



Northeast
Utilities System

PURCHASE ORDER

All Purchase Order, Revision and Blanket Release numbers must appear on all Invoices Correspondence, Packing Sheets, and Bills of Lading.

PSS290-2 REV 10-08

Mail Invoice To:

PUBLIC SERVICE CO NH - GEN
P.O. BOX 5017
HARTFORD CT 06102-5017

Purchase Order : 02255681
Revision :
Release :
Printed : 06/25/10
Page : 1

Please Direct Inquiries to:

DAVID W. PACKARD
Title: SR SOURCING CONSUL.
Phone: 603-634-2299
Fax : 603-634-2449

Ext:

Vendor:

RICHARD LEVITAN
LEVITAN & ASSOCIATES INC
100 SUMMER ST STE 3200
BOSTON MA 02110

Primary Ship To: PUBLIC SERVICE NEW HAMPS GEN
STOREROOM
165 GOSLING RD
NEWINGTON NH 03801

Attention : EDWARD A. BEAUREGARD

Instructions & Notes

Provide a "Determination of the Real Option Value of Newington Station" per Levitan proposal dated June 23, 2010. Terms and conditions shall be as per previously negotiated "GTC Consulting Services dated 2.10.10 (for PO 02253736) which are attached for reference.

The confidentiality agreements: "Personal Confidentiality Information Agreement" signed February 11, 2010, and "Critical Infrastructure Information Non-Disclosure Agreement" signed April 23, 2010 shall apply and are attached for reference.

The summary of Levitan "Key Personnel" is attached for reference. Work will be performed on a time and materials basis. The applicable billing rates are contained in the proposal and are attached.

Work will not exceed the NTE cost of [REDACTED] without prior written PSNH approval.

Note: The Seller in accepting this Purchase Order, agrees to and accepts the NUSCO Purchase Order Terms and Conditions (Revised - October 16, 2008) on the reverse side of this order.



Northeast
Utilities System

PURCHASE ORDER

All Purchase Order, Revision and Blanket Release numbers must appear on all invoices Correspondence, Packing Sheets, and Bills of Lading.

PSR 001 REV 10-08

Invoice To:

PUBLIC SERVICE CO NH - GEN
P.O. BOX 5017
HARTFORD CT 06102-5017

Purchase Order : 02255681
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Page : 2

Instructions & Notes

Please sign and email the cover PO to David W. Packard.

Header Terms and Conditions - Text at End

Fac	Standard Name	Rev	S/P	Text	Title
	SAR12	002	S	Y	ACKNOWLEDGE, CONTR. AGREES TO T&CS, SIGN AND RETUR
	SRO20	002	S	Y	INVOICES WILL NOT BE PAID WITHOUT REFERENCE TO PO
	STA19	000	S	Y	TAX, SALES TAX NOT APPLICABLE IN NEW HAMPSHIRE
	VSP10	002	V	Y	THE COMPANY REPRESENTATIVE MONITORING WORK

Line	Qty	UP	Item Description	Unit Price	Extension
0001	1	LO	Catalog ID:		

Qty: 1 Delivery Date: 06/25/10

NON-TAXABLE

NEWINGTON STATION STUDY

CONTINUED UNIT

OPERATION STUDY TO BE FILED WITH LCIRP

Contact information:

Erica L. Menard

Public Service Company of New Hampshire

(603) 634-2261

menarel@nu.com

in accordance with revised proposal

dated June 23, 2010

and personnel information within

original proposal

in response to RFX-00155-2010

Purchase Order Total Amount

Note: The Seller in accepting this Purchase Order, agrees to and accepts the NUSCO Purchase Order Terms and Conditions (Revised - October 16, 2008) on the reverse side of this order.



Northeast
Utilities System

PURCHASE ORDER

All Purchase Order, Revision and Blanket Release numbers must appear on all Invoices Correspondence, Packing Sheets, and Bills of Lading.

PSC890-2 REV 10-08

Mail Invoice To:

PUBLIC SERVICE CO NH - GEN
P.O. BOX 5017
HARTFORD CT 06102-5017

Purchase Order : 02255681
Revision :
Release :
Printed : 06/25/10
Page : 3

PO HAS BEEN PROPERLY AUTHORIZED BY BUYER
David W. [Signature] 6/25/10

Variable Terms and Conditions

Line Fac Standard Name Rev Variable Text
VSP10 002 THE COMPANY REPRESENTATIVE MONITORING WORK
Variable: VSP10 Type: PURCH
Title : THE COMPANY REPRESENTATIVE
THE COMPANY REPRESENTATIVE MONITORING YOUR PERFORMANCE UNDER THIS PURCHASE
ORDER IS ERICA MENARD

Standards and Procedures Text at End

Standard: SAR12 Type: PURCH
Title : ACKNOWLEDGE, CONTR. AGREES TO T&CS, SIGN AND RETURN
CONTRACTOR HEREBY ACKNOWLEDGES RECEIPT OF, UNDERSTANDING OF, AND
AGREEMENT TO ALL TERMS AND CONDITIONS AND TECHNICAL REQUIREMENTS
CONTAINED IN OR INCORPORATED BY REFERENCE IN THIS PURCHASE ORDER.
A SIGNED COPY OF THIS PURCHASE ORDER MUST BE RETURNED TO THE OWNER
WITHIN FIVE (5) DAYS AFTER RECEIPT OF THIS PURCHASE ORDER BY
CONTRACTOR.

[Signature] 6/25/10

> SIGN NAME DATE
Richard Levitan

> PRINT NAME
President

> TITLE
Levitan & Associates, Inc.

> COMPANY

Note: The Seller in accepting this Purchase Order, agrees to and accepts the NUSCO Purchase Order Terms and Conditions (Revised - October 16, 2008) on the reverse side of this order.



Northeast
Utilities System

PURCHASE ORDER

All Purchase Order, Revision and Blanket Release numbers must appear on all Invoices Correspondence, Packing Sheets, and Bills of Lading.

PS8890-2 REV. 10-08

Mail Invoice To:

PUBLIC SERVICE CO NH - GEN
P.O. BOX 5017
HARTFORD CT 06102-5017

Purchase Order : 02255681
Revision :
Release :
Printed : 06/25/10
Page : 4

Standard: SRO20

Type: PURCH

Title : INVOICES WILL NOT BE PAID WITHOUT REFERENCE TO PO

INVOICES WILL NOT BE PAID IF THEY ARE SUBMITTED WITHOUT A TYPED REFERENCE TO THE APPROPRIATE PURCHASE ORDER NUMBER . PLEASE PUT THE ENTIRE PURCHASE ORDER NUMBER, INCLUDING ANY REVISION NO. AND BLANKET RELEASE NO., FOR A TOTAL OF 16 DIGITS IF REQUIRED, ON YOUR INVOICE AND MAIL THE INVOICE TO THE ADDRESS SHOWN ON THE TOP OF THE PURCHASE ORDER. PO REFERENCE NUMBERS MUST BE TYPED ON THE FACE OF THE INVOICE. HANDWRITTEN PO REFERENCE NUMBERS CANNOT BE ACCEPTED.

Standard: STA19

Type: PURCH

Title : TAX, SALES TAX NOT APPLICABLE IN NEW HAMPSHIRE

FOR NEW HAMPSHIRE PURCHASES, THE FOLLOWING APPLIES:
SALES TAX NOT APPLICABLE IN NEW HAMPSHIRE.

*** * * End of Purchase Order * * ***

Note: The Seller in accepting this Purchase Order, agrees to and accepts the NUSCO Purchase Order Terms and Conditions (Revised - October 16, 2008) on the reverse side of this order.

LEVITAN & ASSOCIATES, INC.
MARKET DESIGN. ECONOMICS AND POWER SYSTEMS

100 Summer Street
Suite 3200
Boston, MA 02110
Tel: (617) 531-2818
Fax: (617) 531-2826

June 23, 2010

Erica L. Menard, Supervisor- Business Planning & Performance Analysis
David W. Packard, Senior Sourcing Consultant
Public Service of New Hampshire, P.O. Box 330
Manchester, New Hampshire 03105-0330

Re: Proposal Addendum to Determine the Real Option Value of the Newington Station

Dear Ms. Menard and Mr. Packard:

Thank you for providing Levitan & Associates, Inc. (LAI) with the opportunity to amend our second proposal of June 20, 2010, to address how we will quantify the benefits associated with Public Service of New Hampshire's (PSNH's) ownership and operation of the 400 MW dual fuel capable Newington Station (Newington). This addendum replaces LAI's second proposal of June 20, 2010 and our original proposal of April 26, 2010, including all pricing for the individual work tasks delineated therein. We have done our best to tailor our proposed methodology and research emphasis to incorporate the PSNH steering committee's constructive comments and recommendations based on discussions in your office on June 16th, subsequent email, and our June 23rd conference call, in which study objectives have been prioritized and study methods agreed.

While LAI has defined our general approach, methodology, and data requirements in this addendum, we reserve the right to make additional analytic refinements and data requests as appropriate. Notably, we will *not* make any structural modifications to the valuation technique that addresses the potential impact of the proposed HQ HVDC transmission line to southern New Hampshire, nor will we consider PSNH's portfolio attributable to interaction effects between Newington and other generation assets. In addition to clarifying and extending our modeling capabilities and methods, we also address deliverables and price. Prior background information regarding LAI's qualifications and experience has been omitted from this addendum.

Modeling Capability

LAI licenses various models and databases that will be used in this study. We also license other modeling tools for development of customized proprietary financial and mathematical models. A number of LAI proprietary models will help support the quantification of plant commitment and dispatch, generation entry / exit, price and load volatility, and customer load patterns and migration, among other variables. LAI also has a capacity price forecasting model that reflects ISO-NE's Forward Capacity Market (FCM). LAI's simulation, financial, and statistical models will support the study objectives set forth by the PSNH steering committee, thereby providing a solid foundation for LAI's testifying expert(s) to convey to the New Hampshire Public Service Commission (NH PSC) the reasonableness of our findings.

Valuation Approach

Newington's declining capacity factor has raised the question of the station's value to ratepayers. Current weak capacity prices coupled with the present outlook for capacity prices during a period of capacity overhang in New England portends weak financial performance when Newington is considered on a stand-alone basis. In conducting this study, the primary objective is to determine Newington's value to PSNH's retail customers when we consider both the intrinsic and extrinsic value of the sundry benefits ascribable to Newington relative to the costs otherwise borne by PSNH's retail customers if PSNH could no longer lay claim to Newington's energy, capacity, and hedge or "insurance" benefits. Part of this assessment will therefore reflect the value to New England at large through Newington's daily participation in either the Day Ahead Market (DAM) or Real Time Market (RTM).

Newington provides operational flexibility by: (i) its moderate startup cost and time, (ii) quick ramp rate relative to other steam turbine generators (STGs) and other PSNH resources, (iii) its ability to burn a mix of residual fuel oil (RFO) and/or natural gas, and, (iv) its ability to avoid costly fixed firm transportation reservation rates on the Portland Natural Gas Transmission System (PNGTS). Newington provides financial benefits directly to PSNH customers due to the unit's low net book value relative to the potential uncertain cost of capacity under ISO-NE's evolving FCM. The empirical challenge is to determine whether or not Newington provides PSNH with an effective market hedge against future uncertain energy, capacity, ancillary service, fuel, emission prices, and load. The uncertainty about load relates not only to the overall level of customer usage, but also to the number of customers from month-to-month in response to market and regulatory incentives that allow migration from (to) competitive suppliers to (from) PSNH for backstop service. Also, Newington can provide transmission security benefits, but the determination of such transmission security benefits under ISO-NE's Local Sourcing Requirements or Transmission Security Analysis is not part of LAI's study approach.

In this study, LAI will derive the value of PSNH's continued ownership and operation of the Newington Station. We will quantify the real option value (ROV) of the asset based on LAI's technical assessment of the evolving FCM, and calibration of historical hourly energy and ancillary services prices to monthly or annual on-peak and off-peak energy forward prices. Underlying fuels and emissions markets will be included in the analysis, again based on calibration to their monthly or annual forward prices. The analysis of FCM prices will consider ISO-NE load uncertainties and future potential Forward Capacity Auction (FCA) "trajectories" based on changes to dynamic and static de-list bids, other revisions to the mitigation rules, and adjustments to the Alternative Price Rule (APR) when Out of Market (OOM) resources are deemed to depress the capacity price. On an expedited track, other issues raised by FERC in the FCM Redesign Order will be considered, only as appropriate. Therefore we will want to have one meeting with the PSNH steering committee and, perhaps, other NU FCM Working Group participants to ensure that the range of FCA trajectories has been reasonably defined.

LAI will also estimate any additional insurance-like value based on consideration of the appropriate cost of market price and load volatility risk avoidance. By postulating the loss of Newington, we would estimate plant value as a financial hedge relative to the alternative of a purchased hedge instruments strategy. We will assess a strategy where PSNH does business with creditworthy counterparties by rolling purchases of strips of call and put options. Call options would provide energy price protection, while straddles (paired call and put options) would provide load volumetric protection.

In accord with the three tasks previously formulated, our proposed approach is described below.

Task 1 – Qualitative Analysis of Economic and Reliability Value

In the first work task we will identify, describe, and summarize the conditions where Newington provides future economic and reliability benefits to PSNH's customers and to the ISO-NE at large. The planning horizon is 2011 to 2020. We will report the daily and longer-term operating benefits of being able to schedule energy from Newington to serve PSNH's customers' requirements. This task will provide the NH PSC with context and perspective regarding the building block assumptions used in the quantitative analysis.

We will review and evaluate:

- PSNH's reliance on Newington to self-schedule energy when the all-in, out-of-pocket cash cost of scheduling generation from Newington is in-the-money based on dispatch scheduling protocols commonly employed by generators throughout New England. We will review the plant's operating cost relative to energy prices on a locational basis when Newington has operated.
- Newington's locational benefits in the broader context of the ISO-NE system. Newington's contribution to system reliability will be described given its location in the New Hampshire area. On a qualitative basis, we will report the locational benefits of not being bottled when the ME-NH interface is constrained, if applicable. We will review ISO-NE data on any local reliability issues in the New Hampshire area.
- ISO-NE's Regional System Planning (RSP) studies of the Seacoast area, including Portsmouth, where Newington provides ISO-NE with dependable capacity regardless of operating constraints on PNGTS or other pipelines serving northern New England. We will identify material uncertainty factors in the Seacoast area, such as high load growth or generating resources that may be at risk of retirement.
- Potential repowering of Newington in order to take advantage of existing electrical and natural gas interconnections, oil tankage and conversion capability to low sulfur diesel, community support, and other infrastructure capability.

- Key short-term and long-term uncertainty drivers. The economic theory of real options will be presented, including easily understandable illustrations of plant dispatch, fuel switching/blending, and Newington's multiple product bidding flexibility. We will highlight the plant's ability to switch or blend fuels to mitigate against fuel and emission allowance price uncertainty.

Task 2 – Quantitative Analysis of Economic and Additional Insurance Value

The scope of the quantitative assessment will be centered on Newington's operational and financial value, including the additional hedge or insurance value it provides to PSNH customers. As previously mentioned, LAI's quantitative assessment will not include Newington's contribution to local or system reliability. At this juncture, we do not intend to compute the site-specific repowering option value.

The first phase of the analysis is to forecast expected energy, capacity, fuel, and emissions prices. This set of consistent multi-commodity forecasts may be also be used by PSNH in preparing its IRP. For this purpose we use a combination of available forward market information, fundamental models, and statistical calibration and extrapolation procedures. This phase has several steps.

- We will forecast expected monthly fuel prices and expected annual emission allowance prices as inputs to our energy and capacity market models. We will use forward prices for natural gas and oil for all years, and emission allowance forward prices in the early years and published long-term forecasts in the later years, together with calibration to fuel prices at Newington based on historic locational and product basis spreads.
- We will use ISO-NE historic DAM and RTM hourly energy prices to calibrate and shape NYMEX MassHub monthly and annual forward prices to the hourly level. Beyond the horizon of available energy forward prices, we will extend the energy price forecast based on NYMEX Henry Hub gas forwards and the market heat rates implied by the current relationship of MassHub energy and Henry Hub gas forward prices.
- We will update and run our proprietary capacity price forecasting model. This model will include the results of FCAs #1-3, and will reflect LAI's professional judgment regarding APR functionality in response to OOM resources that may affect FCA capacity prices over the planning horizon. The FCM net cost of new entry (CONE) method, including deducts for peak energy rents will be quantified. In light of rapidly changing regulatory events coupled with LAI's expectation that FERC will approve ISO-NE's recommended position, one meeting with the PSNH steering committee and other NU FCM Working Group participants is anticipated.

The second phase of the analysis is to simulate a set of stochastic paths for the uncertain operating variables of fuel, energy, and emission allowance prices. The stochastic fuel and

energy prices in each scenario will be formed first at the daily level using a set of correlated two-factor (short-term and long-term) lognormal mean reversion equations for the uncertain input and output commodity prices. The energy prices will also include an overlay of hourly price fluctuations using historical simulation. The expected capacity, energy, fuel, and emission price forecasts will be used to "seed" the stochastic price forecasting model with the expected seasonal shape and long-term curve for each commodity. Historical daily and hourly prices for at least the past three years will be used to estimate the statistical mean reversion, volatility, and correlation parameters for the short-term stochastic components. Either long-dated forward energy, oil, and gas product prices, option implied volatilities, or many years of historical spot prices will be used to estimate the volatility and correlation parameters of the long-term stochastic components of the input and output commodity prices. Importantly, the extra ancillary services revenue attributed to Newington will be based on a simplified analysis of the relationship between historical annual energy and ancillary service revenues. In light of our production milestones and budget objectives, we do not think it is necessary to conduct technical analysis of Newington's ancillary service revenue potential.

The third phase of the analysis will use Monte Carlo unit operation simulation to estimate Newington's operational performance and net margin for the set of stochastic fuel, energy, emissions allowance, and capacity prices. To compute real option value, LAI will model unit commitment and dispatch to reflect Newington's dispatch, fuel switching/blending, and multiple product (energy into DAM v. RTM) flexibilities. Working closely with the PSNH steering committee, LAI will need extensive information on Newington's operational costs and constraints. This information requirement is delineated in this addendum.

In light of Newington's relatively short startup and shutdown times, the commitment and dispatch optimization model will have a daily scope. The dispatch model will be designed to respect the station's heat rate curve, emission rates on each fuel, minimum up and down times, start costs, ramp rate, and any fuel blending/switching limits. LAI may use statistical software for the commitment and dispatch analysis if the model can be optimized without exposing LAI to an additional work burden that has not been contemplated in formulating the price to conduct this advisory service.

Many simulation paths will be run; hence, station results will be rolled-up to the monthly or annual level for reporting of generation, revenues, costs, and gross margin. We will report summary operating results by time period and across the probability distribution. The expected value of the net operating revenues will be calculated as the average of the individual simulation path net operating revenues. To facilitate the NH PSC's appreciation for the station's ROV, we will prepare graphs and tables representing the distribution of results. Presumably, we will use PSNH's weighted average cost of capital (WACC) as the discount rate – however, we will need to hear back from the steering committee regarding other financial considerations that may warrant a basis point deduct or adder to WACC. The overall NPV would represent the economic value of continued ownership and operation of Newington. The intrinsic value of Newington's net operating revenues will

be calculated in order to estimate its real option premium value by subtracting the intrinsic value from the expected stochastic value.

The fourth phase of the analysis is to estimate any additional hedge or insurance-like value of continued Newington operation. We understand that there are times when PSNH faces extreme price and volumetric risk, and commits Newington on a conservative basis, thereby resulting in cash losses on an expected value basis. We interpret PSNH's conservatism as a physical hedge against the commitment and dispatch that otherwise would be scheduled in light of expected DAM prices and loads. This operational strategy represents price and volumetric hedge protection that otherwise would need to be obtained by purchasing financial options. The scope of this analysis will focus on Newington and PSNH load, without consideration of PSNH's other owned or contracted physical assets or PSNH's financial contracts. Instead, LAI will conduct two proxy analyses.

