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May 25, 2004

VIA HAND-DELIVERY

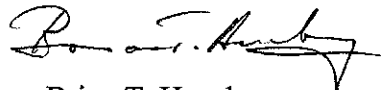
Ms. Pamela Katz
Chairman
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06501

Re: Docket No. 272

Dear Chairman Katz:

Enclosed are an original and twenty (20) copies of the Direct Testimony of Roger Zaklukiewicz, Anne Bartosewicz, John Prete, Cyril Welter, and James Hogan Regarding the East Shore Route.

Very truly yours,



Brian T. Henebry

BTH/da
Enclosures

cc: Service List

{W1302433}

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STATE OF CONNECTICUT

SITING COUNCIL

Re: The Connecticut Light and Power Company and The) Docket 272
United Illuminating Company 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 Scovill Rock Switching)
Station in Middletown and Norwalk Substation in)
Norwalk, Connecticut Including the Reconstruction of)
Portions of Existing 115-kV and 345-kV Electric)
Transmission Lines, the Construction of the Beseck)
Switching Station in Wallingford, East Devon Substation)
in Milford, and Singer Substation in Bridgeport,)
Modifications at Scovill Rock Switching Station and) May 25, 2004
Norwalk Substation and the Reconfiguration of Certain)
Interconnections)

**DIRECT TESTIMONY OF ROGER ZAKLUKIEWICZ, ANNE BARTOSEWICZ,
JOHN PRETE, CYRIL WELTER, AND JAMES HOGAN
REGARDING THE EAST SHORE ROUTE**

1 1. **INTRODUCTION**

2 Q. Please describe what is meant by the term "East Shore Route"?

3 A. For purposes of this testimony, the term "East Shore Route" is used to refer to
4 any route configuration that connects the following three terminal points: (1) the strong
5 source at Beseck Switching Station in Wallingford ("Beseck"); (2) a new termination facility
6 (either a substation or switching station containing overhead to underground transition
7 facilities) adjacent to the existing East Shore Substation in New Haven (this new termination
8 facility at East Shore, which would have to be constructed as part of any "East Shore Route",
9 is hereinafter referred to as "East Shore"); and (3) East Devon Substation in Milford ("East
10 Devon"). As set forth in detail below, there are a number of potential routes that connect
11 these three terminal points, and these various routes have been evaluated by the Companies

12 using the same routing criteria applied to all potential routes for the Middletown to Norwalk
13 Project (“the Project”). The existing East Shore Substation is the end point of a 345-kV line
14 (the 387 line) that proceeds from Scovill Rock Switching Station (in Middletown) through
15 Black Pond Junction (in Meriden), East Wallingford Junction (in Wallingford), and Totoket
16 Junction (in Branford).

17 There is no East Shore Route “alternative” in the sense that no East Shore Route
18 meets the statutory criteria for an alternative route to be considered by the Council (i.e.,
19 technical feasibility, environmental impact, and reasonable cost). Therefore, The
20 Connecticut Light and Power Company and The United Illuminating Company (collectively,
21 “the Companies”) have not proposed any such configurations for certification by the Council.

22 Q. Please provide a brief summary of your testimony regarding the East Shore
23 Route.

24 A. National and regional reliability standards dictate that, as part of any East
25 Shore Route, a second 345-kV line would have to be constructed on the right of way
26 (“ROW”) between Beseck and East Shore, in addition to the existing 345-kV line (the 387
27 line) between Scovill Rock and East Shore substations. The only practical route for such a
28 second line would be along the existing 387 line ROW, which would require extensive
29 clearing of forested vegetation within the ROW, construction through numerous residential
30 areas, and the addition of a second 345-kV line in the ROW abutting areas designated in
31 Conn. Gen. Stat. § 16-501(a)(1)(C), such as Pond Hill Elementary School in Wallingford.
32 This segment of an East Shore Route – between Beseck and East Shore – is not advantageous
33 compared to the proposed route. The second segment of an East Shore Route – between East
34 Shore and East Devon - would be at best very challenging from a construction standpoint,

35 wholly apart from the reliability considerations associated with additional underground cable.
36 Any such route would require a crossing of New Haven Harbor or the Quinnipiac and Mill
37 Rivers and significant additional underground construction (5.8 additional miles of
38 underground cable for the “part underground / part overhead” route and 13 additional miles
39 for an “all underground” route between East Shore and East Devon). The overhead portion
40 of the “part underground / part overhead” route between East Shore and East Devon would
41 pass through residential areas in Orange and Milford that are also traversed by the proposed
42 route.

43 As a whole, none of the potential East Shore Routes offer advantages over the
44 proposed route in terms of reduction of social and environmental impacts, and would cost
45 \$125-350 million more than the proposed route. Finally, the additional underground
46 construction required by the East Shore Route would not provide acceptable operability and
47 reliability. This issue will be the subject of later hearings in this docket.

48 **2. REVIEW OF THE STUDIES CONDUCTED IN DETERMINING THAT A**
49 **SECOND 345-KV LINE IS NECESSARY AS PART OF ANY EAST SHORE**
50 **ROUTE**

51
52 Q. During the route evaluation process that was performed prior to the filing of
53 the Application for a Certificate of Environmental Compatibility and Public Need
54 (“Application”), did the Companies consider using the existing 387 line as part of the
55 Project?

56 A. Yes, as discussed in section G.4.3.3 of the Application, during the planning of
57 the Project the Companies considered incorporating into the 345-kV loop the existing 387
58 line between Beseck and East Shore Substation in New Haven as a means of minimizing the
59 new construction required for the Project.

60 Q. Why was the use of the existing 387 line rejected at that time?

61 A. The Companies determined that in order to meet national and regional
62 reliability standards a second 345-kV line would have to be constructed on separate
63 structures within the same ROW occupied by the existing 387 line. The Companies further
64 concluded that, in order to connect East Shore to East Devon, an East Shore Route would
65 require the construction of approximately 5.8 - 13 miles of three sets of underground 345-kV
66 cables, which would be undesirable from a reliability and operability viewpoint. In addition,
67 as discussed in the Application, the Companies determined that an East Shore Route using
68 the existing 387 line ROW to connect Beseck and East Shore, and then connecting to East
69 Devon, would be significantly more expensive than the cost of the proposed overhead line
70 between Beseck and East Devon.

