would weather affect that time span also?

MR. HAIR: I'm sorry?

MR. ASHTON: Would weather affect that duration?

MR. HAIR: Not so much. Not really. The only effect of weather is, you know, if it's cold and below freezing at night -- actually, I think we're envisioning a 24-hour operation -- so not really. I mean thunderstorms may shut work down. But no, weather doesn't really have an effect.

MR. O'NEILL: Mr. Hair, what are the relative cost factors of micro-tunneling versus conventional trenching, do you have any idea?

MR. HAIR: No -- I can't give you an accurate answer, but the trenchless excavation techniques are going to be substantially significantly more expensive.

MR. O'NEILL: Thank you.

ACTING CHAIRMAN TAIT: Mr. Walsh, how many more questions do you have? I was just wondering whether to take the break now or at 3:00 o'clock. What would suit you best?

MR. WALSH: I just have a - very few more questions.

ACTING CHAIRMAN TAIT: Let's continue then.

MR. WALSH: I'll -- I will turn it over to Miss Meskill and she can finish up, thank you.

MS. MESKILL: Thank you. Actually, most of my questions have already been answered, but I do have one follow-up question, and I think I'm going to probably direct it to Miss Mango because it involves her testimony. On page 13 you discuss the fluid that's going to be in the cable, and I don't know if I'm pronouncing it correctly, but it says it's polybutene?

MS. MANGO: Yes.

MS. MESKILL: Okay. Can you tell me -- you describe its characteristics. Can you tell me whether or not that fluid is flammable?

MS. MANGO: Not as far as I know. And let me say up front that I think we have somebody who is available to testify specifically about this fluid, do we not, tomorrow --

MS. MESKILL: Tomorrow?

MS. MANGO: Yes.

MS. MESKILL: Okay.

MS. MANGO: So you would get more information from that person than you would get from me.

MS. MESKILL: Okay, thank you.

ACTING CHAIRMAN TAIT: Does that conclude DOT's cross-examination?

MR. WALSH: Yes --

MS. MESKILL: Yes --

MR. WALSH: -- thank you.

ACTING CHAIRMAN TAIT: Okay. We'll take a 10-minute break. And I think then, Mr. Reif, you're next after -- oh, Brian --

MR. EMERICK: One question for Mr. Hair. In the HDD what's the approximate angle of the drill?

MR. ASHTON: Entry --

MR. HAIR: Yeah. For rock jobs we're looking at perhaps 14-degree with horizontal. Typically, we'd be looking at 10 to 12. That will vary -- that will be a designed figure based on specific conditions at a given site, work space -- you know, if we're diving down into rock or if we're trying to stay in the softer soil above. But you know, somewhere let's say from 10 to 14 degrees with horizontal.

MR. EMERICK: I guess -- I have a combination question. In terms of -- you're saying diving down, but we've also heard one of the driving factors in selecting the proposed route is it's relatively flat where HD -- HPFF over significant elevation changes is a problem in terms of slumping cables, etcetera. And I was just wondering given, you know, that we're diving down, how steep that angle is and

whether that's a factor in terms of the kind of cable we're using here or whether they're going to make you go -- not dive down, but do a little more gentle dive?

MR. HAIR: Well 14 degrees with horizontal is fairly gentle, but I'd have to let some of the cable experts answer that question.

MR. WILLIAMS: Yeah, 14 degrees is -- only for a distance -- you're only going to a depth from the surface of perhaps 40 feet, you know 15 feet or so underneath the water bottom. So while we're talking about what is for the cable a fairly steep slope, the distance over which we're doing that is quite short.

MR. EMERICK: So it's not a problem in terms of what we heard in some of the limitations in terms of cable, in terms of elevation changes?

MR. WILLIAMS: Again, 14 degrees is a slope that could be of concern, but we're only dropping 40 feet in doing that. If we were going 14 degrees for thousands of feet, it would be a problem, but we're just really dropping 40 feet.

MR. EMERICK: Alright, thank --

MR. ZAKLUKIEWICZ: I think in the detailed design of this, Mr. Emerick, we have to take into account every location where there is a direct bore, an HDD, and

to account as to looking at the cable stresses, and those may mean that we have vaults, splicing vaults closer together, or we may have to move where we would normally prefer to have a splicing vault in lieu of the fact that we've done an HDD at this location to ensure the reliability of the cable. So this is all going to be factored in once we get Siting Council approval to move forward with the project, hopefully we will.

And before we put together the D&M plan, this is the detailed engineering that has to be done to bring forth the D&M plans as to here at the site locations. And before we do that, then we would do the detailed design, meet with the towns and the DOT to make certain there's -- here's where the vaults are going to have to be placed technically within a hundred feet or so to minimize the impact on the stresses of the cables.

MR. EMERICK: Thank you.

ACTING CHAIRMAN TAIT: We're in recess for 10 minutes.

(Whereupon, a short recess was taken.)

ACTING CHAIRMAN TAIT: We'll go back in order. I understand the Applicant has some information that they can add to the record.

MS. RANDELL: Yes. We have two items.

Starting with your, Mr. Reed, you were going to provide an order of magnitude cost comparison between underground distribution lines and underground transmission.

MR. REED: The cost of a mile of distribution facility, basically existing a substation, again depends very much on the soil conditions, where it's located, but it would cost approximately three million dollars per mile, and I'll say plus or minus 20 percent based on soil conditions, traffic conditions, depending on where you building it and everything, but a mile of distribution is about three million dollars.

