

**STATE OF VERMONT
BEFORE THE PUBLIC SERVICE BOARD**

**Tariff filing of Citizens Communications)
Company, d/b/a Citizens Energy Services,)
requesting a rate increase in the amount of)
40.02%, to take effect December 15, 2001)**

Docket No. 6596

**REBUTTAL TESTIMONY OF
PAUL CHERNICK
ON BEHALF OF
THE VERMONT DEPARTMENT OF PUBLIC SERVICE**

Resource Insight, Inc.

MAY 10, 2002

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Exhibit DPS-PLC-R1	<i>Deposition of Hugh Gates in Docket No. 6332</i>
Exhibit DPS-PLC-R2	<i>Hieber Adjustment to Rate-Year Costs, with Corrections</i>
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1 **I. Introduction**

2 **Q: State your name, occupation and business address.**

3 A: I am Paul L. Chernick. I am the president of Resource Insight, Inc., 347
4 Broadway, Cambridge, Massachusetts 02139.

5 **Q: Are you the same Paul Chernick who filed direct testimony in this case?**

6 A: Yes.

7 **Q: What subjects do you cover in this rebuttal testimony?**

8 A: I respond to the following topics:

- 9 • Mr. Hieber's assertions regarding CUC's planning and the inevitability of
10 the HQ-VJO purchase.
- 11 • The regulatory implications of CUC's failure to monitor the markets and
12 seek out alternatives to the HQ-VJO contract (as raised by Messrs. Hieber
13 and McNeil).
- 14 • The Company's claim (in the testimonies of Messrs. Hieber, Higgins and
15 Lesser) that the HQ-VJO purchase has environmental benefits, or should be
16 treated as having environmental benefits.
- 17 • The role of participants in VJO decision-making.
- 18 • Mr. Hieber's analysis of the cost of the HQ-VJO purchase and market
19 alternatives for the rate year.
- 20 • Mr. Higgins's economic analyses of the HQ-VJO purchase from the
21 perspective of 1991.

22 **Q: Has the Company's rebuttal materially changed any of the conclusions**
23 **from your direct testimony?**

1 A: No.

2 **II. The Company's Failures in 1991**

3 **A. The Company's Planning in 1991**

4 **Q: How does Mr. Hieber describe the Company's monitoring of markets and**
5 **analysis of alternatives to the HQ-VJO contract?**

6 A: Mr. Hieber's rebuttal testimony attempts to depict Citizens as very active in
7 pursuing alternatives to the HQ-VJO contract. However, even as Mr. Hieber
8 describes them, these activities appear to have been very limited and to have
9 ended in January 1991, with Mr. Hieber's departure from the Company.

10 **Q: Does Mr. Hieber offer any new rationale for the Company's failure to seek**
11 **alternatives?**

12 A: Yes. Mr. Hieber says, "I do not believe that Citizens was a party to that action
13 [Docket No. 5330-E] and thus it should not be bound by any directives contained
14 therein" (Hieber Rebuttal at 8). Citizens is listed in service list for Docket No.
15 5330-E, so it is not clear why Mr. Hieber believes that it was not a party. Nor
16 do I understand how Mr. Hieber can argue that Citizens was free to ignore the
17 Board's warning that "prudent utility managers must actively seek out other
18 options and consider negotiations with potential alternative sources of efficiency
19 and supply within the next few months" (Order of 4/30/91 at 18).

20 **Q: What alternative does Mr. Heiber say he developed, in case the HQ-VJO**
21 **contract were to be terminated?**

1 A: Mr. Heiber testifies that his “best alternative action plan was to run up to HQ to
2 obtain a similar contract to the HQ Contract” (Heiber Rebuttal at 2). This does
3 not seem to be the well-developed alternative that the Board sought.

4 **Q: Mr. Heiber asserts that you “agreed that [running up to HQ to obtain a
5 similar contract to the HQ Contract] would have been the Company’s
6 likely course of action” (Heiber Rebuttal at 2). Is that correct?**

7 A: No. I agreed that Citizens “probably would have negotiated an alternative
8 arrangement with Hydro Quebec.” Unlike Mr. Heiber, I did not testify that
9 Citizen should have limited its power procurement efforts to “running up to
10 HQ,” or accepting a contract similar to the uneconomic HQ-VJO contract. I
11 believe that Hydro Québec would have negotiated a contract with Citizens that
12 was competitive with alternatives available from US utilities.

13 If Citizens could do no better with Hydro Québec than a copy of the HQ-
14 VJO contract, even after Hydro Québec lost its major planned long-term power
15 sales (to Vermont and New York), Citizens should have obtained US resources
16 until Hydro Québec decided to reenter the market seriously and competitively.

17 ***B. Regulatory Implications of the Company’s Failures***

18 **Q: Do the witnesses for Citizens accept the Company’s responsibility to
19 monitor markets and develop alternatives to the HQ-VJO contract?**

20 A: No. To the contrary, the Company’s witnesses invoke the results of the
21 Company’s imprudence as part of their defense.

22 For example, Mr. Heiber complains that the resources described in my
23 testimony are “ill-defined examples of potential resources,” that I made “no
24 effort to establish that these loosely described alternate resources fit the needs

1 of VED,” and that I “simply speculate[d] about possible alternate resources
2 available to the VED” (Hieber Rebuttal at 12). He also claims (at) that the
3 alternatives I discussed were “arbitrarily identified.” Mr. Hieber’s complaint
4 amounts to little more than the observation that I was not reporting the results
5 of the Company’s actual efforts to solicit proposals in 1991. I could not report
6 those results, because there weren’t any; the Company failed to investigate
7 alternatives to the HQ-VJO contract.

8 Similarly, Mr. McNeil asserts that at the time of the premature lock-in
9 decision in August 1991, “there was no hard evidence that the Contract was
10 going to be uneconomic” (McNeil Rebuttal at 5). There was no such evidence
11 because Citizens (like Central Vermont and Green Mountain Power) failed to
12 look for it.

13 **Q: How should gaps in the evidence resulting from the Company’s imprudence**
14 **be treated in this proceeding?**

15 A: The Company should be held accountable for its imprudence, including its
16 failure to monitor markets, accumulate information on resource alternatives, and
17 compare the HQ-VJO contract to those alternatives. The Board should not allow
18 Citizens to hide behind uncertainties created by its own imprudence.

19 **C. *The Role of Participants in Making Decisions About the Contract***

20 **Q: What is the Company’s position regarding its ability to affect decisions**
21 **regarding the HQ-VJO contract?**

22 A: A number of Citizens witnesses question whether the Company had any
23 influence over the lock-in decision, or any other decisions regarding the HQ-VJO
24 contract.

1 **Q: How did this issue arise in this case?**

2 A: In my direct testimony, I remarked in passing that I believed that Central
3 Vermont and Green Mountain Power, who represented the bulk of the voting
4 power of the VJO and the Participants, would have been reluctant to lock in had
5 Citizens pointed out that less expensive alternatives were available. While
6 Citizens has treated this as an important question, it is my understanding that,
7 if Citizens did not have control over its resource decisions, it would be liable for
8 the imprudence of its agents Central Vermont and Green Mountain Power. The
9 Board has already found those utilities to be imprudent regarding the lock-in in
10 Dockets Nos. 5983, 6107, and 6120 and 6460.