- First, historical data on DAM hourly energy spot prices and published call option prices will be used in a regression model to estimate the size of the risk premium over the risk-neutral price of the options to estimate the \$/MWh cost of hedging price risk by time-of-day and season. This analysis will be supplemented with other available studies that have attempted to estimate the size of the risk premium. The same level of risk premium will be projected over the 10-year period since buying this price protection can be deferred until a few months to a year or two before delivery.
- Second, the hedge value of insuring against volumetric uncertainties of customer migration into or from PSNH and weather-based load uncertainty will be estimated by using a closed-form option valuation method. Specifically, the model will use a strip of straddle options (call option and put option at the same strike) to hedge load volatility based on a confidence interval of load uncertainty.

Task 3 – Expert Witness Testimony and Support

LAI has a number of testifying experts available to support PSNH's regulatory filing before the NH PSC. The principal witness will be Richard Carlson, Ph.D., Managing Consultant, who will be primarily responsible for the financial and mathematical work tasks defined in this addendum. Dr. Carlson has extensive experience with individual asset and portfolio level cash flow at risk analysis and options valuation.

Other LAI experts may be required to support PSNH's regulatory filing to support integrated resource planning issues, standard professional conventions associated with wholesale power procurement in New England to serve retail customers, the FCM forecast, transmission reliability, fuels, Newington's operational capability, among other things. Other testifying experts can include Seth Parker, Vice President; Jack Elder, Manager-Market Design; and/or Richard Levitan, President.

Data Inputs Required

LAI will require operating and financial data from PSNH covering Newington's market products, performance characteristics, recent and planned maintenance / upgrade requirements, potential CapEx requirements to meet state and/or federal environmental compliance requirements, RFO transport and storage costs, transport adders incurred on PNGTS relative to Algonquin Citygates, among other things. We would also like to review any prior short-term or long-term studies that have been conducted by PSNH and your advisors. LAI intends to obtain all other data from public sources, in particular, ISO-NE.

We respectfully request the following specific items at the outset (additional requests may be made later):

- Current and projected (if any planned changes) Newington operating characteristics:
 - Maximum operating capacity by season or month (MW)
 - Minimum operating capacity (MW)
 - Maximum spinning reserve capability (MW)
 - Planned maintenance schedule (dates) by year
 - Expected forced outage rate (%)
 - VOM cost on oil (\$/MWh)
 - VOM cost on gas (\$/MWh)
 - Cold start cost (\$) and/or start fuel (MMBtu)
 - Hot start cost (\$) and/or start fuel (MMBtu)
 - Cold start time (hours)
 - Hot start time (hours)
 - Minimum run time (hours)
 - Minimum down time (hours)
 - Ramp rate (MW/minute)
 - Average Heat rate on oil (MMBtu/MWh)
 - Average Heat rate on gas (MMBtu/MWh)
 - Limits on fuel blending/switching (if any)
 - SO₂ emission rate on oil (lb/MMBtu)
 - NO_x emission rate on oil (lb/MWh)
 - NO_x emission rate on gas (lb/MWh)
 - EPA limit or company policy on maximum sulfur content of oil (by year)
- Historical operating performance of Newington for the past 10 years, in Excel or Access format:
 - Forced outages (MW by date/hour)
 - Maintenance outages (by date/hour)

- DAM energy sales (MWh by date/hour)
- RTM energy sales (MWh by date/hour)
- Self-generation (MWh by date/hour)
- Uplift payments (\$ by date/hour)
- Spinning reserve capacity sales (MW by date/hour)
- AGC capacity sales (MW by date/hour)
- Fuel use by type (MMBtu by date/hour)
- Cost of RFO delivered to Newington
- Basis adder payable to marketer or third party on PNGTS
- Description of any constraint on PNGTS affecting gas availability to Newington, including imbalance resolution cost, penalty, ratable-take requirement
- Algonquin Citygates benchmark prices on days when natural gas was used
- Brief description of day-ahead and intra-day gas scheduling flexibility during the heating season, November through March, versus non-heating season
- Any internal or external studies that quantify the price of risk built into daily or monthly exercisable call options
- Any reports or studies of recent and planned maintenance or upgrade projects
- Any prior short-term or long-term studies that have been conducted for Newington
- Historical PSNH customer and load data for the past 10 years, in Excel or Access format:
 - Monthly customer count by class
 - Hourly load by customer class

LAI intends to obtain all other data from public sources, ISO-NE, or a vendor of market price data.

Deliverables

Four deliverables will be provided:

1. Abstract of the report, including preliminary mock-ups of presentation charts and tables
2. Excel file of forecasted expected capacity, energy, fuel, and emission prices suitable for inclusion in PSNH's IRP
3. Draft report (30-40 pages)
4. Final report.

Timeline

LAI will exercise reasonable efforts to meet the overall time objective of delivering a final report in early September 2010. The current expected schedule has seven weeks to prepare

Erica L. Menard, David W. Packard

June 23, 2010

Page 9

a first working draft, one week for PSNH to return comments to us, and one week for LAI to edit the final report. These are aggressive production milestones that will therefore necessitate active involvement by the PSNH steering committee, timely turnaround of required data inputs to the analysis and good access to the steering committee throughout July and August.

Price

The Not-to-Exceed (NTE) cost to conduct this study is [REDACTED], including the work products requested by PSNH to support your IRP filing requirements. The NTE cost includes LAI's miscellaneous licensing fees payable to MathWorks or Stata, ICAP, and Bloomberg. To the extent our actual fees are lower than the NTE amount, we will charge you our actual fees to complete the study. The NTE amount covers the finalization of the report to be filed with the NH PSC, but it does not include any professional services associated with the preparation of expert testimony or other administrative support services throughout the hearing phase in 2011.

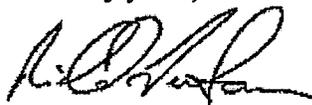
All consulting services performed after October 1st will be invoiced on a time and materials basis under our standard fees, a copy of which is attached hereto.

LAI has no conflicts of interest that would impair our ability to represent PSNH's interests fully before the NH PSC throughout the duration of this engagement. LAI has submitted a request to the CT DPUC as well as the DPUC's FERC counsel, and such request for a favorable determination regarding the absence of a conflict of interest has been granted.

If you have additional information requirements or concerns, please do not hesitate to contact me at 617-531-2818 or via email at rll@levitan.com.

We look forward to working closely with PSNH in the months ahead and toward the privilege of this engagement.

Sincerely yours,



Richard L. Levitan
President

PRICING POLICY AND BILLING TERMS

Fees for services performed by the LAI project team will be billed under LAI's standard rates for services. Each consultant has a specific billing rate indicated below; consultants bill actual time spent on the assignment calculated to the nearest quarter hour.

<u>Consultant</u>	<u>Hourly Rate</u>
R.L. Levitan	[REDACTED]
R.C. Yardley	[REDACTED]
J.R. Bitler	[REDACTED]
S.G. Parker	[REDACTED]
E.G. Cool	[REDACTED]
R.L. Carlson	[REDACTED]
J.J. Elder	[REDACTED]
M.C. Lints	[REDACTED]
R.J. Bolbrock	[REDACTED]
P.L. Curlett	[REDACTED]
W.R. Luthern	[REDACTED]
T.M. Halleran	[REDACTED]
E.K. Tsikirayi	[REDACTED]
B.L. Shapiro	[REDACTED]
D.A. Rigos	[REDACTED]
S. Pierce	[REDACTED]
M.J. DeCoursey	[REDACTED]
J.A. Lacika	[REDACTED]
M.L. Onore	[REDACTED]
D.L. Petrucci	[REDACTED]
M.B. Shapiro	[REDACTED]
Research Assistants	[REDACTED]

BILLING

Clients will receive a monthly invoice issued the first week of each calendar month. All invoices will be accompanied by a detailed description of services performed by the individual consultants who performed work activities. Payment is due 30 days after the invoice date. LAI reserves the right to apply interest on outstanding balances beyond 60 days.

EXPENSES

While consultants are on assignment, expenses will be billed on an as-incurred basis. Expenses include telephone, travel, and miscellaneous report preparation costs.

TIMING

LAI will be prepared to commence work within 10 calendar days of our notification to proceed. Work products can be scheduled to accommodate client's timing requirements to the maximum extent possible.

NORTHEAST UTILITIES SERVICE COMPANY

GENERAL TERMS AND CONDITIONS CONSULTING SERVICES

1. DEFINITIONS.

- 1.1 **ACCEPTANCE:** All or any portion of the Work shall be deemed to have been accepted as complying with the terms of the Contract thirty (30) days following Consultant's notice to Utility that Work has been completed in full compliance with the Contract, unless Utility provides Consultant within such thirty (30) day period written objections describing how the Work is incomplete or is not in compliance with the Contract.
- 1.2 **APPROVAL:** Whenever Utility provides its approval or authorization for Consultant's proposed action, such approval or authorization represents only the consent of Utility, and shall neither relieve Consultant of its obligation to fully comply with the terms of the Contract nor substitute Utility's judgment for that of Consultant concerning the propriety, usefulness, or suitability of such action in fulfilling Consultant's obligations concerning the Work.
- 1.3 **CONSULTANT:** The entity issued a Purchase Order by Utility.
- 1.4 **CONSULTANT'S REPRESENTATIVE:** The individual identified by Consultant with authority to act on behalf of Consultant in performance of the Contract.
- 1.5 **CONTRACT:** The collective term used to describe the documents comprising each agreement between the parties for services, equipment or materials to be supplied to Utility by Consultant, under the authority of Utility's Purchase Order, including without limitation, these General Terms and Conditions. The preprinted terms set forth on the back of each page of Utility's Purchase Order shall not bind either party.
- 1.6 **DIRECT, INCREMENTAL COSTS:** A measure of all reasonable charges incurred by a party, including labor, fringe benefits, charges for direct supervisory personnel, equipment, materials, rental charges, and as-billed charges of subcontractors/suppliers; excluding profit.
- 1.7 **HUBZONE SMALL BUSINESS CONCERN:** A small business concern located in a historically underutilized business zone, which appears on the List of Qualified HUBZone Small Business Concerns maintained by the Small Business Administration.
- 1.8 **INFORMATION:** All intellectual property, computer software and documentation, studies, data, reports, documents, designs, plans, drawings, calculations, specifications or other information, in whatever form or media.
- 1.9 **MINORITY OWNED SMALL BUSINESS CONCERN:** A small business concern (i) Not less than fifty one percent (51%) owned by one or more individuals that are Black American, Native American, Hispanic American, Asian, Pacific Islander or

Subcontinent Asian American, and (ii) The management and daily business operations of which are controlled by one or more individuals that are Black American, Native American, Hispanic America, Asian, Pacific Islander or Subcontinent Asian American.

- 1.10 **SERVICE-DISABLED VETERAN-OWNED SMALL BUSINESS CONCERN:** A small business concern (i) Not less than fifty one percent (51%) of which is owned by one or more service-disabled veterans, as defined in 38 U.S.C. 101(2) and 38 U.S.C. 101(16), or, in the case of any publicly owned business, not less than fifty one percent (51%) of the stock of which is owned by one or more service-disabled veterans; and (ii) The management and daily business operations of which are controlled by one or more service-disabled veterans or, in the case of a veteran with permanent and severe disability, the spouse or permanent caregiver of such veteran.
- 1.11 **SITE:** The premises of Utility at which Work is to be performed.
- 1.12 **SMALL DISADVANTAGED BUSINESS CONCERN:** A small business concern that represents, as part of its offer, that (1) It has received certification as a small disadvantaged business concern consistent with 13 CFR 124, Subpart B; (2) No material change in disadvantaged ownership and control has occurred since its certification; (3) Where the concern is owned by one or more individuals, the net worth of each individual upon whom the certification is based does not exceed \$750,000 after taking into account the applicable exclusions set forth at 13 CFR 124.104(c)(2); and (4) It is identified, on the date of its representation, as a certified small disadvantaged business in the database maintained by the Small Business Administration's Central Contractor Registration.
- 1.13 **SUBCONTRACTOR:** Any subcontractor, subconsultant, licensor or supplier of any tier who furnished equipment, material and/or services related to the Contract under the Contract, or at the direction and control of Consultant.
- 1.14 **UTILITY:** Northeast Utilities Service Company, a Connecticut corporation ("NUSCO"), as agent for the company or companies listed in the "Furnish and Ship To" block on the face of the first page of the Purchase Order under which the Contract is issued.
- 1.15 **UTILITY'S REPRESENTATIVE:** The individual(s) identified in Utility's Purchase Order with authority to act on behalf of Utility concerning the Contract.
- 1.16 **VETERAN-OWNED SMALL BUSINESS CONCERN:** A small business concern (1) Not less than fifty one percent (51%) of which is owned and by one or more veterans (as defined at 38 U.S.C. 101(2)) or, in the case of any publicly owned business, not less than fifty one percent (51%) of the stock of which is owned by one or more veterans; and (2) The management and daily business operations of which are controlled by one or more veterans.
- 1.17 **WOMEN-OWNED SMALL BUSINESS CONCERN:** A small business concern (1) That is at least fifty one percent (51%) owned by one or more women, or, in

the case of any publicly owned business, at least fifty one percent (51%) of the stock of which is owned by one or more women; and (2) The management and daily business operations of which are controlled by one or more women.

1.18 **WORK:** Materials, equipment and the scientific, architectural, technical, engineering, training, supervisory, construction, or other services provided by Consultant and any subcontractors, if any, under the Contract.

2. **CONSULTANT'S BILLING RATES.** Whenever Consultant performs Work on a time and materials basis (including but not limited to Work performed as a change or addition to the scope of Work described in the Contract) Consultant shall be compensated at the Billing Rates as set forth in the Purchase Order. Whenever Consultant performs Work at its Direct Incremental Cost, Consultant shall be compensated at eighty percent (80%) of the rates set forth in the Purchase Order.

3. **TERMS OF PAYMENT.**

3.1 Utility shall pay Consultant the charges indicated in properly itemized and supported invoices for Work performed by Consultant and Accepted by Utility in accordance with the terms of each Contract, less adjustments for prepayment, defective Work, or disputed items.

3.2 Each invoice shall be certified in writing as correct by Consultant's Representative and shall be itemized to fully describe each element of cost charged to Utility. For Work charged on the basis of time and material, Consultant shall bill in accordance with Utility's billing instructions.

3.3 Utility may withhold payment of all or part of any invoice to such extent as may be necessary to protect itself from loss caused by:

3.3.1 defective Work not remedied;

3.3.2 claims filed or reasonable evidence indicating probable filing of claims by other parties against Consultant or Utility in connection with the Work;

3.3.3 failure of Consultant to make payments properly to subcontractors for material, labor or equipment;

3.3.4 reasonable doubt that the Work can be completed for the unpaid balance of the Contract;

3.3.5 reasonable indication that the Work will not be completed within the Contract time;

3.3.6 unsatisfactory prosecution of the Work by Consultant;

3.3.7 failure of the Consultant to provide millennium compliant materials, equipment, and/or services; or

3.3.8 failure of Consultant to perform any of its obligations under the Contract.

When the above grounds are removed or Consultant provides a surety bond satisfactory to Utility which will protect Utility in the amount withheld, payment will be made of the amounts withheld. When deemed reasonable by Utility, Utility may use such funds to rectify the situation giving rise to the withholding of funds.

- 3.4 Utility shall pay each invoice or provide written objections to all or any portion of each invoice within thirty (30) days after receipt by Utility. If Utility disputes a portion of an invoice, Consultant may submit a revised invoice for the undisputed amount and Utility shall pay such undisputed portion within thirty (30) days.
- 3.5 Except for Work performed at a fixed price, Consultant shall make available to Utility during the Work and for a period of three (3) years following Acceptance of all Work, all source documents necessary to verify the elements of all billable charges, including but not limited to: each worker's name, charge classification, and hours worked; computer usage summaries; and original documentation of all reimbursable expenses (e.g. receipts for travel, business expense and employee expense). Upon five (5) days prior notice by Utility, this information shall be available for audit by Utility during normal business hours, at Consultant's principal office or at any other location agreed to by the parties.

4. TAXES.

4.1 Taxes on Utility's Purchases from Consultant. Consultant's price(s) and any Billing Rates that apply under the Contract exclude any and all present and future Federal, state, county, municipal or other jurisdiction's sales, use, excise or other taxes that may apply to Utility's purchase of the Work. For a period of three (3) years following completion of the Work, Utility shall pay to Consultant any such taxes that Consultant is obligated by law to collect from Utility for Work accepted and purchased by Utility, provided that Consultant submits written notice to Utility within fourteen (14) days of Consultant's receipt of notification of any imposition of such taxes. Utility may, however, direct Consultant to withhold payment and to contest the amount or validity of any such tax imposition. Consultant shall fully cooperate with Utility in any such tax contest. Utility shall reimburse Consultant for any interest or penalties actually paid by Consultant as a result of Utility's exercise of its right to contest the imposition of any taxes.

4.2 Taxes on Consultant's Purchases. If Utility informs Consultant that Utility has a tax exemption certificate or a direct pay permit that applies to a specified portion of the Work, Consultant shall notify its Subcontractors and suppliers that their services performed for, materials supplied for Consultant's use in, and/or equipment supplied for installation as part of the specified "tax exempt portion" or "direct pay portion" of the Work are either exempt from sales and use taxes or Utility pays such taxes directly. Consequently, these Subcontractors and suppliers should not collect such taxes from Consultant and Consultant's prices and Billing Rates to Utility should reflect such tax exemption or Utility's direct payment on Consultant's purchases from Subcontractors and suppliers for the tax exempt or direct pay portion of the Work. Subcontractors and suppliers

providing services, materials and or equipment for any portions of the Work that are neither tax exempt nor direct pay shall apply any normally applicable sales or use taxes to such "normal tax" portions of the Work and Consultant's prices and Billing Rates will be deemed to include any and all applicable taxes on such normal tax portions of the Work. If Utility does not inform Consultant that it has a tax exemption certificate or a direct pay permit that applies to a portion of the Work, Consultant should presume that its purchases from Subcontractors and suppliers associated with the Work are subject to any applicable sales and/or use taxes on such purchases and Consultant will be deemed to have included any and all applicable taxes on its purchases from Subcontractors and suppliers in the prices and Billing Rates stated the Contract.

4.3 Income and Payroll Taxes. Notwithstanding any provision of the Contract, Utility shall not be required to pay or reimburse Consultant for any taxes levied against Consultant's income or payroll.

4.4 Non-Resident Tax Bonds. If required by applicable law, Consultant and all Subcontractors shall provide to Utility a certificate of compliance with the non-resident contractor bonding provisions applicable to the Work. Consultant shall furnish such certificate to Utility in the case of (i) Consultant, no later than the earlier to occur of thirty (30) days after the date of the Contract, or the date of commencement of the Work; and (ii) each Subcontractor, within the earlier to occur of thirty (30) days after Consultant's retention thereof, or the date of commencement of the Work under such subcontract.

5. CHANGES AND ADDITIONS.

5.1 Either party may request changes or additions to the Work by submitting a written request to the other. Changes requested by Consultant shall not, however, be implemented until approved in writing by Utility. All changes shall be made in accordance with approved Utility procedures.

5.2 Utility shall have the right to require Consultant to make changes or additions that are of the character described in the scope of Work to the extent such changes or additions are within the general expertise of Consultant's forces performing Work. If such changes or additions are scheduled to be completed by or within six (6) months following the then scheduled completion date of the Contract, such Work shall be performed at Consultant's time and material rates in effect for the Contract, unless the parties agree in writing to another method of compensation.

5.3 If a change or addition will increase or decrease the cost or time required to complete the Work, the party requesting the change or addition will set forth in its request the appropriate adjustment to compensation or completion deadlines. Written acceptance by the party receiving the request for change or addition shall be a binding settlement between parties of the issues set forth in the request.

5.4 At no time shall the Work be delayed by Consultant due to a dispute between the parties concerning the cost or time required to accomplish a change or addition requested by Utility.