MR. ASHTON: That's in a duct --

MR. REED: That's in a duct bank --

MR. ASHTON: Okay --

MR. REED: -- and that could be a 12 to 16 cable duct bank.

MR. ASHTON: So the three million would cover all of those --

MR. REED: Yes, yeah.

MR. ASHTON: Thank you.

ACTING CHAIRMAN TAIT: Okay. And the other piece of information?

MS. RANDELL: Yes. Mr. Zaklukiewicz, do you have information with respect to CL&P's transmission

lines installed within state roads?

MR. ZAKLUKIEWICZ: Yes, I do. We were able to locate in a preliminary review three locations. Two of them have to do with independent power producing facilities that were turned over to CL&P. The first one is in -- the Exetor generating facility in Plainfield, Connecticut, there is approximately a hundred -- there is approximately 0.25 miles in State Highway 14, that is 115-kV cross-link polyethylene cable from the Exetor generating facility. To our knowledge, following that project, there was no contaminated soil located in that quarter-mile stretch of Route 14.

The second location, again with an independent power producer, and this was the transmission fee, that 69-kV, that was HPFF cable associated with the interconnection to SCRRRA, and that is the acronym for Southeast Connecticut Regional Resource Recovery Authority generating facility in Preston, Connecticut. The length of that line on state roads is approximately 2.25 miles. And that would have been in Routes 12, 2A and 177. Again to our knowledge, we found no contaminated soil or no contaminated soil was discovered in the process of installing that 2.25 mile section of HPFF cable.

The third is a one-mile stretch of EPR, which is ethylene propylene rubber cable, which was in New London, Connecticut, and that is the interconnection of the electrified railroad station that was placed in New London from our Williams Street Substation, also located in New London. And in that mile stretch along Route 32 our records indicate there was no contaminated soil located in the excavation of placing that 115-kV cable in service.

ACTING CHAIRMAN TAIT: Thank you, Mr. Zak.

MR. EMERICK: Mr. Chairman.

ACTING CHAIRMAN TAIT: Yes?

MR. EMERICK: I assume we'll have some search by UI to see if we have an incidence where we have a state route excavation contamination settlement process in terms of disposal of that material?

A VOICE: Yes, we will.

MR. EMERICK: Okay, thank you.

ACTING CHAIRMAN TAIT: Okay. Fred.

MR. CUNLIFFE: I believe that Mr. Reed needed to follow up on the comparison of the distribution versus the transmission cost, and I don't think I heard the transmission cost per mile.

A VOICE: John, do you want to --

MR. PRETE: I'll be happy to answer that. Again, go to the attachment to DW-31 -- 031. If you look at the summary of costs, the cost of -- the direct cost of the proposed route underground, 23.6 miles, is 177,904,000. So the cost per mile on that particular calculation is 7.33 million per mile.

MR. ASHTON: That's an all in cost -- all facilities?

MR. PRETE: Yes, that's the direct cost associated with all facilities.

MR. FITZGERALD: Including the substations?

A VOICE: No --

A VOICE: No --

MR. PRETE: No.

MR. FITZGERALD: Okay.

ACTING CHAIRMAN TAIT: And Mr. Williams, you're going to report tomorrow on the New York under-grounding 345 --

MR. WILLIAMS: The Commonwealth Edison --

ACTING CHAIRMAN TAIT: The Commonwealth --

MR. WILLIAMS: -- of Chicago, yes --

ACTING CHAIRMAN TAIT: Tomorrow?

MR. WILLIAMS: Yes, we are.

ACTING CHAIRMAN TAIT: Okay. Going back to our hearing program, I'm down to No. 19, Mr. Reif.

MR. REIF: No questions.

ACTING CHAIRMAN TAIT: No questions, okay. Mr. Ball, representing Wilton and Weston. And I understand Westport is sort of going to tag on after you guys are through, is that correct, Mr. Cederbaum?

MR. CEDERBAUM: Yes, thank you very much, Mr. Tait.

ACTING CHAIRMAN TAIT: Okay.

MR. BALL: Thank you, Mr. Tait. David Ball on behalf of the Towns of Wilton and Weston. Monte Frank, who also represents the Towns of Wilton and Weston, will have some questions after I'm through.

I'd like to ask Mr. Hair a follow-up question from the prior line of questioning. There was questioning as to horizontal directional drilling and whether it's a technique used along highways. Would you care to comment on that, Mr. Hair?

MR. HAIR: Well -- yes. Horizontal directional drilling is typically applied to cross major obstacles, such as rivers, where there's really no other appropriate construction method. Horizontal drilling for a major waterway is generally cheaper than open cut

construction.

And I guess really -- if I can maybe get at the -- get at -- maybe get at the meat of this particular issue, perhaps there was a feeling that the entire route could be drilled or perhaps drilled in segments or stitches. While that may be technically feasible, that would I think -- aside from substantially higher costs, it would also probably represent a much greater impact and inconvenience to the public around Route 1.