11 **Q: Do you still believe that Central Vermont and Green Mountain Power**
12 **would have responded to well-supported and timely concerns from**
13 **Citizens?**

14 A: Yes. It is clear from the fact that they held the August 28 phone call, and a
15 follow-up vote to ratify the lock-in, that the larger Joint Owners wanted the
16 support of the participants.

17 **Q: Does the Company's rebuttal argument that it was a Participant, rather**
18 **than a Joint Owner, change any of your conclusions?**

19 A: No. In addition to the points I raised in my direct, in my cross-examination,
20 and in the preceding questions, it should not be forgotten that Franklin was a Joint
21 Owner and that Citizens, by virtue of its merger with Franklin, is now a Joint
22 Owner. Franklin's expectations and actions with respect to the lock-in and other
23 issues in this case are described by Hugh Gates in Exhibit DPS-PLC-R1.

1 **III. Environmental Effects of the Hydro-Québec Purchase**

2 **Q: Which Citizens witnesses assert that the HQ-VJO purchase has environ-**
3 **mental benefits?**

4 A: This claim is discussed in the rebuttal testimonies of Messrs. Hieber, Higgins,
5 and Lesser. In some cases, the witnesses may be arguing that the purchase
6 should be treated as having environmental benefits, even if it has none.

7 Mr. Hieber (at 8) calls for counting the societal effects, including environ-
8 mental effects, of “domestic resources as the energy from such sources was
9 produced from oil, natural gas, or (as thought in 1987/88) coal fired units similar
10 to the generic unit that New York was using to establish its avoided costs.”

11 Mr. Higgins (at 12) applies “externality adders to each option or portfolio
12 based on the externality adders for various fuels/resources included in Appendix
13 4-4 of the Vermont DPS Statewide Energy Efficiency Plan, The Power to Save
14 ...filed May 23, 1997.” He also mentions (at 13) the “Board’s own finding in
15 Docket No. 5330 that air emissions from Hydro Quebec were 4 to 40 times less
16 than alternative resources.”

17 Mr. Lesser (at 45) similarly advocates the use of externality values similar
18 to those of Power to Save, and refers to the Board’s order in Docket No. 5330
19 as justification for assuming that “there were substantial environmental benefits
20 to the HQ contract.”

21 **Q: Are these arguments equally valid for selecting resources in the early 1990s,**
22 **and for estimating the current costs of the Company’s imprudence and**
23 **above-market costs for the used-and-useful test?**

24 A: No. A utility in 1991 might have been led by the order in Docket No. 5330 to
25 believe that the HQ-VJO contract had “substantial environmental benefits,” at

1 least until it reviewed the order carefully. Thus a utility might have been reason-
2 able in giving a small credit to the contract in a 1991 analysis that might be
3 relevant in determining whether its decision to support the lock-in was prudent.
4 Since Citizens did not compare the HQ-VJO purchase to alternatives in 1991, this
5 point is not directly applicable in the current proceeding.

6 The situation is very different when attention shifts from the decisions
7 made in 1991 to the consequences of those decisions today. The order in Docket
8 No. 5330 accepted a large number of assumptions, many of which have turned
9 out to be incorrect after the fact. It is no more appropriate to rely on the
10 environmental conclusions of Docket No. 5330 today than it would be to use the
11 fuel-price forecasts accepted in that docket.

12 In terms of relying on current estimates of environmental values, the
13 situation is reversed. Citizens and other utilities were not using the Power to
14 Save externalities in the early 1990s, and arguments that Citizens would have
15 used those values are simply not plausible. Citizens could use those values
16 today, if it believes them; I have seen no evidence outside this case that suggests
17 that Citizens uses externality values greater than those required by Board order.

18 **A. The Board's Order in Docket No. 5330**

19 **Q: Have the Citizens witnesses properly characterized the environmental**
20 **aspects of the Board's decision in Docket No. 5330?**

21 **A:** No. The Board's conclusions on the environmental effect of the HQ-VJO contract
22 are complex, and are spread through a long and involved decision. In its Order
23 of October 12, 1990, the Board made the following statements:

- 1 • “[T]his Contract is, compared to other available choices, an environmentally
2 attractive supply source for Vermont.” This statement appears to be based on the
3 conclusion that “large-scale hydroelectric facilities can have significant,
4 negative environmental effects, but we believe that these effects, properly
5 controlled and mitigated, are *less* damaging than the alternative supply sources”
6 (Order at 29, original emphasis).
- 7 • “The power supplied under the Contract will be supplied overwhelmingly by
8 hydroelectric facilities, which over their useful lives, produce far less pollution
9 than all the available supply alternatives (with respect to air pollution and
10 critical greenhouse gases, 4 to 40 times *less* pollution than the alternatives.)
11 While hydroelectric facilities do have significant environmental impacts,
12 reliance on this renewable source of energy will displace power that would,
13 almost certainly, come from fossil-fired or nuclear-power units, which impose
14 environmental risks and harms of regional and global concern” (Order at 9,
15 original emphasis).¹
- 16 • “[W]e do not accept the argument that approval of this contract should ‘cause’
17 the construction of major new facilities on the Hydro-Québec system” (Order
18 at 28). The Board found that the combination of the 323 MW of expiring sales
19 from Hydro Québec to Vermont, 3,500 MW of planned generation additions
20 (including 2,510 under construction), and 4,000 MW of planned efficiency
21 programs would meet the HQ-VJO sale without new construction. (The Board
22 elaborates on some of these issues in the Order at 171–177.)

¹This finding appears to be based on a table in finding 257 (Order at 183), comparing the carbon emitted from flooding new reservoirs to the emissions from coal, oil, and gas plants.

- 1 • In the event of cancellation, “it is reasonable to expect that Hydro Québec will
2 attempt to sell the power elsewhere so that its projected export sales targets will
3 be met and its construction schedule will not be delayed.... [I]t is also probable
4 that over the longer term, even if the contract is rejected, Hydro Québec will
5 continue to develop surplus hydroelectric capacity for sale to other utilities that
6 could also be used to replace fossil fuel fired generation with similar air quality
7 benefits.” (Order at 167–168, note 45).
- 8 • Of the three environmental scenarios that the DPS developed, the Board rejected
9 the one in which one-third of the power freed up by cancellation would displace
10 coal generation in Ontario, because of Mr. Winter’s testimony that Ontario’s
11 dispatch of its coal plants would not be affected by purchases from Hydro
12 Québec (Order at 167).² This was the only DPS scenario in which 100% of the
13 HQ-VJO energy was resold.
- 14 • If none of the HQ-VJO energy would be resold after a cancellation, the
15 environmental benefits of the purchase were greater than if $\frac{2}{3}$ of the energy were
16 resold (Order at 167, finding 212). The Board did not express an opinion about
17 the amount of power that would be resold in the short term, but indicated that
18 all of it would be resold in the longer term (Order at 167–68, note 45).

