

**CITY OF NEGAUNEE**  
**SCOPE OF WORK AND SPECIFICATIONS**  
Ten Year Electric Distribution System And  
Five Year Construction Work Plan

**SECTIONS**

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## **1.0 GENERAL**

Negaunee Electric Department requests proposals from qualified engineering firms (Engineer) for engineering services for the design of a 10-year Electric Distribution System Plan that contains a 5-year Construction Work Plan (CWP) to implement the distribution plan recommendations. The proposal shall address all items described within this RFP. Clarifications will be submitted to all prospective engineering companies.

All proposals shall be concise and costs shall include the hourly rate of the key project team members, the number of hours estimated for each task, plus any other direct or indirect costs. This data shall be provided as shown in Exhibit I.

The CWP may be in general conformance with RUS Bulletin 1724D-101B (reference [www.usda.gov/rus/pasdl](http://www.usda.gov/rus/pasdl)) and shall include recommended system upgrades based upon cost effective construction, reliable service, prudent utility practices and reasonable time tables. Negaunee Electric Department will be involved in the plan process and will be attending the review meetings outlined in the report, as well as the kickoff meeting, held in Negaunee, MI.

## **2.0 CONTRACT**

Prior to proceeding with the projects, the successful Engineer shall prepare and submit to Negaunee Electric Department a contract for completing engineering services for design of a 10-year Electric Distribution System Plan that contains a 5-year CWP to implement the distribution plan recommendations completing the projects. Any activity completed prior to acceptance of the contract shall be at no expense to Negaunee Electric Department. The contract shall include clauses for the following:

1. General liability insurance in the amount of \$5,000,000
2. Professional liability insurance with an aggregate annual limit of \$1,000,000
3. A list of engineering fees and direct expenses for the project (Exhibit I).

## **3.0 DESCRIPTION OF SYSTEM**

The City of Negaunee's Electric Department serves approximately 2,000 residential consumers and 250 commercial customers. The Negaunee distribution system is served on UPPCo's 33kV distribution system, with an ownership demarcation on the low side of 33kV/4.16kV step-down transformer. Historical system peak load is approximately 4-5 MW.

#### **4.0 HISTORICAL DATA REVIEW**

A review of historical system data shall be included in the CWP report for reference. This information shall include, at a minimum, the following:

- A. A complete description of the service area, and load classes served; a review of power supply and transmission system; and graphical review of consumer statistics and growth patterns. Tables and graphs shall be prepared to indicate the number of consumers and usage by major consumer classification.
- B. A review of line statistics including an analysis of system aging and conductor sizes; historical demand and energy use shall be reviewed for a minimum of five years and graphically portrayed for the period.
- C. A review of substation and delivery point capacities shall be provided.
- D. A review of distribution system losses for a minimum of five year period.
- E. A review of electric distribution service reliability for a minimum of 10 years by major category.
- F. A review of electric transmission power supplies for reliability and capacity for a minimum of 10 years.

All data shall be provided in a tabular format where possible, as well as the use of graphical exhibits to provide ease in interpretation of such data.

#### **5.0 PLANNING CRITERIA**

Planning criteria shall be prepared and may be in general accordance with RUS. Planning criteria shall be reviewed and agreed upon with Negaunee Electric Department prior to completing existing or projected system analysis.

#### **6.0 DATA BASE**

The existing Negaunee Electric Department system is mapped on Arc Map and this data is available to the Engineer. The Database shall be graphical in nature and include all regulators, capacitors, step-up step-down transformers. Database shall be complete such that load transfer analysis can be completed. In general, line sections shall be kept to reasonable lengths to assure that an accurate review of system loads, losses and voltage is completed. The Engineer shall identify all customers from the billing database in each new line section. Densely populated areas will be broken down into additional line

section numbers. The final computer database files must be compatible with the Negaunee Electric System's operating system and shall become the property of Negaunee Electric Department upon completion of the study.

## **7.0 LOAD FORECAST**

Historical usage, recent requests for service, WPPI Energy forecasts and the city long range plan shall be reviewed to determine appropriate load growth factors to be used in this study. In addition, individual line section multipliers shall be identified for both (demand metered) and energy consumption classes. Different factors of growth will be applied to each of these categories. It is also anticipated that some line sections may have no growth while others have higher growth rates. Generally, growth factors shall be classified as none, low, moderate, or high.

A thorough field review of the distribution system shall be completed to determine appropriate locations for the various line section multipliers. USE OF FEEDER OR STATION MULTIPLIERS IS NOT ACCEPTABLE.

Negaunee Electric Department shall approve all loads and growth factors to be used in the analysis.