What I think you need to recognize is that drilling is going to offer a good solution for crossing obstacles where your other options are limited, but the drilling is going to take up a lot more space than trenching for a longer period of time. So while we might be able to drill a 2,000-foot stitch or a 3,000-foot stitch or even longer, on either end we're going to have a substantially -- have to take a substantially greater amount of space for the operations. The longer the crossing, the longer the period of time. And just to kind of give you a feel for what it can be, we've been involved -- I've been involved in 5,000-foot rock crossings that have taken six to eight months. So the --

COURT REPORTER: One moment please.

(Pause). Thank you.

MR. HAIR: The applications that we are envisioning here is to apply the technology for the minimal amount of impact or inconvenience to the public where -- you know, where it fits. You know, if we're just looking once again at marching down in a thousand or even five-hundred foot segments, open cutting, being there for a few days and then moving on, that's going to represent, I think, a lot less impact.

MR. BALL: Thank you. Let me shift gears and ask some questions about the HPFF cables and leaks from the cables. Mr. Zak, I believe in your testimony you testified that the underground cables along Segments 3 and 4 ought to operate leak free except for dig-ins. Can you explain how the design of the HPFF cables will help to operate leak free? (Pause). Or Mr. Gregory?

MR. ZAKLUKIEWICZ: I'll give you a high level response back and if additional detail is necessary, Mr. Gregory and Mr. Williams can add to my comments.

At an extremely high level, I think the technology has changed over the years such that we better -- we have better information and clearly understand how to cathodically protect the cables. Clearly, the pipe

will be specified with a mastic, which basically should isolate the cable from ground even though it's installed in ground. After the welding of each piece is performed, we will then turn around and put a mastic coating, which is a continuation of the coating in which the piping is purchased, such that we have a continuous isolation from ground on the outside of the piping.

When we install the pipe, whether it be in a direct bore or in a jack and bore, we will also do testing following the installation of that section of pipe to ensure the integrity of the insulating material on the outside of the piping from ground, such that we will -- we will not have areas where the flow of current then can go from the point where there's a breach in the insulation to ground at that point. And that basically ends up creating your cell, which ends up in deterioration and pitting of the pipe. Where we end up with the pipe basically scarred in the pulling of pipe beneath a river or some other obstacle as a result of the bore, we will then at that point add cathodic protection for that section of pipe and localize to provide the protection necessary to ensure the integrity of the pipe for a significant number of years after its installation. Do you want to add more to that?

MR. WILLIAMS: That is exactly correct. In addition incidentally to the mastic, there is a thick polyethylene coating that is extruded on the pipe in the factory, so that that provides additional mechanical and corrosion protection to the pipe. Every foot of the pipe is what we call 'jeeked' (phonetic), which is to put a voltage test on the coating to make sure that the coating has no --

COURT REPORTER: Mr. Williams, just turn that microphone --

MR. WILLIAMS: Oh, I'm sorry. Thank you. Every foot of the pipe before it is backfilled or before it goes into a bore has a voltage of more than 10,000 volts applied to the pipe and the coating, and if that -- if there's any damage whatsoever to the coating, there's a spark at that location, and that's corrected. So that the pipe is in absolutely perfect shape when it goes into the ground. The cathodic protection is applied to the full length of the circuit just in case someone nicks the pipe, for example some unauthorized digging in the area, so that we do not have corrosion at that location. And then very important, what the industry has learned in the last decade is that careful maintenance of the corrosion system, that is go out every year or every two years and

test the coating and make sure that the coating is in good shape, will keep you leak free.

MR. ASHTON: May I ask a follow-up question on that? Mr. Williams, you've had considerable experience with the Con-Ed system. Was there any problem to the underground pipe cable systems caused by ground currents from the subway and electrified railroad traffic?

MR. WILLIAMS: Yes. That's a good question. Both Con-Edison and Boston Edison have DC currents in the subway systems that have created all sorts of difficulties for them over the years in terms of currents flowing from the cable pipe to the subway taking apparent metal away from the cable pipe and creating leaks. I don't believe you have that on any of your system.

MR. ASHTON: Is the ground currents from the subway system evident in the Fairfield County area? I had heard -- well, I won't testify.

ACTING CHAIRMAN TAIT: For a change. (Laughter).

MR. WILLIAMS: I wish you would because I don't know the answer. I have not heard of that, but that's -- again, that's not my expertise.

MR. ASHTON: Mr. Zak may possibly know. Have there been any evidence of ground currents from the subway system up in lower Fairfield County?

MR. ZAKLUKIEWICZ: Not to my knowledge. It's a continuous process for which you need a continual check on because of the other infrastructures installing their cathodic protections and the interaction of the facilities for each one of the owners. So there is a continuous adjustment that goes on and a continuous checking of the cathodic protection that you believe you had installed to ensure that you are really cathodically protecting the equipment that you have in place.

MR. BALL: On those occasions where there may be leaks, I assume that you will be employing technologies so that you can quickly detect the leaks. And I'm hoping you can comment on the nature of that technology and how quickly one can detect a leak in the ordinary course?

MR. ZAKLUKIEWICZ: Certainly. Mr. Williams will handle that.

MR. WILLIAMS: Thank you. The industry is very sensitive to the possibility of leaks even though, except for a few isolated utilities, leaks are very very uncommon. Every project that's designed, in addition to

what we've described for the protection of the pipe for corrosion protection and so forth, has leak detection systems installed so that the utility can detect the presence of a leak at the lowest possible level.