²Mr. Winter actually testified that purchases from Hydro Québec might cause Ontario Hydro to reduce its coal-fired generation, and hence its carbon emissions, but not its production of acid gases (SO₂ and NO_x), since HQ purchases would allow Ontario Hydro to defer retrofits or burn higher-sulfur coal. Alternatively, he testified, Ontario Hydro might reduce generation at its oil-fired units, or increase sales to other utilities, either of which would have effects similar to direct Hydro Québec sales into the Northeast US.

- 1 • The Department’s scenarios in which less than 100% of the HQ-VJO power is
2 resold assume that incremental hydroelectric development is delayed by the
3 cancellation (Order at 186–187, note 49).

4 **Q: What is the net result of these findings by the Board in Docket No. 5330?**

5 A: On the one hand, the Board finds that the contract is “environmentally
6 attractive” because large hydro is “less damaging than the alternative.” On the
7 other hand, the Board finds that Hydro Québec’s construction of large hydro is
8 likely to be the same, with or without the contract. At least in the long term, the
9 Board finds that Hydro Québec’s off-system sales and resulting environmental
10 effects would be the same with or without the contract. In the short term, the
11 Board suggests that Hydro Québec might sell less energy off-system were the
12 contract cancelled, but also suggests that the reduction in sales would only result
13 from a delay in Hydro Québec’s hydro construction schedule, which the Board
14 does not believe will occur. Similarly, the statement that *hydroelectric facilities*
15 produce less air pollution than fossil generation does is not relevant to the
16 *contract’s* effect on emissions, if the hydro facilities are not avoidable by
17 rejecting the contract.

18 In short, the Order in Docket No. 5330 suggested that the environmental
19 benefits of HQ-VJO contract are limited to the extent to which Hydro Québec
20 would choose not to resell the energy if the contract were cancelled, and that
21 whatever effects occurred would be limited to the short term. The Board found
22 the environmental effects of the purchase to be smaller than the environmental
23 effects of alternatives. However, reading the order as a whole leads to the
24 conclusion that the differences must be rather small. Indeed, the Board may

1 simply have meant that the dams (as opposed to the HQ-VJO Contract) produce
2 little air pollution.

3 **B. Emissions Effects of the Hydro-Québec Contract and Alternatives**

4 **Q: What considerations determine the environmental effects of a power-supply**
5 **resource?**

6 A: The relevant question is how the construction and dispatch of power plants
7 would change as a result of a utility acquiring one resource or another. The
8 private cost of a power-supply resource may be indexed to the costs of a nuclear
9 plant, an oil plant, or Danish cheese futures. The emissions will be determined
10 by what additional generation the seller or some other party builds and operates
11 as a result of the transaction, not by the form of the contract.

12 **Q: What were the emission effects of the HQ-VJO contract?**

13 A: The environmental effects of the HQ-VJO contract depend on what would have
14 happened to the energy had the Vermont utilities canceled the contract. Hydro
15 Québec might have

- 16 • canceled construction of the dams that would have provided the contract
17 energy.
- 18 • built the same dams, and spilled water, unable to sell the power.
- 19 • stored some more water behind its dams.
- 20 • deferred some NUG units from which it planned to purchase.
- 21 • sold the power to New England or other utilities in the Northeast in short-,
22 mid-, and long-term contracts.

23 The Board rejected the first possibility (dam cancellation), at least with
24 regard to the minimum 340-MW purchase, which would be supplied by dams

1 that would have been built anyway, on essentially the same schedule (Order in
2 5330 at 175–177).³

3 The second possibility (spillage) has always been unlikely. Hydro Québec
4 has a large amount of storage and has never appeared to be in any danger of not
5 finding a market for its power.

6 The third option, storing more water, might delay the resale of the power
7 until the water was released. That delay would be limited to a few years, and
8 would be offset by two sources of increased value. First, the storage would
9 increase rate at which new dams would fill, and hence accelerate their rise to
10 full production, and increase the head at existing plants, which would tend to
11 increase the energy output per unit of water through the turbines. Second, the
12 increased stored energy would tend to be used at times of drought in Québec,
13 when Hydro Québec would otherwise operate its high-pollution Tracey oil
14 plant—or in other shortage situations, when Northeastern utilities would run
15 their least-efficient and dirtiest plants. Consequently, if Hydro Québec chose to
16 store more water, the environmental benefits of freeing up that generation might
17 well be greater than if Hydro Québec chose to resell the power promptly.

³The Board appears to have been correct. The dams that HQ has added since the HQ-VJO lock-in were all under construction at the time of the lock-in. The largest hydro projects then planned (Great Whale and NBR) were subsequently canceled; HQ solicited bids from IPPs in 1991 and selected about 1,000 MW, mostly from new gas-fired plants. It is not clear to what extent this IPP solicitation was driven by the export market, and to what extent it was the result of a political or strategic decision to develop an IPP market in Quebec. It is possible that the HQ-VJO sale resulted in the addition of some new gas-fired generation in Quebec. Additional dams under construction or planned today are clearly competing with the Northeastern regional power market (from which HQ could otherwise purchase power, and into which it will sell any excess), and would have been equally likely to be constructed with or without the HQ-VJO contract.

1 The fourth possibility, deferral of some NUGs, would result in environ-
2 mental benefits equal to the avoided effects of those NUGs. Hydro Québec
3 issued an RFP in May 1991 and gradually signed up projects over the next year
4 or more. By February 1993 HQ had 3 MW of hydro NUGs in operation, 38 MW
5 of biomass NUGs in development, and 964 MW of gas-fired plants in the pre-
6 contract negotiation phase (*Robertson's Competitive Competition* 4(1)).⁴ Most
7 of the NUG capacity Hydro Québec was planning was very similar to the gas-
8 fired NUGs planned for the northeastern U.S. in the same period. Since they
9 would not have been subject to the U.S. Clean Air Act and the more-stringent
10 standards of New York and New England, the Québec units might well have
11 been dirtier than those in the U.S., especially in terms of NOx emissions.

12 The final and most likely effect of canceling the purchase would be that
13 Hydro Québec would sell more power off-system in economy sales and other
14 shorter-term arrangements, principally to New England, New York, and New
15 Brunswick.⁵ To the extent HQ-VJO purchase used energy that otherwise would
16 have been sold to some other buyers in New England or adjacent regions, the
17 HQ-VJO purchase must have required these other buyers to use more energy from
18 existing fossil generation to meet their loads. That energy would have come
19 from the regional marginal supplies.

⁴This total capacity of over 1,000 MW is higher than the 760 MW of NUG capacity included in the NERC's *Electricity Supply and Demand 1993-2002* (June 1993), which may indicate some attrition among the proposals, a change in HQ's plans, or HQ's allowance for future attrition.

