



January 8, 2010

To Whom It May Concern:

The City of Dover will receive sealed proposals on February 8, 2010 at 2:00 p.m. local time for a **CENTRALIZED CAPACITOR CONTROL PILOT PROGRAM, PROPOSAL NUMBER 10-0028DPS.** The RFP submissions must include one (1) original and three copies.

**All vendors must complete the request for proposal (RFP) notice and fax it to (302) 736-7178 if they intend to bid. Any vendor not returning the form may not receive published addenda.**

Your proposal is not revocable for ninety (90) days following the response deadline indicated above.

If you have questions concerning this Request for Proposal, they must be made in writing and emailed to me at [pgregg@dover.de.us](mailto:pgregg@dover.de.us). All questions must be submitted no later than January 22, 2010 at 2:00 pm local time. All questions will be compiled and answered in the form of an addendum and will be faxed to all prospective bidders who return the RFP solicitation form attached. All changes or corrections to this Request for Proposal will be handled by addenda issued by the Procurement Manager. The receipt of all Addenda must be acknowledged on the proposal submission form.

The City of Dover reserves the right to request corrections, clarifications, and/or additional information pertaining to Respondent's response.

It has been determined that this solicitation be offered as a request for competitive sealed proposals, pursuant to **Delaware Code Title 29, Chapter 6924 (a)**, because the use of competitive sealed bidding is not in the best interest of the City. The use of competitive sealed proposals is necessary to:

- Conduct Oral or written discussions with offerors concerning technical and price aspects of their proposals;
- Afford offerors an opportunity to revise their proposals;
- Compare the different price, quality and contractual factors of the proposals submitted.
- A copy of the complete warranty must be included with the proposal.
- The price and complete description of any additional or extended warranty offered must be included in the proposal.

RFP's will be opened publicly at the time and place designated in this letter. The main purpose of the bid opening is to reveal the name(s) of the bidder(s), not to serve as a forum for determining the low bidder(s).

The contract shall be awarded within 90 days of the closing date to the offeror whose proposal is determined in writing to be most advantageous to the City. All prices must be held firm for a minimum of 90 days from the date of the opening. The proposals, summaries, and tabulations shall not be open for public inspection until after receipt of a fully executed contract.

Conflict of Interest Clause:

Pursuant to Dover Code, Chapter 30, Section 30-33, No city employee or official may participate on behalf of the city in the review or disposition of any matter pending before the city in which he has a personal or private interest. No city employee or official shall benefit from any contract with the city, nor solicit any contract, and shall not enter into any contract with the city (other than an employment contract). No person who has served as a city employee or official shall represent or otherwise assist any private enterprise on any matter involving the city, for a period of two years after termination of his employment or elected or appointed status with the city, if he gave an opinion, conducted an investigation or otherwise was directly and materially responsible for such matter in the course of his official duties as a city employee or official. All parties hereto declare and affirm that no officer, member, or employee of the City, and no member of its governing body, and no other public official of the City who exercises any functions or responsibilities in the review or approval of the undertaking described in this contract, or the performing of services pursuant to this contract, shall participate in any decision relating to this contract which affects his or her personal interest, or any corporation, partnership, or association in which he or she is directly or indirectly interested; nor shall any employee of the City, nor any member of its governing body, have any interest, direct or indirect, in this contract or the proceeds thereof.

The City of Dover reserves the right to waive technicalities, to reject any or all bids, or any portion thereof, to advertise for new proposals, to proceed to do the work otherwise, or to abandon the work, if in the best interest of the City.

All proposals are to be received by the Procurement Office, 710 William Street, Dover, DE, 19904 no later than the 2:00 p.m. bid opening. All proposals will be opened in the presence of the Procurement Manager or his/her designee. The name of each offeror shall be read publicly. All other information contained in the proposals shall be confidential so as to avoid disclosure of information prejudicial to competing offerors during the negotiation process. Any and all proprietary information contained within the proposal must be clearly marked. The cover must indicate that the proposal contains such information. **Copies** of the proposals will not be provided to competing vendors.