There are -- within the pressurizing plant, which is what maintains the fluid pressure on the line, there are probably four or five levels of leak detection, some more sensitive than others. If you want, I'll be glad to describe each of them or just give you a summary. But built inherent in the design of any modern pressurizing plant are at least four different levels of leak detection systems.

MR. BALL: Well how about a brief summary?

MR. WILLIAMS: Okay. A brief summary, some of the levels are inherent in the -- the obvious one such as the tank level, that's the level of liquid in the tank, reduces -- each time you take a reading on the tank to a level it sets an alarm. That's obviously fairly course, but that is a method to determine a lost of fluid.

In the sequence of pump operations, if a pump historically operates five times a day to maintain pressure on the line and it starts operating six times a day, the utility goes out and sees if maybe the reason

it's operating an additional time is because you're not having as much fluid come back into the line as you send out.

The most sensitive that's used nowadays is a combination of super sensitive flow meters that monitor the flow during the evening hours and nighttime hours as the system cools down because the load is low, so that the fluid that's in the reservoir tank gets pumped into the lines to maintain the proper pressure. During daytime heating when the loads are building up, that fluid gets pushed back into the tank again to maintain proper pressures. So these very sensitive flow meters on a daily basis measure what the amount of fluid leaving the tank is, what the amount returning to the tank is. And they're never exactly the same because load levels fluctuate, you know, on a daily and weekly basis. So in addition to that, this very sophisticated system monitors the loading on the feeder, calculates the amount of fluid that should go in and come out, compares the measure to the calculated, and if they vary by a certain amount, it rings a bell so to speak and the utility goes to search if there's a leak.

MR. BALL: And once the leak is detected through this technology, maybe you can briefly describe

the steps that the utility will take to remedy it?

MR. WILLIAMS: Okay, I'd be glad to. We truly do not anticipate any corrosion type leaks on a line like this because we do not have the subway system with the currents that tend to rob metal from the pipe. We do not expect to have the very congestive conditions that are in New York City. But if a corrosion leak does occur, it's typically a very very small leak, it's just a pinhole, because that's what corrosion is. And a leak such as that, the utility would, through their detection methods, detect that they have a leak. The line -- the longer of the two lines, 15 or so miles long, what the procedure would be is to go to the middle of the line, take the line out of service, reduce the pressure, which would reduce the leak rate, the lower the pressure, the lower the amount of leak from a given hole size, freeze in the middle of the line, isolate the one-half versus the other, then halve that, then halve again, and get down to within perhaps a half a mile or so, and then inject a perfluorinated tagent, which is a material that is super sensitive detection down to one part in tenth to the minus fourteenth or so, go above ground and sniff for the presence of that material, and that would pinpoint where the leak is, and the utility would excavate at that

location and repair the leak.

MR. BALL: And how quickly is that process typically?

ACTING CHAIRMAN TAIT: What dog do you use to do the sniff -- (laughter) -- of that concentration?

MR. WILLIAMS: As an aside, we actually did train dogs a few years ago to sniff. And they were successful even in New York City. But it's a -- it's a -- it's a mass spectrometer is what you would use with a special sniffer that would detect the presence of this material.

The length of time really varies. It -- it's very hard to predict -- the leak rates are very low. The length of -- the length of time that you would take to find a leak can range from a few days to I'd have to say a few months depending upon -- there have been occasions where the leak rate is so small that it's just taken months to find out exactly where the leak is. If it's a dig-in, if someone pokes into the pipe with a hoe ram or something like that, the location is immediate because there's an operator right there. So it varies from almost instantaneous to a length of time.

MR. EMERICK: Mr. Williams --

MR. WILLIAMS: Yes?

MR. EMERICK: -- do you have access to the line in terms of detection methodologies at each splice vault?

MR. WILLIAMS: The -- that is also a good question. There is a technique that was developed under an EPRI, Electric Power Research Institute, project several years ago, that at every splice location there's a special valve that is -- that can be installed -- and as a matter of fact, I happened to have invented the device and I'm quite proud of it -- you can insert this device -- (laughter) --

MR. EMERICK: Then I'm glad I asked the question.

MR. WILLIAMS: I was hoping. You -- you insert this device, which is an extremely sensitive flow meter, and it will look at the extremely slow leak rate from one end, and then you go to the next manhole to see if the leak rate goes, you know, to the right or to the left. And so you can use that technique at every splice location. The problem -- and the reason it's not routinely applied is you have to have the line cooled down because otherwise just the natural convection currents of the dielectric liquid will mess up the reading. So unfortunately, the line has to be out of

service for awhile before you can use it. But you're right, there is a device that goes into every splice location.

MR. EMERICK: Well, I guess beyond that, I think you said you would -- if you had a leak, you would start in the middle of the line and try and isolate where it was --

MR. WILLIAMS: Yes --

MR. EMERICK: -- and then isolate down and down --

MR. WILLIAMS: Yes --

MR. EMERICK: -- and then smaller and smaller --

MR. WILLIAMS: Yes --

MR. EMERICK: -- and then eventually inject a detection fluid into it and sniff it?

MR. WILLIAMS: Right.

MR. EMERICK: That's suggests to me that where are you getting access other than through splice vaults? I assume each splice vault has got to provide some method of gaining access to the fluidized system?

MR. WILLIAMS: Yes. Every splice vault routinely as part of normal installation has a valve on top of the splice casing that you use for sampling

dielectric liquid for maintenance purposes and so forth and for inserting this device that I described, and you can also insert this fluid at that location. Yes --

MR. EMERICK: Thank you --

MR. WILLIAMS: -- this tagent at that location.