⁵One of the effects of the HQ-VJO contract was that the Vermont utilities reduced their entitlement in the existing HQ-NEPOOL Phase II purchase. Some of the energy freed up by cancellation of the HQ-VJO contract would flow back through the Phase II contract.

1 **Q: What would be the environmental effects of purchases from New York or**
2 **New England utilities?**

3 A: Unless the contractual arrangement caused the seller to build a plant earlier, or
4 delay the retirement of generating capacity, the energy to serve the contract
5 would have come from the regional marginal supplies. Whether NU labeled a
6 sale as being from Seabrook, Merrimack, Montville, or system power, when
7 Citizens used that energy it would be supplied by NEPOOL turning up the
8 marginal unit in New England, or purchasing from the marginal unit in New
9 York, New Brunswick, or some other nearby power pool.

10 **Q: How do the environmental effects of the HQ-VJO purchase compare to the**
11 **effects of alternative purchases?**

12 A: In most cases, they would be identical. Whether Citizens purchased power from
13 Hydro Québec, a New York utility, or a New England utility, the dispatch of
14 power plants and the environmental effect would be essentially the same. The
15 flow of contract dollars within the region does not determine the dispatch of
16 power plants. Regardless of whether Citizens contracted for power from Hydro
17 Québec or from NU, for example, when NEPOOL dispatched power resources to
18 meet regional needs, it would dispatch essentially the same mix of NU power
19 plants, other New England power plants, imports from Hydro Québec, and other
20 imports. The environmental effect of the HQ-VJO purchase would thus be similar
21 to the externalities from purchases within New England.⁶

⁶If the power would otherwise have been sold to New York, it would have resulted in reduced usage of gas-, oil-, and coal-fired generation in New York, and probably would have reduced imports of coal-fired power from PJM and Ontario Hydro. Some of the New York generation freed up by that hypothetical purchase would have been sold to New England, but imperfections in coordination of dispatch between NYPP and NEPOOL might have limited the amount of increased

1 **Q: Could Citizens have acquired any supply resource in 1991–92 that would**
2 **have provided environmental benefits, compared to purchases from**
3 **Québec, New York, or NEPOOL utilities?**

4 A: Yes. If the Company actually caused a clean new generator (e.g., a new
5 renewable or gas combined-cycle plant) to be built before it was otherwise
6 needed or economical, that power would be cleaner than the regional supply.
7 Those actions are generally expensive, but would be justified at sufficiently
8 large externalities. Citizens has not suggested that it would have pursued any
9 such green but expensive option.

10 **IV. The Excess Cost of the Hydro-Québec Purchase in the Rate Year**

11 **Q: Which Citizens witnesses compare the cost of the HQ-VJO contract to**
12 **alternatives in the rate year?**

13 A: Mr. Higgins touches on this subject in his analysis of whether the contract is
14 economically used and useful. The more complex comparison is provided by
15 Mr. Hieber, who presents a series of adjustments three times: discussing the
16 concepts (at 4–5), the potential benefits or costs (at 6–9), and specific estimates
17 of the adjustments (at 10–11).

18 **Q: What is the effect of Mr. Hieber’s adjustment?**

19 A: Mr. Hieber starts with an HQ-VJO price of \$63.5/MWh and adjusts it down to
20 \$55/MWh. He takes my \$45/MWh price for market purchases and adjusts up to

sales to New England. In this case, the environmental benefit of canceling the HQ-VJO contract might well have been greater than the environmental cost of purchases from within NEPOOL.

1 \$66/MWh. His adjustments bring the HQ-VJO contract from \$18.5/MWh above
2 the price of market purchases to \$8.5/MWh below market.

3 **Q: Are Mr. Hieber's adjustments correct?**

4 A: Most of Mr. Hieber's adjustments are entirely invalid. A few of his proposed
5 adjustments might have a germ of legitimacy, but Mr. Hieber provides no basis
6 for his estimates.

7 Several of Mr. Hieber's adjustments assume that, had the HQ-VJO contract
8 been cancelled, Citizens would have obtained all of its power from the US, over
9 the VELCO system. These adjustments would not be necessary if Hydro Québec
10 chose to match the prices offered by New England and New York utilities and
11 independent power producers.

12 **Q: Please describe Mr. Hieber's adjustments and your response.**

13 A: While his three lists differ slightly, Mr. Hieber's adjustments can be summarized
14 in nine elements (Hieber Direct at 4–5, 8):⁷

15 • Averaging in “lower cost products from HQ, especially for block loading,
16 such as assured secondary energy, special contract energy for large
17 interruptible customers such as Rock 10 and Jay Peak, and tertiary/dump
18 energy.” Mr. Hieber estimates that these less-expensive purchases reduce
19 the average cost of CUC's purchases from Hydro Québec by \$4.5/MWh.

20 The adjustment is without any basis. Mr. Hieber has not shown that
21 these other purchases are dependent on, or related to, the HQ-VJO purchases.
22 Hydro Québec sells and has sold economy power to many utilities and

⁷In addition, Mr. Hieber asserts that the HQ-VJO contract has some risk benefit, but does not demonstrate or estimate any such value (Hieber Rebuttal at 9).

1 other parties, including New York utilities that canceled their contract for
2 Hydro Québec purchases. Indeed, canceling the HQ-VJO contract would
3 have made more room for these attractive sales.

- 4 • Including additional “revenues for wheeling [power to] CV and other
5 VJO,” which Mr. Hieber estimates to be worth \$4/MWh.

6 These additional revenues to CUC are simply transfers from other
7 Vermont utilities, and increase the losses of those utilities due to the HQ-
8 VJO contract.⁸

- 9 • Including the avoided “cost for additional VED transmission facilities to
10 provide VED system with sufficient reliability if it bought 100% of its
11 power from the USA for 100% of the time without support from HQ.” Mr.
12 Hieber estimates this at \$5/MWh.

13 Department Witness Steve Litkovitz demonstrates that Mr. Hieber’s
14 estimate of this cost is inflated, particularly since the transmission system
15 necessary to integrate Citizens more closely into the VELCO system would
16 be similar to the transmission system Citizens actually built to Hydro
17 Québec. Mr. Hieber also unrealistically assumes that the connection from
18 Hydro Québec to Citizens would completely disappear, leaving Citizens
19 “without support from HQ.”

- 20 • Including the avoided costs of “VELCO transmission system upgrades
21 necessary to provide the VED with 100% of its power.” Mr. Hieber
22 discusses costs that he considers to be related, but does not specifically
23 estimate the costs.

⁸Interestingly, the Department’s estimate of the damages to CV of the HQ-VJO contract did not include the transmission charges from Citizens.

1 Mr. Litkovitz discusses the errors and misconceptions in Mr. Hieber’s
2 vague discussion of this point. Mr. Hieber provides no support for many
3 of his assertions, such as that domestic purchases would require
4 “advancing the \$120-150 million VELCO reinforcement program by 2–3
5 years.” Nor does he provide derivations for his estimates.