## **8.0 EXISTING SYSTEM ANALYSIS**

An existing system analysis for each service area shall be completed. Existing peak loads for the appropriate summer or winter peak season, or both, shall be utilized in this analysis. The existing system analysis shall include results from both the existing system model with present loads as well as the projected four-year loads on the present system. Tables or maps showing the maximum voltage drop and location, substation capacity, distribution line capacity, power factor, line losses, and service reliability shall be included in this section of the report. Detailed narratives on physical condition of plant and the weakest portions of the system shall also be included. This data shall be gathered from a field review of the system and from operations personnel. A table of regulators circuit breakers and reclosers, with corresponding projected system loads, shall also be included. This data shall be provided by substation. The following items apply to Sections 8 and 9 of this RFP.

- A) Load Flow Studies - Determine line impedance, bus voltages, branch currents, load currents, branch power flows, and power used between buses. Evaluate kW, kVA and kVAR power flows. This task will be completed for all distribution circuits and for all transmission circuits.
- B) Evaluate System Energy Losses - Determine magnitude and cause of losses, including distribution transformer sizing.
- C) Evaluate Reliability/Power Outages - Review outage reports and voltage levels for the System to determine the impact of outages.

- D) Evaluate Transmission System (if applicable) - Determine capacity loading levels, losses, system compatibility and reliability and circuit configuration.
- E) Evaluate Distribution Substations - Determine capacity, loading levels, losses, system compatibility, reliability and settings of equipment.
- F) Evaluate first level contingencies – Determine and design alternate feeds for all with priority given to critical loads identified by Negaunee Electric Department.
- G) Evaluate Main Feeder and Interconnection Distribution System - Determine capacity, loading level losses, reliability, and present circuit configurations.
- H) Capacitors-Power Factor - Analyze adequacy of size and location of existing capacitor installations. Evaluate present power factor condition.

## 9.0 EXPLORATORY PLANNING

Utilizing the information completed in the existing system analysis and planning criteria, the exploratory planning process shall be completed.

- A) Develop and present options for improving any system deficiencies. Options should be phased over a period of years and prioritized.
- B) Provide reasonable cost estimates for each option suggested for improving any system deficiencies.
- C) Assist Negaunee Electric Department with seeking financing alternatives in the event that a renovation is pursued.
- D) Work with WPPI Energy on determining the impact of all capital investments and maintenance on customer rates.
- E) Complete an electric system short circuit and protective device coordination study that includes the following:
  - Calculate fault currents as required
  - Establish system protection criteria
  - Evaluate the system protective equipment performance
  - Develop a recommended system protection improvement plan as required
  - Document the results in a formal report

All improvements shall be thoroughly justified and alternatives shall be reviewed to provide the best engineering, operations, and economic solution for Negaunee Electric Department. Detailed cost estimates shall be provided for all noteworthy options and compared and reviewed with Negaunee Electric Department prior to final acceptability.

## **10.0 DELIVERABLES**

The following items shall be submitted to Negaunee Electric Department:

- A. Electronic files containing all data base files used and created for the CWP.
- B. Maps showing the improvement, improvement code, & a brief description of the improvement. Projected voltage drops prior to and after recommended improvements shall also be shown on the maps. Negaunee will specify map scale and print size
- C. Provide a written report for the plan. At a minimum, this report shall include the following sections:
  - 1. Execution Summary & Purpose of Report
  - 2. Planning Criteria
  - 3. Historical Data & Statistics
  - 4. Summary of Existing & Recommended Projected System by Feeder
    - 4.1 – Feeder #1
    - 4.2 – Feeder #2
    - 4.3 – Feeder #3
    - 4.4 - Feeder #4
  - 5. Summary of Transmission System
  - 6. Other Improvements and Maintenance
  - 7. Summary of Costs
  - 8. Supplementary Data Used in Analysis
- D. Cost Estimates
- E. Basis of costs

## F. Engineering Certification

### **11.0 REQUIRED FIELD INVESTIGATION AND MEETINGS**

The following meetings will be required for the study:

#### A) Kick-off Meeting & Field Inspection

1. Familiarization with System- Review electrical system data, conductor sizes and lengths, equipment data, etc. Field inspection of the electrical system. Verify completion of the data for the study and notify of any deficiencies.
2. Familiarization with Location of Over-current and Line Switching Equipment - Become familiar with the existence and location of fuse structures, switch structures, sectionalizers, reclosers, circuit breakers, and any other switching equipment.
3. Review Substation Documentation - Inspect substation for adherence to current code requirements. Check for broken or inadequate material and equipment. Verify single line drawings of substations and acquire ratings and settings.
4. System, Substation, and Circuit Capacity and Loading Levels - Obtain from records the historic load data on the transmission and distribution circuits and substations.