6. **DESIGN DOCUMENTS.**

- 6.1 If Consultant is required to provide design documents in connection with the Contract, complete and accurate documents shall be submitted in sufficient time for review and approval by Utility prior to starting Work affected by such documents. All equipment and material shall conform to the details shown on drawings approved by Utility.
- 6.2 Once design documents have been approved by Utility, Consultant shall not make any changes in design documents without the prior written approval of Utility.
- 6.3 Consultant shall immediately request additional instruction whenever design documents are found to be unclear, incorrect or conflicting. Consultant shall not undertake any Work based upon such documents until such discrepancy has been resolved by Utility.
- 6.4 Preliminary, certified for manufacture, or certified for construction drawings shall be submitted to Utility in the form of one good sharp reproduction (sepia acceptable) made from Consultant's original drawing. The drawing shall be produced in accordance with acceptable industry practices as outlined in ANSI Standard Y14 1980, as amended and supplemented, and shall be legible such that Utility is able to clearly distinguish all characters and lines on a 1/2 size (C size) print made from a second generation aperture card.
- 6.5 Unless the parties otherwise agree in writing, all design documents shall belong to Utility and shall be subject to the requirements applicable to Utility's Proprietary Information set forth herein, whether or not each such document is so identified.
- 6.6 Approval of Consultant's design documents shall in no way reduce or modify Consultant's obligations to meet performance and other requirements of the Contract. By such approval, Utility in no way assumes any part of Consultant's responsibility for acceptable design documents or for the satisfactory performance of resulting work furnished in accordance with design documents.

7. **CLAIMS.** Any claims by Consultant for increased compensation or extension of completion deadlines shall be waived unless written notice providing a reasonably detailed statement of the basis for the claim is furnished to Utility within ten (10) days from the date of the event giving rise to such increase or extension. Within thirty (30) days thereafter, Consultant shall submit to Utility appropriate detailed supporting documentation justifying the basis for the claim. Notwithstanding the foregoing, nothing in this Article 7 shall expand any time period for giving of notices provided in Article 8.

8. **DELAYS IN PERFORMANCE.** Each party shall give the other prompt written notice of any circumstances which may delay performance of the Work. Each party shall reimburse the other its Direct Incremental Costs reasonably incurred by the delayed party to accommodate the delay caused by such party. Each party shall use reasonable commercial efforts to minimize such costs. Consultant shall not be compensated for delay time unless it provides notice to Utility in accordance with the terms of the Contract.

9. FORCE MAJEURE.

- 9.1 Neither party shall be liable to the other for loss or damage resulting from any delay or failure of a party to perform its contractual obligations due to conditions or circumstances which are not caused by that party's violation of the Contract and are beyond that party's control, including but not limited to: acts of God; war; acts of the public enemy; riot; civil commotion; sabotage; Federal, state or municipal action, inaction or regulation, strikes or other labor troubles; fire; flood; accidents; epidemics; quarantine restrictions; embargoes; damage to or destruction in whole or in part of office equipment or manufacturing plant, to the extent such facilities are necessary to proper performance of the party's obligations under any Contract and alternate facilities are not reasonably available; and inability to obtain raw material, labor, fuel or supplies.
- 9.2 Force majeure shall extend the time for Consultant's performance to the extent such condition directly affects completion of Work. Consultant shall use its best efforts to reschedule its Work, to mitigate the effect of such condition, and to eliminate such condition as soon as possible. However, unless Utility agrees to pay all Direct Incremental Costs of such measures, Consultant shall not be required to subcontract Work or to work additional hours or shifts which, but for the delay, would not have been required to meet the schedule for completing all or any portion of the Work.
- 9.3 Neither this Article nor any other provision of the Contract shall excuse the non-performance or delayed performance of Consultant due to any commercial impracticability experienced by Consultant, including but not limited to market changes, increased costs or insufficient money.

10. SUSPENSION OF WORK. Utility may at any time suspend the Work or any part thereof upon oral notice to Consultant. Such oral notice shall be confirmed in writing. The Work shall be resumed by Consultant within ten (10) days after the date fixed in the written notice from Utility to Consultant to do so. Utility will reimburse Consultant for direct, reasonable expenses incurred as a result of such suspension. If the Work or any part thereof is stopped by notice aforesaid, and if Utility does not give notice in writing to Consultant to resume work at a date within thirty (30) days after the date fixed in the written notice to suspend, then Consultant may abandon that portion of the Work so suspended upon ten (10) days prior written notice to Utility and it will be entitled to payment for all Work done on the abandoned portion, including commitments relating thereto, plus proportionate profit on Work done.

11. TERMINATION FOR CAUSE.

11.1 Utility shall have the right, upon providing written notice to Consultant, to terminate the Contract without any liability being owed thereby by Utility to Consultant, in the event of the occurrence of any of the following:

11.1.1 insolvency of Consultant;

- 11.1.2 filing of voluntary bankruptcy by Consultant;
 - 11.1.3 the filing of an involuntary petition to have Consultant declared bankrupt;
 - 11.1.4 appointment of a receiver or trustee for Consultant;
 - 11.1.5 execution by Consultant of an assignment for the benefit of creditors; or
 - 11.1.6 commencement of any legal proceeding against Consultant which, in Utility's opinion, may interfere with Consultant's ability to perform in accordance with the Contract.
- 11.2 If Consultant fails to perform the Contract as specified herein or if Consultant breaches any of the terms of the Contract, Utility shall have the right without any liability being owed thereby by Utility to Consultant, upon giving Consultant written notice and allowing Consultant reasonable time to remedy such deficiency, to:
- 11.2.1 cancel the Contract in whole or in part upon giving written notice to Consultant; and
 - 11.2.2 obtain the materials, equipment, or services under the Contract from another Consultant with any excess cost resulting therefrom chargeable to Consultant.
- 11.3 Upon receipt of any notice as described in Section 11.1 or Section 11.2.1 above, Consultant shall immediately cease Work, commence demobilization of any affected forces, and, if requested by Utility, promptly remove from the Site all materials and equipment which have not been either fully or partially paid for by Utility. If requested to do so by Utility, Consultant shall promptly transfer title and deliver to Utility such completed or partially completed Work and/or contract rights as Consultant has. Consultant shall promptly settle the liabilities and claims arising out of the termination of subcontracts and orders.
- 11.4 In the event any termination under this Article 11 is subsequently determined by a court of competent jurisdiction to have been made without cause, such termination shall be deemed a Termination for Convenience under Article 12 hereof.

12. TERMINATION FOR CONVENIENCE.

- 12.1 Utility shall have the right to terminate the Contract or all or any portion of the Work for any reason, for Utility's convenience, upon at least one day's written notice to Consultant specifying when such termination becomes effective. Upon such effective date, Consultant shall immediately cease Work, commence demobilization of any affected forces, and, if requested by Utility, promptly remove from the Site all materials and equipment which have not been either fully or partially paid for by Utility. Consultant shall promptly settle the liabilities and claims arising out of the termination of subcontracts and orders. If requested to do so by Utility, Consultant shall promptly transfer title and deliver to Utility such completed or partially completed Work and/or contract rights as Consultant has. After the termination,

Consultant shall cooperate with Utility to the fullest extent to transfer to Utility control of all personal and real property for the purpose of allowing Utility or its designee to fully perform all functions previously performed by Consultant under the Contract.

12.2 In the event of a termination under Section 12.1, Utility shall pay (i) a termination charge if specified in the Contract or (ii) if no termination charge is specified, a percentage of the Contract price equivalent to the percentage of the Work completed in compliance with the Contract through the effective date of termination plus the Direct Incremental Costs of Consultant to accomplish termination. Consultant shall use its best efforts to minimize the costs of termination. As a condition to Utility's obligation to pay such costs, Consultant shall provide Utility with an itemized accounting of all costs of termination.

13. **UTILITY'S REPRESENTATIVE STATUS.** Utility's Representative will perform inspection of the Work. He/she has authority to stop the Work whenever such stoppage may be necessary to insure the proper execution of the Contract. He/she also has authority to reject any and all Work and materials which do not conform to the Contract and to decide questions which arise in the execution of the Work. Utility's Representative will within a reasonable time after presentation to him/her make decisions in writing on all claims of Consultant and on all other matters relating to the execution and progress of the Work or the interpretation of the Contract documents.

14. **CONSULTANT'S SUPERVISORY DUTIES.**

Prior to commencing any Work, Consultant shall identify to Utility a Consultant's Representative authorized to receive all communications from Utility, provide all approvals or authorizations required from Consultant and act on behalf of Consultant in all matters concerning the Work. Utility reserves the right to require the removal and replacement of Consultant's Representative for any reason.

Consultant shall use its best skill and attention to ensure the efficient and continuous supervision of labor forces required to complete the Work. Consultant shall provide an adequate and competent supervisory staff throughout the course of the Work.

Consultant shall at all time enforce strict discipline and good order among its forces, and shall avoid employing any unfit person or anyone not skilled in the tasks assigned under the Contract. Utility shall have the right to request Consultant to remove any person determined by Utility to be unqualified or unfit to perform the Work.

In the event Consultant and/or Consultant's employees are given access to certain of Utility's computer equipment, Consultant agrees not to use Utility's computer equipment and/or information for any purposes other than that contemplated in the Contract. Consultant further agrees to keep confidential any information it obtains in the course of performing Work under this Contract. Consultant agrees to cause its employees to comply with applicable provisions of Utility's Information Security policy as they pertain to Utility's employees.

Consultant shall be fully liable for the acts and omissions of its employees, subcontractors, and all persons under its control.

15. **INDEPENDENT CONSULTANT.** Consultant, its employees, subcontractors and those under its control shall perform all Work as independent Consultants, and shall not be deemed to be the employees or agents of Utility for any purpose whatsoever.
16. **SUBCONTRACTING.** Consultant shall provide Utility with notice of any Work which it intends to subcontract along with a list of proposed Subcontractors. Utility shall have the right to reasonably refuse any such proposed Subcontractor. Consultant shall not make any substitution of proposed Subcontractors prior to or during the term of this Contract without written approval from Utility. Neither Consultant nor any Subcontractor shall assign any Work under this Contract without the written consent of Utility. Consultant shall be fully responsible to Utility for acts and omissions of its Subcontractors and of persons either directly or indirectly employed by them. Consultant shall direct and control the activities of all such Subcontractors, and shall remain fully bound to all terms and conditions of the Contract including but not limited to all requirements for indemnity and warranty. Nothing contained in the Contract documents shall create any direct contractual relation between any Subcontractor and Utility.
17. **RELATIONSHIP WITH OTHER FORCES.** If the Contract includes any Work at premises other than those of Consultant or its Subcontractors, Utility shall have the right to place its forces or those of its contractors at such premises to perform work not included in the Contract. Consultant's forces shall work in harmony with all such other forces; and in accordance with Utility's schedules.
18. **COMPLIANCE WITH LAWS.** At its sole cost and expense, Contractor shall (a) comply with all Federal, state and local laws, rules, regulations, and orders applicable to the Work; (b) shall acquire all permits, licenses and other approvals required to be obtained by Contractor to perform the Work; and (c) notwithstanding anything to the contrary in the Contract, shall defend, indemnify and hold Utility harmless for any liability, fines, penalties, costs and expenses arising from or related to Contractor's noncompliance with this Section 18.
19. **SITE REQUIREMENTS AND INSPECTION.** For all Work to be performed at a Site, Consultant's forces shall comply with Utility's Site requirements, procedures and policies and training requirements, including among others those relating to safety, security, access authorization and environmental practices, currently in effect, copies of which are available upon request. All Work performed by Consultant shall be undertaken in full cooperation with Utility's forces or the forces of other Consultants at the Site, in order to achieve the least possible interference with the continuity and efficiency of all Utility's activities at the Site. **CONSULTANT REPRESENTS THAT PRIOR TO COMMENCING WORK IT HAS CONDUCTED SUCH INSPECTIONS AND MADE SUCH INQUIRIES AS IT DEEMS NECESSARY CONCERNING CONDITIONS AT EACH SITE WHICH MIGHT AFFECT CONSULTANT'S EXECUTION AND COMPLETION OF THE WORK. CONSULTANT AGREES AND ACKNOWLEDGES THAT INFORMATION PROVIDED BY UTILITY CONCERNING SITE CONDITIONS HAS BEEN USED FOR REFERENCE ONLY AND SHALL NOT BE CLAIMED TO RELIEVE CONSULTANT FROM ITS OBLIGATION TO INDEPENDENTLY ASSESS THE REQUIREMENTS OF THE WORK.**
20. **INCIDENTAL MATERIALS AND CONSUMABLES.** Consultant, at its sole expense and

prior to delivering consumables or materials incidental to performance of Work at the Site, shall inspect or test the consumables or materials to provide material compliance with the technical specifications of the Contract. Evidence of compliance may consist of Consultant's testing and inspection records or those of the manufacturer for batches, groups, lots, etc. of consumables or materials from which those provided to Utility are taken.

21. NONDISCRIMINATION IN EMPLOYMENT. In connection with its performance of the Contract, Consultant shall comply with the applicable provisions of Executive Order 11246 and the regulations issued pursuant thereto (generally Part 60-1 of Title 41 of the Code of Federal Regulations), unless exempted by said regulations, particularly the provisions of the Equal Opportunity Clause (41 CFR Section 60-1.4(a)), which are incorporated herein by reference; the provisions and regulations pertaining to nondiscrimination and affirmative action in employment (41 CFR Sections 60-1.4, 1.40, 1.41 and 1.42), and the filing of Standard Form 100 (EEO-1). Consultant certifies, in accordance with the requirements of 41 CFR Section 60-1.8), that its facilities for employees are not segregated. In addition, Consultant shall comply with the provisions of the Affirmative Action Clause for Workers with Disabilities (41 CFR Section 60-741.5), and for Special Disabled Veterans and Veterans of the Vietnam Era (41 CFR Section 60-250.5), which are also incorporated herein by reference.

22. SECURITY. Consultant shall comply with Utility's security requirements currently in effect, copies of which are available upon request. All personnel employed by, supervised by or under the control of Consultant shall be instructed in and familiar with the security regulations of each Site. Consultant's personnel shall strictly adhere to the security regulations and obey the directions of Utility's security personnel. Consultant shall develop and, after review and approval by Utility, implement a security program to account for and protect all tools and equipment under its sole and exclusive care, custody and control in the performance of the Work. Utility shall not be liable to Consultant for loss of or damage to such tools or equipment.

23. SAFETY PRACTICES.

23.1 All persons employed by Consultant, its subcontractors, agents, or those under its control shall be instructed in and familiar with safety rules and regulations applicable to the Work being performed. Consultant shall have the sole responsibility to see that such persons are so informed and that safety practices are followed. Copies of Utility's safety rules are available upon request.

23.2 While performing all Work, Consultant, its subcontractors, agents, and those under its control shall fully comply with all federal, state, and local safety rules and regulations. In addition, when performing Work in close proximity to Utility's employees, Utility's safety rules shall be applicable.

23.3 All persons employed by Consultant, its subcontractors, agents, or those under its control who carry out Work in the vicinity of energized conductors and equipment shall be instructed by Consultant in approved methods of artificial resuscitation before beginning Work.

- 23.4 Consultant shall furnish to Utility's Representative Material Safety Data Sheets (MSDS) for any product intended for use on this project and make copies of such MSDS available for Utility's employees at a central location at the work Site. No product for which an MSDS submittal has been requested shall be used until the MSDS has been reviewed by Utility.
24. **RESPONSIBILITY OF UTILITY FOR OPERATION OF ITS EQUIPMENT.** For as long as the operation of Utility's equipment at a Site is within Utility's exclusive control, Utility shall be liable for any injury to persons or damage to property resulting from Utility's improper operation of such equipment except to the extent any injury or damage is determined to be due to the negligent acts or omissions of Consultant, its employees, agents or those under its control. However, Utility shall not be liable to Consultant, its employees or those under its control for any incidental, indirect or consequential damages.
25. **CLEANUP.** For Work performed at any Utility Site, Consultant shall at all times keep the premises or Site free from accumulations of waste material or rubbish and shall remove at its own expense from Utility's property and from all public and private property all temporary structures, rubbish and waste materials resulting from its operations. This requirement shall not apply to property used for permanent disposal of rubbish or waste materials in accordance with permission for such disposal granted to Consultant by Utility.
26. **REMOVAL OF EQUIPMENT.** Except as required to comply with the directions of Utility or Consultant's surety upon takeover of the Work, Consultant shall promptly remove all equipment, materials and supplies from the Site upon completion, termination, or cancellation of the Contract. If Consultant fails to complete such removal within fifteen (15) days after notice from Utility, Utility may elect (i) to retain all or any portion of such remaining equipment, materials and supplies as its property, or (ii) to remove and dispose of all or any portion of such items at the expense of Consultant.
27. **INSURANCE FOR EQUIPMENT AND MATERIALS.** Utility shall, at no cost to Consultant, provide "all risks" property insurance for all equipment and materials placed at Utility's Site that is or will become property of Utility. The insurance coverage shall not extend to Consultant's consumable materials, equipment, tools, machines, or vehicles.
28. **INSURANCE BY CONSULTANT.**
- 28.1 As a condition to undertaking any Work, Consultant shall acquire at its own expense subject to the compensation terms stated herein the following insurance coverages (or equivalent) with indicated amounts to be in force during all Work and for one year from the date of final payment under the Contract or Acceptance of all Work under the Contract, whichever is later, unless a longer period is specified below:
- 28.1.1 Workers' Compensation - Statutory coverage and Employers Liability Insurance with limits of \$500,000.
- 28.1.2 Comprehensive or Commercial General Liability Coverage on standard bureau form excluding Professional Liability but including Operations, Products and Completed Operations, Contractual Liability and Broad Form

Property Damage Liability written in one or more layers with a combined single limit for Bodily Injury and Property Damage of \$1,000,000 per occurrence and \$2,000,000 annual aggregate. Products and Completed Operations coverage shall remain in effect for a minimum of three (3) years from the date of final payment under the Contract or Acceptance of all Work under the Contract, whichever is later, unless the Work is to be performed solely in CT, in which case the required coverage should be in force for two (2) years from such date.

28.1.3 Comprehensive Automobile Liability Coverage, including all owned, non-owned, and hired vehicles, with a combined single limit for Bodily Injury and Property Damage of \$1,000,000 per accident.

28.1.4 Errors and Omissions coverage for professional services and products provided by Consultant with not less than an aggregate limit of \$2,000,000.

28.2 All policies contemplated in this Article 28 other than Workers' Compensation and Errors and Omissions shall be endorsed to name Utility, its affiliates and their respective directors, officers, employees and agents, as additional insured as respects any and all third party bodily injury and/or property damage claims arising out of Consultant's operations hereunder. All policies shall require thirty (30) days written notice to be given to Utility of cancellation and/or material change in any policy.

28.3 Certificates of insurance to evidence such policies to Utility of such insurance shall be provided to Utility within thirty (30) days of the award of any Contract but in no event later than prior to commencement of any Work. Contractor shall ensure that its broker shall provide Utility with replacement certificates evidencing required insurance coverage prior to the expiration of prior certificates. Failure to provide such certificates shall be grounds for withholding payment and/or termination of the Contract.

28.4 Such insurance coverage shall be primary to any other coverage available to Utility or its affiliates, and shall not be deemed to limit Consultant's liability under the Contract.

29. INDEMNITY BY CONSULTANT FOR THIRD PARTY DAMAGES AND CLAIMS.

Consultant shall be solely responsible for and shall indemnify, and save Utility, its parent, affiliates and its and their employees, agents, officers and directors harmless from and against any and all costs (including but not limited to litigation expenses and attorney's fees), losses, liabilities, fines, penalties, damages, claims, demands, actions or proceedings arising from or relating to the Work or Contract, including:

29.1 bodily injury (including death) to any person, including but not limited to Utility's employees, Consultant's employees, any subcontractor's employees, or any other third parties;

29.2 personal injury (including but not limited to false arrest, false imprisonment, or violation of privacy rights);

- 29.3 damage to property;
- 29.4 any noncompliance or violation of applicable local, state, or federal statutes, laws, orders or regulations; or
- 29.5 any unlawful employment practice of Consultant, including without limitation employment discrimination, wrongful discharge, termination of employment or violation of state or federal statutes or regulations relating to employment practices

that (i) is caused by the acts or omissions of Consultant, its employees, agents, subcontractors, or those under its or their control, or (ii) arises out of or is in any way connected with the performance of the Contract or the Work to be performed, to the extent permitted by law.