Minority vendor preference shall be three percent (3%) of the value of the award. **The vendor must identify qualification and claim to the preference on the submitted documents.** The vendor must provide authoritative proof of qualification for this preference such as identification in the certification directory maintained by the State of Delaware, Department of Administrative Services, Office of Minority and Women Business Enterprises. This preference is to be considered as stand alone and can not be added to any other preference that may be allowed.

Local vendor preference shall be considered for materials, equipment, construction contracts, and utility contracts. Local vendor preference shall be three percent (3%) of the annual value of the award. The term local vendor is defined as a gradually increasing range with preference assigned as follows:

Rule 1: Vendor located within the city limits of the City of Dover.

Rule 2: Vendor located within Kent County, Delaware (applicable only if no vendor qualifies under rule 1)

Rule 3: Vendor located within the State of Delaware (applicable only if no vendor qualifies under rules 1 & 2)

In the event that no vendor qualifies under rules 1, 2, or 3, no local vendor preference will be awarded. **The vendor must identify qualification and claim to the preference on the submitted proposal documents.** This preference is to be considered as stand alone and can not be added to any other preference that may be allowed.

In the event the contractor does not fulfill its obligations under the terms and conditions of this contract, the City of Dover may contract for an equivalent product on the open market. Any difference in cost between the contract prices herein and the price of open market product shall be the responsibility of the contractor. Under no circumstances shall monies be due the contractor in the event open market products can be obtained below contract cost. Any monies charged to the contractor may be deducted from an open invoice.

Neither the contractor nor the City of Dover shall be held liable for non-performance under the terms and conditions of this contract due, but not limited to, government restriction, strike, flood, fire, or unforeseen catastrophe beyond either party's control. Each party shall notify the other in writing of any situation that may prevent performance under the terms and conditions of this contract.

Vendors must provide references to the City of Dover upon request. Vendor references may be checked to verify the proposer's ability to perform the contract requirements, the quality of work and the ability to meet obligations.

**ENVELOPES MUST BE MARKED "CAPACITOR CONTROL PILOT PROGRAM, RFP NUMBER 10-0028DPU RFP OPENING FEBRUARY 8, 2010, 2:00 P.M."** No faxed bid will be accepted. Failure to comply with the above format *may* result in disqualification of your bid.

The City of Dover shall have the right to reject any or all proposals if deemed to be in the best interest of the City, such as but not limited to local vendor preference and minority vendor preference while awarding bids.

Sincerely,

Peter K. Gregg  
Contract and Procurement Manager  
City of Dover  
(302) 736-7795  
Fax (302) 736-7178  
Purchasing[at]cityofdover.com  
[www.cityofdover.com](http://www.cityofdover.com)



**REQUEST FOR PROPOSAL SOLICITATION NOTICE**

RFP Number: 10-0028DPU

RFP Opening: February 8, 2010, 2:00 p.m.

Description: Centralized Capacitor Control Pilot Program

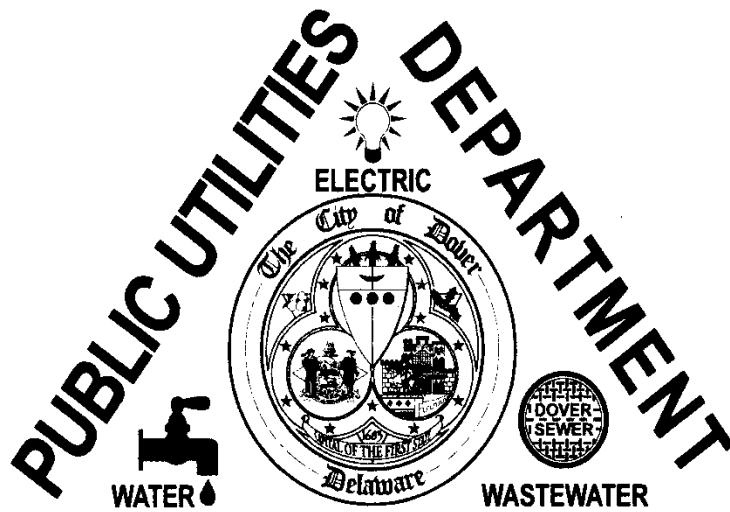
If you are interested in the request for proposal described above, you can download it in Adobe PDF format from our web site <http://www.cityofdover.com>. Any amendments of other additional information related to this solicitation will be posted with the original document on the web site.