- 6 • Including avoided “costs of additional inefficient operating costs, i.e.
7 necessity of having to run high cost generation (diesel) for area protection,
8 if the VED took all of its power from domestic sources.” Mr. Hieber
9 includes \$2.5–\$5/MWh for this cost and the previous one.

10 This adjustment appears to assume that the Citizens and VELCO
11 transmission systems are not upgraded, and therefore inconsistent with
12 those estimates.

- 13 • Including “losses in the delivery of power from New England or New York
14 sources to VED’s system.” Mr. Hieber estimates that effect as about 3%, or
15 \$1.5/MWh.

16 That may be a reasonable estimate.

- 17 • Counting the avoided “transmission charges from VELCO as a result of
18 losing the internal generation (IGAP) credit afforded to HQ block loading
19 deliveries.” Mr. Hieber estimates this effect at \$2/MWh.

20 These savings to CUC are simply transfers from other Vermont
21 utilities, since the only change is in the allocation of VELCO’s embedded
22 costs.

- 23 • Including the costs avoided by “the scheduling flexibility afforded by the
24 HQ Contract.” Mr. Hieber estimates that flexibility to be worth \$5/MWh.

1 Mr. Hieber is roughly correct as to the relative value per MWh of the
2 HQ-VJO contract, compared to around-the-clock, flat, baseload power.
3 However, my estimates of the costs of other resources included
4 comparable flexibility, as I state in my direct testimony (at 44, ll. 4–21).⁹
5 Since I added these costs, adding them again is inappropriate.

- 6 • Including “An environmental/societal cost...as the energy from [alterna-
7 tive] sources was produced from oil, natural gas, or (as thought in 1987/88)
8 coal fired units similar to the generic unit that New York was using to
9 establish its avoided costs” (Hieber Rebuttal at 8). Mr. Hieber estimates
10 this cost as \$2.5/MWh.

11 I discussed in the previous section the errors in the Company’s
12 position on environmental benefits. Mr. Hieber computes the environ-
13 mental benefits of the HQ-VJO contract from values he attributes to the
14 Order in Docket No. 5330, but does not specifically cite. While Citizens
15 might have interpreted the Order in 1991 as suggesting that the Company
16 should include some environmental benefits in evaluating the contract, the
17 estimate of current damages must rely on actual conditions, not those that
18 might have been forecast a dozen years ago. Mr. Hieber has not identified
19 any actual environmental benefit of the contract, compared to any other
20 resource.

21 **Q: Please summarize your corrections to Mr. Hieber’s adjustments.**

⁹Mr. Hieber notes that Mr. Biewald and I recognize the flexibility benefits of the HQ-VJO contract (compared to flat energy contracts), but ignores our testimony on the adjustments we made to the flat energy contracts to make them comparable to the HQ-VJO contract.

1 A: Exhibit DPS-PLC-R2 summarizes Mr. Hieber's adjustments and my response.
2 Other than the small amount of line losses, none of Mr. Hieber's adjustments
3 appear to be reasonable.

4 **V. The Hydro-Québec Purchase from the Perspective of 1991**

5 **Q: How does Mr. Higgins address the imprudence of the early lock-in decision**
6 **and the damages that resulted?**

7 A: Higgins tries to show that no costs were imposed by the Company's imprudent
8 lock-in decision, by arguing based on a portfolio analysis that prudent planning
9 would have led Citizens to commit to the HQ contract in decision in 1991.

10 **Q: Does he accomplish that objective?**

11 A: No. Higgins's computations are of little practical value, for the following
12 reasons:

- 13 • The methods and inputs in Higgins's analyses do not represent the
14 approach that Citizens would have used had it behaved prudently. Higgins
15 does not use the best assumptions that were (or should have been)
16 available to Citizens.
- 17 • Higgins presents calculations and rehashes arguments that were rejected
18 by Board in Dockets Nos. 5983 and 6107.
- 19 • Higgins relies on a Green Mountain Power witness in Docket No. 6107,
20 without purporting to provide independent analysis.
- 21 • His externality assumptions and computations are incorrect.

1 **Q: In what areas are Higgins's analyses inappropriate or incorrect for the**
2 **purpose of determining which resources Citizens would have selected to**
3 **replace the HQ-VJO contract?**

4 A: His analyses contain problems in several areas, including

- 5 • the choice of fuel prices,
- 6 • the costs assumed for the resource alternatives analyzed,
- 7 • the construction and modeling of the resource portfolios,
- 8 • externalities.

9 **Q: What are the problems with the documentation of Mr. Higgins's analysis?**

10 A: Mr. Higgins failed to provide the workpapers underlying his analysis and
11 alternative resource cost assumptions. To the extent I have been able to deter-
12 mine the basis for his cost estimates, it is largely because he repeats the errors
13 of the analysis that he sponsored jointly with Mr. Oliver in Docket No. 6107.

14 The spreadsheets from which his exhibits were calculated were provided
15 to the Department on May 7, four days after the testimony was filed. Those
16 spreadsheets include many undocumented inputs. Had I had more time to review
17 and correct his computations, and the opportunity to review his supporting
18 inputs, I would have been able to provide a more complete analysis of Mr.
19 Higgins's testimony.¹⁰

¹⁰For example, I have not been able to determine why Mr. Higgins reduced his estimate of the real discount rate from 7.5% in the Green Mountain Power dockets to 7% in this docket. Lower discount rates tend to make the HQ-VJO contract look more favorable, especially compared to Mr. Higgin's inflated combined-cycle costs in the later years of the analysis.

1 **A. Fuel Prices**

2 **Q: What fuel prices did Higgins use in his analyses?**

3 A: He used the following two sets of fuel prices:

- 4 • The U.S. DOE EIA Fall 1990 Forecast, published in the 1991 Annual
5 Energy Outlook; and
- 6 • The fuel forecast provided in NEPOOL's April 1991 Summary of the
7 Generation Task Force Long-Range Study Assumptions, which was based
8 on DRI's Fall 1990 energy forecast.

9 **Q: Does this represent the set of fuel prices that Citizens would have used in
10 a prudent analysis of alternatives in late 1991 and 1992?**

11 A: No. These fuel prices do not provide much useful information in determining
12 what resources Citizens would have selected, had it been prudently comparing
13 the HQ-VJO contract to alternatives in this period. Both of these forecasts were
14 produced in 1990, and forecasts fell significantly in 1991.

15 As shown in Exhibit DPS-PLC-R3, the fuel prices Higgins uses in his
16 analysis are much higher than the WEFA Winter 1991–92 price projections that
17 Oliver and Higgins used in their analysis for Green Mountain Power in Docket
18 No. 6107. The WEFA Winter 1991–92 price projections are close to what Green
19 Mountain Power believed at the time of the lock-in and were within the range
20 of fuel prices expected by other utilities. Oliver and Higgins did not dispute the
21 reasonableness of Green Mountain Power's preferred fuel-price projection in
22 Docket 6107.

23 In short, at the time that Citizens would have been evaluating alternatives
24 to the HQ-VJO contract (had it not locked into the contract prematurely), prudent

1 analysis would have relied on the fuel prices utilities believed at the time, rather
2 than on out-of-date 1990 projections.

