

**CENTRAL MAINE POWER COMPANY  
RESPONSE TO INDUSTRIAL ENERGY CONSUMER GROUP'S DATA  
REQUEST NO. 1  
DOCKET No. 2008-255**

**October 7, 2008**

**IECG-01-05**

- Q.** Please provide any documents, which, together or separately, show CMP's historical timeline for consideration of undertaking and decision to undertake the MPRP.
- A.** The initial scope of work proposal from RLC Engineering to perform the system study dated October 23, 2006 is attached. In addition, the request to initiate the original purchase order for Cianbro, which included the RLC Engineering study work dated November 30, 2006, is attached.

**Response Prepared and Submitted By:**

Mary Smith  
Project Manager  
Central Maine Power Company

**Attachments:**

- 1. RLC Engineering Scope of Work**
- 2. Request to Initiate Purchase Order**

RLC Engineering, LLC  
-Draft- Scope of Work for Maine 345-kV Transmission Study

Project Name: Central Maine Power Company 345-kV Transmission Planning Study

Project Description: Central Maine Power (CMP) desires to conduct a transmission planning study to investigate the expansion of the Maine 345-kV transmission system to improve transmission system reliability performance and support future transmission customer needs and load serving obligations based on internal and regional planning criteria requirements.

Work Scope: Conduct a comprehensive steady-state and stability assessment of the current system including planned upgrades to determine transmission system reliability performance under several system conditions and operating scenarios. Determine the need for 345-kV system expansion to improve performance and minimize reliability risks. The transmission system reliability assessment will include: 1) all lines in service (N-0); 2) contingency analysis (N-1) of design contingencies; and 3) contingency analysis with a line out of service (N-1-1) of design contingencies. This study will use a five-year and ten year forecasted load base cases with multiple dispatch scenarios as required to reasonably stress the system in Maine and the surrounding region under study. Stability transfer limit performance will be benchmarked for the current system on a list of critical, 345-kV system normal and extreme contingency faults at stated ISO-NE operating guide limits.

Alternative assessment of Maine 345-kV expansion alternatives that include 2<sup>nd</sup> 345-kV path between Orrington and Maine Yankee or Surowiec and 3<sup>rd</sup> Maine to New Hampshire line between Surowiec or South Gorham and Three Rivers or Gosling Road.

Assumptions: CMP and RLC personnel will develop a list of assumptions to be utilized in the 345-kV transmission planning study to meet CMP's proposed study specification. A specification was unavailable for use in developing this proposed scope of work. The following is a preliminary list of study assumptions that will need to be determined at project initiation:

- Generator dispatch in Maine and New Hampshire
- Proposed generation projects and their respective upgrades to be considered
- Transmission system re-inforcements associated with proposed reliability projects
- Design basis of all existing and proposed Special Protection Systems
- Maine and New Hampshire contingency and stability fault list
- Interface limits

## Draft Scope for Maine 345-kV Transmission Study

**Methodology:** the following methodology will be used to conduct the transmission system reliability assessment of transmission upgrade alternatives.

1. Develop five-year and ten-year base cases as specified by CMP from the latest ISO-NE library of cases used in planning studies. If available, use five year case as starting point and make changes as needed to accurately reflect the future system conditions based on CMP's and BHE's latest planning assumptions and list of proposed upgrades.
2. Create multiple dispatch scenarios to reasonably stress the system in the area under study.
3. Determine list of design contingencies to assess transmission system reliability.
4. Conduct N-0 and N-1 contingency analysis
5. Create line-out base cases with modified dispatch conditions
6. Conduct N-1-1 contingency analysis
7. Tabulate results and compare with CMP's transmission planning criteria
- 8.
9. Identify 345-kV transmission line and 345/115-kV autotransformer upgrade alternatives
10. Assess performance issues with alternatives under assessment
11. Benchmark change in stability transfer limits
12. Determine protection requirements for alternatives
13. Document assumptions and findings into a final report for CMP review
14. CMP selects and recommends alternative
15. System Impact Studies for Proposed Alternative
16. Develop study scope documents for committee review and approval
17. Conduct steady-state assessment and transfer analysis
18. Conduct stability and short-circuit assessment
19. Analyze Bulk Power System requirements based on NPCC methodology
20. Construction outage feasibility study
21. Prepare final documentation for ISO-NE and NEPOOL Reliability Committee review and approval
22. Determine need for additional design basis studies

The study will conform with CMP's internal transmission planning standards as well as ISO-New England's Planning Procedures.

