

STATE OF CONNECTICUT

Docket No. 424

Victor Civie

CONNECTICUT SITING COUNCIL

October 1, 2012

VICTOR CIVIE AND RICHARD CIVIE PARTIES POST-HEARING BRIEF

For the reasons set forth in this brief, the undersigned Parties urge the Siting Council to deny the Proposed Card to Lake Road Line. In the event the Line is approved the undersigned Parties urge the Siting Council to bury the proposed transmission line with the modified locations herein. These actions will serve to protect the Town of Mansfield's residents from the enormous negative impact on property values and health while preserving unencumbered enjoyment of their properties.

I. The Proposed Card to Lake Road line does not satisfy any need and provides no benefit to the Connecticut ratepayers. The Connecticut ratepayers will experience no increase in service yet bear the burden of the cost.

There is no question that the Proposed Card to Lake Road lines are not necessary for the reliability of the electric power supply of Connecticut. It has been agreed that the issue, of all power problems that effect the Connecticut ratepayer, was not resolved by the Proposed Card to Lake Road lines but undisputedly solved by the Proposed Lake Road to West Farnum line.

From August 28 transcript :

Pg 60, 13 MR. V. CIVIE: Table 6-5 are the Level 2 results after the new Lake Road to West Farnum lines are added, correct?

Pg 60, 24 MR. V. CIVIE: And this is prior to the Pg 60 line 1 Card to Lake Road street lines were added, correct? MR. OBERLIN: That is correct.

Pg 61,5 MR. V. CIVIE: so do we see any violations there that affect Connecticut in Table 6-5? MR. OBERLIN: No.

Pg 61, 10 MR. V. CIVIE: Okay. But adding -- going from Table 6-4 to 6-5, we no longer have those problems in Connecticut, correct?

MR. OBERLIN: Again, I agree the Connecticut issue has been resolved, but the system network

issue has not been resolved.

Thus ISO (represented by Mr Oberlin) agrees that the Connecticut issue has been resolved without the addition of the new Proposed Card to Lake Road lines. However he adds that there are other hypothetical problems that have not been resolved in other areas of the system network. (ie. The Massachusetts and Rhode Island hypothetical issues as identified by the Study remain.)

From the August 30, 2012 transcript Pg 69

MR. V. CIVIE: "... the new proposed line from Card Street to Lake Road, that is the new proposed line in regards to Connecticut violations did not resolve any Connecticut violations, that is that all the Connecticut violations [are] removed without the ... proposed Card to Lake Road line. "

The Applicant's claim for benefit and need is based on a study (the Study) conducted by ISO New England (ISO). Under the particular and excessive hypothetical conditions of the Study, the Connecticut Mystic Shunock and Mystic Whipple Lines (Mystic Lines) were overloaded creating what ISO terms thermal violations.

The Study clearly proves that Connecticut Issue was not resolved by the Proposed Card to Lake Road Lines. It was also proven that the Mystic Lines were the only lines that effect the Connecticut ratepayer. The Proposed Card to Lake Road line has no effect on Connecticut service. The Study demonstrates that the Proposed Card to Lake Road lines will have no effect in solving any Connecticut problem.

A. The Applicant's solution is not Reasonable nor credible.

It is important that a system planner plan for prudent, relevant, reasonable and credible contingencies. The maintenance and operation of Connecticut distribution lines is unexcelled. The existing Card to Lake Road lines are an example of this extraordinary service. (*The existing*

Cards to Lake Road lines comprise two sets of 3 cable lines. There are two cables for each phase. NU Interrogatory response May 4, 2012, pg 1 of 4, a.) No loss of service could be identified in the history of the Existing Card to Lake Road Lines. *(August 28, 2012 Transcript pg 66 at 19)*. In contrast, the lines associated with the Mystic area have long been problematic. The applicant maintains that these lines consist primarily of "patchwork". The Applicant's solution does not address the real problem of the Mystic lines which is clearly that the Mystic Lines need to be upgraded to a higher capacity. The application does not propose to upgrade the capacity of the Mystic lines. The Applicant's solution is only to hypothetically divert power from the lines. This is not fix, it is simply the manipulation of data to appear to fix the problem.

Here a Study based on unreasonable conditions and non-credible generation was manipulated to produce problems in Connecticut. The Proposed Lake road to West Farnum line was hypothetically used to divert power away from the Mystic Lines so that there were no longer hypothetical overloads in Connecticut. The conditions used for the Study were arbitrary. The Mystic lines can still be overloaded in studies conducted under different arbitrary conditions even with the applicants solution in place. The real problem still remains.