71 Q. Why did the Companies subsequently undertake a series of thermal load flow
72 studies re-evaluating the feasibility of using the existing 387 line as part of the Project?

73 A. As required by the Siting Council's Application Guide dated September 9,
74 2003, the Companies took a "second look" at the East Shore Route at the request of the
75 Mayor of Wallingford, who asked the Companies during the municipal consultation process
76 to reconsider the use of this route. The challenge was to determine whether, by reconfiguring
77 the East Shore Substation, the thermal rating of the existing 387 line could be increased. The
78 Companies then began a series of thermal load flow studies to determine whether (assuming
79 such a reconfiguration was done at East Shore Substation) an East Shore Route that
80 incorporated the existing 387 line (as opposed to the construction of a second 345-kV line)
81 would satisfy national and regional reliability standards.

82 Q. After conducting these studies, what did the Companies conclude about
83 whether a new 345-kV line would be needed as part of an East Shore Route?

84 A. The Companies determined that utilizing the existing 387 line as part of the
85 loop would not satisfy national and regional reliability standards. Therefore, the Companies
86 reached the same conclusion they had drawn before filing the Application, namely, that the
87 East Shore Route would require the construction of a second 345-kV line between Beseck
88 and East Shore, and thus would not substantially reduce the amount of new 345-kV
89 construction that would be required.

90 Q. Please describe the series of additional studies that were conducted prior to the
91 Companies reaching this conclusion that a second 345-kV line would be needed as part of
92 any East Shore Route.

93 A. The Companies commissioned PowerGEM, an electrical consulting firm, to
94 conduct a total of seven thermal load flow studies. In addition, ISO-New England's
95 Southwest Connecticut (SWCT) Working Group prepared a study that evaluated the results
96 of the PowerGEM studies of the East Shore Route and compared those results to the
97 Working Group's modeling of the Middletown to Norwalk Project as proposed. (Copies of
98 these studies were filed by the Companies as part of Addenda 1, 2, and 3 to the Supplemental
99 Filing dated January 7, 2004, January 30, 2004, and February 23, 2004, respectively. *See*
100 CL&P/UI Exhibits 14, 18, and 21)

101 PowerGem conducted the following thermal load flow studies:

- 102 • A study dated December 31, 2003 utilizing the same dispatch assumptions
103 made in ISO-NE's Southwest Connecticut Working Group evaluation of the
104 Middletown to Norwalk Project. This study determined that the normal
105 loading on the 387 line was near its normal rating in the base cases, and that
106 one of the post-contingency overloads was of the 387 line itself (*See*

107 CL&P/UI Exhibit 14, Addenda #1 to the Supplemental Filing dated January 7,
108 2004);

- 109
- 110 • Two studies dated January 28, 2004 that modeled the existing 387 line with
111 the generation at New Haven Harbor Station (NHHS) in service and out of
112 service. These studies determined that with NHHS out of service the 387 line
113 was overloaded during normal operating conditions. Post-contingency
114 overloading was even more severe. These studies also determined that when
115 NHHS was out of service, there were post-contingency overloads on other
116 portions of the Connecticut 345-kV transmission system, specifically the 345-
117 kV lines in the vicinity of Southington Substation and Frost Bridge Substation
118 (in Watertown). (See CL&P/UI Exhibit 18, Addenda #2 to the Supplemental
119 Filing dated January 30, 2004);
 - 120
 - 121 • Two studies dated January 28, 2004 that modeled an upgraded 387 line
122 (assuming the portion of the line between Black Pond Junction and Scovill
123 Rock Switching Station was reconducted with 2-954 ACSR bundled
124 conductors) with the generation at NHHS in service and out of service. Even
125 with this reconductoring, the 387 line and other portions of the Connecticut
126 transmission system exhibited post-contingency overloads. (See CL&P/UI
127 Exhibit 18, Addenda #2 to the Supplemental Filing dated January 30, 2004);
 - 128
 - 129 • Two studies dated February 16, 2004 that modeled the East Shore Route using
130 previously modeled assumptions along with an additional assumption of 700
131 MW transfers between New England and New York. These studies
132 determined that, with a 700 MW flow from New England to New York, there
133 were numerous thermal overloads on various 345-kV lines within
134 Connecticut. The proposed Middletown to Norwalk Project does not exhibit
135 such post-contingency overloads on the 345-kV system. (See CL&P/UI
136 Exhibit 21, Addenda #3 to the Supplemental Filing dated February 23, 2004,
137 Attachment 1, p. 11).
 - 138

139 Q. What conclusions did the ISO-NE SWCT Working Group reach in its
140 comparison study?

141 A. After reviewing the results of the series of PowerGEM studies and comparing
142 those results to the Working Group's thermal load flow modeling of the Middletown to
143 Norwalk Project, the Working Group concluded that:

144 The East Shore Alternative as studied was found to be an unacceptable
145 substitute to the Middletown Norwalk Project because it does not meet NERC,
146 NPCC or NEPOOL criteria. The East Shore Alternative does not strengthen

147 the power supply into SWCT by introducing a new source; it simply connects
148 the load in SWCT to an already heavily loaded 387 line. The most notable
149 overload in this report is the one on the 387 line. Even with the assumed
150 reconductoring of the limiting portions of the 387 line, the line continues to
151 overload. In addition, an outage of this line yields substantial overloads on
152 the remaining corridors serving SWCT and the 345-kV across the state. (See
153 CL&P/UI Exhibit 21, Addenda #3 to the Supplemental Filing dated February
154 23, 2004, Working Group Comparison Study, p. 13)
155