If you do not have internet access and want to receive this request for proposal, all subsequent amendments, or additional information on the bid package, please provide the requested information to:

The City of Dover  
 Central Services Department  
 710 William Street  
 Dover, DE 19904  
 Fax: (302) 736-7178, attention Peter Gregg  
 Phone: (302) 736-7795  
 e-mail: [purchasing\[at\]cityofdover.com](mailto:purchasing[at]cityofdover.com)

Please complete the following and return this form to Central Services:

Company:	Vendor Response /Request
Address	No bid at this time, please retain on bid list
	Please send complete RFP package
Contact:	I will download the RFP package
Phone	I intend to bid
Fax	I do not intend to bid
e-mail for ITB/RFP	Other:



# CITY OF DOVER

Public Utilities Department

Electrical Engineering

RFP 10 – 0028DPU

Centralized Capacitor  
Control Pilot Program

# System Specification for Centralized Capacitor Control Pilot

The City of Dover Public Utilities Department will be receiving sealed proposals at our Procurement Office, located at 710 William St. Dover, DE 19904, no later than 2:00pm EST on **February 8, 2010**, for a **Centralized Capacitor Control Pilot Program**.

All proposals must include one (1) original and three (3) copies in a sealed envelope on which the outside will be clearly marked **RFP 10-0028DPU Capacitor Control**, with the name and address of the proposer submitting the proposal. Proposals will be received until 2:00pm EST or hand delivered no later than 2:00pm EST on Friday **February 8, 2010** at which time they will be publicly opened in the Procurement office, 710 William St. Dover, DE 19904. Proposals may be submitted by email to [bids@dover.de.us](mailto:bids@dover.de.us). All electronic proposals must contain **RFP 10-0028DPU Capacitor Control** in the subject line. Any proposals submitting by facsimile, telegraph, or telephone will not be accepted under any circumstances.

It is the responsibility of each proposer to ensure their proposal arrives on time. Any late proposals will not be accepted and returned unopened. Proposals may be withdrawn at any time prior to opening.

All proposals must be firm for 90 calendar days. Price to include any/all delivery charges, FOB destination to 710 William St. Dover, DE 19904. Any proposals that do not meet these criteria may be considered non-responsive.

Full payment of this purchase will be made only upon the department head's satisfaction as to the fulfillment of all the conditions of this contract.

The City of Dover reserves the right to waive technicalities, reject any or all bids, or any portion thereof, to advertise for new proposals, to proceed to do the work otherwise, or to abandon the work, if in the best interest of the City.

The City reserves the right to request clarification of information submitted and to request additional information from one or more proposers. All cost associated with the presentation of the proposal and any supplemental information shall be borne solely by the proposer, and shall not be passed on to the City under any circumstances.

In order to ensure fair consideration for all proposers, communication to or with any department or departmental staff during the submission process, will be prohibited excepted as provided below. Any communication between proposer and the City will be initiated by the appropriate staff member in order to obtain or clarification needed to develop a proper, accurate evaluation of the proposal. Such communications initiated by a proposer may be grounds for disqualifying the offending proposer from consideration for award of the proposal and/or any future proposal.

The following time table will be used for this RFP:

Issue Request for Proposal:	January 8, 2010
Questions in Writing Due:	January 22, 2010 by 2:00pm EST
Addendum to RFP no later than:	January 29, 2010
<b>Proposals Due:</b>	<b>February 8, 2010 by 2:00pm EST</b>

All questions are to be submitted in writing to Peter Gregg at [purchasing@dover.de.us](mailto:purchasing@dover.de.us) or faxed to 302-736-7178. Please reference **RFP 10-0028DPU QUESTIONS** in the subject line.

In comparing proposals, consideration will not be confined to price only. The successful bidder will be one whose product is judged to best serve the interests of the City of Dover; these proposals will be evaluated on price, reputation in capacitor control, compliance with specifications, and Section 14: Evaluation of Proposal. The City of Dover reserves the right to reject any or all bids or any part thereof, and to waive any minor technicalities. A contract will be awarded to the bidder submitting the lowest responsible bid meeting the criteria specified herein.