B. The Mystic Lines are the only lines that effect the Connecticut ratepayer.

Only the Mystic Lines effect the Connecticut ratepayer in the Study. The Mystic Lines are the only lines with hypothetical violations that are located entirely within Connecticut. The Shunock Wood River line runs from Connecticut to Rhode Island. The Study also indicated hypothetical problems for this line. There are no other lines in Connecticut in which the Study found problems. *(Section 6 of the Solutions Study, July 2012 page 36 et al. also August 28, 2012 Transcript pg 43 at 13)*. It was proven that the Shunock Wood River line does not effect the electric reliability or service regarding the Connecticut ratepayer.

Regardless of what happens to the Shunock Wood River line, Connecticut service is not

effected.

From the August 28, 2012 transcript at pg 44 at 3:

"MR. V. CIVIE: Let's say the line was severed, would any -- and everything was working functionally in Connecticut. Would a Connecticut person lose service?"

MR. OBERLIN: Ignoring any configuration issues at [Shunock], no."

Conversely, the applicant has failed to prove that any line but the Mystic lines effect Connecticut.

Wood River which is located in Rhode Island (ie does not service Connecticut).

C. The Proposed Card to Lake Road line has no effect on Connecticut service.

Problems (violations) as determined by the Study (*Solutions Study, July 2012 page 38*). are found in tables 6-4 and 6-5. These are the tables relevant to the Mystic lines. Tables 6-5 proves that the Proposed Card to Lake Road lines do not have any effect in Connecticut whatsoever. Table 6-4 is the condition prior to the addition of the Proposed Card to Lake Road lines. Table 6-5 is the condition after the addition of the Proposed Card to Lake Road lines.

There is no significant change in the tables proving that the Proposed Card to Lake Road lines have no effect on the system.

From the August 28, 2012 transcript at page 62 at 5.

MR. V. CIVIE: So take a look at Table 6- 5. Prior to the lines -- prior to the new Proposed Card to Lake Road lines being added, and we look at Table 6-6 after the new proposed Card to Lake Road lines have been added, it doesn't appear there's any significant difference in Table 6-5 and 6-6, correct?

MR. OBERLIN: That's correct.

ISO further confirms that the Proposed Card to Lake Road lines are not needed in the above tables in which all hypothetical violations of Connecticut lines appear. (*Refer to the August 28, 2012 transcript pg 62&61 at 5*). The problems in the Mystic lines only appear in these (the import to eastern New England) sections of the Study. That is, the hypothetical Mystic lines overloads only appear in tables 6-4 and 6-5 of the Study.

D. The Study demonstrates that the Proposed Card to Lake Road lines do not solve any Connecticut problem

Including the Mystic Lines problems(Overloading) above, the Proposed Card to Lake Road lines do not resolve any problem that effects the Connecticut ratepayer.

The Proposed Card to Lake Road lines did not resolve any voltage violations. All voltage violations were resolved with the addition of a breaker at Sherman road Mass (*refer to page 38 last paragraph Solutions Study, July 2012*).

The Applicant did not site any other reason for need. The Applicant did mention Delta P tests however provided no proof or testimony on how the Delta P tests would effect the Connecticut rate payer. No new Delta P tests were conducted under the most updated study. The hypothetical Delta P and other tests were run in an older study. This older study was made on the Lake Road units which the Applicant consistently maintains is not even considered part of Connecticut. (For example August 30, 2012 transcript pg 112 at 24). Even in the older study no Delta P violations were resolved by the Proposed Card to Lake Road lines. Nowhere in the study was the existing or Proposed Card to Lake Road line associated with a Delta P value grater that .5. (A violation occurs at a level of .5 or greater.)

The Applicant provided no proof or testimony in regard to how any other data or results from the Study would effect Connecticut service.

II. With the existing Card to Lake Road Line in place there is more than sufficient capacity to carry all the power required for any and all situations and contingencies found in any study.

A. Under any and all conditions and contingencies the maximum power that was required for the Card to Lake Road line in any of the studies was 1,415 megawatts. The Existing Card to Lake Road line has a capacity of 1,912 megawatts which is more than sufficient to carry the necessary additional loads without any modification. (Iso response Table 3-A Page 2 of 2, Forth Physical Page).