MR. ZAKLUKIEWICZ: Except for a very very small pinhole, Mr. Emerick, you can also just use the regular common sense technique. And we've used it fairly successful on the Long Island Cables. You have equal pressure. You know that if the flow out of Terminal A is 10 gallons per minute and the flow out of Terminal B is only one gallon per minute, the fault is probably much closer to Terminal A. So you could break down that distance appreciably by just looking at some of the flows into where the leak has occurred, and it gives you a better feel rather than starting at the midpoint and working your way back towards one of the terminals. But that -- that is another way of doing it. And the smaller the leak, the longer it's going to take us to find it. And the larger the leak, the vice versa of just -- just by knowing what the flows are, you can get some approximation as to where the leak is and start working at that point where the flows appear to be, not centered

but towards one of the ends, and start working that way and helping yourself out. But any -- any leak is going to resolve -- result in the loss of some number of gallons of fluid of the polybutene, which we said we would use into the environment.

MR. EMERICK: Okay.

ACTING CHAIRMAN TAIT: Mr. Ball.

MR. BALL: Let me -- I'd like to ask a couple of questions about the actual construction process with the underground line in Segments 3 and 4. While the underground portion of the line is being constructed, would you expect outages on the existing circuits during the construction period, assuming underground?

MR. ZAKLUKIEWICZ: When we say with the proposed -- with the proposed 345-kV underground between East Devon and Singer and Singer and Norwalk, there -- while that construction is taking place for the transmission lines, there should be basically no impact except for the substation work at East Devon and at Singer and at Norwalk, but the -- and that work where you would have an impact on the existing transmission facilities, those impacts would be in terms of days, and maybe in a few cases could be into a week or a week and a half as opposed to continuous long outages into months as

a result. So, I -- I personally do not see an impact on the existing 115-kV systems that are in place nor an impact on the generation that is in place connected to the system while we build the Segments 3 and 4 by what was proposed in the application.

MR. ASHTON: Mr. Zak, isn't it correct that ISO New England would have to give permission for line outages due to construction purposes, recognizing the reliability issues in the area?

MR. ZAKLUKIEWICZ: Absolutely. And mine was just when it's built and tested. Now I'm -- now I'm interconnecting and doing the final testing, that that's where I was talking the days and the weeks of interconnecting bus sections or bringing new line positions into the new facilities at the substations.

MR. BALL: Now by contrast under Alternatives A or B in the application, would there be a problem with outages on the existing 115-kilovolt lines during the construction period of the new 345 line?

MR. ZAKLUKIEWICZ: The impact of trying to build Alternative A or Alternative B is going to be enormous. And I think I testified to that at one time in Docket 217. Recognize that we have -- from Hawthorne west we have two of the five transmission lines which

interconnect the eastern part of the State to the Norwalk/Stamford area, and that's the 1710 and 1730 transmission lines leaving Devon. Taking those lines out of service has two impacts. No. 1, we have a substantial distribution load at Hawthorne, at Old Town, and at Western Sub for which you can just not remove both 115-kV lines because all of that load cannot be served by any other transmission that is on the system, and system meaning UI and CL&P.

Also impacted would be the fact that, as we've testified before in the need portion of this docket, to get the output generation from Devon and Pequonnock, they heavily rely on the transmission lines both the northern route, which is the 1710 and 1730 line, along with the railroad lines, of trying to equalize and not overload any of those corridors to move the power from the generation in Bridgeport and the generation at Devon to the west.

My own view is that you would have to -- to serve the load reliably, you would have to build a -- construct a 115-kV underground transmission line first between Hawthorne, which goes into Old Town, which goes into Western, which goes down into the Norwalk area, and it would either have to be one or two 115-kV underground

lines before you would then be able to take down the overhead transmission lines on that northern route, which goes from Devon to Hawthorne to Old Town to the Norwalk area in order to perform the work. I think I've already testified that to try and build a 115-kV line and a 345-kV line while any part of that existing double circuit line is energized would, in my mind, not be possible, and that you would at minimum have to build a 115-kV line on the edge of the right-of-way, the expanded right-of-way in order to try and construct this new monopole with 345 on one side and 115-kV on the other side.

MR. BALL: Now this additional line that you would have to build during the construction period, is this a wraparound line? That's a term that you had used in the application and I'm wondering if that's the same thing? Specifically, I'm looking at --

MR. ZAKLUKIEWICZ: Yes.

MR. BALL: Okay. In the application in Volume 1 on page H-42 there's a discussion about the construction of wraparound lines -- and I'll wait for you to get there, Mr. Zak -- in the section under Engineering and Construction Issues there's a discussion about these temporary lines.

MR. ZAKLUKIEWICZ: Okay, I have it.

MR. BALL: And I'd like to ask you about one of the statements in the application, which is that the additional work involved with the lines would extend the construction schedule, increase costs, and cause greater potential environmental impacts. And just focusing on that sentence, I want to ask you to break that down. First of all, the extension of the construction schedule, do you -- can you elaborate on that?