Consultant further agrees to obtain, and maintain at its expense, such insurance as will insure the provisions of this and all other indemnity obligations in the Contract. Nothing in this section shall derogate or reduce Consultant's obligations under Article 28 hereof.

30. INFRINGEMENT OF PROPRIETARY RIGHTS.

Consultant shall indemnify, defend and hold harmless Utility, its parent, affiliates and its and their employees, agents, officers, and directors from any and all liabilities, penalties, damages, claims, actions or proceedings based upon any allegation that any portion or all of the Work furnished under the Contract, or any use thereof for purposes intended by the Contract constitutes an infringement of any patent, copyright, trademark or other proprietary interest.

If Utility provides Consultant notice of a claim of infringement with respect to any material, equipment or Information used in connection with the Work (collectively, the "Product") or Utility's use of all or any portion of the Product is enjoined due to such claim of infringement, Consultant shall promptly and at its sole expense either (i) procure for Utility the right to continue using the Product or (ii) replace the Product with non-infringing and functionally equivalent Product, (iii) modify the Product so that it becomes non-infringing and functionally equivalent, or (iv) take such other action as is necessary to assure Utility's uninterrupted use of the Product.

Consultant shall not be liable for indemnification to Utility to the extent infringement results from (i) design requirements included in the Work at the specific, written direction of Utility, or (ii) because of use or operation of the Work by Utility in violation of written instructions provided as part of the Work by Consultant, its subcontractors or suppliers.

- 31. CONSULTANT INFORMATION.** Consultant shall provide Utility with all Information necessary for Utility's use and understanding of the Work and the installation, operation, maintenance and repair thereof, and to allow Utility to satisfy any order of any governmental body or court. Except for Information deemed to be proprietary to Consultant under the terms of the Contract, all Information supplied or delivered to Utility pursuant to the Contract shall be the property of Utility. Consultant may retain for its records only, copies of any Information furnished to Utility, and unless otherwise agreed to by the parties,

shall treat such Information in accordance with the requirements applicable to Utility's proprietary information.

32. PROPRIETARY INFORMATION.

32.1 Each party acknowledges that it may be necessary to disclose proprietary information (Proprietary Information) to the other. The parties intend that the designation of Consultant's Information as Proprietary Information shall be limited to Information that has unique commercial value and was developed independently from the Work. Except to the extent described at Section 32.2 below or as otherwise agreed to by the parties, each party agrees not to disclose to third parties or to publish any Proprietary Information of the other which is disclosed, reduced to writing, and conspicuously marked as "Proprietary Information". However, if Utility, within one hundred eighty (180) days of receipt of Proprietary Information, disputes the proprietary nature of such Information by written notice to Consultant, the parties shall consult to resolve such dispute. Each party shall advise its employees, consultants and those under its control of these requirements for confidentiality with regard to Proprietary Information.

32.2 Utility shall have the right, without Consultant's approval, to disclose Consultant's Proprietary Information to the limited extent required (i) for financing, acquisition or conveyance of ownership share, licensing, construction, operation, repair or maintenance of the facility at which the Work is performed, and (ii) to comply with any request or order of a governmental agency or court. If Utility discloses Consultant's Proprietary Information to any governmental agency or court, Utility shall, to the extent it does not violate or fail to comply with any such request or order, advise Consultant prior to disclosure and cooperate in any effort by Consultant to minimize the amount of Proprietary Information disclosed, secure confidential treatment of such Proprietary Information, or seek permission from such governmental agency or court to revise the Proprietary Information in a manner consistent with Consultant's interests, the interests of Utility, and in a manner which meets the requirements of the governmental authority or court.

32.3 Any Information transmitted to either party will not be deemed Proprietary Information if that Information is:

32.3.1 In the receiving party's possession without restriction on disclosure prior to disclosure hereunder;

32.3.2 At the time of disclosure, generally available to the public without restriction on disclosure;

32.3.3 After disclosure, generally available to the public without restriction on disclosure, by publication or otherwise, through no fault of receiving party; or

32.3.4 After the time of disclosure, received from a third party who imposes no obligation of confidentiality and who, insofar as the receiving party can reasonably determine, did not acquire any such Information directly or indirectly from the other party subject to requirements of confidentiality.

- 32.4 Consultant shall notify Utility as soon as possible in writing if any Proprietary Information provided to Utility has been downgraded to a non-proprietary status.
- 32.5 The provisions of this Article shall also apply to Information which a party identifies and establishes in writing to the others as having been obtained from third parties under agreements for confidentiality.
- 32.6 The provisions of this Article shall survive the termination of the Contract and shall bind the parties and their successors and assigns for a period of five (5) years after initial disclosure of such Proprietary Information.

33. WARRANTY.

- 33.1 Services Warranty. Consultant warrants that any services performed under the Contract shall be performed by personnel who are fully qualified and competent and whose guidance recommendations, and performance reflect professional knowledge, judgment, and performance generally accepted and appropriate in the utility industry. If, within the period of two (2) years from Acceptance of all Work under the Contract, it is determined that any portion of the services performed by Consultant fails to comply with the warranties set forth above, or if a defect or error is discovered in any design, plan, drawing, specification, data or Information supplied with such services, Consultant shall, at its sole cost and at Utility's option, (i) correctly re-perform such services or correct the defect or error in the design, plan, drawing, specification, data or Information, or (ii) return to Utility the charges paid by Utility and attributable to such services or defective or erroneous design, plan, drawing, specification, data or Information supplied.
- 33.2 Supplier Warranties. Consultant shall take all reasonable steps to transfer for the benefit of Utility all warranties or guarantees available from the suppliers of Information, materials and equipment to Consultant, its agents, subcontractors, or those under its control.
- 33.3 Information Warranty. Consultant warrants that it has the full legal right, title and ownership of the Information furnished pursuant to the Contract.
- 33.4 Equipment and Materials Warranty. For a period of two (2) years after Acceptance of all Work under the Contract, Consultant warrants that all equipment and materials it supplies shall be free from defects in title, material and workmanship and shall conform to specifications set forth in the Contract. If the warranty set forth above is breached, Consultant shall at its option and expense, either repair or replace the affected equipment and materials. Consultant shall have no obligation for breach of warranty if Utility fails to store, operate or maintain equipment supplied by Consultant in accordance with Consultant's written instructions furnished to Utility as part of the Work. In no event shall Utility be required to comply with standards that exceed those generally accepted in the industry.
- 33.5 Completion Warranty. Consultant warrants that it shall complete the Work in accordance with the project schedule. If the Work falls behind schedule due to

causes attributable to Consultant or any person under its control, Consultant shall, at its sole expense, use its best efforts to restore the Work to schedule, including but not limited to placing its forces and those of its subcontractors on extended working hours, assigning additional forces to the Work, or establishing expedited, priority treatment for the acquisition, fabrication, and delivery of the materials, equipment and supplies necessary to complete the Work.

33.6 Conditions of Warranty. The foregoing warranties are subject to the following conditions:

33.6.1 Consultant shall not be responsible for repairs, replacement, or corrections made by others to the Work, except upon its prior written authorization.

33.6.2 Utility shall notify Consultant in writing of any breach of warranty.

33.6.3 In addition to its other warranty obligations, Consultant shall reimburse Utility for Utility's Direct Incremental Costs to provide Consultant access to such defective Work and to restore facilities disturbed by such access.

33.6.4 If any defect in Consultant's Work is latent and not discoverable by Utility's reasonably careful inspection during the initial warranty period, the applicable warranty period shall be extended to a total cumulative period of seven (7) years.

33.6.5 Corrective Work performed by Consultant shall be subject to the applicable warranty provisions of this Article. The warranty period for such corrective Work shall be the remainder of the original warranty period of two (2) years plus an additional two years.

33.6.6 The warranties provided for in this Article 33 shall apply whether the Work is performed on-Site or off-Site.

34. LIMITATION OF LIABILITY.

34.1 CONSULTANT'S LIABILITY TO UTILITY UNDER THE CONTRACT WHETHER BASED UPON BREACH OF ANY EXPRESS OR IMPLIED WARRANTY, TORT, CONTRACT, STRICT LIABILITY, OR OTHERWISE SHALL BE THE SUM OF (i) FOR WARRANTY AND INDEMNITY OBLIGATIONS, THE REMEDIES DESCRIBED IN THE CONTRACT, PLUS (ii) FOR DAMAGES CONSULTANT IS REQUIRED TO INSURE AGAINST, ANY RECOVERY AVAILABLE UNDER THE INSURANCE COVERAGES REQUIRED BY THE CONTRACT PLUS (iii) FOR ANY ADDITIONAL DIRECT DAMAGES TO THE UTILITY, AN AMOUNT EQUAL TO THE GREATER OF THE TOTAL OF ALL CHARGES PAID BY UTILITY TO CONSULTANT UNDER THE CONTRACT OR TWO MILLION DOLLARS (\$2,000,000).

34.2 EXCEPT TO THE EXTENT ALLOWED UNDER THE INSURANCE, WARRANTY OR INDEMNITY PROVISIONS OF THE CONTRACT, NEITHER PARTY SHALL BE LIABLE TO THE OTHER FOR ANY INDIRECT, INCIDENTAL OR

CONSEQUENTIAL DAMAGES.

- 34.3 CONSULTANT WAIVES ALL CLAIMS AGAINST UTILITY FOR ANY LIABILITY OR LOSS IN CONNECTION WITH: (i) PAYMENT OF ALL FEDERAL, STATE AND LOCAL TAXES OR CONTRIBUTIONS IMPOSED OR REQUIRED UNDER UNEMPLOYMENT INSURANCE, SOCIAL SECURITY AND INCOME TAX LAWS WITH RESPECT TO CONSULTANT'S WORK UNDER THE CONTRACT; (ii) ALL LOSSES IN CONNECTION WITH ANY CLAIMS FOR LOST WAGES, SEVERANCE PAY, PENSIONS OR OTHER BENEFITS WITH RESPECT TO CONSULTANT'S WORK UNDER THE CONTRACT; AND (iii) ALL CLAIMS FOR LIABILITY FOR DAMAGE TO CONSULTANT'S PERSONAL PROPERTY OR INJURY TO CONSULTANT OR ITS PERSONNEL IN CONNECTION WITH THE CONTRACT.
35. **RIGHTS AND LIABILITIES OF PRINCIPALS.** All benefits, protections, indemnifications and other rights in favor of Utility under the Contract shall also benefit, protect and indemnify the principals of Utility.
36. **WAIVER OF MECHANIC'S LIENS.** Consultant hereby waives its rights to any mechanic's lien under any applicable statutes or otherwise for services performed or material or equipment furnished in connection with the Work. Consultant shall obtain from any Subcontractor or materialman prior to the performance of any Work, a written waiver satisfactory to Utility of all such subcontractors' or materialmen's right to any such lien and shall deliver such waiver to Utility promptly upon receipt thereof. Upon Utility's request, Consultant shall obtain, without additional cost to Utility, a bond satisfactory to Utility to indemnify Utility against such liens and charges.
37. **ARBITRATION.** Any controversy or claim arising out of or relating to this Contract or breach thereof which cannot be resolved by mutual agreement shall be settled by arbitration in accordance with the rules of the American Arbitration Association and judgment upon the award rendered by the arbitrator(s) may be entered in any court having jurisdiction. Any such arbitration proceeding shall take place in the state of Connecticut. Consultant shall carry on the Work and maintain the progress schedule during any arbitration proceedings, unless otherwise agreed to by Utility in writing.
38. **ADVERTISING.** Unless authorized in writing by Utility, Consultant shall not engage in any advertising, publicity or other promotional activity which directly or indirectly mentions or refers to the relationship between the parties or the Work furnished under the Contract.
39. **ASSIGNMENT.** Consultant has been selected by Utility because of its particular expertise. Consultant shall not assign the Contract in whole or in part except upon the written consent of Utility. Consultant shall not assign its right to any monies due but unpaid under the terms of the Contract. Utility shall have the unrestricted right to assign the Contract in whole or in part.
40. **WAIVERS.** No waiver by any party of its rights against the other for a particular default shall be deemed to be a waiver of rights with regard to any other default by the other.

41. **APPLICABLE LAW.** The Contract and the rights and duties of the parties hereunder shall be governed by and construed, enforced and performed in accordance with the laws of the State of Connecticut, without regard to its principles of conflicts of law *provided* that if the Site is located entirely outside of the State of Connecticut, then the Law of the State/Commonwealth where the Site is located (and where the Work is performed) may govern certain aspects of the enforcement of the rights and remedies of Owner (including legal process and procedure) with respect to such Work.
42. **NOTICES.** All notices required under the Contract shall be in writing and signed, and shall be deemed to be given when received upon personal delivery, or if mailed, as of the date indicated on the receipt document provided by the mail carrier, if so delivered, or if mailed to the party set forth on the "Direct Inquiries To" line on the Utility's Purchase Order, upon delivery to the address set forth thereon, unless otherwise indicated in the Contract.
43. **RIGHT TO AUDIT.** Utility shall have the right to inspect and audit all of Consultant's and any Subcontractor's books, records, correspondence, receipts, vouchers and memoranda relating to or affecting the Contract. Consultant and any Subcontractors shall preserve all such records for a period of one year following Acceptance or final payment, whichever is later. Consultant shall provide for such right to audit by Utility in all contracts with Subcontractors relating to the Contract.
44. **SUPPLIER DIVERSITY.**
- 44.1 Utility is a United States government contractor and fully supports the government's policies of ensuring that Small Diverse Business Concerns have every opportunity to compete for government contracts and subcontracts. Utility has and will continue to commit to filing annual subcontracting plans regarding the utilization of Small Diverse Business Concerns as contractors and subcontractors in accordance with Federal Acquisition Regulation clause 52.219. FOR ALL CONTRACTS THAT OFFER SUBCONTRACTING OPPORTUNITIES, CONSULTANT WILL BE REQUIRED TO SUBMIT DATA AND/OR SUBCONTRACTING PLANS REGARDING SUBCONTRACTOR'S UTILIZATION AND INTENDED UTILIZATION OF SUCH SMALL DIVERSE BUSINESS CONCERNS DURING THE TERM OF THIS CONTRACT. If direct subcontracting opportunities do not exist, Consultant nonetheless may be required to submit data and/or subcontracting plans regarding indirect spend.
- 44.2 "Small Diverse Business Concern" includes but is not limited to Small Disadvantaged Business Concerns, Minority Owned small Business Concerns, Woman Owned Small Business Concerns, Veteran Owned Small Business Concerns, Veteran Owned Business Concern, Service-disabled veteran owned business concern and HUBZone Small Business Concern. Consultants acting in good faith may rely on written representations by their subcontractors regarding their status as a Small Diverse Business Concern.
- 44.3 Flow-down of Federal Acquisition Requirements (FAR) Clause 52.219-8 -- Utilization of Small Business Concerns. Utilization of Small Business Concerns (Oct 2000).

- (a) It is the policy of the United States that small business concerns, veteran-owned small business concerns, service-disabled veteran-owned small business concerns, HUBZone small business concerns, small disadvantaged business concerns, and women-owned small business concerns shall have the maximum practicable opportunity to participate in performing contracts let by any Federal agency, including contracts and subcontracts for subsystems, assemblies, components, and related services for major systems. It is further the policy of the United States that its prime contractors establish procedures to ensure the timely payment of amounts due pursuant to the terms of their subcontracts with small business concerns, veteran-owned small business concerns, service-disabled veteran-owned small business concerns, HUBZone small business concerns, small disadvantaged business concerns, and women-owned small business concerns.
- (b) The Consultant hereby agrees to carry out this policy in the awarding of subcontracts to the fullest extent consistent with efficient contract performance. The Consultant further agrees to cooperate in any studies or surveys as may be conducted by the United States Small Business Administration or the awarding agency of the United States as may be necessary to determine the extent of the Consultant's compliance with this clause.

45. **EXECUTIVE ORDER 13201 COMPLIANCE.** Consultant agrees to comply with the provisions of 29 CFR Part 470.
46. **PRIORITY OF DOCUMENTS.** In the event of conflict among the Contract documents, the order of priority shall be: (1) the terms appearing on the face of Utility's Purchase Order; (2) any Special Conditions supplied by Utility; (3) these General Terms and Conditions; (4) the specification; (5) any remaining documents referred to on Utility's purchase order. The pre-printed terms on the back of Utility's purchase order are hereby deleted and shall not bind either party.
47. **SEVERABILITY.** In the event that any provision of the Contract is deemed invalid or unenforceable, it shall be modified to the extent necessary to make it valid and enforceable. The remaining provisions of the Contract shall remain fully enforceable notwithstanding the unenforceability of any individual provision.
48. **NO GIFTS OR INDUCEMENTS.** Consultant warrants and represents to Utility that neither it has neither provided nor offered to provide any gifts, payments, or other inducements to any officer, employee or agent of Utility for any purpose. Consultant shall not provide or offer any gifts, payments, or other inducements to any officer, employee or agent of Utility for any purpose and shall ensure that no employee or agent of Consultant offers and such gifts, payments or inducements.
49. **ELECTRONIC DELIVERY OF INFORMATION.** In performing Services under this Contract, Utility and/or Consultant may wish to exchange business data or information electronically using a point-to-point connection or a value added network either directly or through a third party E-Business provider (collectively, "E-Business"). The parties

recognize and agree that the electronic transmission of information, including attachments, and access to E-Business systems by Utility employees, cannot be guaranteed to be secure from third party interception, error free or free from viruses or other damaging computer code, and that such information could be intercepted, corrupted, infected, lost, destroyed or incomplete, or otherwise be adversely affected during transmission or harmful to the recipient's computer system. Utility and Consultant have each taken steps within their organization to reduce the foregoing risk, consistent with the industry practices; however, there can be no assurance that outgoing E-Business is free of the foregoing faults or that engaging in E-Business will not create any harm to electronic systems. If Consultant elects to transmit information or documents relating to this Contract using E-Business, Consultant shall be deemed to have accepted and be bound by the terms of this Contract and the NUSCO Purchasing Department E-Business Trading Partner Agreement executed by the parties and on file with the NUSCO Purchasing Department.

50. **COMPLETE AGREEMENT.** The Contract shall constitute the complete agreement between the parties. All prior communications, whether oral or written, shall be superseded by the Contract and shall not bind the parties. No change to the Contract shall be binding upon the parties unless made in writing and signed by both parties.

CONFIDENTIALITY AGREEMENT

This Confidentiality Agreement ("Agreement") is made as of February 11, 2010, by and between Northeast Utilities Service Company and its parent and affiliates (collectively "NUSCO"), and Levitan & Associates, Inc. ("Counterparty"), either or both of which may also hereinafter be separately referred to as a "Party" or together as the "Parties".

WHEREAS, NUSCO desires to obtain consulting services from Counterparty (the "Services"); and

WHEREAS, in order for Counterparty to provide such Services, NUSCO may need to provide to Counterparty information that may include any of the following: any document, whether paper, magnetic tape, computer disk, microfiche, or any other form of media, that has any kind of confidential information including, but not limited to, personal information, proprietary information, protected health information and any other information the NUSCO designates as confidential. A Confidential Record may be, but is not limited to, business plans; marketing strategies, bidding activities, technical and performance information, contracts, financial records, research documentation, personnel and medical-related data, and information about customers, investors or any company or individual with whom the company does business. Personal information means information capable of being associated with a particular person through one or more identifiers, including, but not limited to, a Social Security number, a driver's license number, a state identification card number, an account number, a credit or debit card number, a passport number, an alien registration number or a health insurance identification number. Proprietary information is the NUSCO's proprietary or confidential business or technical information including, but not limited to, technical, financial, commercial, marketing or other business information that the company desires to protect against unrestricted disclosure or competitive use. Protected health information comprises any information relating to the past, present and future physical or mental condition of an individual, including, but not limited to, any information about their participation or coverage in NUSCO's health plans. Regarding protected health information, an individual is defined as an employee, retiree or their dependents. All personal health information is confidential if it is combined with any other information including, but not limited to, names, addresses, zip codes, dates of birth, dates of death, telephone numbers, fax numbers, e-mail addresses, social security numbers, medical records numbers, health plan numbers, license numbers, vehicle identification numbers, account numbers, biometric identities, full face photos, health plan enrollment information or any other unique identifying number, characteristic or code. (collectively "Confidential Information"); and

WHEREAS, the Parties acknowledge that the release or use of such Confidential Information outside of the Services to be provided to NUSCO would place NUSCO at a significant competitive disadvantage and/or potentially expose it to lawsuit, therefore, would be extremely detrimental to the business operations of NUSCO; and

WHEREAS, the Parties acknowledge that, except for this Agreement, Counterparty would not be provided access to NUSCO's confidential and proprietary information.