From August 28 transcript:

pg 59,19 MR. OBERLIN: So you'd have roughly a high of fourteen hundred -- four 20 hundred and -- fourteen hundred and fifteen megawatts --

pg 60,1 MR. OBERLIN: Yep. As a -- as a high.

B. The capacity of the Existing Card to Lake Road line provides further proof that the Proposed Card to Lake Road line does not satisfy any need and provides no benefit to the Connecticut ratepayers.

In the Study, 1,415 megawatts of power was rerouted from Card to Lake Road to resolve all violations. The Existing Card to Lake Road power line by itself, without modification, has more than sufficient capacity (1,912 megawatts) to support this 1,415 megawatts of power. Therefore, the Existing Card to Lake Road power line is more than sufficient to resolve all of the violations. Consequently there is no need to construct the Proposed 345kv Card to Lake Road power line.

III. The Applicant has not met their statutory burden of proof.

The Applicant has not met their statutory burden of proof in that the Proposed Card to Lake Road line provides any public benefit. (*CGS 16-50*) The Study failed to demonstrate that the Proposed Card to Lake road line would resolve any violation anywhere.

A. In the Study, violations will occur with the Existing Card to Lake Road line out of service and with power loss on a massive scale. However, these violations have nothing to do with the Existing Card to Lake Road line being out of service. In fact the Study did not prove that this line outage caused any violations. A responsible planner must plan for reasonable and credible contingencies. In this case, since no contingency is dependent upon the Card to Lake Road Line, there is no need to plan for a second line. That is no resolution of any violation can be attributed to the Proposed Card to Lake Rd line under any contingency whether the line is in or out of service.

The Study clearly demonstrates that the addition of the new line had no effect on any violation in the East to West studies. No violations were resolved after the proposed line was added. Tables 6-5 and 6-6 (*Solutions Study, July 2012 pg 38*) depict hypothetical violations in the Study. Compare table 6-5 prior to adding the line and table 6-6 after adding the line. There is no difference. No violations were removed from the Study by adding the Proposed Card to Lake Road lines.

In the West to East study it was never determined that the Proposed Card to Lake Road line alone was responsible for resolving any violation. The line was never tested separately. In table 6-10 (*Solutions Study, July 2012 pg 39*) both the Proposed Card to Lake Road line and the Sherman Road to West Farnum line were added together to remove the remainder of the violations. It can not be concluded that the Proposed Card to Lake Road lines removed any violations therein.

IV. The Study is not reasonable or credible.

The study is not in compliance with ISO and NERC standards. A system planner plans for prudent, reasonable and credible contingencies. The studies presented in this application are not either reasonable or credible.

A. The Study was based on unreasonable and unrealistic power loss running against ISO and NERC rules. Over 4,000 megawatts of Connecticut power were eliminated in the study, almost half of the current demand. (*August 28 Transcript pg 24-25*)

In the Study Millstones was out, Cross cable was out, Norwalk cable was out, all of New York was out and Berkshire was out all occurring during peak summer times. Iso could not identify a time when all of this power was out simultaneously nor could ISO or the Applicant prove or state that it would be reasonable that all of this power would be unavailable any time in

the future. This runs directly against ISO rule 5.2

"5.2 Reasonably Stressed Conditions

Reasonably stressed conditions are those severe load and generation system conditions which have a reasonable probability of actually occurring." Iso New England Planning Procedure PP5-3

The Mystic Lines only required an extra 150 MW to resolve their issues. Over 4,000 megawatts of Connecticut power was eliminated in the study. Only 150MW of this 4000MW would have been needed to eliminate the violations. That is, if the 4000MW was reduced to 3850 MW (which is still unreasonably high) violations could be resolved regarding the Connecticut Mystic Lines.

B. The contingency tests were incorrectly applied. N-1-1 testing was in error.

The existing line Card to Lake Road contains two sets of lines /elements. In a typical line/element there are 3 cables. The existing Card to Lake Road line contains 6 cables. (The existing Card to Lake Road lines comprise two sets of 3 cables. There are 2 cables for each phase. *NU Interrogatory response May 4, 2012, pg 1 of 4, a.)*

In an N-1-1, test two elements are removed. In the Study, both Card to Lake Roads lines where removed plus another element. (*Follow up Analysis July 2012 pg 37.*) Thus overall three elements were removed invalidating the N-1-1 test.