156 Therefore, even if the existing 387 line were reconductored, compliance with national and
157 regional reliability criteria would not be achievable (regardless of the size of the replacement
158 conductor) because any East Shore Route that uses the existing 387 line as a component
159 would not build a new source into SWCT. As a result, the loss of the 387 line would result in
160 post-contingency overloads elsewhere on the transmission system. This analysis also showed
161 that other transmission lines would experience overloads, including overloads on the
162 following lines:

- 163 • 318/362 Line between Southington S/S and Meriden S/S (345-kV; 3.9 miles);
- 164 • 1342 Line between Bokum S/S and Green Hill S/S (115-kV; 11.3 miles);
- 165 • 1610 Line between Glen Lake Junction and Southington S/S (115-kV; 18.3 miles);
- 166 • 1610 Line between Mix Avenue S/S and Glen Lake Junction (115-kV; 2.9 miles);
- 167 • 1990 Line between Frost Bridge S/S and Baldwin Junction (115-kV; 7.0 miles);
- 168 • 1990 Line between Stevenson S/S and Baldwin Junction (115-kV; 10.4 miles);
- 169 • 91001 Line between CRRA and Ash Creek S/S (115-kV; 1.2 miles).

170
171 The additional studies performed by PowerGEM and the ISO-NE SWCT Working Group
172 thus confirmed the Companies' original determination that any East Shore Route would
173 require the construction of a second 345-kV line between Beseck and East Shore in order to
174 satisfy national and regional reliability criteria.

175 Q. Once the Companies determined that national and regional reliability criteria
176 require that a second 345-kV line must be constructed as part of any East Shore Route, did
177 you review potential East Shore Routes for the installation of this new 345-kV line?

178 A. As discussed below, the Companies have reviewed a number of potential
179 routes that would connect Beseck and East Devon via East Shore.

180 **3. PURPOSE OF THE EAST SHORE ROUTE REVIEWS**

181 Q. In the April 2004 hearings, members of the Council requested that the
182 Companies further evaluate certain potential transmission line routes in New Haven County,
183 between Beseck and East Devon (i.e., Project Segment 2). Have you done this further
184 evaluation?

185 A. Yes. With respect to Segment 2 of the Project, the Council asked for further
186 information regarding some of the alternative routes that the Companies initially considered
187 but subsequently dismissed because of operational, cost, or environmental/social impacts.
188 The alternative alignments for the transmission line that were reviewed in the Application are
189 illustrated on the Route Analysis Maps (Drawing No. RA-001, Sheets 1 and 2), located in the
190 Map Pocket in the back of Volume 1 of the Application. The results of the Companies'
191 studies of such alternatives were summarized in the Application, Volume 1, Sections H.3,
192 H.4, and H.5.

193 In addition, the Council specifically requested analyses of several other route options
194 between Beseck and East Devon that had not been reviewed in detail in the Application, such
195 as the Amtrak corridor and the Airline Railroad corridor.

196 **4. SUMMARY OF ROUTE EVALUATION PROCESS**

197 Q. What assumptions were used in the Companies' additional reviews of routes
198 for the Segment 2 portion of the Project, as requested by the Council?

199 A. All of the routes considered in this analysis would involve the construction of
200 a new 345-kV transmission line. Although an existing 345-kV line (the 387 line) traverses

201 north-to-south between Beseck and UI's East Shore Substation¹, the Companies' studies have
202 determined that this line, either as presently configured or as could be reconducted, would
203 not meet national and regional reliability criteria required for the proposed Project. As a
204 result, a new 345-kV line would be necessary.

205 In addition, all of the routes considered in this study would require the construction of
206 a new termination facility – either a new substation or switching station containing overhead
207 to underground transition facilities - adjacent to UI's existing East Shore Substation, located
208 east of New Haven Harbor in the City of New Haven. From this new East Shore termination
209 facility, the routes would traverse south-southwest to a termination at East Devon. The
210 feasibility of a marine route alternative that would involve a submarine cable between East
211 Shore and East Devon was also investigated.

212 Q. What criteria were used in analyzing these routes?

213 A. In evaluating the routes, the Companies applied the same routing objectives
214 described in the Application (Volume 1, Section H.1). In addition to system reliability
215 issues, factors considered included construction constraints; availability of ROWs within
216 which the transmission facilities could be located without having to acquire private property;
217 minimization of social impacts; minimization of impacts to sensitive environmental
218 resources; protection of public health and safety; and cost.

219 Q. Please describe the process used to review the routes.

220 A. The same process used to evaluate the alternatives identified in the
221 Application also was used to assess the East Shore Routes (refer to the Application, Volume
222 1, Section H.2). In addition, representatives of the Companies, as well as the Companies'

¹ The proposed route is aligned within this 387 line ROW between Beseck and East Wallingford Junction (in Wallingford).

223 engineering consultant (Burns & McDonnell), conducted field reconnaissance of the routes;
224 reviewed aerial photographs, local road maps, and U.S. Geological Survey maps; examined
225 data concerning existing transmission ROW widths; and performed other research to compile
226 baseline environmental data. In addition, the Companies commissioned the ESS Group, Inc.
227 (ESS) to conduct a study of marine routing options between East Shore and East Devon.

228 **5. IDENTIFICATION OF EAST SHORE ROUTES**

229 Q. Please describe the routes that were reviewed between Beseck and East
230 Devon, via East Shore.

231 A. The East Shore Routes can be best described by subsection:

- 232 • Beseck to East Shore; and
- 233
- 234 • East Shore to East Devon.
- 235

236 For both of these subsections, the Companies evaluated several alignments within the
237 subsection. These alignments, as summarized below, are illustrated on the Route Maps
238 (Figures 1-3) that are attached to this testimony. For discussion purposes, each of these
239 alignments is subdivided into numbered sections, or "links", as illustrated on Figures 1-3.
240 The numbered links are referenced in this testimony to describe the locations of the routes.