Draft Scope for Maine 345-kV Transmission Study

Deliverables:

- 1) Provide thermal and voltage assessment of transmission system under the scenarios and outage conditions stated previously.
- 2) Prepare documentation of base cases in both summary and one-line diagram format.
- 3) Discussion of study methodology and list of assumptions and design contingencies used in analysis.
- 4) Base case and files used to develop study in PSLF format.
- 5) Prepare report on transmission upgrade alternative assessment
- 6) Scope and final report documents to Reliability Committee and Task Forces for ISO-NE and NEPOOL proposed plan application approvals.

Schedule (completed by dates)

- A. Begin November, 06
- B. Project Initiation and documentation of assumptions by Dec 1, 2006
- C. Base case development for system studies by Jan 1, 2007
- D. Transmission Upgrade Alternative Assessment by Apr 1, 2007
- E. System Impact Study
  - a. Steady State July 1, 2007
  - b. Stability and Short-circuit August 1, 2007
  - c. BPS testing Sep 1, 2007
- F. ISO-NE and NEPOOL Proposed Plan Application Approval by Oct 1, 2007

Estimated Cost:

Estimate is based on rates shown in Rates Table for RLC Engineering, LLC.

I. Establish and Document Study Assumptions	150 hrs
II. Base Case Development & Documentation	130 hrs
III. Transmission Upgrade Alternative Assessment	450 hrs
IV. Steady state SIS on Proposed Alternative	200 hrs
V. Stability and Short-circuit SIS on Proposed Alternative	340 hrs
VI. Bulk Power System Testing	160 hrs
VII. Construction Outage Feasibility Study	80 hrs
VIII. Final Documentation for ISO-NE and NEPOOL Committees	260 hrs
IX. Meetings with CMP, ISO-NE, and NEPOOL Committees	180 hrs
Total Estimated Time for Project Completion	1950 hrs

Total Estimated Cost - \$292,500

Draft Scope for Maine 345-kV Transmission Study

Rates Table:

**RLC Engineering, LLC**  
**Power System Studies Group**  
**2006/07 FEE SCHEDULE**

<u>Classification</u>	<u>Hourly Rate</u>
Manager Power System Studies	\$160
Principal Power System Engineer	\$157.50
Senior Power System Engineer	\$140
Power System Engineer	\$115
Associate Power System Engineer	\$95

Maine 345-kV Transmission Planning Study  
Project Task List

<i>Task Description</i>	
I.	<b>Project initiation - Establish Study Assumptions</b>
1.	Determine Generator Dispatch Assumptions for modeling
a.	Maine
	- BHE (MIS, GLHA, Misc.)
	- CMP North (Harris, Wyman, Bucksport, SEA, SAPP1)
	- CMP Western (RPA, AEC, Mead, AEI, Lewiston Hydros)
	- CMP Southern (WEC, Yarmouth)
b.	New Hampshire
	- PSNH (Seabrook, Newington, ConEd, Merrimack, Schiller, AES)
c.	Confirm stability models- generator, excitation, turbine-governor
d.	Confirm Station Service load modelling
e.	Confirm Generator reactive capability
2.	Determine proposed new Generators and upgrades to be modeled in Study
a.	Specified by ISO-NE and GMP
	- Redington, Kibby, Athens
3.	Determine proposed new Generators not modeled in Study
a.	Specified by ISO-NE and GMP
4.	Determine transmission system re-inforcements associated with reliability projects that are to be included in Study and collect data.
a.	BHE
	- NRI and Downeast Project
b.	CMP
	- Maguire Road, Benton
c.	PSNH
	- Deerfield 301 Loop, Y138, Gosling Road, Scobie-Hudson
d.	Vermont
	- Northern Loop, NWWT Reliability Projects
e.	Other Projects listed in most recent ISO-NE RSP
5.	Determine and document changes with Special Protection Systems (SPS)
a.	Models to capture all SPS
	- MEPCO Corridor
	- MYDCT SPS
	- DLP generation rejection in Maritimes for L/O 388, 392, 396/3001, 3016
6.	Develop list of Contingencies for ME and NH (and Maritimes?)
a.	Thermal Design Contingencies -250
b.	Stability Design Contingencies- 50 Local Contingencies
c.	BPS testing
	- Steady-state
	- Stability
7.	Establish the interface limits to study: (supplied by ISO-NE)
a.	NB-NE
b.	Orrington-South
c.	Surowiec-South
d.	ME-NH
e.	NNE-Scobie plus 394
f.	North-South