NOW, THEREFORE, in consideration of the mutual agreements contained herein, the Parties agree as follows:

1. Confidential Information.

- a. Under the terms of this Agreement, certain Confidential Information may be disclosed by NUSCO to Counterparty and to its directors, officers, employees, agents, or advisors, who, in the Parties' reasonable judgment, have the need to know the specific Confidential Information being disclosed. Such Confidential Information shall be marked "Confidential" by NUSCO and shall be kept confidential by Counterparty and its agents, employees, and representatives in compliance with all applicable federal and state laws and shall take appropriate measures to protect NUSCO's Confidential Information, including but

not limited to those steps taken to protect the confidential information, data or other tangible or intangible property of its own that the Counterparty regards as proprietary or confidential and that is of similar value or importance to the Confidential Information disclosed hereunder. Counterparty agrees to use the Confidential Information solely for evaluating the Confidential Information as requested by NUSCO, and Counterparty shall not distribute, copy, or otherwise communicate any of the Confidential Information to any other person or entity except as permitted under this Agreement. Counterparty will maintain records of the persons to whom Confidential Information is distributed, will inform all such persons of the confidential nature of the Confidential Information, will direct them to treat such information in accordance with this Agreement, will exercise such precautions or measures as may be reasonable in the circumstances to prevent improper use of Confidential Information by them, and will be responsible for any breaches by them of the provisions of this Agreement.

b. Counterparty shall retain and store all Confidential Information furnished to NUSCO by Counterparty in a secure and confidential manner. Counterparty shall use the Confidential Information solely for the performance of the Services, and Counterparty shall not use the Confidential Information in any manner whatsoever outside of the Services or discussions thereon.

c. Counterparty may disclose the Confidential Information without NUSCO's prior written consent only to the extent such information is:

- (i) already known to Counterparty as of the date of disclosure hereunder;
- (ii) already in possession of the public or becomes available to the public other than through the act or omission of Counterparty in breach hereof;
- (iii) able to be disclosed without Confidentiality restrictions as specifically provided in this Agreement;
- (iv) as may be required by law, statute, rule or regulatory authority to be disclosed, including any subpoena or other similar form of process, provided that Counterparty shall follow the procedures described in Paragraph 1.g of this Agreement;
- (v) acquired independently from a third party that, to the knowledge of Counterparty, has the right to disseminate such information at the time it is acquired by Counterparty; or
- (vi) independently developed by Counterparty without reliance on the Confidential Information disclosed by NUSCO.

e. Counterparty understands and acknowledges that NUSCO will suffer immediate and irreparable harm in the event that Counterparty fails to comply with the terms of this Agreement, and that monetary damages alone may be inadequate to compensate NUSCO and provide a remedy for a breach of this Agreement. Accordingly, Counterparty agrees to defend and indemnify NUSCO for any claims, costs (including legal costs), liabilities, and damages that NUSCO may incur as a result of Counterparty's breach of the terms of this Agreement and that NUSCO will be entitled to monetary and non-monetary remedies that might be available, including injunctive relief in the event it is determined by a court that a breach has occurred or is likely to occur, as well as reimbursement of legal costs, to enforce the terms of this Agreement.

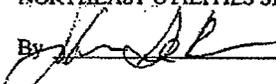
- f. The Confidential Information shall remain the property of NUSCO, and NUSCO may demand the return thereof at any time upon giving of written notice to Counterparty. Within fifteen (15) days of receipt of such notice, Counterparty shall return all of the original Confidential Information and shall destroy all copies, reproductions or extracts (both written and electronic) in its possession and in the possession of any representatives to whom it was disclosed, except that Counterparty may retain an archived copy of Confidential Information which has been incorporated in Counterparty's models and other work products, subject to the confidentiality obligations of this Agreement. The destruction of such Confidential Information shall be certified by Counterparty to NUSCO promptly following completion of the destruction of such Confidential Information.
 - g. If Counterparty becomes legally compelled to disclose any of the Confidential Information to a federal or state governmental agency, Counterparty shall inform NUSCO of such disclosure promptly after such agency's request so that NUSCO may seek a protective order or other appropriate remedy.
 - h. Counterparty, its directors, officers, employees, agents and representatives, will not disclose any Confidential Information, or the terms of this Agreement, to any third party, except as may be mutually agreed upon in writing by the Parties and, if so agreed, by the execution of a mutually acceptable nondisclosure agreement.
2. The rights and obligations arising under this Agreement with respect to Confidential Information disclosed hereunder, particularly the confidentiality obligations, shall survive any termination of this Agreement.
 3. **No Obligation to Disclose.** NUSCO has no obligation to disclose Confidential Information hereunder. NUSCO represents and warrants that it has ownership of and the right to disclose the Confidential Information which it discloses under this Agreement.
 4. **Disclaimer of Warranties.** NUSCO makes no representations or warranties, express or implied, as to the quality, accuracy and completeness of the Confidential Information disclosed hereunder. NUSCO and, as applicable, its affiliates, and their officers, directors and employees or agents, shall have no liability whatsoever with respect to the use of or reliance upon the Confidential Information by Counterparty.
 5. **No Obligation to Enter into an Agreement.** Nothing contained in this Agreement shall create an obligation on NUSCO or its affiliates' part to offer or enter into any agreement with Counterparty. Any agreement shall be in writing and shall be subject to a final executed contract(s) containing mutually acceptable terms and conditions.
 6. **License.** Neither the execution of this Agreement, nor the disclosure of any Confidential Information by NUSCO hereunder, shall be construed as granting to Counterparty either a license (expressly, by implication, estoppel, or otherwise) under, or any right of ownership in, such Confidential Information or in any invention, patent or patent application, or copyright now or hereafter owned or controlled by NUSCO.
 7. **Amendment.** This Agreement may not be changed, modified, released, discharged, abandoned, or assigned (in whole or in part) except by an instrument in writing signed by an authorized representative of each Party hereto.
 8. **Other Agreements.** Unless expressly agreed otherwise in an instrument in writing signed by an authorized representative of each Party hereto, nothing in this Agreement shall supersede or in any way modify any of the terms and conditions, or the rights and obligations of the Parties, included in any other agreements, including any purchase agreement(s), between the Parties.

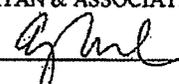
9. **Governing Law.** This Agreement shall be governed by and interpreted in accordance with the laws of the state of Connecticut, notwithstanding conflicts of law provisions, rules or principles to the contrary.
10. **Merger and Severability.** This Agreement constitutes the entire understanding and agreement between the Parties relating to the subject matter hereof. If any of the provisions of this Agreement are determined to be invalid under applicable law, they are, to that extent, deemed omitted. The invalidity of any portion of this Agreement shall not render any other portion invalid.
11. **Authority.** Each person signing this Agreement represents and warrants that the entity for which he is signing has duly authorized this Agreement and has he has the authority to sign on behalf of such entity.

IN WITNESS WHEREOF, the Parties hereto have caused this Agreement to be executed by their duly authorized representatives. This Agreement may be executed in counterpart.

NORTHEAST UTILITIES SERVICE COMPANY

LEVITAN & ASSOCIATES, INC.

By 

By 

Typed JoAnne DeRico

Typed Ellen Cool

Title Sr. Sourcing Consultant

Title Vice President & Principal

Date 2/11/2010

Date Feb 11, 2010

**CRITICAL INFRASTRUCTURE INFORMATION
NON-DISCLOSURE AGREEMENT**

This CRITICAL INFRASTRUCTURE INFORMATION NON-DISCLOSURE AGREEMENT (the "Agreement") is made by the undersigned (the "Recipient") in favor of NORTHEAST UTILITIES SERVICE COMPANY ("NUSCO") as agent for one or more of its affiliates including THE CONNECTICUT LIGHT AND POWER COMPANY, WESTERN MASSACHUSETTS ELECTRIC COMPANY, PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE and YANKEE GAS SERVICES COMPANY (collectively, the "Company").

WHEREAS, the Recipient has requested that the Company disclose to the Recipient certain Critical Infrastructure Information or "CII", all or a portion of which has been classified as confidential and proprietary, and which may include CEII and CIP Information, all as defined herein;

WHEREAS, the Federal Energy Regulatory Commission ("FERC") has defined Critical Energy Infrastructure Information ("CEII") as "specific engineering, vulnerability, or detailed design information about proposed or existing critical infrastructure that: (1) relates details about the production, generation, transportation, transmission, or distribution of energy; (2) could be useful to a person in planning an attack on critical infrastructure; (3) is exempt from mandatory disclosure under the Freedom of Information Act, 5 U.S.C. 552 (2000); and (4) does not simply give the general location of the critical infrastructure";

WHEREAS, in addition to CEII, the Company has information regarding critical assets and critical cyber assets which are subject to the North American Electric Reliability Council ("NERC") Critical Infrastructure Protection ("CIP") standards (CIP-002 through CIP-009) pertaining to the reliability and availability of the Bulk Electric System in North America ("CIP Information").

NOW, THEREFORE, for good and valuable consideration, the receipt and adequacy of which are hereby acknowledged, the Recipient agrees as follows:

1. "CII" Definition. For purposes of this Agreement, "Critical Infrastructure Information" or "CII" shall mean: (i) all CEII information designated as such by FERC; (ii) all CIP Information containing critical asset and critical cyber assets designated as such pursuant to the NERC CIP standards; (iii) any other information designated by the Company as proprietary and confidential, whether furnished before or after the date hereof, whether oral, written or recorded/electronic, and regardless of the manner in which it is furnished; and (iv) all reports, summaries, compilations, analyses, notes or other information which contain such information.

2. Use and Protection of CII.

(a) All CII shall be maintained by Recipient in a secure place. Recipients may make copies of CII, but such copies become CII and subject to these same procedures. Recipients may make notes of CII, which shall be treated as CII if they contain CII. Such CII shall be kept confidential by Recipient and its agents, employees, and representatives and shall take appropriate measures to protect Company's CII, including but not limited to those steps taken to protect the confidential information, data or other tangible or intangible property of its own that the Recipient regards as proprietary or confidential and that is of similar value or importance to the CII disclosed hereunder.

(b) Recipient shall limit disclosure of CII within its organization strictly to persons with a need-to-know and then only after advising such persons as to the confidential and proprietary nature of the CII and obtaining such person's agreement as to the limitations on use and further disclosure as set forth in this Agreement. Recipient will maintain written records of the persons to whom CII is distributed. Recipient shall indemnify and hold the Company harmless from all liabilities arising from or related to the disclosure of CII in violation of this Agreement by Recipient or by any employee, agent, or other representative of Recipient or by any third party to whom Recipient or any such employee, agent or representative discloses CII in violation of this Agreement.

(c) Although a Recipient of CII may use CII as foundation for advice provided to his or her employer or clients, s/he may only discuss CII with or disclose CII to another Recipient of the identical CII. A Recipient may check with the Company to determine whether another individual is a Recipient of the identical CII.

(d) A Recipient will not knowingly use CII directly or indirectly for an illegal or non-legitimate purpose. Recipient agrees to use the CII solely for purposes expressly requested by the Company.

(e) In the event that the Recipient is required to disclose CII by subpoena, law or other directive of a court, administrative agency or arbitration panel, the Recipient hereby agrees to provide the Company with prompt notice of such request or requirement in order to enable the Company to (i) seek an appropriate protective order or other remedy, (ii) consult with the Recipient with respect to taking steps to resist or narrow the scope of such request or legal process, or (iii) waive compliance, in whole or in part, with the terms of this Agreement. In the event that such protective order or other remedy is not obtained, or the Company waives compliance with the provisions hereof, the Recipient hereby agrees to furnish only that portion of the CII which the Recipient's counsel advises is legally required and to exercise best efforts to obtain assurance that confidential treatment will be accorded such CII.

3. Return of CII. In the event that the Company, in its sole discretion, so requests, the Recipient will promptly deliver to the Company all CII, including all copies, reproductions, summaries, compilations, analyses or extracts thereof.

4. CII "on Loan". CII provided pursuant to this Agreement is deemed to be on loan and must be returned to the Company upon request. If the Recipient is an employee of a federal or State agency, s/he must note that the information is not the property of the agency. .

5. No Warranty. The CII is provided "as is" with all faults. In no event shall the Company be liable for the accuracy or completeness of the CII. The Company shall not have liability to the Recipient, or any other person or entity, for the Recipient's use of any CII disclosed pursuant to this Agreement.

6. Equitable Relief, Audit. Without prejudice to the rights and remedies otherwise available to the Company, the Company shall be entitled to seek equitable relief by way of injunction or otherwise if the Recipient breaches or threatens to breach any of the provisions of this Agreement. The Company may audit the Recipient's compliance with this Agreement.

7. Survival. The Recipient remains bound by these provisions unless the Company has rescinded it.

8. No Waiver. The Recipient understands and agrees that no failure or delay by the Company in exercising any right, power or privilege hereunder shall operate as a waiver thereof, nor shall any single or partial exercise thereof preclude any other or further exercise thereof or the exercise of any right, power or privilege hereunder.

9. Governing Law. This Agreement and the rights and duties of the parties hereunder shall be governed by and construed in accordance with the laws of the State of Connecticut without regard to its principles of conflicts of law *provided that* (a) if the CII pertains to Owner's sites or operations occurring entirely outside of the State of Connecticut then the laws of the State/Commonwealth where the Site is located (or to which the CII pertains) may govern certain aspects of the enforcement of the rights and remedies of Company (including legal process and procedure); and (b) any CII that is CEII is exempt from mandatory disclosure under the Freedom of Information Act, 5 U.S.C. 552.

10. Assignment Prohibited. Any assignment of the Recipient's rights, obligations or duties under this Agreement without the Company's prior written consent shall be void.

11. Entire Agreement. This Agreement contains the entire agreement between the parties concerning the protection of the CII, and no modification of this Agreement or waiver of the terms and conditions hereof shall be binding upon the parties, unless approved in writing by each of them.

12. Severability. If any provision or provisions of this Agreement shall be held to be invalid, illegal or unenforceable, the validity, legality and enforceability of the remaining provisions shall not in any way be affected or impaired thereby.

IN WITNESS WHEREOF, the Recipient has executed this CII Non-Disclosure Agreement as of the date set forth below.

RECIPIENT: Levitan & Associates, Inc.

By:

Signature:

Name (please print):

Date:

Organization: Address:

Seth Parker
Seth Parker
23 Apr. 2010
100 Summer St., Suite 3200
Boston, MA 02110

*PROVIDED IN RFX-155-2010
CLOSED 4/26/10

KEY PERSONNEL

LAI has selected the following individuals for this project, based on their familiarity with the New England power market, plant economics and modeling. Seth Parker, VP and a principal of LAI, will be the overall project manager and coordinate all work activities of the project team. Mr. Parker is responsible for many of LAI's financial assignments and will be actively involved in all Newington Station tasks and work products.

Seth Parker has worked in the power industry for 30 years and has significant experience evaluating proposed and existing power plants across the full range of technologies and fuels. He was responsible for the firm's ICAP work in the NYISO and PJM markets (including development of capital / operating costs, stochastic treatment of key variables, and financing assumptions), and has represented those client interests in FERC Technical Conferences. He has directed many economic analyses that include plant valuations that capture implicit and extrinsic sources of value. Prior to joining LAI, Parker conducted due diligence evaluations in support of over \$6 billion of power and infrastructure project debt for commercial lenders, investment banks, and multilateral agencies.

Richard Carlson, Ph.D., Managing Consultant, has 30 years of experience as a consultant, software developer, and research economist on a wide range of energy and environmental economics topics, including stochastic simulation techniques, market behavior, market volatility, real option value, portfolio risk measurement, integrated resource planning, emissions compliance, and rates. Dr. Carlson has led development of commercial software used for integrated resource planning, emissions compliance, and hydro storage scheduling under uncertainty. He has performed independent market price analyses in support of power plant financings and the auction of purchased power agreements, and has testified in rates and integrated resource planning cases.

Jack Elder, P.E., is Manager - Power Systems & Market Design at LAI and has over 30 years of experience in the power industry, specializing in power system modeling, plant thermodynamic performance, and heat balances. Mr. Elder supervises LAI's production simulation and transmission load flow modeling efforts to derive forward locational energy prices and is an authority on technical operating and performance issues. He has performed analyses of transmission pricing and access reforms under FERC Order 888 initiatives and has provided utility clients with engineering economic evaluations and performance assessments of power stations.

Edward K. Tsikirayi, Senior Consultant at LAI, has close to 20 years of bulk power planning and operations experience, including transmission-constrained reliability assessments and competitive market production simulations. He utilizes LAI's suite of chronological simulation and transmission flow models to conduct resource adequacy assessments, project economic evaluations, energy and capacity price forecasts, and load / optimal power flow analysis. Mr. Tsikirayi has conducted numerous multi-regional and inter-market price forecasts for LAI clients, estimated the impact of proposed

transmission upgrades on inter-zonal transfer limits, and other transmission system assignments. Prior to joining LAI, Mr. Tsikirayi was Lead Engineer for Power Supply and Reliability Planning with ISO-NE.

SETH G. PARKER

SUMMARY

An economic and financial manager with an international background in competitive markets and power project development, valuation, financing, and divestiture / privatization / acquisition. Principal experience includes modeling of energy projects, asset valuation, inter-market transactions, contracts, market design, risk management, and regulatory policy.

PROFESSIONAL EXPERIENCE

1998 -	Levitan & Associates, Inc. Principal & Vice President Managing Consultant
1988-1998	Stone & Webster Management Consultants (US and UK) Vice President Assistant Vice President Executive Consultant Senior Consultant
1984-1988	J. Makowski Associates, Inc. Financial Manager - Ocean State Power
1981-1983	ThermoElectron Energy Systems Senior Financial Analyst
1978-1981	Pacific Gas and Electric Co. Project Financing Analyst

CONSULTING ASSIGNMENTS

Valuation and Due Diligence

Established the economic value and financing plan for existing 43 MW hydroelectric power plant in support of acquisition and financing by a Massachusetts municipal utility.

Forecasted expected operating regime and changes in market power prices and regional air emissions for proposed Bayonne 512 MW GT peaker plant with HVAC u/w cable lead into New York City; report was part of Bayonne's petition for an Art. VII Certificate.

Prepared revenue and operating expense projections of PJM coal and combined cycle plants being sold by AES, including capacity revenues under alternative scenarios.

Conducted financial analysis of rival cogeneration projects at New York University, including operating cost savings, tax-exempt debt terms, and credit rating impacts; prepared project valuation and recommendation for Financial Committee.

Advised the New York State Housing Finance Agency as lender to a New York cogeneration project, including project review, contract negotiation, and financing terms.

Managed due diligence review, construction monitoring, and acceptance testing of the following cogeneration, combined cycle, fluidized bed, and industrial projects for commercial lenders, investment banks, and government, bilateral & multilateral agencies:

- Brooklyn Navy Yard, a 220 MW cogeneration plant, New York
- Derwent Cogeneration Project, a 210 MW cogeneration plant, England
- East Java Power, a 500 MW combined cycle plant, Indonesia
- EES Coke Battery, a 900,000 ton per year coke facility, Michigan
- Guna Power Project, a 347 MW naphtha / gas combined cycle plant, India
- Hadley Falls, a 43 MW hydroelectric plant, Massachusetts
- Hub Power, a 1200 MW, \$1.8 billion, World Bank-supported plant, Pakistan
- Indiana Harbor Coke Battery, a 1.3 million ton per year facility, Indiana
- Kot Addu, a 1600 MW oil / gas combined cycle plant, Pakistan
- Midland Cogen Venture, a 1,370 MW \$2.3 billion cogeneration plant, Michigan
- Niagara Falls Resource Recovery, an 800,000 ton per year plant, New York
- Panther Creek, an 80 MW fluidized bed power plant, Pennsylvania
- Warrior Run, a 180 MW fluidized bed power plant, Maryland
- York Research, financing of four plants, Texas, New York, and Trinidad

Evaluated operating characteristics and economics of cogeneration expansion plans for the Massachusetts Institute of Technology, and recommended phased-in scheduling.