241 **5.1 Beseck to East Shore Routes**

242 Between Beseck and East Shore, three primary routes were assessed:

- 243 • **387 Transmission Line Route.** This route would follow CL&P's existing 387
244 transmission line corridor (which includes the 345-kV 387 line, as well as a 115-kV
245 line) from Beseck south to East Wallingford Junction and then continuing south to
246 Totoket Junction (in Branford). (See Figure 2) From Totoket Junction, the route
247 would follow the UI portion of the same 345-kV/115-kV ROW west to the vicinity of
248 the existing East Shore Substation. There are two choices for the northern portion of
249 this route between Beseck and East Wallingford Junction:

250

251 ⇒ **Overhead:** Overhead configuration within the existing 387 line ROW. This is
252 the alignment followed by the proposed route in this area.

253

254 ⇒ **Underground:** Underground configuration following Carpenter Lane to
255 Research Parkway to Williams Road to the 387 line ROW (links 3v, 65, 4b). The
256 line would be buried within residential streets and within the 387 line ROW
257 (south of Williams Road to East Wallingford Junction). Link 4b would be
258 constructed underground in this case. This portion of the line roughly parallels
259 the Airline Railroad (refer to discussion below). A transition station would be
260 located a short distance south of East Wallingford Junction at the point where the
261 387 line ROW diverges from the Airline Railroad corridor.

262

263 • **Airline Railroad Route.** Under this route, the transmission line would be aligned
264 along the railroad corridor formerly owned by Conrail and referred to as the “Airline
265 Railroad”. The alternative would follow the railroad ROW from Wallingford south
266 through North Haven, East Haven, and New Haven. In New Haven, the route would
267 diverge east from the Airline Railroad corridor to follow an Amtrak rail line east into
268 East Haven. At the intersection of this railroad with the 387 line, the route would turn
269 west, following the 387 Line ROW to East Shore.

270

271 • **Amtrak Railroad Route.** This route would involve an alignment along the Amtrak
272 Railroad (located generally parallel to, but west of, the Airline Railroad) from
273 Wallingford south through North Haven and Hamden to New Haven and then east,
274 into East Haven, along the same railroad ROW as described for the Airline Railroad.
275 At the railroad’s intersection with the 387 line ROW, the route would diverge west,
276 following the electric transmission line corridor to the vicinity of the existing East
277 Shore Substation as described above for the Airline Railroad Alternative. An existing
278 115-kV transmission line parallels the Amtrak Railroad from Wallingford Junction to
279 the East Shore Substation.

280

281 **5.2 East Shore to East Devon Routes**

282 From East Shore to East Devon, both upland and marine routes were examined:

283 • **Marine Routes.** ESS reviewed marine transmission cable routes that would traverse
284 from East Shore, into New Haven Harbor, south-southwest through Long Island
285 Sound and then to East Devon, either via an alignment up the Housatonic River or via
286 an alignment that would parallel the existing Iroquois Gas Transmission System
287 pipeline ROW north (east of Charles Island) to a landfall at Silver Sands State Park in
288 Milford and then underground along Milford streets, north to East Devon.

289

290 • **Upland Routes.** Three primary upland routes between East Shore and East Devon
291 were considered. All of these would involve an underground configuration (primarily

292 within road ROWs) through the densely developed New Haven metropolitan area.
293 West of New Haven, the routes would either continue underground beneath streets or
294 transition overhead to East Devon. Following is a brief description of the routes from
295 East Shore to East Devon:

296

297 **Underground Routes.** All of the following routes would involve underground cable
298 installed principally within public road ROWs and would require a crossing of New
299 Haven Harbor or the Quinnipiac and Mill Rivers.

300

301 - **George Street / Route 34.** Cross the Quinnipiac and Mill Rivers north of I-95
302 and follow Chapel Street west to U.S. Route 5 (State Street), then proceed south
303 and west on to George Street through New Haven to State Route 34, to State
304 Route 121 to Milford, and then local streets to East Devon.

305

306 - **U.S. Route 1.** Cross the Quinnipiac and Mill Rivers north of I-95 and follow
307 Chapel Street west to U.S. Route 5 (State Street), then turn south to U.S. Route 1
308 to Milford and then local streets to East Devon.

309

310 - **Sargent Drive / Route 162.** Cross the Quinnipiac and Mill Rivers north of I-95
311 and follow Chapel Street west to East Street, then south to Sargent Drive. Follow
312 Sargent Drive through New Haven to State Route 162 to Milford and then local
313 streets to East Devon.

314

315 Two variations could apply to any of the routes above. One variation would be to
316 follow Sargent Drive to Ella T. Grasso Boulevard, then follow it to one of the three
317 routes. The other variation would be to bore under New Haven Harbor to Sargent
318 Drive, and again use Ella T. Grasso Boulevard to connect to the three main routes.

319

320 **Combined Underground / Overhead Route.** Under this route, the transmission line
321 would include both an underground and an overhead component. The underground
322 portion of the route would follow George Street through New Haven to State Route
323 34 to the existing CL&P 115-kV ROW near Maltby Lakes on the West Haven /
324 Orange border. Adjacent to the CL&P ROW, a transition station with full switching
325 capabilities would have to be constructed on land owned by the South Central
326 Connecticut Regional Water Authority. From this transition station, an overhead
327 transmission line would extend south, within the existing CL&P ROW, through
328 portions of Orange and Milford to East Devon. The portion of the route south of the

329 transition station would be the same as the proposed route described in the
330 Application (i.e., within CL&P's existing 115-kV ROW).

331

332 **6. DISCUSSION OF ROUTING FEATURES AND CONSTRAINTS, BY ROUTE**

333

334 **6.1 Beseck To East Shore**

335 **6.1.1 387 Transmission Line Route**

336 Q. Where would this route be located?

337 A. This route would be aligned within CL&P's existing 345-kV 387 line ROW,
338 which traverses north to south from the proposed Beseck site (Wallingford), through East
339 Wallingford Junction, and crossing portions of Wallingford, North Haven, North Branford,
340 East Haven, and Branford to UI's Totoket Junction (Branford). At Totoket Junction, the 387
341 line ROW turns southwest, traversing Branford, East Haven, and New Haven to interconnect
342 to UI's existing East Shore Substation, which is located on the eastern side of New Haven
343 Harbor and south side of Interstate 95.