V. Underground Facility

The Town of Mansfield supports an underground facility from Route 192 to Pole 9067. The underground facility meets all the requirements pursuant to Connecticut Statue 16-50pi. This facility will cost 800 thousand dollars regionalized and 2.99 million dollars not regionalized more than the Applicant's proposed overhead line.

A. The underground facility does not impose an unreasonable economic burden on the ratepayers of the state.

The distance of the underground line as modified by the Town of Mansfield is 2400 feet. All original estimates were made on a distance of 5808 feet. The estimated cost for the 5808 feet is \$12.5 million. (Appendix A) Prorated for 2400 feet this cost is \$5.22 million. The Applicant's estimated cost for the Overhead lines for this distance is \$5.4 million. (*Page 15-62 Vol 1*) Prorated this cost becomes \$2.23 million. The difference is \$2.99 million. The regionalized rate is .27. (*Page 15-62 Vol 1*) Thus the regionalized cost is \$800 thousand.

1. Discrepancies in Applicant's cost estimate.

The Applicant has not justified the following costs as listed on the estimate. (Appendix B) Plating \$248,000 Contaminated Soils \$1,365,000, Spare parts \$1,052,000 (Note terminations and Splices are double billed listed here and separately), Escalation \$3,767,000 and contingency \$8,740,000.

The Applicant cannot cite any estimate where these costs appear in any underground configuration in the past. (*June 26, 2012 Transcript pg 95 et all*) The Applicant could not find these costs in the CL&P cost estimate for an underground configuration of Bethel/Norwalk Project (*see Appendix C also Schedule 12-C application dated January 12, 2005, Appendix 5-7*). (Note: In this configuration the costs per mile were much higher because the underground lines were dug and placed under a substantial amount of pavement.)

Some costs provided by the Applicant such as cable, splice vaults, splices, and terminators are unreasonably high can be easily verified with the manufacturers.

The Applicant's cost is based on a 3 circuit configuration (*9 cables total see Applicant's answer to question 3 Interrogatory 4/09/12.*) The Applicant provides no law or regulation to justify a three circuit underground design. The Applicant plans on only using 2 circuits at a time. "VICTOR CIVIE: So you only plan on operating two cables at one time? You have three

cables, three circuits, only two are going to be active at one time? MR. CARBERRY: That's right. " (*June 4, 2012 Transcript pg 158 at 18*). In addition, the Applicant admits that three circuits were never used nor required in any underground configuration in the past. (*June 4, 2012 Transcript pg 160 at 10*)

The Applicant presents a contradiction in logic. The Applicant does not propose 3 circuits for the overhead lines. (*Volume 1, 3.1.1 Three sets of conductors, each set 2 cables, 6 cables total or 2 circuits*) The Applicant admits there are no restrictions regulations or laws that impact specifically on an underground design. (*June 5, 2012 Transcript page 52 at 10*) Since 3 circuits are not required for the overhead lines then 3 circuits are not required for the underground lines.

The claim that three circuits are required for N-1-1 contingencies is invalid. This is a gross misuse of the N-1-1 testing. The N-1-1 requires the loss of two circuits/elements. If two underground circuits are used along with the two existing overhead circuits there will always be two circuits remaining if two circuits are lost. The other two circuits carry more than enough power to remove any violation. Conversely, the Applicant has not justified nor can it be justified how N-1-1 requires three circuits.

B. The underground Facility is technologically feasible.

The Bethel/Norwalk, Middletown /Norwalk and other projects prove that an underground facility is technologically feasible.

C. The underground station can be easily moved to pole 9066/7 without any additional considerations requiring no more excavation or hazzards to the environment than the original station.

Moving the underground station to the vicinity of poles 9075/6 will place the station past the residential areas. Since this vicinity is over 400 feet from any wetlands including vernal

pools the application will not be effected including the Section 404 Clean Water Act Permit. There is no significant difference in distance from Wolf Rock, Joshua's Trust and any other landmark compared to the site the Applicant proposes.

In addition the area for the transition station at 9066/7 is relatively flat. The two circuit footprint would fit in this area without any significant excavation. No forest would be removed. A significant amount of forest will be removed by the Applicant's proposed design.