Managed due diligence reviews of US coal and gas-fired power plants in support of Manweb (UK) equity investments; helped negotiate transaction modifications as required.

Recommended cogeneration plant design and financing plan for Turkish Industrial Zone.

Evaluated the feasibility of converting the Bataan nuclear power station in The Philippines to a gas-fired combined cycle plant for Shell Oil Company.

Market / Policy Analysis

Provided advice on financial, operational, decommissioning funding, and ratepayer risk issues to the Vermont Department of Public Service regarding Entergy's application to restructure the ownership of its merchant nuclear plants, including Vermont Yankee.

Advising three New York generators on the NYISO installed capacity demand curve reset process for 2011/12 – 2013/14, focusing on transmission deliverability, peaker

proxy technology / cost / performance, site requirements / availability, and net energy revenues.

Prepared expert report on the Dominion Virginia Power's 2007 Solicitation for 2011 Unit Capacity for Shell Energy NA that addressed capacity needs, bidder qualifications, best competitive procurement practices, and bid evaluation methodology.

Prepared major deregulation study for the Maryland Public Service Commission that evaluated new generation, transmission, and demand-side options; evaluated divestiture impact on profitability of generation fleet and financial contribution to parent company; updated study for rate-base utility or power authority generation ownership.

Advised New York Power Authority (NYPA) on inter-market transactions, including power economics, interconnection requirements grid upgrades, reliability impacts, permit issues, and regulatory considerations; represented NYPA at PJM committee meetings.

Advised generator group on PJM proposed Reliability Pricing Model (RPM) capacity valuation mechanism, including gas turbine capital & operating costs, expected net revenues, financing charges, etc.; represented group before FERC.

Assessed market prices and congestion costs relative to competing generation and transmission project bids for Long Island Power Authority (LIPA); responsible for ICAP forecasts across northeast markets and commercial analysis of hvdc cable proposals.

Evaluated market potential of PJM cable exports into New York City for potential purchaser of Linden simple / combined cycle project, including cable expansion issues.

Revised 2005/06 - 2007/08 capacity market demand curve parameters for NYISO based on levelized costs of gas turbine peaker capacity, including net energy revenues from multi-regional simulation model with stochastic treatment of hourly loads; evaluated demand curve slope and zero-crossing point; achieved consensus with stakeholder group.

Advised counsel for Mirant Equity Committee regarding NYISO, ISO-NE, and PJM capacity markets and the use of demand curve mechanisms to forecast ICAP prices.

Established feasibility of inter-pool wheeling into load pocket to reduce congestion costs; quantified maximum benefit and related reliability and portfolio effects for LIPA.

Evaluated alternatives to the Indian Point Nuclear Power Station for Westchester County and its Public Utility Service Agency, including power and local economic implications of shut-down, repowering, replacement with transmission / conventional / renewable resources, continued operation, and license extension.

Estimated market value of incremental energy and capacity from the Bonanza coal plant owned by the Deseret Generation and Transmission Cooperative in Utah.

Prepared analysis of US power markets and merchant plant business structures for overseas investor; recommended target areas and distressed asset screening model.

Advised stakeholder group on technical, environmental, operational, and regulatory issues of energy infrastructure projects across LI Sound and in southwest Connecticut for the Institute for Sustainable Energy; prepared guidelines for Connecticut Siting Council.

Prepared long-term market price forecasts by sub-regions in New England, New York, and PJM to capture congestion effects for PECO Energy's acquisition of Sithe assets.

Market analysis of conversion of Salem Harbor to gas for ISO-NE White Paper.

Assessed the market potential for independent power producers throughout the US; identified competitive capability of utility / non-utility developers and engineering firms.

New England cogeneration marketing and permitting assistance for Unitil gas utility.

Assessed state-by-state future demands for cogeneration systems based upon industrial activities, fuel costs, utility purchase and sales rates, and regulatory climates.

Auctions & Procurement

Retained by the Illinois Power Authority as Procurement Administrator for the 2008, 2009, and 2010 competitive procurements of energy (financial swaps), capacity, and RECs (both physical delivery) for the Ameren Illinois Utilities (AIU); responsible for benchmark pricing, finance, credit, security, performance, and related contract issues.

Advised the Connecticut Department of Public Utility Control (DPUC) on economic costs / benefits and credit / collateral terms and conditions for long-term PPAs.

Conducted power and fuel price forecasts and financial analysis for a confidential equity investor in the auction of the 2,480 MW Ravenswood Facility in New York City.

Assisted Allegheny Electric Cooperative to identify power purchase and equity investment opportunities in PJM; evaluated economics and risk parameters of PPA, tolling, market purchases, and ownership options; reviewed ISDA and EEI agreements.

Part of Procurement Monitor team on behalf of DPUC to oversee United Illuminating and Connecticut Light & Power 2006-2008 supply procurements; responsible for credit issues and evaluating financial barrier options to protect against unanticipated price movements.

Advised LIPA on commercial and financial issues associated with multiple solicitations for on-island and off-island capacity and energy; refined contract terms on risk and credit.

Evaluated third party contracts and on-site generation alternatives for Visy Paper in NYC.

Evaluated design-build proposals for a CHP plant at Rochester Institute of Technology, including engineering / construction qualifications, O&M strategy, financial structure, utility interconnection issues, and lifecycle cost / ROI results.

Evaluated strategic electric and gas procurement strategy options for the Buffalo Fiscal Stability Authority; made implementation recommendations to BFSA and City officials.

Project Financing

Advised multiple clients on off-balance sheet financing structures, including tax-exempt operating leases and third-party ownership of CHP and cogeneration facilities.

Structured non-recourse construction and permanent debt financing for Ocean State Power, the first IPP in the US; provided liaison between investors and financial advisor.

Developed off-balance sheet financing plans for ThermoElectron cogeneration projects.

Applied to the US Synthetic Fuels Corporation for price supports and loan guarantees.

Managed PG&E's \$60 million pollution control Industrial Development Bond financing.

Recommended financing structures for PG&E subsidiaries & joint venture projects - coal mine, generating plants, gas exploration / production, and residential conservation.

Project Development

Advised Maine Department of Transportation on proposed LNG terminal project, including project feasibility, site, safety, comparative economics, and pipeline routing.

Provided commercial advice on 15 MW cogeneration upgrade for New York University, including economic feasibility, contract structure, and utility backup arrangements; advised on renewable wind project development / contractual support.

Advised The Stanley Works on business strategy / financing of 8MW hydroelectric plant.

Completed pre-financing development work (permits, construction, and financing) for Ocean State Power Phase I, a 225 MW combined cycle plant in Rhode Island.

Privatization / Divestiture

Prepared comprehensive descriptions of Southern California Edison thermal generation (12 plants, 10,000 MW) and Commonwealth Edison coal stations (6 plants, 6,000 MW).

Technical and economic advisor to Maine Public Service, Fitchburg Gas and Electric, and Unitil Corp for hydro, thermal, and power purchase agreement divestiture.

Contractual advice to Empresa Electrica de Guatemala, S.A. for power plant divestiture.

Technical and commercial advice (including forward pricing) to a confidential bidder for the New England Electric System divestiture (2800 MW thermal & 1200 MW hydro).

Provided technical / environmental advice to the Government of Pakistan for the 1600 MW Kot Addu plant privatization; developed capacity / energy contract pricing structure.

Gas and Fuel Projects

Developed integrated gas supply, storage, and forward haul transportation project for utilities in the metropolitan NY / NJ area to expand wintertime deliveries.

Evaluated equity return / risk profiles and prepared cash flow forecasts of interstate gas pipelines and storage projects for independent power plants throughout the Northeast.

Prepared testimony on risk, financing, and capital cost for the Endicott Pipeline Co.

Evaluated throughput and rate impacts on financial returns of competing gas pipeline proposals to support the development of Iroquois Gas Pipeline.

Technical Advisor to the Government of Pakistan for the privatization of the Sui Northern Gas Pipeline Company (approx. 200 bcf annual sales with 24,000 km of pipe).

Determined the distribution links between major domestic gas production basins and demand markets to help allocate exploration and development funds of Sohio Petroleum.

World Bank commercial advisor on the Asia Pacific Ltd. oil storage & pipeline, Pakistan.

Energy / Power Plant Optimization

Evaluated contract terms and conditions governing energy options for Nassau County Hub commercial district including cogeneration, spot market purchases, etc.

Assisted NYC industrial firm with cogeneration development; drafting steam purchase, power purchase option, site lease, and development contracts.

Developed cost-effective energy strategy, including asset reconfiguration, permit modification, and contract restructuring, for Massachusetts Water Resources Authority.

Implemented direct gas service via Algonquin Gas Transmission and evaluated cogeneration options for Phelps Dodge copper plant in Connecticut.

Developed inside-the-fence cogeneration and fuel strategy for Arizona paper mill.

Identified optimal cogeneration plant configuration and fuel supply for City of Holyoke.

Litigation Support and Expert Testimony

Submitted comments to the Virginia State Corporation Commission on behalf of Shell Energy NA regarding Dominion Virginia Power's 2009 Integrated Resource Plan on capacity needs and sources (Case No. PUE-2009-00096).

Submitted expert report and testified before the Virginia State Corporation Commission on behalf of Shell Energy NA regarding Dominion Virginia Power's 2007 Solicitation for 2011 Unit Capacity on RFP structure and bid evaluation issues (Case PUE-2008-00014).

Prepared information requests, submitted expert testimony, and testified before the VT Public Service Board on behalf of the VT Dep't of Public Service regarding the proposed restructuring of Entergy's merchant nuclear generation assets (Docket No. 7404).

Submitted expert report on behalf of generator group and participated in Technical Conference before FERC regarding proposed Reliability Pricing Model mechanism that will set market capacity prices in PJM (FERC Dockets Nos. EL05-148 and ER05-1410).

Prepared expert report on New York and New England capacity market mechanisms and plant valuation impacts for the Mirant Corp. equity committee in US Bankruptcy Court (Case No. 03-46590).

Submitted FERC affidavit regarding gas turbine engineering and economic parameters to reset locational ICAP demand curve; represented NYISO at FERC Technical Conference (FERC Docket No. ER05-428).

Expert witness regarding geothermal EPC contract performance and consequential damages based on market power rates before the American Arbitration Association.

Expert witness testimony for the Bridgeport RESCO waste-to-energy facility at the Connecticut DPUC re avoided cost pricing in the deregulated energy market (Docket 99-03-35REO3).

Provided tax valuation support for gas and electric assets for Yankee Gas Company and The Connecticut Light and Power Company in Connecticut Superior Court (Docket No. CV 95-0072561S).

Expert witness report for PECO Energy (Exelon) supporting decision to cancel purchase of equity interest in the River Bend nuclear plant in US District Court for the Middle District of Louisiana (Adversary Proceeding No. 98-477-B-M3).

Expert witness report and testified regarding contractual benefits of major coal plant turbine upgrade based on future market power values in US District Court for the Middle District of Florida, Orlando Division, (Case No. 6:99-CV-76-ORL-22A); accepted as an expert in power project cost analysis and power price forecasting.

Expert witness regarding economic feasibility, financing, and profitability of Mid-Atlantic Energy's proposed cogeneration plant in West Virginia Circuit Court (Civil Action No. 95-C-214M).

Presented testimony on relationship of independent power development fees to project capital costs before the American Arbitration Association.

Financial Analysis

Evaluated the intended financing plan and resulting credit strength of the proposed owner of Entergy's merchant nuclear plants, including Vermont Yankee, for the Vermont Department of Public Service; prepared information requests and rebuttal testimony.

Prepared investment analysis for Massachusetts Institute of Technology cogen project.

Advised lessor on utility buyout offer of wood-fired plant including future residual value.

Evaluated pro forma assumptions and risk / return analysis of Malaysian power projects.

Reviewed financial feasibility of proposed clean coal demonstration projects for DOE.

Managed steam purchase contract evaluation and internal cogeneration feasibility study for petrochemical producer in The Netherlands.

Proposed project financing options for Elektrenai plant modernization in Lithuania.

Power and fuel negotiation support for Cumbria Power, Ltd., the first IPP in England.

Determined economic assumptions, prepared financial pro formas, and analyzed equity return / risk for numerous proposed power projects for ThermoElectron and other clients.

Prepared long-term financial and rate forecasts of PG&E for state commission filing.

Generation Planning / Resource Economics

Assessed Dominion Virginia Power's 2009 Integrated Resource Plan for Shell Energy NA.

Evaluated bidders for Indianapolis Power & Light's 1992 competitive power solicitation.

Audited Florida Power & Light's resource plan, including fuel, load, and generation.

Techno-economic cogeneration feasibility study for Algonquin Gas Transmission.
Valued existing plant based on alternative peaking capacity for Delmarva Power & Light.
Forecasted avoided energy / capacity costs for third-party generators throughout the US.
Supervised life cycle power plant economic analysis for a Fuel Use Act application.
Compared historic and projected electric use by major manufacturing industry for EPRI.

PRESENTATIONS & PUBLICATIONS

Moderated panel on ISO-NE's Forward Capacity Market mechanism at the Northeast Energy & Commerce Association's 2009 Power Markets Conference.

Gas and electric market interdependency panel moderator at Platt's 4th Annual Northeast Power Forum, 2009.

Sponsor for the Northeast Energy and Commerce and Association conference "Northeast Capacity Markets"; moderator for panel on generation entry / attrition outlook, 2007.

Conference organizer and moderator for "Capacity Markets – Impacts on Assets and Power Pricing" regarding G&T investment decisions in ISO-NE, NYISO, and PJM, 2007.

Conducted half-day workshop, "Forecasting Capacity Prices in the Northeast" and panel moderator on generation financing at Infocast Northeast Power Supply Forum, 2006.

"Financing Projects with ICAP Revenues", Infocast Financing U.S. Power conference, 2004.

Panel moderator on New England and Canadian LNG Projects, Infocast Atlantic Coast LNG Conference, 2004.

Speaker, "Power Sales Contract Restructuring Issues", at Infocast Asset Optimization and Portfolio Management Conference, 2003.

Panelist on "Southwest Connecticut Congestion", 10th Annual New England Energy Conference, 2003.

"Fuel and Power Contracting", Int'l District Energy Association Conference, 2002.

"Contract Restructuring", Infocast QF & IPP conference, 2001.

“Successful Valuation and Value-Creation of Transmission Assets”, Infocast Electric Asset & Portfolio Valuation conferences, 2001.

“Evaluation of Repowering the Cabot Street Steam Station” using gas turbine technology, International District Energy Association conference, 2001.

“Plant Repowering” at the Infocast Plant Acquisition conference, 2000.

“Equipment Performance Impacts”, Infocast Merchant Peaking Plant conference, 2000.

“The Pros and Cons of Repowering” in Competitive Utility, 2000.

“The First Wave” (initial divestiture results) 1998 and “Gas versus Coal” (techno-economic study) 1995, Independent Energy magazine.

“Evaluating Technical and Construction Risk” and “The Due Diligence Process”, classes and case studies on for the Infocast Project Finance Institute, 1996-1998.

Non-utility generation and project financing classes at Stone & Webster Utility Management Development Program, 1989-96; General Electric, 1991-94; IBM 1994.

"Self Generation under Competitive Bidding", 1989 Cogen & IPP Congress.

EDUCATION

Wharton Graduate School (Univ. of Penn.), MBA in Finance / Operation Research, 1978.

Brown University, Sc.B. in Applied Mathematics / Economics, 1976.

International Gas Turbine Institute course: Basic Gas Turbine Technology, 1996.

Kennedy School (Harvard University) courses: International Geopolitics of Oil, 1982, and International Political Economy, 1993.

MISCELLANEOUS

Board of Directors, Northeast Energy and Commerce Association, 2007-.

Adjunct faculty lecturer in finance, Golden Gate University, 1979-1980.

Optimum yield resource management, National Oceanic and Atmospheric Admin, 1977.

Mayor's Waterfront Development Committee and Interface: Providence, 1974-1976.

RICHARD L. CARLSON, Ph.D.

SUMMARY

An economics consultant and model developer experienced in power contracts, wholesale electric market performance and market power, stochastic analysis of market risk drivers, portfolio risk-reward optimization, emissions compliance, integrated resource planning, hydro storage optimization, asset valuation, due diligence, and software product management.

PROFESSIONAL EXPERIENCE

- 2008 - **Levitan & Associates, Inc.**
Managing Consultant
- 2007 - 2008 **Ventyx, Inc.**
Vice President of New Solutions, Software
- 2002 - 2007 **Global Energy Decisions, LLC. (acquired by Ventyx)**
Vice President of New Solutions, Software
Assistant Vice President of Research, Software
Director of Planning and Risk Analytics, Software
- 1998 - 2002 **Henwood Energy Services, Inc. (acquired by GED)**
Director of Planning and Risk Analytics, Software
Product Manager, Software
Senior Project Manager, Consulting
Project Manager, Consulting
- 1992 - 1998 **The Goodman Group, Ltd.**
Senior Economist
Economist
- 1986 - 1991 **Economics Plus, Inc.**
Principal
- 1981 - 1985 **Queens College, City University of New York**
Assistant Professor
Instructor
- 1981 - 1986 **Center for the Biology of Natural Systems, Queens College**
Research Associate
- 1978 - 1981 **Center for the Biology of Natural Systems, Washington University**
Research Associate

CONSULTING ASSIGNMENTS

Regulation

Currently preparing due diligence work for a group of generating companies regarding the NYISO ICAP Demand Curve Reset evaluation.

Developed Monte Carlo risk simulation framework for fuel, REC, and GHG prices, forecasts of REC prices and regional wind farm capacity expansion, and energy bid-cost markup model for a potential generation re-regulation study for the Maryland Public Service Commission.

Prepared the economic analysis portion of a joint affidavit to FERC re the need for a risk adder for the rate of return on a transmission project in Maine for remote wind farm development.

Developed a Cournot (pivotal player) model of market power and applied it for the Independent Assessment Team's evaluation of alternative PPA auction rules for Alberta's 1999 deregulation of electricity generation.

Developed econometric models for the California ISO for ancillary services price forecasting and monitoring of potential market power.

Coauthored a client report on alternative incentive regulation systems.

Prepared reports to the Maine Public Utilities Commission staff and testimony to the Ontario Energy Board re the need for special discount rates for large industrial customers.

Prepared a client report on industrial cogeneration economics and the issue of "cross-hauling."

Prepared testimony to FERC on behalf of interveners re the market power analysis submitted by H.Q. Energy Services (U.S.) Inc. in its application for market-based rates.

Prepared testimony to FERC on behalf of interveners re the market power analysis submitted by NEPOOL in its application for market-based rates.

Procurement and Asset Valuation

Currently advising an offshore wind developer in preparation of a proposal response to an RFP.

Advised a New England LSE in developing an RFP for procuring energy and RECs under long-term contracts, and developing methods for evaluation of bids from wind farms and wood biomass plants.

Prepared an energy, REC, and capacity market valuation and risk analysis report for an investment bank interested in the purchase of existing and planned wind farms in New England and New York.

Developed a REC price forecast benchmark procedure for Illinois REC auction procurement by the Illinois Power Agency on behalf of Ameren Illinois.

Developed a statistical optimization model framework to aid two New England LSEs in determining the number of bids to accept in standard service power procurement auctions while maintaining laddering diversification.

Developed a credit risk model of potential future exposure for a New England LSE to apply in setting collateral rules for power contracts.

Prepared a market simulation and risk analysis report for an investment bank interested in the purchase of three existing coal plants in PJM.