344 Q. What is the length of this route?

345 A. Approximately 19.5 miles

346 Q. Could the new 345-kV line be accommodated within the existing ROW?

347 A. Yes. The 387 line ROW is wide enough to accommodate a new 345-kV line
348 without ROW expansion. Between Beseck and East Wallingford Junction, the existing ROW
349 is 275 feet wide and is occupied only by the 387 line. The proposed route is aligned within
350 this portion of the 387 line ROW between Beseck and East Wallingford Junction, as would
351 the overhead route for the East Shore 387 Route. South of East Wallingford Junction, the
352 existing ROW is 320 feet wide and contains a 115-kV line in addition to the 345-kV 387 line.

353 Q. In addition to an all overhead route along this ROW, did the Companies also
354 consider an underground option between Beseck and East Wallingford Junction, as requested
355 by the Siting Council at the April hearings?

356 A. Yes. However, because of time constraints, our review was conducted
357 without the benefit of consultation with the affected municipalities. The Companies
358 identified and reviewed an underground route that would proceed west from Beseck along
359 Carpenter Lane and then south along Research Parkway and Barnes Road / Williams Road to
360 an intersection with the 387 line ROW (refer to Figure 2, links 3v, 65, 4b, 10a). From the
361 Williams Road intersection south to East Wallingford Junction, the 345-kV line would be
362 installed underground within the 387 line ROW.

363 In the vicinity of East Wallingford Junction, the existing 387 line ROW traverses the
364 Tradition Golf Course. In this area, the overhead route would involve relocating the existing
365 387 line to accommodate the new 345-kV line. The underground route would involve
366 burying the new line along the railroad tracks through the golf course to the point where the
367 387 line diverges from the railroad. A transition station with full switching capabilities
368 would have to be built at this point. This transition station would require the acquisition of 2-
369 8 acres of land. The site identified for such a potential transition station would be
370 approximately 1,500 feet south of Pond Hill Elementary School in Wallingford. The length
371 of underground from Beseck to this point would be approximately 6.8 miles.

372 From the new transition station south, the new 345-kV line would be overhead,
373 within the existing 387 line ROW. The distance from the transition site to East Shore is
374 approximately 12.7 miles through hilly terrain. Along this segment, the route would traverse

375 portions of six municipalities: Wallingford, North Haven, North Branford, Branford, East
376 Haven, and New Haven.

377 Q. What types of land uses are located adjacent to this ROW?

378 A. Between East Wallingford and Totoket junctions, the route would traverse
379 hilly and rolling terrain characterized by a mix of residential subdivisions, rural residential
380 areas, and agricultural and forested lands. From Totoket Junction, the route would traverse
381 south/southwest through extensive forested areas adjacent to the Lake Saltonstall watershed,
382 and would also span the southern portion of the lake, which forms the border between
383 Branford and East Haven. In East Haven, the route would traverse State Route 100 near two
384 schools (Robert Carbone Elementary and Joseph Melillo Middle School) and then would
385 cross near an industrial area north of I-95. The route would proceed west into New Haven
386 near an oil tank farm, cross a small park (Peat Meadow Park), and traverse an urban
387 residential area (including two abutting condominium complexes) before turning south across
388 I-95 and entering the industrial area near New Haven Harbor where UI's existing East Shore
389 Substation is located.

390 Q. Would vegetation on the existing 387 line ROW have to be cleared to
391 accommodate the new 345-kV facilities?

392 A. Yes. Because the existing ROW only accommodates one 345-kV line and one
393 115-kV line, additional vegetation clearing would be required. The Companies estimate that
394 approximately 150 acres of clearing would be necessary, including the removal of forest
395 vegetation along the portions of the ROW within the Lake Saltonstall Recreation/Watershed
396 Area.

397

398 **6.1.2 Airline Railroad Route**

399 Q. Please describe the general conditions along this railroad corridor.

400 A. The "Airline Railroad Route" would extend from Beseck to East Wallingford
401 Junction following the same alignments as described for the "387 Route", above (i.e., 387
402 line ROW overhead, or underground configuration within streets from Beseck to Williams
403 Street and then underground along the 387 line ROW). Approximately 1 mile south of East
404 Wallingford Junction (south of Pond Hill Road in Wallingford), the Airline Railroad Route
405 would diverge from the 387 line ROW to follow the railroad (see Links 66, 68, 10c in Figure
406 2 attached). The 345-kV line would be located overhead, adjacent to the railroad, and would
407 extend for approximately 11.5 miles overhead through portions of Wallingford, North Haven,
408 East Haven, and New Haven. Adding approximately 6.8 miles of overhead (or underground)
409 line from Beseck to East Wallingford Junction, the total length would be approximately 18.3
410 miles.

411 Just east of the Quinnipiac River, the route would diverge from the Airline Railroad
412 to follow an Amtrak rail line, which loops through New Haven and traverses east to
413 Branford. This alignment would avoid densely developed portions of New Haven, as well as
414 avoiding having to cross the Quinnipiac River and the Mill River to get to East Shore. The
415 line from East Shore to East Devon would also have to cross these rivers, or New Haven
416 Harbor.

417 The route would follow the Amtrak line east/southeast through East Haven and the
418 Annex neighborhood of New Haven before intersecting the 387 line ROW. From that
419 intersection, the route would traverse along the 387 line ROW southwest to East Shore. Like

420 the 387 line ROW route, the Airline Railroad Route would add a second 345-kV line through
421 Peat Meadow Park in New Haven.

422 Q. Would new easements have to be acquired to install the 345-kV along this rail
423 line?

424 A. Yes. Based on the need for a 120-foot-wide ROW for the installation of a
425 new 345-kV line, a total of 265 acres of land would have to be acquired.

426 Q. What types of transmission structures would be used along the rail line?

427 A. In order to follow this railroad corridor, the 345-kV design would have to be
428 vertical monopole construction with the arms facing and possibly overhanging the railroad
429 tracks. The typical design would be a 130-foot monopole. The edge of the pole would have
430 to be at least 12 feet from the nearest rail according to the NESC.