3 **Q: How large an effect do the higher fuel prices have on Mr. Higgins's estimate**
4 **of the cost of alternative resources?**

5 A: Exhibit DPS-PLC-R4 shows the real-levelized cost of the individual resources
6 that Mr. Higgins and his Navigant colleagues computed with the WEFA forecast
7 and his two new forecasts. The most fossil-fueled resources are as much as 50%
8 more expensive with Mr. Higgins new forecast than the forecasts that Central
9 Vermont and Green Mountain Power had adopted by late 1991.

10 **Q: Does Higgins offer any rationale for ignoring the fuel-price forecasts that**
11 **were actually used in late 1991 and 1992?**

12 A: No. Higgins's only explanation for his choice of forecasts was that they were
13 "available" to Citizens prior to the lock-in (Higgins Rebuttal at 6).

14 **B. Alternative Resources and Portfolio Modeling**

15 **Q: What classes of alternative resources does Higgins consider?**

16 A: He compares the HQ-VJO contract to various combinations of utility purchases,
17 non-utility generators, and utility-owned plants.

18 **Q: What are the problems in Higgins's portfolio analysis?**

19 A: In the time available, I have identified the following problems with the Higgins
20 analysis:

- 21 • Failing to recognize that the cost of spot energy purchases would vary with
22 the load shape of the purchase.
- 23 • Constructing arbitrary and inefficient portfolios.

- 1 • Assuming that alternatives to the HQ-VJO purchase would be dispatched
2 inefficiently, with more expensive resources being operated in preference
3 to less-expensive resources. In particular, Mr. Higgins ignores the use of
4 the spot market to reduce operating costs or increase profits.
- 5 • Overstating the incremental VELCo wheeling charges that would result
6 from replacing HQ purchases with purchases from U.S. sources.
- 7 • Overstating the fixed cost of combined-cycle units.
- 8 • Attributing to purchases the environmental effects of the contract
9 resources, rather than the actual system marginal resources.¹¹
- 10 • Dismissing the feasibility of purchases from New York, based on a claim
11 that the NYPP-NEPOOL interface was unreliable. This assertion that has
12 been rejected by the Board in Dockets Nos. 5983 and 6107. The power
13 sales offered by New York utilities were some of the lowest-cost offers.

14 **Q: Please explain the problem in Higgins's treatment of spot-market energy**
15 **prices.**

16 A: The basic problem is that Higgins assigns all spot purchases and sales the same
17 price. In some portfolios (e.g. Portfolio 10), spot provides energy at a 75%
18 capacity factor, with most of the energy delivered in peak hours, as is true for
19 the HQ-VJO contract. In others (e.g. Portfolios 2 and 4) the spot energy would be
20 purchased off-peak, supplementing resources that are assumed to be turned off
21 at hours when the HQ-VJO contract would be used (as might occur for oil plants).

¹¹For example, Mr. Higgins attributes coal externalities to several purchases (including various purchases from UI, PSNH, NiMo, and NYSEG), even though the contracts were unlikely to increase the dispatch of any coal plants.

1 The value of energy in the spot market would vary with its load shape. Off-
2 peak energy to supplement an oil plant would be less expensive than the largely
3 on-peak energy that would be required to match the profile of the HQ-VJO
4 contract.

5 **Q: Please describe Mr. Higgins's inefficient portfolios.**

6 A: I have identified three types of inefficient portfolios. In at least five of his port-
7 folios (1, 3, 10, 11, and 12) Mr. Higgins assumes the addition of NUG contracts
8 or new combined-cycle units in the 1990s even though utility purchases were
9 less expensive for this period.

10 In Portfolio 9 Mr. Higgins stops the United Illuminating purchase (which
11 was offered through 2006) in 1999, and replaces it with a much more expensive
12 new combined-cycle unit.

13 Portfolio 13 consists entirely of spot purchases, which were not a serious
14 long-term supply alternative.

15 **Q: Please describe Mr. Higgins's modeling of inefficient dispatch.**

16 A: First, Mr. Higgins assumes that the Altresco and Masspower combined-cycle
17 NUGs and the generic combined-cycle units would be dispatched at just 75%
18 capacity factors, even though they would have availability around 90%. Since
19 these plants all have very low energy costs, the additional generation would
20 allow profitable sales into the spot market, reducing the net cost of the non-HQ
21 portfolio.

22 Second, Mr. Higgins imposes arbitrary limits on the dispatch of oil plants,
23 setting Norwalk Harbor at a 60% capacity factor and West Springfield 3 at a
24 20% capacity factor, when each plant is capable of higher output. As a result,
25 Mr. Higgins uses uneconomic spot energy purchases when it would be less

1 expensive to run the oil capacity he includes in the portfolio. Given his
2 assumptions about spot energy prices, the oil plants would be economic to run
3 at their full availability.¹²

4 Third, Mr. Higgins assumes that the coal-fired Bridgeport Harbor 3 and the
5 oil-fired New Haven Harbor would operate at the same capacity factor in the
6 UI-Unitil contract. Mr. Higgins assumes a 75% capacity factor for the UI-Unitil
7 contract; during 1987–1990, Bridgeport Harbor 3 averaged 82.5% availability
8 and the NEPOOL Unit Availability Task Force proposed an 81.7% target
9 availability for Bridgeport Harbor 3. If the Company purchased capacity from
10 United Illuminating mimicking the UI-Unitil mix, and operated that capacity at
11 an average of 75%, more of the energy would come from the less expensive
12 Bridgeport Harbor 3 and less from New Haven Harbor.

13 Fourth, Mr. Higgins limits the UI-Unitil purchase to a 75% capacity factor,
14 even though Bridgeport Harbor 3 had operated at more than 82% availability,
15 and New Haven Harbor at more than 90% availability, in 1987–1990. The
16 proposed target availability was 81.7% for both units.

17 Fifth, Mr. Higgins limits the NYSEG and NiMo purchases to 75% capacity
18 factors, even though

- 19 • NYSEG specifies a 100% maximum monthly capacity factor and indicates
20 that energy will be available whenever there is sufficient supply from
21 NYSEG’s “system and purchases.” Considering NYSEG’s surplus position,
22 the availability of the purchase should be quite high.
- 23 • NiMo proposes a minimum daily capacity factor of 40%, but no maximum.

¹²This is partly due to Mr. Higgins’s error of failing to reflect the differences in spot prices as a function of load shape.

1 **Q: How has Mr. Higgins overstated the incremental VELCO wheeling charges**
2 **that would result from replacing Hydro Québec purchases with purchases**
3 **from U.S. sources?**

4 A: The VELCO charges are based on each utility's loads, not on its purchases. VELCO
5 reduces each utility's billing demand by half of its internal generation capacity,
6 including the Company's block-loading portion of its HQ-VJO purchase. Thus if
7 the VELCO billing-demand charge is \$18/kW-year, as Mr. Higgins assumes, then
8 replacing the HQ-VJO purchase with a U.S. purchase would add only \$9/kW-year
9 in VELCO wheeling charges.¹³

10 **Q: What errors have you identified in Mr. Higgins's modeling of the**
11 **combined-cycle units in his portfolio analyses?**

12 A: In my limited review of Mr. Higgins's spreadsheets, I have found the following
13 two errors:

- 14 • Using an implausibly high price for gas pipeline capacity.
- 15 • Failing to reflect the value of combined-cycle plants beyond the end of his
- 16 analysis.