VI. Environmental Issues

The project provides a significant negative impact on the environment. 227 wetlands and 104 watercourses will be impacted including 88 vernal pools and 29 amphibian breeding habitats. (*Vol 2 Page 10 sec 4.0*) Wetlands will be filled. (*June 4, 2012 Transcript pg 96*). 268 acres of forest and forest wetlands will be destroyed. (*June 4, 2012 Transcript pg 90*). 50 acres of precious forest wetlands will be devastated (*June 4, 2012 Transcript pg 88*). In place will be desolate regions saturated with herbicide to prevent natural recovery.

The project is reasonably likely to have, the effect of unreasonably polluting, impairing or destroying the public trust in the air, water or other natural resources of the state.

VII. Impact Overview

The FAA has determined that constructing the proposed Card to Lake Road lines creates a Flight Safety Hazard in Mansfield. This is especially dangerous since the Hazard runs directly through a well established mountain top neighborhood. The Town of Mansfield's underground variation eliminates the Flight Safety Hazzard caused by the proposed project

An additional set of poles and lines completely change both the outlook and perception of the property. Two lines create a perception of dangerously powerful electromagnetic fields and create a strong industrial presence. A large number of buyers who may purchase a property next

to one set of lines will not consider two sets of lines. In addition, a second set of lines puts cables closer to properties. Closer means no buffer. Children will be exposed to herbicides and greater radiation when playing on their own properties. Permanent large scale deforestation due to this project also substantially detracts from the property values. This deforestation will not occur in the underground configuration.

Finally is the problem that residents are forced to endure the constant aggravation and irritation of highly visible red lights running right through their neighborhood. These lights will be seen for miles being placed at high elevation well above the nearby airport. The purpose of these lights are to be highly visible to planes both under and over as they fly by or prepare to land. The Applicant does not guarantee nor offers any proof on what lighting system or other modification the FAA might impose.

From June 26, 2012 transcript pg125 at 7

"MR. CASE: We would -- we would do whatever the FAA directs us, but right now they're telling us to put in steady state low intensity blinking - or low intensity steady state lights."

The new Proposed Card to Lake Road facility is directly visible and adjacent to eleven unsold grand fathered lots owned by the undersigned Party. Seven unsold lots directly border the proposed lines. If the application is approved without modification, these lots will be not suited for development. All Mansfield residents who currently live in the neighborhood will suffer a great loss.

Conclusion:

The Study and testimony prove that the new Proposed Card to Lake Road lines do not resolve any Connecticut power problem.

The Applicant presented erroneous facts and figures regarding cost, construction, environment and presentation. The application was submitted to this Council absent the prerequisite element of benefit and need.

The Applicant is attempting to force an issue that does not exist. In this attempt, data is manipulated so that hypothetical problems exist. However, despite all of the data manipulation, the Applicant still fails to associate any problem that is resolved by the Proposed Card to Lake Road Lines. The lines are simply not needed.

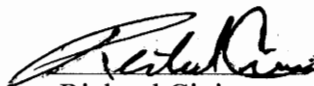
The Applicant failed to meet their statutory burden of proof as required by Connecticut Statue 16-50. Mansfield residents will suffer from increased exposure to radiation/herbicides, a devaluation of property values, highly visible red lights, negative aesthetics and an FAA flight safety hazzard. Connecticut will suffer a significant negative impact on the environment including the devastation of wetlands and forest. If the application is approved, the Connecticut ratepayer will pay for a facility and not receive any benefit in return.

The only reasonable course of action is to deny the Proposed Card to Lake Road lines.

Respectfully Submitted



Victor Civie



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I hereby certify that a copy of the foregoing document was sent electronically or by U.S. mail to the Docket No. 424 service list on October 1, 2012.



Victor Civie

APPENDIX A

Cost Estimate
Mount Hope Underground
Party Victor Civic

Length 1.1 miles. 2 circuits

Mount Hope Underground Cost Estimate

345-KV XLPE Cable	5,245,000
Communications	75,000
Temp Monitoring	100,000
Installation Duck Bank and Earthwork	3,310,000
Transition stations	2,600,000
Overhead	<u>1,200,000</u>
Total	\$12,530,000

Installation Duck Bank and Earthwork Details Dollars Thousands

Overhead & Management	80
Duct Bank Materials & Installation	1610
Fluidized Thermal Backfill	620
Ancillary Traffic etc	70
Vaults	420
Conduit	<u>510</u>
Subtotal	\$3310

345-KV Cable and Accessories Details Dollars Thousands

Cable	3136
Installation	1145
Splices	450
Terminators	175
Ancillary Clamps Grounding Line box etc	189
Testing	<u>150</u>
Total	\$5245