431 Q. What are the principal land uses adjacent to the railroad corridor?

432 A. In the towns of Wallingford and North Haven, the Airline Railroad Route
433 corridor passes through suburban and urban residential areas. In many of these areas,
434 residential developments closely border the rail line. In North Haven, the corridor is adjacent
435 to the State of Connecticut Area Cooperative Educational Services School (formerly the Mill
436 Road Elementary School), which is currently undergoing extensive renovation and
437 expansion. Some undeveloped areas (e.g., open fields, agricultural and forested areas) are
438 located along the northern portion of the route in the town of Wallingford. In addition, the
439 route traverses extensive tidal wetland and floodplain areas along the Quinnipiac River, as
440 well as industrial and commercial areas in North Haven, New Haven, and East Haven.

441 Q. Can you estimate whether homes or other structures would have to be
442 removed to accommodate the new 345-kV line adjacent to the railroad?

443 A. We estimate that nine homes and six commercial or industrial buildings would
444 have to be acquired and removed.

445 Q. In your opinion, would it be reasonable to install the 345-kV line along the
446 Airline Railroad Route?

447 A. No. This route would require the acquisition of numerous homes and
448 commercial structures and have significant social and environmental impacts.

449 **6.1.3 Amtrak Railroad Route**

450 Q. Please describe why the Companies reviewed the Amtrak corridor as a route
451 for the 345-kV line.

452 A. The Companies initially reviewed this and other railroad corridors as part of
453 the Project's overall alternatives evaluation process. During this process, the Amtrak rail
454 corridor was reviewed and dismissed from consideration. However, at the April hearings, the
455 Siting Council requested that the Companies review whether the 345-kV transmission line
456 could be aligned along the Amtrak rail corridor that traverses southwest to northeast through
457 New Haven County, generally in the vicinity of U.S. Route 5.

458 Q. Please describe the route that the Companies reviewed.

459 A. The Companies reviewed the use of the Amtrak corridor between Beseck and
460 East Shore. Similar to the Airline Railroad Route, both overhead and underground options
461 were considered for the transmission line from Beseck to the Amtrak corridor. The Amtrak
462 Railroad Route traverses Wallingford, North Haven, Hamden, New Haven, and East Haven.

463 For the overhead line options, various existing transmission line ROWs in the vicinity
464 were considered. As an example, CL&P has a transmission line ROW from Carpenter Lane
465 Junction that runs west (link 5), as well as the proposed route (link 8), that crosses the

466 Amtrak Railroad. UI has an existing transmission corridor that shares the Amtrak rail
467 corridor from near Wallingford Junction south to East Shore.

468 To reach the Amtrak corridor from Beseck, it was determined that the route proposed
469 in the Application along CL&P's existing transmission ROWs had far fewer impacts (i.e.,
470 387 line ROW to East Wallingford Junction and then west along the 1630 / 1655 115-kV
471 ROW). At the intersection with the Amtrak corridor, the route would diverge south from this
472 transmission ROW to follow the railroad.

473 Q. Why couldn't the transmission line follow the Amtrak corridor farther north,
474 closer to Beseck?

475 A. North of the East Wallingford Junction / Wallingford Junction area, the
476 Amtrak line traverses central Wallingford. Approximately 71 businesses, including the train
477 station, are within the 120-foot ROW that would be required for a new 345-kV line along the
478 railroad. Even the use of a compressed 80-foot ROW would affect 50 businesses and the
479 train station. As a result, such an alignment was determined to be unacceptable.

480 Q. Did the Companies investigate an underground option as part of this railroad
481 route?

482 A. Yes. The underground route would be to follow Carpenter Lane Road (link
483 3v) to Route 68 (link 5ua) west to Route 5, then south within Route 5 (link 69) to a transition
484 station (with full switching capability) site south of Toelles Road near the Wallingford/North
485 Haven border. From the transition station, the line would be constructed overhead to East
486 Shore. The last part of the route would be the same as described for the Airline Railroad
487 Route, above.

488 Q. Are there any constraints to the location of the 345-kV line adjacent to the
489 Amtrak corridor?

490 A. Yes. Existing UI 115-kV lines are located along the Amtrak corridor. The
491 lines are predominantly double-circuit, although a portion of the overhead construction is
492 single circuit. The 345-kV and the 115-kV lines cannot both fit in the corridor along the
493 railroad tracks due to clearance requirements. Consequently, the 115-kV lines would have to
494 be removed and placed underground. The 115-kV lines cannot be removed from service
495 because they are the source for three UI substations. The most logical underground route for
496 the 115-kV lines is within U.S. Route 5, which would enable them to connect to the existing
497 substations along the railroad corridor. This underground route would be approximately 11.5
498 miles long, mostly double circuit.

499 The Amtrak railroad corridor is adjacent to the Quinnipiac River floodplain for most
500 of its length. The majority of the corridor is bordered by businesses on one side and wetlands
501 on the other, including the Quinnipiac River Marsh Wildlife Area.

502 Further, following the Amtrak corridor would result in 6 residences and 50 businesses
503 falling within the required ROW.

504 Q. In light of the construction constraints and environmental and social impacts
505 described above, do you believe it would be reasonable to install the 345-kV line along the
506 Amtrak Railroad Route?

507 A. No.

508 **6.2 Marine Routes**

509 Q. Why did the Companies examine marine routes between East Shore and East
510 Devon?

511 A. The Companies recognize that a submarine transmission line between New
512 Haven and Milford would not be consistent with various Federal and State regulations (such
513 as the Federal Clean Water Act and the Coastal Zone Management Act) and would not be
514 permitted, given the State's extension of the moratorium on utility project crossings of Long
515 Island Sound. However, in the interest of preparing a complete Application, the Companies
516 initially reviewed potential marine routes between New Haven and East Devon, as well as
517 between Bridgeport and Norwalk (refer to the Application, Volume 1, Section H.3.4 and the
518 Route Analysis Maps at the end of Volume 1).