The following point system will be used for evaluation of each proposal:

	<b>Factor</b>	<b>Point Range</b>
1	Price	0-10
2	Reputation in Capacitor Control	0-10
3	Compliance with Specifications	0-10
4	Section 14 – Evaluation of Proposal	0-30
	<b>Maximum Points</b>	<b>60</b>

Original manufacturer's brochures of the proposed units are to be submitted with the proposal. All modifications made to the standard production unit, to comply with the minimum requirements, described in the manufacturer's brochures must be certified by the manufacturer to have been in prior successful use (including the name of users) and submitted with the bid, or the bid will be deemed "non-responsive" and rejected without further review.

It shall be the bidder's responsibility to carefully examine each item of the specification. All variances, exceptions and/or deviations shall be fully described in the appropriate section. Deceit in responding to the specification will be cause for automatic rejection.

## **OVERVIEW**

The City of Dover Public Utilities, located in Dover Delaware, is a Municipal electric utility with approximately 14 distribution substations, 3 transmission substation, 40 fixed capacitor banks and 40 controlled capacitor banks. The City of Dover is interested in applying a pilot Centralized Capacitor Control Management System, which includes 1 distribution substation and 6 existing controlled capacitor banks (pole and pad mount), to demonstrate improvement of power factor on the feeder and at the substation; to optimize delivery on individual circuits; and provide voltage protection for feeders. It is the intent of this specification to purchase a pilot system which will allow the City of Dover to automatically manage system power factor at the substation and distribution feeders. This pilot system will allow for evaluation, to determine whether a City wide Centralized Capacitor Control program is in the City of Dover's best interest.

The City of Dover is interested in a system from a company with a proven history of Centralized Capacitor Control. The application must fully integrate with and use time stamped data from City of Dover's SCADA, system. The Centralized Capacity Control System must also be able to communicate to one-way capacitor controllers and two-way capacitor controllers, plus validate the operation of the controller. The system must also communicate with, receive status and analogs from and control capacitor banks over a two-way communication system. The system will include as standard features multiple operational strategies that provide Power Factor Correction, Voltage Control, Conversation Voltage Reduction (CVR) and Voltage/VAR management that protect feeder voltages and optimizes VAR flow within a specified voltage range. The application must provide the utility the ability to confirm control actions via automated applications. The system

must provide a schedulable sub-system to automatically verify the state of capacitor controllers on a feeder, substation and area basis.

It is the intent of the City of Dover is to purchase a pilot capacitor control system platform capable of communicating on several different communications networks that operate on public and private networks allowing the utility maximum flexibility in building its system.

The utility will not purchase an untested technology and will give credit in the evaluation to mature systems from suppliers who work to provide high customer satisfaction.

## 1 INSTRUCTIONS FOR RESPONSE

This specification is for the manufacture, delivery, installation, testing and operator training for a centralized capacitor control system utilizing a mix of communication enabled controllers that support VHF Paging, 900 MHz FLEX<sup>®</sup> commercial paging, IP/Stack (Dynamic and Static), BPL, WiFi, Digital Cellular (1xRTT/GPRS), Licensed & Unlicensed Radio Capacitor Bank Controllers (CBC's).

All systems shall include the materials, tools, equipment, testing and miscellaneous services necessary to provide a complete and operable system described herein. It is assumed that a computer is required for any system being proposed, and as a result, Section 2 should be considered a mandatory requirement for each utility system being proposed. Bidders should indicate any components or services to be provided by the Utility.

### 1.1 Bidders shall use the following conventions in responding to this specification:

Each bid shall include a detailed proposal describing the vendor's offering, its technical characteristics, options, etc. Each bid shall also include a section titled "Response to Specification" in which the bidders compliance or non-compliance with each numbered paragraph in this document is indicated. Each numbered paragraph in this document shall be referenced in the vendor's response; the following codes shall be used to indicate the bidder's compliance with each requirement:

C - The offered system complies completely with the requirement

M - The offered system meets the intent of the specification with a documented modification to the specification statement

X - The offered system does not comply with the requirement

A - An alternate solution is offered

The Utility realizes that each vendor's system operates uniquely and may differ from these specifications. Any exceptions and/or clarifications shall be indicated and referenced to the specific paragraph of this specification. Full compliance will be assumed if there is no statement of exception. Alternate responses should be used only when truly necessary. The price proposal will include complete costs for C, M, and A requirements. All requirements with an 'X' response will be deemed partially non-compliant. The vendor must estimate the cost of providing any response with an 'X' response. A vendor that cannot meet each specification will be penalized in the evaluation of the program.