**Mount Hope Underground Variation - In ROW
Cost Estimate Details**

UG Route Length (Miles) 1.11 miles

Description: 3 cables per phase, 3 splices per vault

Item	Cost
Civil / Site Work (Duct Bank)	
Admin/Mob/De-mob by Contractor	\$405,330
Material Testing	\$175,500
Construction Staking/Survey	\$23,400
Traffic Control, Flagger & Police	\$84,000
Existing Utility Locates (potholing)	\$1,607
Trench Excavation	\$322,218
Rock Excavation (Trench)	\$960,687
Existing Utility Relocation	\$16,619
HDD	\$0
Jack & Bore	\$0
Duct Bank (9'-8" PVC & (7)-2" PVC	\$3,061,071
Grounding System	\$379,000
Temperature Monitoring System	\$81,000
Fluidized Thermal Backfill (FTB)	\$560,898
Pavement Restoration	\$0
Plating	\$248,000
Traffic Signal Loop Detection Repair	\$0
Cathodic Protection	\$14,625
Communication Handholes	\$30,044
Contaminated Soils Testing and Disposal	\$1,365,247
Thermal Couple	\$29,250
Clearing and Grubbing / Access Road	\$1,104,597
Landscaping/Restoration	\$17,833
SUBTOTAL - Civil / Site Work (Duct Bank)	\$8,880,926
Civil / Site Work (Splice Vaults)	
Splice Vaults	\$1,320,000
Rock Excavation (Vault)	\$288,000
SUBTOTAL - Civil / Site Work (Splice Vaults)	\$1,608,000
Cable (Procurement and Installation)	
(9)-345KV XLPE Cables	\$8,043,393
Installation of (9)-345KV XLPE Cables	\$1,065,127
(2) Fiber Optic Cables -Relaying	\$65,837
Splices	\$1,931,400
Terminations	\$1,153,260
Spare Parts - cable, terminations, splices, etc..	\$1,052,500
SUBTOTAL - Cable (Procurement and Installation)	\$13,311,317
Transition Stations Construction (2 Sta)	\$18,842,450
SUBTOTAL - Mt. Hope UG Variation Construction	\$42,642,693
Engineering/Permitting/CM/PM (incl Co OH)	\$9,323,686
Escalation	\$3,787,747
AFUDC	\$508,763
Contingency	\$8,740,955
TOTAL - Mt. Hope Underground Variation	\$65,003,844

Conceptual Grade estimate (-25% to + 50% accuracy band).