17 **Q: Why do you say that Higgins uses pipeline costs that are too high?**

18 A: Higgins assumes pipeline demand costs of \$1.60/MMBtu (based on a 100%
19 capacity factor), which is equivalent to \$584/MMBtu-day of pipeline capacity or
20 \$117/kW-yr. of combined-cycle capacity (at their assumed heat rate) in 1990

¹³Alternatively, Mr. Higgins could have added \$9/kW-year to the block-loaded portion of the HQ-VJO capacity, and \$18/kW-year for any other HQ-VJO capacity.

1 dollars.¹⁴ He assumes that the pipeline costs would escalate at the general
2 inflation rate to the in-service date of each combined-cycle unit. This pipeline
3 cost is nearly half of his estimate of the total annual fixed costs of a baseload
4 combined-cycle unit. This cost number is much too high.

- 5 • The 1989 NEPOOL Generation Task Force (GTF) “Long-Range Planning
6 Study Assumptions” reported a pipeline fixed charge of \$1/MMBtu, with
7 no escalation, either to the power plant’s installation date or afterward.
- 8 • In its 4/1/91 report, the NEPOOL GTF reduced its estimate of pipeline fixed
9 charges to \$0.65/MMBtu in 1990 dollars, inflated to the in-service date and
10 held constant thereafter. This is the report on which Mr. Higgins relies for
11 his NEPOOL GTF forecast of gas price; he ignores the pipeline costs on the
12 next line.

13 **Q: What is the basis of Higgins’s assumption of higher gas prices?**

14 A: Mr. Higgins is using the same \$1.60/MMBtu that Oliver and Higgins assumed in
15 their GMP analysis in Docket No. 6107. In his rebuttal testimony in Docket
16 6207, Oliver admitted that the \$1.60/MMBtu figure represented the cost of gas
17 transportation from Alberta.

18 Mr. Higgins therefore appears to be mixing apples and oranges. In his DOE
19 EIA forecast, he combines domestic wellhead prices (largely from the Gulf and
20 Southwest) with Canadian gas-pipeline charges. Since the Canadian gas
21 commodity cost less than domestic gas, and domestic transportation cost less

¹⁴This is \$1.60 per MMBtu of gas deliverability to the plant, and would be paid regardless of the extent to which the plant actually operated. At a 75% capacity factor, the cost is about \$2.13 per MMBtu actually used.

1 than Canadian transportation, Mr. Higgins overstates the total cost of delivered
2 gas.

3 The error is more obvious in his NEPOOL forecast, in which he combines
4 the GTF forecast of commodity with a transportation cost that is nearly
5 \$1/MMBtu more than that forecast by the GTF.

6 **Q: How does Mr. Higgins fail to reflect the value of combined-cycle plants**
7 **beyond the end of his analysis?**

8 A: Mr. Higgins applies his projections of the nominal annual costs of the combined-
9 cycle plant from the date he assumes it would be built to the end of the HQ-VJO
10 schedules it would replace. In some portfolios (e.g. Portfolio 10) that period is
11 as short as one year; in other portfolios, such as Portfolio 1, it is as long as
12 eighteen years. He attributes the high accounting and ratemaking costs of the
13 early years to these alternatives, and ignores the benefits of the plants (built in
14 earlier years' dollars and partially depreciated) in later years. The standard
15 solution to avoiding this end-effects problem is to compute the cost of the plants
16 in real-levelized terms. Mr. Higgins has demonstrated that he knows how to
17 compute real-levelized costs, and this error was pointed out to Mr. Higgins and
18 his colleagues at Navigant in Docket No. 5983 and Docket No. 6107.¹⁵ I do not
19 understand why Mr. Higgins persists in this error.

20 **Q: Is Mr. Higgins correct when he says (Higgins Rebuttal at 17) that there “is**
21 **significant uncertainty associated with the cost and availability of firm**
22 **transmission capacity to effectuate delivery of the power to Vermont?”**

¹⁵Mr. Higgins did apply real-levelized costs for some combined-cycle plants in the portfolio analyses (closely resembling his analyses in this docket) in his joint testimony with Mr. Oliver in Docket No. 6107.

1 A: No. Mr. Higgins supports this assertion with two more assertions, neither of
2 which he documents.

3 First, he asserts “that delivery power from NYSEG to Vermont would
4 require that Citizens procure firm transmission service over several transmission
5 systems.” That statement is neither clear nor correct. First, it is not clear what
6 Mr. Higgins means by a “transmission system,” which could refer to the
7 property of a particular utility, the system dispatched by a power pool (NYPP or
8 NEPOOL, for example), or all the synchronized Eastern Interconnection.¹⁶
9 Second, even using the most restrictive definition, NYSEG could deliver power
10 to Vermont over either the NiMo system or the NYPA system. NiMo, the other
11 New York utility with a large surplus, could deliver power directly to Vermont.

12 Mr. Higgins then asserts (at 17–18) that “there is significant uncertainty
13 related to whether there was firm transmission service available between New
14 England and New York. Mr. Doug James, transmission planning engineer for
15 the ISO-NE, testified in Docket No. 6107 on the uncertainty of available firm
16 transmission capacity from New York to New England as concluded by several
17 studies performed by NEPOOL during the early 1990s.” Responding to this vague
18 reference to testimony of another witness in another proceeding is difficult,
19 since Mr. Higgins does not specify which parts of the James testimony he is
20 sponsoring, if any. Also, since the James testimony is not in the record, I would

¹⁶Mr. Higgins might even be referring to the electrical flows induced in the Northeast electric grid by transfers between pools. In reality, the flows would change little due to a contractual purchase. For financial purposes, the relevant path is the contract path for which transmission charges would be paid; that is what I will discuss.

1 have to explain his positions (which Mr. Higgins does not attempt) before I
2 could rebut them.

3 Much of Mr. James testimony was a rehash of Mr. Bolbrock's testimony
4 for GMP in Docket No. 5983; the Board considered those arguments in Docket
5 No. 5983 and rejected them (Order at 201). Similarly, the Board rejected the
6 arguments when Mr. James presented them in Docket No. 6107 (Order at 44).
7 Considering that Mr. Higgins has not even repeated the testimony of Bolbrock
8 and James, let alone improved on it, it is not clear why he expects the Board to
9 give their arguments any weight.