519 At the April 2004 Siting Council hearings, members of the Council requested an
520 analysis of whether a submarine transmission cable could be constructed within the Federal
521 Navigation Channels within New Haven Harbor and the Housatonic River, thereby avoiding
522 significant impacts to shellfish resources. In accordance with this request, the Companies
523 commissioned ESS, the firm that conducted environmental analyses for the Cross Sound
524 Cable Project and performed a marine routing feasibility study of a Bridgeport to Norwalk
525 route for this Project, to complete similar analyses for an East Shore to East Devon submarine
526 route.

527 Q. What are the results of the ESS marine routing analysis?

528 A. The ESS study demonstrates that there all submarine alignments between East
529 Shore and East Devon that would result in significant environmental impacts, compared to
530 any of the upland alternatives available for the transmission line between New Haven and
531 Milford. In particular, a marine route would be 21 to 25 miles long (depending on whether
532 the route paralleled the Iroquois pipeline or was aligned within the Housatonic River) and
533 would result in impacts to between 2.6 and 5 miles of shellfish lease areas that could not be

534 avoided. It is unlikely the submarine cable for the Project could be co-located with the Cross
535 Sound DC Cable in the Federal Navigation Channel in New Haven Harbor due to the lack of
536 space. Any alignment outside of the channel would result in impacts to shellfish lease areas
537 that were not affected by the Cross Sound Cable installation.

538 Although a Federal Navigation Channel is located within the Housatonic River, the
539 entire river is an important natural seed bed for oysters. According to the Connecticut
540 Department of Agriculture, Bureau of Aquaculture, installing the cable within the river
541 would cause sedimentation that would cause potentially significant impacts to these seed
542 beds, not only in the river itself, but also in the State's largest natural shellfish seed bed, a
543 3,000-acre area located immediately adjacent to and west of the mouth of the Housatonic
544 River. Further, as a result of historical industrial uses and other discharges, sediment quality
545 in both New Haven Harbor and in the Housatonic River could pose concern with respect to
546 the installation of the submarine 345-kV cables.

547 Any potential marine alternative between New Haven and East Devon would result in
548 potential significant impacts to shellfish resources, as well as to a variety of other coastal
549 environmental resources and uses (e.g., water quality, marine fisheries, wildlife management
550 areas, boating and other recreational uses of the coastal zone). The Project is not "water
551 dependent" (i.e., does not inherently require linear alignment within Long Island Sound) and
552 thus, given the substantial potential environmental impacts and additional costs, no marine
553 route between New Haven and East Devon can be justified.

554 **6.3 East Shore to East Devon Underground Routes**

555 Q. How did the Companies identify routes between East Shore and East Devon?

556 A. Given the highly urbanized New Haven central business district and
557 metropolitan area, the Companies determined that an underground transmission configuration
558 was the only option for routes immediately to the west of East Shore. The Companies then
559 identified three routes that would be representative of the different types of understreet
560 alignments that would be typical of this area. As with the underground route between Beseck
561 and East Wallingford Junction, this review had to be conducted without the benefit of input
562 from the affected municipalities.

563 Q. Would all of the New Haven to East Devon routes have to cross New Haven
564 Harbor?

565 A. Yes. Either the cables would have to be installed beneath the harbor between
566 East Shore and the Long Wharf / Sargent Drive area, or the cables would have to cross the
567 Quinnipiac and Mill Rivers, north of I-95, in an area that is also considered part of the
568 harbor.

569 Q. Please describe each of the underground routes that were reviewed.

570 A. The three underground routes are described as follows.

571 **6.3.1 State Route 34**

572 Beginning at East Shore, the route would run north within Waterfront Street, under
573 the Quinnipiac River to Criscuolo Park, then west under the Mill River on the south side of
574 Chapel Street. Through downtown New Haven (links 53, 55), the route would have to pass
575 under I-91 and then the Metro-North / Amtrak Railroad corridor to U.S. Route 5. The route
576 would then turn south within U.S. Route 5 for two blocks to George Street, and go west on
577 this street to State Route 34 (Derby Turnpike) (links 57, 58). The route would go under the

578 Temple Medical Center, and past the YMCA/YWCA complex, Yale New Haven Hospital,
579 and the St. Raphael Hospital before the land use changes to residential.

580 As the route passes Ella T. Grasso Boulevard, it would cross through Edgewood Park,
581 between the Yale Bowl and Yale University baseball fields, and would traverse north of the
582 St. Lawrence Cemetery. The route would continue west along State Route 34, through the
583 South Central Connecticut Regional Water Authority property surrounding Maltby Lakes,
584 and would intersect with CL&P's existing 115-kV transmission corridor near the West
585 Haven / Orange town boundary.

586 The route then would continue west on State Route 34 to Route 152 (Orange Center
587 Road) on link 18. (See Figure 3 attached.) The route continues south along Route 152 then
588 turns on to Route 121 South (Grassy Hill Road/North Street). The area adjacent to link 18 is
589 mostly residential. As the route follows Route 121 south it again would cross the existing
590 transmission corridor before reaching U.S. Route 1. The route would then turn west on to
591 U.S. Route 1, and would follow it to Plains Road and the East Devon site (links 19, 20a, and
592 20b). This route would be approximately 16 miles long, the longest of the all underground
593 routes to East Devon.

594 **6.3.2 U.S. Route 1**

595 An alignment along U.S. Route 1 in New Haven County was illustrated on the Route
596 Analysis Maps included in the Siting Council Application. Commencing at East Shore, this
597 route would involve the same options for crossing New Haven Harbor as described for the
598 alignment along Route 34, above. However, this option would follow U.S. Route 5 south to
599 U.S. Route 1. The route would be within U.S. Route 1 southwest, through New Haven, West

600 Haven, Orange, and Milford, to the East Devon site (*see* Figure 3 attached, links 56, 13a,
601 13b, 16, 20a, and 20b).