MR. ZAKLUKIEWICZ: Well even if we built a temporary 115-kV line at the edge of the right-of-way, trying to remove existing lattice structures with an energized 115,000 volt line in close proximity to the construction area is totally different construction than building a line on an existing right-of-way which is de-energized. So the amount of time that would be required to set poles and do the foundation work when in close proximity to the work going on you have energized 115,000 volt conductors, just slows the work down immensely. And I believe I testified before to build that line leaving an energized line in its place, in my mind would take five years or more if I recall my testimony. And that's based on the work we had done basically from the junction of Route 8 to the Hawthorne area previous to this. The

amount of time it took to do that segment of line and then expanding it out over the remaining miles that are there, I don't think I'm too far off on my estimate.

MR. PRETE: I would like to just add to Mr. Zak, it's probably stating the obvious, that all right-of-ways are not created equal. In this area the right-of-way is 80 feet in width. So consistent with Mr. Zak's testimony, taking that into consideration, I think is very important.

MR. BALL: And in light of that testimony, assuming that you had to construct these lines, would that change your testimony as to your expectations in terms of the socialization of the costs of the project and your ability to meet the 2007 deadline?

MR. ZAKLUKIEWICZ: I -- I think it will be difficult to argue a strong case that would take existing 115-kV lines down for this length and putting in an underground 115,000 line to serve customers that are presently served from an overhead line and have those costs socialized throughout New England.

MR. BALL: Alright. Let me continue on with a couple of the other points that you made. Increased costs, do you have any sense of what the increased costs of the temporary lines would be?

MR. PRETE: As far as in amplitude, I'm sure we can get that number, but the increased costs was included in the overall cost estimates that we have provided to the Council in the application.

MR. BALL: As part of Alternatives A and B?

MR. PRETE: That's correct.

MR. BALL: Alright. And the last point that you make is greater environmental impacts. I don't know if someone on the panel would care to comment on that?

MS. MANGO: I guess that would be me. In terms of greater environmental impacts, compared for example with respect to Alternative A, the use of Alternative A versus the portion of the proposed route that it would replace, the underground proposed route, would -- Alternative A would require approximately 49 and a half additional acres of easement to be acquired. And we're assuming an accommodation of a 345 and a 115 on the same right-of-way. All of that would have to be cleared. That would be essentially the 80 feet of existing right-of-way plus the -- I think it's on average about 45 additional feet from Hawthorne to Norwalk.

In addition, with respect to Alternative

A, we would have some what I will call social sort of land use impacts even in the Bridgeport area where we would have to traverse underground through a residential street, essentially Route 59. Our proposed route doesn't really traverse large areas of residential adjacent land uses. So I think those social impacts of having to construct through a residential area and time construction, maybe take longer construction to get through the residential areas, should be considered as well.

MR. BALL: Alright. Mr. Frank will have some questions on environmental issues, but let me just conclude with -- and perhaps it's self-evident, but under your primary proposal, which is to go underground in Segments 3 and 4, I take it you would not need to construct these temporary transmission lines?

MR. ZAKLUKIEWICZ: That -- that is correct, Mr. Ball.

MR. BALL: Okay.

MR. ZAKLUKIEWICZ: In looking at some data that we had, it looked like the cost of the 115-kV under-grounding would be about 61 million dollars.

MR. BALL: Thank you. I have no further questions of the panel. Mr. Frank will have some

questions on environmental issues.

ACTING CHAIRMAN TAIT: Mr. Frank.

MR. MONTE FRANK: If I may, I just want to follow up on the point that was just raised. Miss Mango, Mr. Zak just testified that if Alternative A or B was selected, that there would be an additional 115-kV line that would be built underground along the existing right-of-way, right? Is that -- did I miss --

MR. ZAKLUKIEWICZ: The one -- the 115 line would be built in city streets or state streets and not on the right-of-way.

MR. FRANK: Okay. Okay, let me move on then. With respect to planning the route for the project, did the companies employ certain routing objectives? That's for either Miss Mango, Mr. Prete, or Mr. Zak.

MR. PRETE: Yes.

MR. FRANK: Okay. And was one of those objectives to minimize adverse impacts to environmental, cultural and scenic resources?

MR. PRETE: Yes.

MR. FRANK: And that includes impacts to inland and tidal wetlands?

MR. PRETE: Yes.

MR. FRANK: Vernal pools?

MR. PRETE: Yes.

MR. FRANK: Steep slopes?

MR. PRETE: Yes.

MR. FRANK: Parks?

MR. PRETE: Yes.

MR. FRANK: Watercourses?

MR. PRETE: Yes.

MR. FRANK: Threatened species or species of special concern and other wildlife?

MR. PRETE: Yes.

MR. FRANK: Okay. And was another objective to minimize taking of private property, including people's homes?

MR. PRETE: Most definitely.

MR. FRANK: And with respect to Segments 3 and 4 were the planning objectives met?

MR. PRETE: We believe fully with our proposed line.

MR. FRANK: Now, Miss Mango, with respect to Segments 3 and 4, is it your opinion that the proposed underground route would result in limited environmental impacts?

MS. MANGO: Yes, with respect to Segments

3 and 4.

MR. FRANK: And with respect to Segments 3 and 4, you state on page 14 of your testimony that by virtue of the proposed underground alignment with an existing road right-of-ways, the project will not adversely affect vegetation, amphibian breeding areas, or wildlife resources. Can you explain that please?