10 Nonetheless, I will touch on a few errors that are relatively easily
11 explained. First, Mr. James proposes a very strange definition of "firm" supply,
12 treating any resource that could *ever* be interrupted as non-firm and unreliable.
13 For example, Mr. James states that "In order to compare the Hydro-Quebec
14 power option to another power option one needed to appreciate whether the
15 power resource could be delivered on an *uninterruptible* basis for the desired
16 duration" (6107 Rebuttal at 3, emphasis added). That definition would classify
17 the HQ-VJO contract and essentially all other power resources as non-firm and
18 unreliable.

19 Second, Mr. James took normal ratings of the NYPP-NEPOOL interface
20 (which is the appropriate measure of capacity for firm purchases) and subtracted
21 reported deratings in the much higher emergency ratings.

22 Third, Mr. James made much of the magnitude daily variations of transfer
23 capability (based on data from four days), but failed to mention that most of the
24 variation was above the normal firm rating, not below it.

1 In contrast to the gloomy view of the reliability of purchases from New
2 York expressed by Mr. James, NEPOOL has consistently reported very high
3 reliability (99–100%) for purchases from New York, whether from RG&E,
4 Central Hudson, NiMo, or NYPA.

5 **Q: Does this conclude your rebuttal testimony?**

6 A: Yes.

Exhibit DPS-PLC-R1:

Deposition of Hugh Gates in Docket No. 6332

Exhibit DPS-PLC-R2:
Hieber Adjustment to Rate-Year Costs, with Corrections
(Dollars per MWh)

	Hieber's Adjustments to HQ-VJO and Market Prices				Nature of Correction	Corrected			
	HQ		Market			HQ		Market	
	Adjustment	net	Adjustment	Net		Adjustment	Net	Adjustment	Net
<i>Start</i>		\$63.5		\$45.0			\$63.5		\$45.0
<i>Mix in other HQ</i>	(\$4.5)	\$59.0			<i>Only VJO matters</i>	-	\$63.5		
<i>Wheeling Revenues</i>	(\$4.0)	\$55.0			<i>Transfer from Other Vermont utilities</i>	-	\$63.5		
<i>CUC Transmission</i>			\$5.0	\$50.0	<i>Overstated</i>			-	\$45.0
<i>VELCo Transmission and Inefficient Generation</i>			\$2.5	\$52.5	<i>No Basis</i>			-	\$45.0
			to \$5.0	\$55.0				-	\$45.0
<i>Losses</i>			\$1.5	\$54.0				\$1.3	\$46.3
				\$56.5					\$46.3
<i>Loss of IGAP</i>			\$2.0	\$56.0	<i>Transfer from Other Vermont utilities</i>			-	\$46.3
				\$58.5					\$46.3
<i>Flexibility</i>			\$5.0	\$61.0	<i>Included in Starting Price</i>			-	\$46.3
				\$63.5					\$46.3
<i>Environmental Benefits</i>			\$2.5	\$63.5	<i>There Are None</i>				\$46.3
				\$66.0					\$46.3
<i>HQ Benefit</i>				\$8.5					(\$17.2)

Exhibit DPS-PLC-R3:

Comparison of Higgins Fuel-Price Forecasts

	#6 Fuel Oil			Firm Natural Gas		
	WEFA 9/92	NEPOOL GTF	DOE EIA	WEFA 9/92	NEPOOL GTF	DOE EIA
1991	79%	113%	109%	85%	116%	108%
1992	76%	104%	119%	103%	114%	116%
1993	83%	115%	130%	107%	127%	125%
1994	89%	123%	142%	112%	139%	134%
1995	95%	131%	155%	123%	156%	144%
1996	96%	141%	163%	135%	180%	155%
1997	97%	154%	171%	149%	209%	166%
1998	99%	169%	179%	164%	244%	178%
1999	105%	187%	188%	181%	284%	190%
2000	113%	206%	198%	198%	331%	204%
2001	123%	226%	213%	216%	367%	229%
2002	133%	248%	230%	233%	406%	258%
2003	142%	273%	248%	252%	449%	290%
2004	152%	300%	267%	270%	496%	326%
2005	161%	329%	288%	290%	549%	367%
2006	172%	355%	307%	310%	601%	397%
2007	183%	383%	327%	331%	658%	429%
2008	194%	414%	349%	354%	720%	465%
2009	206%	446%	372%	378%	788%	503%
2010	218%	482%	396%	404%	863%	544%
2011	232%	520%	427%	430%	944%	588%
2012	245%	561%	459%	459%	1034%	636%
2013	260%	605%	494%	488%	1132%	688%
2014	275%	653%	532%	517%	1239%	745%
2015	291%	705%	573%	547%	1356%	805%
2016	307%	761%	617%	580%	1484%	871%
2017	325%	821%	664%	612%	1625%	942%
2018	343%	886%	714%	647%	1778%	1019%
2019	363%	956%	769%	682%	1946%	1102%
2020	383%	1032%	828%	718%	2131%	1192%

NOTES:

NEPOOL GTF and DOE EIA from Fall of 1990.

Exhibit DPS-PLC-R4:
Real-Levelized Costs with Different Fuel Assumptions

HQ-VJO Contract	Date of Offer or Contract	Size (MW)	Duration	Term	WEFA 9/92 Forecast (\$/MWh)	NEPOOL 1991 GTF Assumptions (Fall 1990 DRI)		1991 DOE/EIA AEO Outlook (Fall 1990 Forecast)	
						Cost (\$/MWh)	% Difference	Cost (\$/MWh)	% Difference
HQ Schedule B		0.415	11/95-10/15	20 years	49.34	49.92	1.2%	49.49	0.3%
HQ Schedule C3		0.125	11/95-10/15	20 years	48.89	50.05	2.4%	49.59	1.4%
Proposals and Contracts									
Northeast Utilities Baseload	6/25/1991	Unlimited	11/94-10/05	11	60.24	59.65	-1.0%	60.79	0.9%
Northeast Utilities Intermediate	6/26/1991	Unlimited	11/94-10/05	11	48.19	60.39	25.3%	62.40	29.5%
Northeast Utilities Mix	6/26/1991	Unlimited	11/94-10/05	11	47.63	56.32	18.2%	58.77	23.4%
Cogen Lime Rock Proposal to GMP	6/13/1991	30	11/94-10/23	30	55.51	79.72	43.6%	84.17	51.6%
Altresco Pittsfield/COM Electric	2/20/1992	26	1/92-12/11	20	62.35	69.96	12.2%	68.58	10.0%
UI-UNITIL	2/10/1992	30	5/93-10/06	14	49.32	55.68	12.9%	57.43	16.5%
NIMo Option A	1/14/1992	Up to 300	1/92-12/99	8	44.10	45.19	2.5%	45.68	3.6%
NIMo Option B	1/14/1992	Up to 300	1/92-12/99	8	64.19	60.57	-5.6%	66.82	4.1%
NYSEG Option A	4/22/1992	10-50	1/95-12/09	15	44.38	42.85	-3.5%	43.80	-1.3%
NYSEG Option B	4/22/1992	10-50	1/95-12/09	15	35.88	44.80	24.9%	45.97	28.1%
Generic Resources									
Combined Cycle		200	1/95-12/30	35	56.08	80.44	43.4%	64.50	15.0%