602 This route would be aligned within road ROWs past the Clemente Middle School, St.
603 Bernard Cemetery, and the University of New Haven. The predominant land uses along this
604 portion of the route in Orange and Milford are commercial. During the municipal
605 consultation with the City of New Haven, city representatives cautioned the Companies
606 about the presence of ledge in and around Route 1 as it travels through West Haven. The
607 Companies therefore expect that this route would require blasting in the University of New
608 Haven area.

609 At approximately 13.8 miles, this is the shortest of the all underground route options
610 between East Shore and East Devon. If it were possible to bore under the harbor (link 70),
611 the route would be shortened to 12.7 miles, but this would require a 6,000-foot bore under
612 the harbor.

613 **6.3.3 State Route 162**

614 This underground route would start at East Shore like the other two alternatives. This
615 route was based on crossing New Haven Harbor next to the I-95 bridge. Since this crossing
616 location is congested on both sides with petroleum storage facilities and pipelines, the route
617 would have to be aligned to the north as described before on link 53. The route would then
618 run south within East Street to Sargent Drive. The new line would need to be on the west
619 side of I-95 along the harbor because UI has an underground 115-kV line on the east side of
620 the I-95 (link 60a). The UI line switches to Sargent Drive where Long Wharf Drive ends. At
621 this point, link 60b, both lines would be within Sargent Drive.

622 The route would then follow Elm Street to State Route 162 through West Haven and
623 Milford to Plains Road and then to the East Devon site. In order to reach Elm Street, the line
624 would run through Kimberly Field Park and cross under the mouth of the West River.

625 This route is relatively close to Long Island Sound. For example, Route 162 crosses
626 the Oyster River at Oyster River Beach. Along this route, the land use in West Haven and in
627 the eastern part of Milford is mostly residential, with some mixed commercial/residential.

628 The land use in central Milford, west of the Indian River, is primarily commercial and
629 industrial, although the route would pass Fowler Field before crossing the Wepawaug River.
630 This route would be approximately 14.7 miles long.

631 **6.4 East Shore to East Devon Combined Underground/Overhead Route**

632 Q. Please describe the combined underground / overhead route from East Shore
633 to East Devon.

634 A. This option from East Shore to East Devon would be an underground line
635 through New Haven to the existing 115-kV CL&P transmission ROW at the West Haven /
636 Orange town boundary (near State Route 34), and then overhead along that corridor to East
637 Devon. The eastern portion of this route would be the same as the eastern portion of the
638 Route 34 option, up to the intersection with the existing CL&P ROW (links 13e, 53, 55, 57,
639 58).

640 A transition station with switching capability would have to be built at the point
641 where the underground and overhead lines would connect. For this route, the transition
642 station would be located on the south side of Route 34, on SCRWA property. Because the
643 transition station would have to include switching capability, it would require 2-8 acres of

644 land. The length of underground line would be approximately 5.8 miles, plus 8.2 miles of
645 overhead construction, for a total length of 14.0 miles.

646 The notable features and facilities along the underground route through New Haven
647 are the same as for the Route 34 option; Criscuolo Park, the hospitals, and the YMCA. The
648 overhead portion of this route is identical to the proposed route described in the Application
649 as it passes through Orange and Milford before terminating at East Devon.

650 7. **COST**

651 Based on the preliminary cost analysis done to date, the Companies anticipate that
652 any of the potential East Shore Routes will exceed the cost of the Beseck-East Devon section
653 of the proposed route by \$125-350 million. The significantly higher costs of the East Shore
654 Routes result from additional underground construction and the required terminating,
655 switching, and transition facilities.

656 8. **CONCLUSION**

657 Q. Based on your review, would the alignment of the 345-kV transmission line
658 along any of the East Shore Routes result in any benefits, compared to the proposed route?

659 A. No. Any of the East Shore Routes would require the construction of, at a
660 minimum, one new substation/switching station (i.e., East Shore) and the subsurface crossing
661 of at least one additional major waterway (i.e., the Quinnipiac / Mill River confluence or
662 New Haven Harbor). The new substation/switching station facility at East Shore (as well as
663 any other required terminating, switching and transition facilities) and the additional
664 subsurface water crossings would significantly increase the cost of the project.

665 Of the routes reviewed, alignment of the transmission line along either the Amtrak or
666 Airline railroads would not be practical, due to the substantial social and environmental

667 impacts that would result (e.g., need to acquire ROW, take homes and businesses to
668 accommodate the transmission line ROW, placement of the line through tidal wetlands along
669 the Quinnipiac River). Likewise, marine routes for the Project are not viable due to
670 potentially significant adverse effects on marine life and coastal resources that could be
671 avoided by the use of upland routes.

672 The 345-kV line could be constructed along the existing 387 line ROW between
673 Beseck and East Shore. However, such an alignment would abut at least one school, traverse
674 various residential areas, and would require substantial clearing of forested vegetation within
675 the ROW, including woodlands in the Lake Saltonstall Recreation/Watershed Area.

676 In comparison to the proposed route, each of the potential East Shore Routes are
677 significantly more expensive and have environmental and/or social impacts comparable to or
678 greater than those of the proposed route, and require large amounts of underground
679 construction between East Shore and East Devon.

680 Q. Do the Companies consider any of the potential East Shore Routes to be
681 “environmentally, technically and economically practical”, so as to merit consideration by
682 the Council as an alternative route? (*See Conn. Gen. Stat. § 16-501(D)*)

683 A. No.

684 Q. Why not?

685 A. As will be discussed at the next set of hearings, the additional undergrounding
686 required by the potential East Shore Routes has reliability and operability disadvantages that
687 make them technically impractical. With regard to environmental effects, the Companies
688 would need to perform, gather, and evaluate more environmental data before they could
689 determine if the East Shore Route is “environmentally practical”; however, the analysis the

690 Companies have done to date makes it clear that none of the East Shore Routes offer any
691 measurable advantage over the proposed route between Beseck and East Devon in terms of
692 environmental and social impacts and, typically, have greater impacts. Finally, the East
693 Shore Route is not "economically practical" because it is significantly more expensive than
694 the proposed route yet provides no substantial benefits in terms of mitigation of impacts.

695 Q. Does this conclude your testimony?

696 A. Yes.