MS. MANGO: Yes. It's fairly self-explanatory. If we're within existing developed road rights-of-way, obviously we will not be affecting habitat in terms of different types of vegetation, different types of habitat that could be used by a variety of species.

MR. FRANK: So in other words, whatever species once used that existing road, that habitat had already been impacted historically, is that the concept?

MS. MANGO: That would be correct.

MR. FRANK: And would there be any long-term visual impact associated with an underground line?

MS. MANGO: No, other than those associated with the facilities at the substations, the transition stations.

MR. FRANK: Would there be any long-term adverse effects on existing land uses or on future land

use planning from the proposed underground line?

MS. MANGO: No, we do not believe so.

MR. FRANK: Would there be any substantial adverse impact to cultural resources along the underground line in Segments 3 and 4?

MS. MANGO: No.

MR. FRANK: And would the underground route require any taking of private property?

MS. MANGO: No, it would not.

A VOICE: (Indiscernible) -- didn't include the substations --

MR. FRANK: Except for the substations?

MS. MANGO: Right. You were speaking of the route I assumed --

MR. FRANK: Yes, I was --

MS. MANGO: -- as opposed to the substation facilities.

MR. FRANK: And you state on pages 17 and 18 of the -- of your testimony that installation of an overhead route suggested in Alternative A or B by contrast would result in potentially significant adverse environmental impacts. What is the basis for that opinion?

MS. MANGO: That opinion is based on the

comparison of the portion of the proposed route with the existing easements along which Alternatives A and B would be aligned.

MR. FRANK: Can -- can you explain that further?

MS. MANGO: Well just very generally, let's talk about Alternative B, Alternative B is what we call the all overhead route, and except for two miles in Bridgeport between Seaview and Singer, which would be underground, the rest of the route would be overhead, and it would traverse along easements that have been in existence for a long time, especially the eastern and western portions of the route traverse large areas of very densely developed residential subdivisions. And especially in Stratford, Trumbull, Bridgeport and Fairfield, the companies estimated that some 29 homes would have to be acquired in order to install the 345-kV facilities. When you compare that type of a property social impact to installation within road rights-of-way where none of those impacts would occur, we felt that that constituted a significant comparative impact.

Alternative A does not require the taking of any homes, but also would be installed on narrow rights-of-way. As you've heard here already today, it

would potentially require taking the 115-kV lines that exist there now either out of service, which would not be allowed, or placing them somewhere else, increasing your construction, so you'd actually -- if that were to occur for example, placing the 115 underground, you'd have a set of social impacts where you would have to install the 115 under roads. I'm not sure where those roads would be, there's not a direct line from Hawthorne to Norwalk. And all the roads are basically small two-lane roads. So installing a cable within those roads would be very -- I think it would be difficult, although others from an engineering viewpoint could probably speak to that. And then by the same token, you would have to install your 345-kV on the existing right-of-way, which based on a visual examination of that right-of-way does not have existing access roads as a number of homes that have been developed over the last -- it looks like perhaps recently, certainly within the last 10 to 20 years that are close to the line -- and it would involve the removal of virtually 40 -- all 49 acres would be forested, so you would be not losing habitat, but certainly converting forested habitat to shrub land type habitat.

MR. FRANK: And by converting the 49 acres from predominantly forestland to shrub like habitats,

what sort of impact would that have on the existing habitats that are there?

MS. MANGO: Well, it would modify those habitats. It would not cause a loss of habitat. It would just be a shift in habitat. We could go into the edge effect and, you know, existing -- the effects of existing rights-of-way ad naseum, but I'm not sure that I could say that that would be necessarily a bad impact in terms of wildlife habitat because it would increase diversity. From a land use point of view in terms of removing the woodlands, the wooded areas that exist there as buffers, that would be a negative, like a social negative impact.

MR. FRANK: You state on page 20 of your testimony that impacts to birds and wildlife in general would be considerably greater along the alternative route than along the proposed route?

MS. MANGO: Absolutely true because there would be no impacts to birds and wildlife along the proposed route.

MR. FRANK: And alternatively there would be some impact to birds and wildlife?

MS. MANGO: There would be some impact, there would be a modification.

MR. FRANK: Okay. And there would also be crossings of 49 wetlands with respect to Alternatives A and B as opposed to the proposed route?

MS. MANGO: I think there would be 49 wetland crossed in some manner, shape, or form. They could be spanned along Alternative A. And 85 crossed on Alternative B.

MR. FRANK: Okay. And you state on page 20 also of your testimony that Alternative A would result in four more miles of overhead transmission line than the proposed route. And then in the errata sheet or changes to the record that the company filed on April 2, 2004, the Applicant states that Alternative A would result in 15 more miles of overhead transmission line than the proposed route. I don't know if this is a question for Miss Mango or Mr. Zak, but am I correct to assume that the errata sheet is correct, that is that Alternate A -- Alternative A would result in 15 more miles of overhead transmission line than the proposed route?

A VOICE: That's true --

MR. FRANK: That's on page A --

MS. MANGO: That's true --

MR. FRANK: -- A-33 of the errata sheet --

MS. MANGO: That's for the entire -- you

know, if you look at the entire route. Alternative A is a total of 73 miles from Scovill Rock to Norwalk and has 13 miles of underground and 60 miles of overhead. The proposed route has something like 23 miles of underground out of a total of 68.5 miles. So that's where that 15 miles of differential comes in.