#### B) Existing System Analysis and Preliminary Substation Design Review Meeting

#### C) Draft Report Review Meeting

- 1) Office Review of Draft Recommendations – Review findings of detailed system analysis and exploratory planning with Negaunee Electric Department management and operations. Describe basis for selection of alternatives and justification, as well as other alternatives which were considered but not recommended. For purposes of your proposal, it should be assumed that a full one day planning and review of the report recommendations will be acquired.
- 2) Field review – Conduct a field review of distribution upgrades, substation modifications and other significant projects to assure that the Engineer is familiar with the local site conditions and that any access, routing, land ownership, terrain or other restrictions or complications have been considered in the preparation of construction cost estimates. It is the expectation of Negaunee management the engineering costs included in the Work Plan and

substation will be sufficient to cover all costs for engineering, materials and construction for each and every work plan and substation project.

D) Presentation to the Negaunee City Commission.

## **12.0 PROPOSAL INSTRUCTIONS**

The following items are requested in each proposal:

- A) The firm's proposal should contain information that sufficiently demonstrates its capabilities and experience to perform the required work.
- B) Past Record - Furnish a list (no more than 4) of projects of a comparable nature completed in the last 10-years. Include the name, address and telephone number of each client and the name of the involved responsible representative.
- C) Volume of Present Workload - Provide information about the firm's present workload and state what effect this project would have on it. Explain whether or not the firm has the ability to meet the time table proposed below:

Start Date: January 1<sup>st</sup>, 2019

Study Completion Date: August 1<sup>st</sup>, 2019

- D) Proposed Organization and Management - Your proposal shall include an organization chart established for this project. The chart shall depict lines of authority, titles and the individuals that would be assigned to the project and their titles. Your proposal shall provide a brief narrative description of how the proposed organization will function. The proposal should include a proposed schedule of tasks and dates of completion. Also, it will include the individual who would be designated as the lead contact person. The qualifications, experience and involvement of the people that will account for three-fourths of the time billed to the project will be of paramount importance.
- E) A Current Schedule of Rates and Charges for Personnel, Equipment, etc.

## **13.0 EVALUATION CRITERIA**



Proposal evaluation criteria will include, but not be limited to the following items:

- A) Qualifications of bidder's personnel assigned to the project.
- B) Experience of bidder in preparing system studies, designing substation and managing the construction of substations;
- C) References on work performance.
- D) Proposal outline of project approach showing level of conformity to this RFP.
- E) Recent similar experience.
- F) Total number of engineering hours estimated to complete the project and hourly rates.

**EXHIBIT I - CWP ENGINEERING ESTIMATE FORM**

		<i>Number of Hours (By Personnel Category)</i>					
		<i>Total Cost</i>	<i>Project Mgr.</i>	<i>Project Eng.</i>	<i>Planner</i>	<i>Estimator</i>	<i>Drafter</i>
<b>4 Historical Data Review/Collection:</b>							
A) Description of Service Area	\$						
B) Review of Line Statistics	\$						
C) Review of sub and delivery point capacity	\$						
D) Review of trans and dist. losses	\$						
E) Review of distribution system reliability	\$						
F) Review of transmission system reliability	\$						
<b>5 Establishing Planning Criteria :(RUS)</b>	\$						
<b>6 Data Base Preparation:</b>							
1) Distribution System	\$						
2) Transmission System	\$						
3) Existing Loads	\$						
4) Customer Identification	\$						
<b>7 Load Forecast</b>	\$						
<b>8 Existing System Analysis:</b>							
A) Load Flow Study	\$						
B) Evaluate System Losses	\$						
C) Evaluate Reliability/ Power Outages	\$						
D) Evaluate Transmission System	\$						
E) Evaluate Distribution Substations	\$						
F) Evaluate Contingencies	\$						
G) Evaluate Main Feeder Interconnects	\$						
H) Evaluate Power Factor	\$						

<b>9 Construction Planning</b>							
A) Exploratory Planning for Alternatives	\$						
B) Cost Estimates	\$						
C) Financial Alternatives Assistance	\$						
D) Construction impact on rates	\$						
E) Coordination Study	\$						
<b>11 Required Meetings</b>							
A) Kick-off Meeting and Field Inspection	\$						
B) Existing System Analysis Review Meeting	\$						
C) Draft Report Review Meeting	\$						
D) Presentation to Commissioners	\$						
<b>Total Man-hours</b>							
<b>Total Engineering Cost</b>							