Directed independent valuation assessments for over \$1 billion of power plant structured financings and presented conclusions to prospective investors as advisor to asset owners and their investment banks.

Forecasted electric energy and ancillary services prices for generation asset valuation studies for numerous utility and generating company clients.

Integrated Resource Planning and Renewable Energy

Led implementation and training engagements on the use of the System Optimizer software for integrated resource planning, emissions compliance planning, and hydro storage optimization for PacifiCorp, TVA, and BC Hydro, and trained the trainers for many other implementations.

Designed, directed development, and implemented a software tool that uses historical simulation of wind energy for a European utility company.

Designed, directed coding, and directed implementation and training of a tool for a large hydro utility that uses historical simulation of hydro inflows and statistically adjusts Monte Carlo simulation of power prices and loads, accounting for their partial correlations.

Coauthored a client report analyzing the need for large hydroelectric projects in Quebec.

Portfolio Risk Management

Presented workshops to U.S. and European electric utility and generation companies on portfolio risk management concepts and strategies, stochastic modeling, and real options analysis.

Directed development and implementation of a stochastic portfolio simulation and financial hedging optimization modeling system for an electric utility company.

Energy and Commodity Market Analysis

Developed econometric models for ancillary services price forecasting and multi-product bidding strategies for generation company clients, and prepared client reports on DAM-RTM bidding strategies.

Prepared testimony on avoided costs for an association of small hydro producers.

Prepared a client report on surface coal mining costs in the Southwest.

Led a team that prepared a client report on pulp and paper industry economics.

Developed a national market model and report of joint food and energy production from U.S. agriculture; developed regional market models for U.S. DOE and the Ford Foundation.

Compared alternative municipal solid waste disposal methods using cost and risk modeling with grants from the Veatch Foundation, the J.M. Kaplan Fund, and the New York State Assembly Commission on Solid Waste Management.

Led studies funded by the U.S. Dept. of Energy and the Ford Foundation re the economic potential for fuel ethanol production. Testified before the U.S. Congress Joint Economic Committee Energy Subcommittee, spoke to the U.S. Departments of Energy and Agriculture, and interviewed by National Public Radio on the study results.

Litigation Support

Prepared portion of testimony to FERC on natural gas transportation rates for a western gas company.

Preparing portion of testimony on the reasonableness of excluding a merchant power plant from bidding in an RFP for a PPA.

Prepared testimony on the accuracy of contract payments for a PURPA project owner.

INDUSTRY EXPERIENCE

Managed software product development of the Ventyx EnerPrise software System Optimizer, Planning and Risk, and Market Data Warehouse modules. Prepared market requirements documents, marketing documents and presentations, functional specifications documents, technical documents, and user guides. Supervised quality control and support issues, managed new version software implementations, trained programming, implementation, and support staff and clients in the uses of the software, and provided technical support to sales executives and clients.

Advised energy trading and risk management (ETRM) product managers on risk analytic methods to include in the product.

Directed programming teams in migrating statistical analysis and risk-reward optimization modules, the System Optimizer product, and the Planning and Risk product from independent applications into modules integrated within the SQL Server-based enterprise software system.

Directed software implementation and training staff on numerous client projects involving initial or upgrade implementation of the System Optimizer product, the Planning and Risk product, and the Market Data Warehouse product.

Led a cross business unit team in charge of packaging and marketing of integrated (information, software, consulting) emissions management solutions.

Assessed the market for providing web-based electricity market analytics and portfolio simulation software to financial firms (investment banks and energy hedge funds).

Presented webinars and seminars to North American, European, and Pacific Rim software and advisory clients on planning, portfolio optimization, stochastic modeling, real options analysis, and risk management topics.

Prepared custom implementation solutions for European, U.S., and Canadian software clients, involving a mix of software development and application consulting.

Designed, coded, and documented capacity expansion, emissions compliance, and hydro storage optimization components of the System Optimizer module, and the mean reversion Monte Carlo simulation, statistical estimation, and risk-reward optimization components of the Planning and Risk module.

Developed the Energy, Economic, and Environmental Analysis System (E³AS), a software program and database system funded by U.S. EPA for use by state government agencies in regional inter-industry input-output analysis of employment and air emissions impacts of state-wide energy supply and demand-side management programs.

Developed the Second Opinion software product for economic and financial analysis of investments in solid waste management systems, for use by state and local government agencies.

EDUCATION

Ph.D., Resource Economics (Agricultural Economics), University of Wisconsin – Madison, 1984

M.A., Resource Economics (Agricultural Economics), University of Wisconsin – Madison, 1975

B.S. with Distinction, Agricultural Economics, Washington State University, 1973

EXPERT WITNESS / REGULATORY EXPERIENCE

Maine Public Utilities Commission: Docket 92-331; Airco industrial Gases Request for Interruptible Load Retention Service Rate with Central Maine Power Company; for Maine Public Utilities Commission Staff (July 9, 1993); Supplemental Testimony (August 10, 1993). Development of criteria for special discount rates and analysis of need for special discount rate in instant case (with I. Goodman and R. McCullough).

Maine Public Utilities Commission: Docket 93-147; Central Maine Power Company Petition for a Certificate of Public Convenience and Necessity to Erect a Transmission Line Carrying 100 Kilovolts or More in York County; for Maine Public Utilities Commission Staff (September 21, 1993). Review of need and alternative routes (with I. Goodman and W. Scott).

Ontario Energy Board: E.B.L.O. 246 Amended; 1994/95 Trafalgar Facilities Expansion Program of Union Gas Ltd.; for Pollution Probe Foundation (April 4, 1994); Supplemental Oral Direct Testimony (April 22, 1994). Review of need for gas transmission system expansion (with I. Goodman).

Ontario Energy Board: H.R. 22; Ontario Hydro 1995 Rates Proceeding; for The Green Energy Coalition (June 2, 1994). "Economic Implications of Ontario Hydro Special Industrial Rates" (with I. Goodman).

Ontario Energy Board: H.R. 22; Ontario Hydro 1995 Rates Proceeding; for Nishnawbe Aski Nation and Grand Council Treaty #3 (June 2, 1994). Development and equity concerns of rates proposal on Native American communities (with I. Goodman).

Maine Public Utilities Commission: Docket 92-345, Phase II; Central Maine Power Company's Proposed Increase in Rates; for the Office of the Maine Public Advocate (June 15, 1994). Assessment of DSM impacts of adopting proposed Alternative Rate Plan (with I. Goodman).

Maine Public Utilities Commission: Docket 93-320; Central Maine Power Company and Keyes Fibre Company, Joint Request for Investigation of Special Contract Tariff; Maine Public Utilities Commission Staff (August 1994). "Staff Report and Recommendation Re: Keyes Fibre-CMP Special Rate Contract" (with D. Sipe).

Ontario Energy Board: E.B.R.O. 486; Union Gas Ltd. 1995 Rates Hearing; for Pollution Probe Foundation (December 5, 1994). "Review of Avoided Cost Methodology and Results" (with I. Goodman).

Ontario Energy Board: E.B.L.O. 251; 1995/96 Trafalgar Facilities Expansion Program of Union Gas Ltd.; for Pollution Probe Foundation (May 5, 1995). Review of need for gas transmission system expansion (with I. Goodman).

Ontario Energy Board: H.R. 23; Ontario Hydro 1996 Rates Proceeding; for The Green Energy Coalition (June 16, 1995). "Economic Implications of Ontario Hydro Special Industrial Rates" (with I. Goodman).

Ontario Energy Board: E.B.L.O. 251 (Updated); 1996/97 Trafalgar Facilities Expansion Program of Union Gas Ltd.; for Pollution Probe Foundation (February 8, 1996). "Review of need for gas transmission system expansion (with I. Goodman).

Ontario Energy Board: H.R. 24; Ontario Hydro 1997 Rates Proceeding; for The Green Energy Coalition (June 11, 1996). "Economic Implications of Ontario Hydro's Proposed 1997 Optional Rates" (with I. Goodman).

Ontario Energy Board: E.B.R.O. 493/494; Union Gas Ltd./Centra Gas Ontario, Inc. 1997 Rates Hearing; for Pollution Probe Foundation (September 6, 1996). "Review of Avoided Cost Methodology and Results" (with I. Goodman).

Federal Energy Regulatory Commission: Docket Nos. ER97-1079-000, OA97-237-000; Applications for Market-Based Rates by NEPOOL; for The Grand Council of the Crees (of Quebec) and The New England Coalition for Energy Efficiency and the Environment (July 1, 1997). Review of NEPOOL's "Market Power Analysis" and "Market Power Mitigation Procedure" submissions (with I. Goodman).

Federal Energy Regulatory Commission: Docket No. ER97-851-000; Application by H.Q. Energy Services (U.S.) Inc. for Market-Based Rates; for The Grand Council of the Crees (of Québec) and The New England Coalition for Energy Efficiency and the Environment (August 19, 1997); Supplemental affidavit (September 25, 1997). Review of HQUS' market power analysis (with I. Goodman).

Federal Energy Regulatory Commission: Docket No. EL08-77-000; Petition for Declaratory Order Authorizing Incentive Rates for Central Maine Power Company and Maine Public Service Company for the Maine Power Connection Project; Joint Affidavit for the Connecticut Department of Public Utility Control (August 29, 2008). Review of the costs and benefits of the transmission project related to proposed wind farm development (with B. Shapiro).

PUBLICATIONS AND SELECTED TECHNICAL DOCUMENTS

System Optimizer 2.1 User Guide, Global Energy Decisions, 2007.

Capacity Expansion 1.3 User Guide, Global Energy Decisions, 2006.

The Seven Deadly Sins of Planning and Risk Management for Power Companies, Global Energy Decisions, Briefing Report, 2005.

Theo User Guide, Global Energy Decisions, 2004.

Theo Models Documentation, Global Energy Decisions, 2004.

Forward to Spot Price Model Stochastic Parameter Calibration, Henwood Energy Services, Inc., Technical Report, April 2004 (with Wei Liu).

Documentation for Henwood Stochastic Model Parameter Estimation, Henwood Energy Services, Inc., Technical Report, Feb. 2003.

"Risk Analytics," *Energy Markets*, February 2002, p. 68.

"Simulations of Alternative PPA Holding Restrictions", Prepared for the Alberta Independent Assessment Team, Sept. 28, 1999 (with G. Given and R. Schiffman).

Energy, Economic, and Environmental Analysis System (E3AS) User's Guide – Version 2, Prepared for the U.S. Environmental Protection Agency, The Goodman Group, Ltd., July 1998 (with B. Krier and I. Goodman).

Employment, earnings, and Environmental Impacts of Regional Improvements in Energy Efficiency, Prepared for the Southern States Energy Board, Dec. 1996 (with B. Krier and I. Goodman).

North Carolina State Energy Supply Plan for Use with E3AS, Prepared for the North Carolina Dept. of Commerce Energy Division, Nov. 27, 1996 (with I. Goodman).

Energy, Economic, and Environmental Analysis System (E3AS) User's Guide, Prepared for the Southern States Energy Board, The Goodman Group, Ltd., May 1996 (with B. Krier and I. Goodman).

"Guidelines for Granting Industrial 'Distress' Rate Discounts," *Public Utilities Fortnightly*, January 15, 1995 (with D. Sipe).

The Potential for Cogeneration in the Quebec Pulp and Paper Industry, Prepared for The Grand Council of the Crees of Québec. The Goodman Group, Ltd., December 1993 (with I. Goodman, E. Titus, G. Breton and L. Vanasse).

Economic Analysis of Black Mesa Mine Profitability, Prepared for the Alternative Coal Transport Study, Economic Analysis for the Hopi Tribe, The Goodman Group, Ltd., September 1993.

Economic Evaluation of Ontario Hydro's Proposed Moose River Basin Hydroelectric Projects, Prepared for the Moose River/James Bay Coalition in the Ontario Hydro Demand/Supply Plan Hearing, The Goodman Group, Ltd., and McCullough Research, December 1992 (with I. Goodman, R. McCullough and W. Huddleston).

Incentive Regulation Theory and Practice, Prepared for the Public Interest Advocacy Centre, Ottawa, Canada, The Goodman Group, Ltd. and Econanalysis Consulting Services Inc., November 1992 (with B. Alexander, I. Goodman and J. Todd).

Second Opinion: Municipal Solid Waste Disposal Model User's Guide, Economics Plus, Inc., 1989.

"The Impact of Materials Recycling Programs on Energy Recovery Facility Economics," *Journal of Resource Management and Technology* 15, March 1986, pp. 28-36.

Environmental and Economic Analysis of Alternative Municipal Solid Waste Resource Recovery Technologies, Report to the Veatch Foundation, New York: Center for the Biology of Natural

Systems, Queens College, July 1985 (with T. Webster, B. Commoner, and M. McNamara).

“Alcohol,” in J. Ridgeway, ed., *Powering Civilization: The Complete Energy Reader* (New York: Pantheon Books, 1982) (with D. Freedman, N. Jacobstein, J. Kendell, R. Schneider, and H. Winger).

The New York Metropolitan Area Produce Market: A New Opportunity to Preserve Long Island Farmland, Report to the J. M. Kaplan Fund, New York: Center for the Biology of Natural Systems, Queens College, July 1982 (with L. Herman, T. Goldfarb and B. Commoner).

Economic Evaluation and Conceptual Design of Optimal Agricultural Systems for Production of Food and Energy, Final Report to the U.S. Department of Energy (Washington: US GPO, March 1982) (with D. Freedman, N. Jacobstein, R. Schneider, H. Winger and B. Commoner).

“The Technical Potential for Alcohol Fuels from Biomass,” *Farm and Forest Produced Alcohol: The Key to Liquid Fuel Independence*, Paper submitted to the Subcommittee on Energy, Joint Economic Committee, U.S. Congress, 22 August 1980 (Washington: US GPO, 1990) (with D. Freedman, N. Jacobstein, J. Kendell, R. Schneider, and H. Winger).

“Integrated Food-Energy Production Analysis,” *Alcohol Fuels Policy: Part I Energy Self Sufficiency for Rural America*, Hearings before the Subcommittee on Energy, Joint Economic Committee, U.S. Congress, 17 March 1980 (Washington: US GPO, 1980).

A Critique of ‘The Report of the Alcohol Fuels Policy Review’, Report to the U.S. Department of Energy, Center for the Biology of Natural Systems, Washington University, September 1979 (with B. Commoner and D. Freedman).

Ethanol’s Role in the Current Gasoline Crisis, Report to the Gasohol Caucus, U.S. Congress, 25 June 1979, Center for the Biology of Natural Systems, Washington University, 1979 (with B. Commoner, R. Scott and D. Freedman).

The Economic Potential of On-farm Energy Production Systems, Report to the Ford Foundation, Center for the Biology of Natural System, Washington University, January 1979 (with B. Commoner, D. Freeman and R. Scott).

“The Effects of Property Taxes and Local Public Services upon Residential Property Values in Small Wisconsin Cities,” *American Journal of Agricultural Economics* 59 February 1977, pp. 81-87 (with M. McMillan).

CONFERENCE PRESENTATIONS

“Procurement of Resources via Auctions”, EUCI “Resource and Supply Planning” Conference, Arlington, VA, March 24, 2010.

“Portfolio Optimisation and Risk Management: Practical Applications”, EMART Energy, Pre-Conference Seminar, Amsterdam, Nov. 20, 2007.

“Risk Analysis for an Asset-Centric Portfolio”, EUCI “Risk Management 101” Conference, New York, June 20, 2007.

“Managing Risks of Asset-Centric Portfolios”, EUCI “Risk Management 101” Post-Conference Workshop, New York, June 21, 2007 (with J. Teofilo).

“An Integrated Approach to Portfolio Optimization for a Power Company”, EUCI “Managing Physical and Financial Uncertainty in the Power Industry” Conference Dinner Workshop, New York, August 2, 2006.

“Portfolio Optimization Theory and Practice for Electric Generators and Load-serving Entities”, EUCI Conference, “Portfolio Optimization for Electric Utilities” New York, June 26, 2003.

“Estimating and Modeling Electricity and Fuel Price Volatility: A Comparison of Approaches,” Infocast Conference, “Market Price Volatility,” Houston, May 2, 2002.

“New Methods of Evaluating Assets in the Electric Industry”, UTILICON 2001 Conference, Melbourne, July 25, 2001.

“Portfolio Optimization in Volatile Wholesale Energy Markets”, EUCI Conference, “Portfolio Valuation and Optimization”, Denver, March 9, 2001.

“Estimating and Modeling Electricity and Gas Price Volatility in the MAIN NERC Region,” Infocast Conference, “Market Price Volatility,” Houston, March 5, 2001.

“Estimating and Modeling Gas and Electric Price Volatility in the Mid-American Interconnected Network (MAIN) NERC Region,” Infocast Conference, “Market Price Volatility,” Chicago, May 10, 2000.

“The Runaway World of Merchant Power,” GasMart/Power 2000 Conference, Denver, April 11, 2000.

“Market Power in Alberta,” Canadian Institute Conference, “Deregulation of Power Generation in Alberta,” Calgary, April 10, 2000.

“The Rapid Evolution of Plant Valuation: From Guaranteed Returns to Portfolio Analysis,” Infocast Conference, “Energy Asset and Corporate Valuation,” Orlando, January 26, 2000. With M. Griffith and K. Woodruff.

“Ancillary Services Price Forecasting: Key Drivers of A/S Prices in the California Market,” Infocast “Market Price Forecasting” Post-Conference Workshop, Chicago, May 21, 1999.

JOHN J. ELDER

SUMMARY

A registered professional engineer in mechanical engineering with expertise in market simulation analysis, transmission load flow, and thermodynamics. Leads LAI's chronological production simulation modeling to forecast locational production costs and market energy prices.

PROFESSIONAL EXPERIENCE

- 1995 - **Levitan & Associates, Inc.**
Manager, Power Systems and Market Design
Senior Consultant
- 1994 - 1995 **Hague International Corp.**
Project Engineer
- 1970 - 1994 **Stone & Webster Engineering Corp.**
Principal Mechanical Engineer - Heat Exchanger Specialist
Mechanical Engineer

CONSULTING ASSIGNMENTS

Market Analysis

Prepared analysis and report on the impact of new peaking capacity in NY City on emissions in New York and Eastern PJM.

Testified at the Maryland Public Service Commission regarding the expected value of the output of the Warrior Run project as sold into the PJM market vs. a bilateral contract.

Prepared analysis and report for the Maryland Public Service Commission on the impact of potential policy initiatives on Maryland electric consumer costs.

Prepared analysis and report on the impact of new peaking capacity in the NEMA/Boston area on emissions in New England.

Prepared analysis and report on the market revenues expected for new peaking resources for presentation to the NYISO ICAP Working Group in support of its determination of ICAP Demand Curve parameters.

Advised ISO-New England, New York-ISO and PJM Interconnection regarding the impacts of hurricane related damages to natural gas production, gathering and processing facilities in the Gulf of Mexico on fuel availability and grid reliability for the winter 2005/2006.

Analyzed the historical relationship between load, installed capacity and market energy prices in New England in support of financial analysis of proposed peaking market sales from an existing generator owned by the Massachusetts Water Resources Authority.

Analyzed the distribution of non-energy market revenues (including ancillary services, uplift/BPCG/Operating Reserve Credit and ICAP/UCAP) among various market participants in support of project financial analysis for multiple clients, including utilities, energy investors and generators.

Simulation Modeling

Maintains a database of project development status, generation retirements, load forecasts, transmission constraints and other market data in support of production simulations and other market forecasts.

Performed production simulation modeling for New York State and adjoining areas (PJM, ISO-NE and Canada) to prepare electric energy price forecasts under a congestion pricing framework covering all major consumption areas in New York State as well as plant specific operating costs and revenues for a variety of clients including Pure Energy, Abitas Capital, NYISO, NYPA, LIPA, All Capital, Cornell University, Westchester County Public Utility Service Agency, Consolidated Edison, the New York State University Construction Fund, the University of Rochester, the Rochester Institute of Technology, American National Power.

Performed production simulation modeling for New England and adjoining areas to prepare electric energy price forecasts under a congestion pricing framework covering all major consumption areas in New England as well as plant specific operating costs and revenues for multiple clients, including Connecticut Department of Public Utility Control, Abitas Capital, Consolidated Edison, PP&L Global, TransCanada Power, El Paso, and BW Energy.