Proposed 345-kV Bethel to Norwalk Project - Transmission Line Costs (\$,Thousands)							
Location	Element	Work Description	Quantity	Material	Contracted Services	NU Labor	Total
345-kV HPFF 9.4 Miles							
	Pipe and Accessories Section	Cable pipe, 8-inch nominal, pritec, per foot	100900	\$ 4,290.00	\$ 3,925.00	\$ -	\$ 8,215.00
		Spacers	3200	\$ 65.00	\$ 130.00	\$ -	\$ 195.00
		Excavation, no rock, per cubic yard, including hauling	20	\$ 2.00	\$ 55.00	\$ -	\$ 57.00
		Fluidized Thermal Backfill (FTB™)	2530	\$ 126.00	\$ 268.00	\$ -	\$ 394.00
		Duct encasement concrete	2700	\$ 95.00	\$ 268.00	\$ -	\$ 363.00
		Splicing trifurcator	4	\$ 98.00	\$ 344.00	\$ -	\$ 442.00
		Riser pipe stainless steel 5-inch	840	\$ 91.00	\$ 191.00	\$ -	\$ 282.00
		Cathodic protection	1	\$ 97.00	\$ 153.00	\$ -	\$ 250.00
		Pressurization plant	2	\$ 1,288.00	\$ 43.00	\$ -	\$ 1,331.00
		Leak detection system	1	\$ 993.00	\$ 344.00	\$ -	\$ 1,337.00
		Coated 2 inch pipe schedule 80 including valves, etc.	250	\$ 6.00	\$ 41.00	\$ -	\$ 47.00
		Gallons of polybutene dielectric fluid	179068	\$ 1,193.00	\$ 243.00	\$ -	\$ 1,436.00
		Vaults (including grounding)	22	\$ 993.00	\$ 497.00	\$ -	\$ 1,490.00
		Total Pipe and Accessories Section		\$ 9,337.00	\$ 6,502.00	\$ -	\$ 15,839.00
	Cable and Accessories:	345-kV cable	305508	\$ 29,550.00	\$ 1,147.00	\$ -	\$ 30,697.00
		Normal 3-phase joints	34	\$ 682.00	\$ 3,241.00	\$ -	\$ 3,923.00
		Semi stop joints with bypass piping	2	\$ 56.00	\$ 197.00	\$ -	\$ 253.00
		Complete terminators	12	\$ 1,311.00	\$ 104.00	\$ -	\$ 1,415.00
		Arresters	12	\$ 136.00	\$ 69.00	\$ -	\$ 205.00
		Total Cable and Accessories:		\$ 31,735.00	\$ 4,758.00	\$ -	\$ 36,493.00
	Communication Conduits:	Fiber-optic cable (by others)		\$ -	\$ -	\$ -	\$ -
		Fiber-optic cable splices (by others)		\$ -	\$ -	\$ -	\$ -
		Feet HDPE Conduit	100900	\$ 252.00	\$ 183.00	\$ -	\$ 435.00
		Hand holes	40	\$ 47.00	\$ 19.00	\$ -	\$ 66.00
		Total Communication conduits:		\$ 299.00	\$ 202.00	\$ -	\$ 501.00
	Temperature Monitoring System	Fiber-optic cable	51000	\$ 164.00	\$ 41.00	\$ -	\$ 205.00
		Fiber-optic cable splices (including enclosures)	5	\$ 5.00	\$ 19.00	\$ -	\$ 24.00
		2" HDPE conduit, feet	51000	\$ 80.00	\$ 28.00	\$ -	\$ 108.00
		Thermocouples, each	36	\$ 14.00	\$ 39.00	\$ -	\$ 53.00
		Test stations, each	18	\$ 7.00	\$ 40.00	\$ -	\$ 47.00
		Temperature probes, each	36	\$ 14.00	\$ 29.00	\$ -	\$ 43.00
		Total Temperature Monitoring System:		\$ 284.00	\$ 196.00	\$ -	\$ 480.00
	Duct Bank and Earthwork:	Excavation, no rock, per cubic yard, including hauling	40000	\$ 1,159.00	\$ 6,129.00	\$ -	\$ 7,288.00
		Soil backfill	17300	\$ 608.00	\$ 152.00	\$ -	\$ 760.00
		Excavation for vault	1800	\$ 23.00	\$ 141.00	\$ -	\$ 164.00
		Fluidized Thermal Backfill (FTB™)	20000	\$ 3,440.00	\$ -	\$ -	\$ 3,440.00
		Horizontal vertical drilling	1400	\$ 88.00	\$ 344.00	\$ -	\$ 432.00
		Jack and bore	185	\$ 298.00	\$ 2,865.00	\$ -	\$ 3,163.00
		Sheeting and shoring	5000	\$ 115.00	\$ 161.00	\$ -	\$ 276.00
		Pavement repair	650000	\$ 443.00	\$ 955.00	\$ -	\$ 1,398.00
		Curb repair	20000	\$ 13.00	\$ 52.00	\$ -	\$ 65.00
		Sidewalk repair	1200	\$ 4.00	\$ 6.00	\$ -	\$ 10.00
		Landscape restoration	1	\$ 64.00	\$ 97.00	\$ -	\$ 161.00
		Traffic control	1	\$ 33.00	\$ 1,091.00	\$ -	\$ 1,124.00
		Loam and seed	10000	\$ 33.00	\$ 48.00	\$ -	\$ 81.00
		Survey	1	\$ 33.00	\$ 161.00	\$ -	\$ 194.00
		Rock Excavation	1	\$ -	\$ 9,997.00	\$ -	\$ 9,997.00
		Total Duct Bank and Earthwork:		\$ 6,354.00	\$ 22,199.00	\$ -	\$ 28,553.00
	Engineering, Administration and Other	Includes planning, engineering, siting, surveying, land planning and drafting. Administrative costs including legal, purchasing, contract administration, project	1	\$ -	\$ 4,950.00	\$ 3,300.00	\$ 8,250.00
	Right of Way					\$ 500.00	\$ 500.00
		Total 345-kV HPFF		\$ 48,009.00	\$ 38,807.00	\$ 3,800.00	\$ 90,616.00

Note: ROW costs above represent legal, engineering, cost of land and easements and miscellaneous other NU labor and outside services