Maine 345-kV Transmission Planning Study  
Project Task List

Task Description
II. Base Case Development for Study
1. ?? base case conditions with different dispatches and interface flows
a. 2011 Peak Load - cases with High NB-NE, ME-NH & NO.-SO. Limits
- MIS and Bucksport Sensitivities
- RPA and AEC Sensitivities
- WEC and Yarmouth Sensitivities
- Newington and ConEd Sensitivities
- Seabrook
b. 2016 Peak Load - cases with High ME-NH & NO.-SO. Limits
- MIS and Bucksport Sensitivities
- RPA and AEC Sensitivities
- WEC and Yarmouth Sensitivities
- Newington and ConEd Sensitivities
- Seabrook
c. 2011 Peak Load - cases with High NH-ME and NE-NB transfer
- MIS and Bucksport Sensitivities
- RPA and AEC Sensitivities
- WEC and Yarmouth Sensitivities
- Newington and ConEd Sensitivities
- Seabrook
d. 2016 Peak Load - cases with High NH-ME and NE-NB transfer
- MIS and Bucksport Sensitivities
- RPA and AEC Sensitivities
- WEC and Yarmouth Sensitivities
- Newington and ConEd Sensitivities
- Seabrook
e. 2011 Light Load - 2 cases for Steady State and Stability testing
f. 2016 Light Load - 2 cases for Steady State and Stability testing
III. Transmission Upgrade Alternative Screening Assessment - Steady State Only
1. Review CMP and ISO-NE Goals for transmission improvements
a. Document goals and assumptions for alternatives assessment
b. Document existing and future reliability needs of transmission system
2. Develop and analyze 345 kV design and route alternatives
a. Investigate 345-kV alternatives between Maine Yankee/Surowiec and Orrington
b. Investigate 345-kV alternatives between So. Gorham/Surowiec and Three Rivers
c. Modeling data for alternatives
d. Budgetary cost estimate
3. Develop and analyze 345-115 kV Autotransformer alternatives
a. Investigate alternative interconnection at S/S
- Maxcys
- Surowiec
- South Gorham
- Three Rivers/Gosling Road
b. Modeling data and substation interconnection alternatives
c. Budgetary cost estimate
4. Identify performance issues with alternative interconnections

Maine 345-kV Transmission Planning Study  
Project Task List

<i>Task Description</i>	
	<ul style="list-style-type: none"><li>a. Analyze system response to proposed alternatives<ul style="list-style-type: none"><li>- selected contingency analysis to test acceptability</li></ul></li><li>b. Determine need for supporting projects<ul style="list-style-type: none"><li>- Transmission line rebuilds</li><li>- Capacitor bank additions (shunt and series)</li><li>- FACTS devices</li></ul></li></ul>
5.	Benchmark Stability Transfer limits <ul style="list-style-type: none"><li>a. Determine pre-Project transfer limits on ISO-NE operating guide contingency</li><li>b. Determine post-Project transfer limits on ISO-NE operating guide contingency</li></ul>
6.	CMP and RLC determine all protection design requirements <ul style="list-style-type: none"><li>a. Short-circuit study of design alternatives</li><li>b. Review upgrades of protection requirements</li></ul>
7.	Summarize and report on alternatives <ul style="list-style-type: none"><li>a. Prepare cross-tab reports of steady state results</li><li>b. Preliminary study report on findings and conclusions</li></ul>
8.	CMP selects and recommends desired transmission alternative
IV.	Steady State Analysis for SIS on Proposed Alternative
1.	Prepare Detail Scope of Work including documentation of power flow cases <ul style="list-style-type: none"><li>a. Document study methodology and criteria</li><li>b. Detail list of contingencies</li></ul>
2.	Steady State Contingency Analysis <ul style="list-style-type: none"><li>a. Total of ?? cases (base cases with and without desired interconnection alternative)</li><li>b. Perform steady state N-1 contingency analysis on load flow cases</li><li>c. Perform steady state N-2 contingency analysis on load flow cases</li><li>d. Analyze thermal and voltage performance of tests</li></ul>
3.	Conduct transfer analysis with PT's MUST program <ul style="list-style-type: none"><li>a. Determine dispatch conditions for analysis</li></ul>
4.	Recommend further upgrades/modifications to design
V.	Stability and Short-circuit Analyses for SIS on Proposed Alternative
1.	Prepare Detail Scope of Work including documentation of power flow cases <ul style="list-style-type: none"><li>a. Document study methodology and criteria</li><li>b. Detail list of contingencies including clearing times</li></ul>
2.	Stability testing at light (45%) and peak load level with stressed transfers <ul style="list-style-type: none"><li>a. Perform transient stability testing on 50 selected contingencies</li><li>b. Check system damping</li><li>c. Recommend further upgrades/modifications to design</li></ul>
3.	Additional analysis of specified dispatch and transfer levels <ul style="list-style-type: none"><li>a. Determine any additional sensitivities required for thorough impact study</li></ul>
4.	Document results of short-circuit study for review against ratings