Performed production simulation modeling for PJM and PJM West and adjoining areas to support analysis of policy initiatives for the Maryland Public Service Commission and to develop gas consumption forecasts under transmission constraints for the PJM Interconnection.

Performed production simulation modeling for SERC and adjoining areas to prepare electric energy price forecasts in support of PowerGen on the acquisition of Louisville Gas & Electric.

Performed production simulation modeling for ERCOT and SPP to support financial analysis of the comparative economics of IGCC, pulverized coal and natural gas-fired combined cycle generating plants.

Performed production simulation modeling covering the NY-ISO and adjoining areas to develop electric generator gas consumption forecasts under transmission constraints for LIPA and Consolidated Edison.

Developed and/or reviewed production simulation model assumptions for use by the IMO, NY-ISO and ISO-NE and reviewed their simulation results for gas reliability studies. Analyzed simulation results from MAPS (NYISO and IMO) and Prosym (ISO-NE) to prepare reports and inputs for gas pipeline modeling.

Reviewed production simulation by others (MAPS, Prosym, Promode, UPLAN, IREMM) regarding model assumptions and results in connection with congestion forecasting, energy contracting, contract restructuring and litigation support.

Prepared electric energy price forecasts for several proposed cogeneration evaluations for the University of Rochester, the State University of NY and the University of Massachusetts.

Plant Performance

Analyzed performance parameters and operating limits of several proposed cogeneration technologies for the Cornell University, University of Rochester, the State University of NY and the University of Massachusetts.

Prepared analysis and report on the effect of natural gas supply temperature on plant performance and availability for Florida Power & Light. Analyzed the impact on delivered gas temperature of various pipeline operating modes including the Joule Thomson effect and heat transfer through the pipe wall.

Prepared analysis and report on steam turbine operating limits for a Massachusetts Water Resources Authority cogeneration project that resulted in increased operating flexibility and reduced fuel costs.

Analyzed the performance and operating modes of solid fuel and gas fired combined cycle cogeneration facilities to develop strategies for contract restructuring for utilities in New York, Pennsylvania, West Virginia and Washington.

Analyzed under-performance of Bay State Gas pipeline gas turbo expander energy project and predicted the maximum output that was realized after plant repairs.

Evaluated operating problems and proposed boiler and fuel handling upgrades for the Osceola and Okelanta Cogeneration projects.

Analyzed the performance and operating modes and operating costs of several gas fired combined cycle cogeneration facilities to develop strategies for contract restructuring for Puget Sound Energy.

Transmission Congestion Analysis

Analyzed transmission economic and reliability upgrades in PJM, NY and NE to identify regulated and merchant investment opportunities.

Analyzed transmission congestion in northern Maine to support expert testimony regarding the Maine Power Connection for the Connecticut DPUC.

Analyzed transmission congestion in northern NJ to support selection of points for analysis of Incremental Auction Revenue Rights resulting from the transmission upgrades proposed for the Neptune DC cable for LIPA.

Analyzed transmission constraints and locational capacity and spinning reserve requirements affecting power plants proposed for New York City, Western NY, Rockland County, Long Island, Maine, Rhode Island and Ontario.

Analyzed transmission congestion between JCP&L and the PJM CEI interface to support testimony in the NJ BPU hearings on the GPU First Energy merger.

Transmission Interconnection Support

Provided technical advisory services regarding interconnection options for a cogeneration facility at the Rochester Institute of Technology.

Provided technical advisory services regarding the development of the Green Path transmission project in southern California by Citizen's Energy.

Provided technical advisory services regarding selection of the RTO to serve as operating authority and transmission system upgrades required for the Neptune DC cable from NJ for LIPA.

Provided technical advisory services regarding transmission system upgrades required for interconnection of new generators for two projects in Maine, for Calpine and American National Power, a project in NYC for Visy Paper.

Procurement

On behalf of the Connecticut Department of Public Utility Control, provided modeling to set proxy prices for energy and capacity for the procurement of Standard Service and Supplier of Last Resort Service for the state's two investor-owned utilities.

On behalf of the Connecticut Department of Public Utility Control, testified regarding the comparison of proposals for development of peaking power plants in Docket No. 08-01-01.

Evaluated proposals for the sale of capacity and/or energy to the New York Power Authority.

Advised the Ameren Illinois Utilities regarding the procurement process for the acquisition of a portfolio of energy products, including energy swaps, capacity and renewable energy credits, to meet the utilities' native load requirements for the period June 2008 through May 2009.

Supported due diligence review of the Linden Cogeneration Plant's generation and transmission assets and the potential development of a VFT link between PJM and NY for a confidential client.

Provided advisory services regarding procurement of new base load capacity to Allegheny Electric Cooperative.

Evaluated proposals for the sale of capacity and/or energy to the Long Island Power Authority.

Prepared analysis of "seams issues" to support evaluation of proposals for off-island capacity and/or energy received by LIPA. Issues included scheduling constraints resulting from proposal terms and the requirements of the NYISO and PJM or ISO-NE as well as the costs and risks associated with the PJM or ISO-NE transmission service required to execute the proposed transactions.

Analyzed the role of New England pumped storage facilities in the ancillary services markets for PP&L Global.

Supported due diligence review of Commonwealth Electric's generation assets including production simulation to support an energy price forecast, evaluation of development potential and site inspection of existing facilities for BW Energy.

Supported due diligence review of Boston Edison's generation assets including production simulation to support an energy price forecast, evaluation of development potential and site inspection of existing facilities for Consolidated Edison.

Transaction Support

Evaluated proposals for the sale of capacity and/or energy to the Long Island Power Authority.

Contract Support

Analyzed the distribution of non-energy market revenues (including ancillary services, uplift/BPCG/Operating Reserve Credit and ICAP/UCAP) among various market participants in support of contract financial analysis for multiple clients, including utilities, energy investors and generators.

Analyzed the impact of the terms of a dispatchable NUG contract on market prices to evaluate the total portfolio cost of purchased power for Consolidated Edison.

Reviewed term sheets and draft contracts with regarding interactions with applicable market rules for Consolidated Edison.

Facilitated NUG restructuring of Tenaska Ferndale contract on behalf of Puget Sound Energy.

Supported due diligence review of Central American generation assets including site inspection and evaluation of facilities for BankBoston.

Evaluated proposed strategies to mitigate the effects of minimum generation events with respect to the limitations and constraints imposed by the operating characteristics of the plants operating within the PJM control area.

Litigation Support

Prepared FERC affidavit regarding gas quality control on the Maritimes and Northeast system for Calpine Corporation.

Supported preparation of expert testimony regarding the Maine Power Connection for the Connecticut DPUC.

Prepared analysis of plant revenues in support of asset valuation in Mirant bankruptcy proceeding.

Provided litigation support to owners of a solid fuel, non-utility generator and a gas-fired cogenerator in PJM.

PRIOR BACKGROUND

Prepared performance data for proposals for advanced combined cycle plants using a proprietary coal fired gas turbine combustion system.

Developed a procedure to prevent overheating a combustion turbine when operating with high levels of air extraction.

In support of the development of a high temperature gas to air heat exchanger, predicted the circumferential and axial temperature distribution in a ceramic tube exposed to convective and radiation heat transfer to predict the tube life and susceptibility to thermal cracking.

For the Department of Energy, developed a conceptual design for a closed loop cooling water system to transfer heat from the helium in a closed loop gas turbine power plant to the circulating water system. This effort included sizing the cooling water/circulating water heat exchanger, selecting the flow rates for the cooling and circulating water, and developing a conceptual arrangement.

Evaluated the feasibility and desirability of adding a Secondary Condensing System (SCC) to ABB's System 80+ plant on behalf of the Korean Electric Power Company. Two design

approaches were considered. The evaluation included sizing major equipment, equipment layout, interfaces with existing systems, and licensing impacts.

Reviewed the specification, bid evaluation, contract award, drawing review fabrication and testing for a high pressure and low-pressure feedwater heater for Electric Power Research Institute. Prepared a life cycle cost analysis for heaters using carbon steel, stainless steel and AL6XN tubing.

Participated in the Balance of Plant (BOP) design for a closed cycle helium gas turbine power plant using a helium-cooled reactor as a heat source. Prepared a plant cycle diagram and heat balance diagram. Determined the configuration and required sizes for BOP heat exchangers (recuperators, intercoolers, precooler and cooling tower).

Evaluated the impact of installing an oversized pump impeller for Sequoyah Nuclear Power Station - Tennessee Valley Authority. This analysis included consideration of consequences and repercussions to the system design of the containment spray system.

Developed procedures to ensure the technical accuracy and completeness of Design Basis Documents for North Anna - Virginia Power. Prepared Design Basis Documents for two nuclear power plant systems: the Auxiliary Feedwater and Component Cooling Water systems.

Coordinated engineering activities related to Duquesne Light Company application for a rate increase.

Coordinated and reviewed all Power Division activities related to Beaver Valley Unit 2 submitted to the NRC.

Prepared the Mechanical sections of the Description of Plant and the Plant Estimate for Patriot Power Station, Indianapolis Power & Light, and a 700 MW coal-fired steam power plant.

Supervised all Power Division engineers and designers as they prepared piping and diagrams for Boston Edison's Mystic Station wastewater treatment facility. Responsible for completion of the work on schedule and within budget.

Supervised work on the BOP for Sundesert Nuclear Power Plant. Oversaw activities related to flow diagrams, system descriptions, equipment specifications, and PSAR preparation, ensuring technical adequacy. Prepared BOP work package schedules and budgets.

Prepared and maintained flow diagrams and reviewed associated system diagrams and drawings prepared by other disciplines for Millstone Nuclear Power Station Unit 3. Prepared system descriptions, maintained equipment specifications reviewed vendor drawings and technical documents for compliance with the specifications, FSAR sections for the service water system and emergency diesel generators.

Calculated the thermal performance and fluid pressure drops for heat exchangers for many applications. Prepared calculations for equipment used to determine the heat exchanger

configuration required to meet a specified thermal performance with constraints on pressure drop, overall length and/or diameter.

Prepared many engineering studies to evaluate the technical and economic feasibility of design concepts ranging in scope from individual mechanical components to integrated resource plans.

EDUCATION

Massachusetts Institute of Technology, M.S., Mechanical Engineering, 1967.

Massachusetts Institute of Technology, B.S., Mechanical Engineering, 1967.

PROFESSIONAL REGISTRATION

Commonwealth of Massachusetts Professional Engineer License #EN 27757-M

ASSOCIATIONS

ISO-NE Transmission Expansion Advisory Committee

American Society of Mechanical Engineers

New England Gas Association

Northeast Energy and Commerce Association

PUBLICATIONS

"A Test Program for Predicting and Monitoring the Emergency Diesel Generator Heat Exchangers at Limerick Generating Station and Peach Bottom Atomic Power Station," Proceedings of the International Joint Power Generation Conference, October 1995.

"Cost and Security of Backup Power Supplies," IDEA 13th College/University Conference Proceedings, February 2000.

EDWARD K. TSIKIRAYI

SUMMARY

A consultant with 19 years of experience in bulk power planning and operations including transmission-constrained reliability assessments and production and market based simulations. Expertise includes market analysis, integrated resource planning, transmission reliability assessment, resource adequacy assessments, production and market based simulations and load flow and optimal power flow analysis.

PROFESSIONAL EXPERIENCE

- 2003- **Levitan & Associates, Inc.**
Executive Consultant
Senior Consultant
- 1999-2003 **ISO New England, Inc.**
Lead Engineer (Power Supply and Reliability Planning)
Senior Engineer (Power Supply and Reliability Planning)
- 1990-1999 **Zimbabwe Electricity Supply Authority**
Principal Engineer (Generation Expansion Planning)
Senior Engineer (Generation Expansion Planning)
Engineer (Generation Expansion Planning)
Assistant Engineer (Generation Expansion Planning)

CONSULTING ASSIGNMENTS

MARKET ANALYSIS SERVICES

Currently providing market analysis services to the Connecticut Department of Public Utility Control in the complaint before FERC regarding capacity imports over the Northern New York AC Interface. The services include analysis and interpretation of ISO-NE and NYISO market rules regarding capacity and energy exports/imports and analysis of bidding and scheduling requirements in the Day Ahead and Real Time Markets.

Performed transmission and market analysis services for the Maryland Public Service Commission in several studies to determine future energy options for the state of Maryland. Developed backbone and related transmission infrastructure assumptions for use in the production simulation analyses, provided analysis of factors affecting new generation entry in the state of Maryland, provided analysis on the definition and estimation of the Capacity Gap in Maryland and provided an analysis of the SWMAAC Resource Balance based on the Locational Deliverability Area's CETO and CETL.

Provided assistance to the New York Power Authority (NYPA) in the review of proposals submitted in response to the RFP to provide long term supply of in-City UCAP and optional energy (RFP LTS #5). NYPA had sought proposals from bidders interested in offering up to 500 MW of UCAP and associated energy located in Zone J, and/or qualifying transmission to NYC from an upstate location or an adjacent Control Area. Performed due diligence on respondents; coordinated LAI's production simulation and financial analysis of rival bids, developed transmission assumptions and provided technical transmission support.

Developed capacity price forecasts for work done for TransCanada in their bid to purchase the Linden generation plant.

Performed extensive capacity modeling to determine long term capacity price forecasts for New England, PJM and New York for work done for the Long Island Power Authority (LIPA) Request for Proposals seeking generation to fill up the Neptune and Cross Sound Cable HVDC links. Provided ISO Market Rules advice to Bidders and the Selection Team for the same project. Interviewed prospective bidders.

Performed transmission load flow and optimal power flow modeling of the Northeast System to derive locational marginal prices for the LIPA and PJM systems. This was done in support of work done for LIPA to evaluate bids submitted as part of the Request for Proposals from entities interested in developing a generating facility on Long Island or developing a new transmission line to Long Island that would accommodate the reliable delivery of products from an off-island generating facility.

Developed long term capacity price forecasts for work done for the Cornell University's Energy Master Plan.

Performed market based simulations and capacity modeling to derive long term energy and capacity price forecasts of the New England market for Wheelabrator.

Performed market based simulations and capacity modeling to derive long term energy and capacity price forecasts of the Northeast Market in support of the work done to derive the Demand Curve Parameters for the NYISO for the period beginning May 1, 2005.

Performed market based simulations and capacity modeling to derive a long term energy and capacity price forecast for work done for the County of Westchester in the evaluation of the retirement of the Indian Point Nuclear Units.

TRANSMISSION DEVELOPMENT / BULK POWER MARKETS

Currently providing support to the New York Power Authority in their participation in the PJM Interconnection Marketplace. Support includes providing assistance to NYPA in the review and monitoring of the System Impact Study and Facilities Study of the

Hudson Transmission Project and participating in PJM committees and working groups on NYPA's behalf.

Provided technical advice to Citizens Energy Corporation on the development of a 500 KV AC line and associated 230 kV upgrades in Southern California. The transmission development was part of the "Green Path" project which would be primarily used for the export of renewable energy resources from the Imperial Valley to the San Diego Region of Southern California.

Advised Citizens Energy on the economics of an underwater high voltage direct current (u/w HVDC) cable from Labrador to Boston or New York City. Determined the technology and specifications of the HVDC line, and prepared the conceptual cost estimate of the cable.

PROCUREMENT AND BID EVALUATION SERVICES

On behalf of the Connecticut Department of Public Utility Control (CT DPUC), as part of LAI's oversight of the 2006, 2007, 2008 and 2009 Connecticut Standard Service and Supplier of Last Resort solicitations, supported the development of the requests for proposals and wholesale power agreements, provided modeling support in the setting of proxy prices for energy and capacity (Capacity Cost Allocation - FCM Transition Period and FCM Capacity prices, Congestion, Financial Transmission Rights and Auction Revenue Rights) for the procurement for the state's two investor-owned utilities, communicated with bidders and provided quality control review during bid analysis.

On behalf of the CT DPUC's Peaking Generation Docket Nos 07-08-24 and 08-01-01, conducted between 2007 and 2008, provided analysis of the interconnection issues of the competing projects - reviewed the relevant System Impact Studies / Feasibility Studies, the required transmission interconnection and network upgrades. Provided analysis of transmission deliverability issues.

On behalf of the Illinois Power Agency, supported the development of the capacity request for proposals for the Ameren Illinois Utilities for the 2009 procurement. Provided analysis and insight into the MISO Resource Adequacy Requirement (Module E), Capacity Product Definition, Local Balancing Authority Requirements (AMIL and AMMO) and the MISO rules governing the AIU Capacity Purchase.

REGULATORY WORK

Provided support to the Vermont Department of Public Service in their assessment of the reorganization of Entergy Corporation's non-wholesale generation business which includes the Vermont Yankee station, with a goal of determining whether the reorganization is in the public interest of Vermont ratepayers. Reviewed petitions, testimonies and responses submitted by Entergy and other parties, conducted discovery of Entergy and assisted in the preparation of expert testimony.

Provided Regulatory support for Chelsea Energy, LLC in their filings to obtain a petition for approval by the Energy Facilities Siting Board to construct a 250 MW simple-cycle electric generating facility.

Provided regulatory support for a consortium of PJM generators in their filings on the PJM Reliability Pricing Model.

TRANSMISSION CONSTRAINED RELIABILITY ASSESSMENTS

Performed the Transmission-Constrained reliability assessment of ISO-NE's first Regional Transmission Expansion Plan (RTEP), which identified transmission-constrained areas within New England. Developed ISO-NE's 13 sub-area reliability model using General Electric's Multi-Area Reliability Simulation Model (GE MARS) which quantified the sub-area reliability in terms of Loss of Load Expectation (LOLE) and made several presentations to the Transmission Expansion Advisory Committee (TEAC). Performed several transmission-constrained reliability assessments from 2001 through 2003.

Served as ISO-NE's representative on the North East Power Coordinating Council's (NPCC) CP8 Working Group responsible for multi-area transmission constrained reliability assessment. The assessment covers the New England, New York, Quebec, and Maritimes Control Areas.

RESOURCE ADEQUACY ASSESSMENTS AND INTEGRATED RESOURCE PLANNING

Performed Resource Adequacy assessments for the New England area, including the NPCC-required Triennial Review of Resource Adequacy. Analyzed and developed data, assumptions and methodologies for use in studies; served as the technical generation reliability expert.

Served as the Co-Manager for ISO NE's study to assess the adequacy and deliverability of New England's gas pipeline network.

Developed ISO-NE's first Reliability Rules and Compliance Manual.

Served on NEPOOL's Power Supply Planning Committee and made several presentations to NEPOOL's Reliability Committee.

Produced Zimbabwe Electricity Supply's (ZESA) 20-Year System Development Plan that identified the utility's future resource and transmission needs. Supervised consultants from the World Bank, working on project financing of the identified least cost projects, and conducted feasibility studies of Independent Power Projects.

Produced ZESA's first Integrated Resource Plan, incorporating engineering economic analyses on identified projects. Formulated and negotiated tariffs for imports and developed generation dispatch policy for control center operational personnel.

Produced the first Strategic Plan for ZESA's generation planning section that centered on customer focus, growth, financial management, and human resources.

Produced a Generation Planning Manual that has been adopted throughout ZESA.
Formulated new generation planning criteria that achieved reserve margin cost savings.

Served as ZESA's representative on the Southern African Power Pool's (SAPP) Generation Planning Working Group responsible for developing a common generation plan for SAPP and identifying the pool's optimal reserve margin.

EDUCATION

Moscow Power Engineering Institute, Russia
MS Electrical Engineering (Power Systems and Networks), 1990
BS Electrical Engineering, 1989

PRESENTATIONS & PUBLICATIONS

"Transmission Constrained Reliability Analysis of New England" – several presentations before the Transmission Expansion Advisory Committee (TEAC).

"A Comparative Analysis of GE MARS and ABB Westinghouse Models" – presentation before the TEAC.

"Transmission Constrained Reliability Analysis of New England" - several presentations before the Northeast Power Coordinating Council (NPCC) CP8 Working Group.