MR. FRANK: Okay. So the 15 more miles of overhead transmission lines is the --

MS. MANGO: Correct --

MR. FRANK: -- correct additional --

MS. MANGO: Yes --

MR. FRANK: -- miles of transmission line rather than the four miles?

MS. MANGO: The -- yeah. The four miles compares just Segments 3 and 4, I think. So there's a little difference as to what you're comparing -- does it not?

MR. FRANK: And how -- how does that factor into your opinion that with respect to Segments 3 and 4, if it does, Alternative A would result in more adverse environmental impacts than the proposed underground installation?

MS. MANGO: I think just in general, although -- it's a general statement, obviously it would

depend on site specific conditions -- but in general, if you have a linear project and you have one option that will take you on a shorter route with fewer environmental impacts and an option that is longer that would result through construction in various habitats, your longer route would result in comparatively greater environmental -- you know, environmental impacts both to the natural and the manmade environment in general.

MR. FRANK: And generally speaking, an underground line would result in fewer environmental impacts than an overhead line where you had to expand right-of-ways?

MS. MANGO: Well, for the --

A VOICE: If it's in the streets --

MS. MANGO: -- for the proposed route that we're speaking about. I couldn't -- I couldn't say that that would be a blanket statement.

MR. FRANK: Under public roads?

MS. MANGO: Under public roads for these segments that we're comparing here today.

MR. FRANK: Okay. And from an environmental standpoint is it your opinion that the proposed underground route is superior to either Alternative A or B?

MS. MANGO: From my very parochial environmental standpoint, comparing simply Segments 3 and 4 with the proposed route, I would say yes.

MR. FRANK: Okay.

MR. ZAKLUKIEWICZ: Maybe I can help clarify that -- maybe I can help clarify the four miles and fifteen miles. I think in -- on page 20, Alternative A has four more miles of the overall length, not overhead, but the overall length increases by four miles, not the overhead piece --

MR. FRANK: Right --

MR. ZAKLUKIEWICZ: -- okay, as opposed to interpreting it that an additional four miles of transmission lines would have to be constructed, that is correct. The overall length of the entire proposal goes from 69 miles to 73 miles. That's the four additional miles, not four overhead miles, overhead --

MR. FRANK: I just want to be clear, so --

MR. ZAKLUKIEWICZ: Okay, it's -- the overall length of the total route from Middletown to Norwalk increases by four miles.

MR. FRANK: So the total of the entire line is four more miles --

MR. ZAKLUKIEWICZ: That's correct --

MR. FRANK: -- but the --

MR. ZAKLUKIEWICZ: -- it goes from 69 to 73.

MR. FRANK: But the amount of overhead transmission line is 15?

A VOICE: Correct.

MR. ZAKLUKIEWICZ: Correct.

MR. FRANK: Okay. I have nothing else.

ACTING CHAIRMAN TAIT: Okay. Mr. Cederbaum.

MR. CEDERBAUM: Thank you. Eugene Cederbaum, representing the Town of Westport. Thank you very much -- (indiscernible) --

COURT REPORTER: Wait --

MR. CEDERBAUM: I beg your pardon?

COURT REPORTER: Start that again in front of a mic --

MR. CEDERBAUM: Eugene Cederbaum here for the Town of Westport. With me is Ira Bloom, town counsel.

I'd like to clarify, if I may, one question that came up in the prehearing conference. There was a submission under a letter from Mr. Bloom to Chairman Katz, which contained certain exhibits, a

resolution of the RTM -- the Westport RTM, a letter from the Conservation Director of the Town of Westport, and a letter from the Director of Planning from the Town of Westport, which is part of the record, but technically I think will constitute a limited appearance since the authors of those documents are not with you today.

ACTING CHAIRMAN TAIT: We will accept them as a limited appearance --

MR. CEDERBAUM: Thank you very much, sir --

ACTING CHAIRMAN TAIT: -- assuming there's no objection. Hearing none.

MR. CEDERBAUM: Thank you.

(Whereupon, the Town of Westport Exhibit No. 1 was received into evidence as a full exhibit.)

MR. CEDERBAUM: I'd like to say that the advantage of coming before a hearing like this at a quarter to 4:00 is that you've gotten the lay of the land, which is always -- lawyers are always comforted by that. And the disadvantage is that all of your best questions have already been asked and answered. So, I will do my best not to re-ask them even though I can do them better than anyone who has done them -- (laughter).

I would like to -- and in that vein -- and

Mr. Chairman, if I -- if I -- if I don't do that, please let me know. In that vein though, I would like to address a particular concern of Westport, and that had to do with the modification of the proposed route in -- just before we reach the center of town, the proposed route had directed the cable to pass through, without getting to geographical here, a residential area -- a historical area of town. The town -- as a matter of fact, that's part of these exhibits. The town had some concern about that. And in working with the Applicant, that limited portion of the route was redirected. And it's that portion of the redirection that I'd like to address questions to the panel, because it passes through an area that is either part of or adjacent to a former landfill on which now sits a library, which hasn't disappeared from site since it's construction, and an open-air theatre known as the Leavitt Pavillion. So our public library is on what was the primary portion of that landfill, and also the Leavitt Pavilion is to the south of the library --

ACTING CHAIRMAN TAIT: Still on the landfill?

MR. CEDERBAUM: A portion of it I believe was on the landfill, and here's where I get a little hazy