Maine 345-kV Transmission Planning Study  
Project Task List

<i>Task Description</i>	
	<ul style="list-style-type: none"><li>a. ASPEN breaker evaluation module - can CMP support?</li><li>b. Recommend breaker upgrades based on ratings analysis</li></ul>
<b>VI. Bulk Power System Testing</b>	
1. Study bulk power system requirements	
a. Steady state testing	- Study failure of primary relaying system according to NPCC criteria
b. Stability testing	- Study failure of primary relaying system at all non-BPS station impacted
<b>VII. Construction Outage Feasibility Study</b>	
1. Analyze impact of facility out of service for construction	
a. Three facility out of service studies	
b. Identify reliability impacts or must run generation conditions	
2. Determine need for temporary facilities or alternative upgrades	
a. Design and estimate cost	
b. Compare cost of facilities with impact of construction	
<b>VIII. Final Documentation</b>	
1. Progress Reports on Steady State Analysis	
a. Develop interim report on results of N-1 Contingency analysis	
b. Develop second interim report on results of N-1 and N-2 Contingency analysis	
c. Develop results of Transfer Analysis using PTF's MUST Program	
d. Submit report for TWG Review	
2. Progress Reports on Transient Stability Analysis	
a. Develop interim report on results of system faults	
b. Submit report for SSG Review	
3. Develop draft final reports to TTF and STF	
4. Complete Final report	
<b>VIII. ISO-NE/NEPOOL Committee Meetings</b>	
1. 4 TWG meetings (up to two people)	
2. 4 SSG meetings (up to two people)	
3. 15 Meetings with CMP (up to two people)	
<b>Total:</b>	<b>1950 hours</b>
<b>Estimated Cost</b>	<b>\$292,500</b>

**Smith, Mary R.**

**From:** Smith, Mary R.  
**Sent:** Thursday, November 30, 2006 9:20 AM  
**To:** Ballard, Lance  
**Cc:** Mahoney, Robert S.; Robinson, Stephen G.  
**Subject:** CRO/PO for Cianbro  
**Attachments:** Contract with Cianbro final 11-27-06.doc; CMP - Cianbro Proposal.pdf

To follow up on our discussion yesterday, please move forward to initiate a Purchase Order for Cianbro. Attached are the referenced documents.

**CRO/PO Description:**

Perform services in accordance with the October 25, 2006 Agreement between USS on behalf of CMP, and the Cianbro Proposal dated October 24, 2006 to initiate Phase I of the 345 kV Transmission Reliability Project. Services to include all program management, studies, and associated support for a comprehensive needs assessment, and identification of alternatives.

Amount: \$600,000

WBS: 4X.10516

Completion Date for Phase I: December 31, 2006

Lance – Let me know if I have forgotten/omitted anything.

**Steve and Scott:** *We are still trying to define this ISO process in enough detail to provide a cost estimate. The \$600,000 is an estimate that will get us well on our way but it is not intended at this point to take us through all of Phase I to the I.3.9 approval. This PO is being set up knowing we will need to amend it prior to Phase I completion. Let me know if you have any concerns.*