### 1.2 Partnership and stability requirements

#### 1.2.1 Vendor shall be able to demonstrate its stability by responding to the following requirements:

- 1.2.1.1 Vendor must have five years experience operating in the utility centralized capacitor control applications field
- 1.2.1.2 Vendor must have a history of manufacturing a minimum of 2,500 capacitor bank controllers per year during the past five years
- 1.2.1.3 Vendor must have installed more than three centralized capacitor control systems in the past two years
- 1.2.1.4 Vendor must provide details of its capacitor bank controller's failure rate during the past five years.
- 1.2.1.5 Vendor must provide details and propose terms for its offering of a maximum failure rate guarantee
- 1.2.1.6 Vendor shall be able to demonstrate North American Electric Reliability Corporation's (NERC) and ReliabilityFirst Corporation's Critical Infrastructure Protection compliance, including Cyber Security.

## **2 MASTER STATION COMPUTER**

- 2.1 The specified computer system shall be comprised of a Master Station running a current version of Microsoft's Windows Operating System. The system shall include a RAID disk subsystem with hot swappable system disks and redundant data disks. It shall include an integrated data backup system and include the required communication hardware. The system architecture shall be implemented as a three-tier architecture and allow individual scaling of the presentation, application and data layers.
- 2.2 The Master Station shall support communications to multiple communication channels of the same or different protocol. It shall support 900 MHz FLEX commercial paging, commercial digital cellular providers (1xRTT & GPRS), licensed or unlicensed radios, and utility owned BLP and WiFi networks for the transmission of commands.
- 2.3 The Master Station shall support both one-way and two-way communication connections and these connections can be operated simultaneously.
- 2.4 The system supplied shall include installation drawings, wiring between components of the system, technical assistance, training and complete hardware and software documentation. Documentation of all system hardware components shall include sufficient information for effective troubleshooting and isolation of failures. The system shall be complete in all respects, to fulfill the intention of the contract requirements.
- 2.5 The system should be provided with a real time clock such that the time or date will not have to be re-initialized after momentary or prolonged power outage. The system shall be able to synchronize all servers installed as part of the master station to a single time source.
- 2.6 All data gathered by the system and control actions taken by the system shall be logged to disk for historical use.
- 2.7 A color report printer shall be supported and shall print database reports, trends, etc.

## **3 SOFTWARE FUNCTIONS**

The Master Station Software shall provide a minimum of the following functions:

- 3.1 The user interface shall be a browser based application for distributed user access and to minimize IT support of heavy clients. The user interface shall update system status device states, and analog

information in real-time. The displays shall auto-refresh. The following functions shall be done via Browser Interface:

- 3.1.1 The operator user interface shall be browser based.
- 3.1.2 The area engineer user interface shall be browser based.
- 3.1.3 The majority of all system configuration and modeling activities shall be done through a browser interface.
- 3.1.4 The browser interface shall allow for user specific role based security to be applied for added software configuration security.
- 3.2 The system shall have a graphical user interface to allow the operator to easily view all of the system activity including real-time updating of each individual CBC's state. The state will indicate Open, Closed, failed or undetermined.
  
- 3.3 The user interface shall have multiple views that include a three tier tabular view that shows the feeder, substation and area status.
- 3.4 The system shall support display of information as one-line engineering diagrams.
  
- 3.5 The System shall receive substation and feeder, Volts, Watts and VAR data from one or multiple sources; SCADA, DNP 3.0 field devices that can be scanned, or from the City's Corporate Data Historian. The vendor shall describe its integration strategy for the City of Dover's SCADA and Data Historian in detail. The vendor shall document its prior experience in accomplishing this integration with other clients.
  
- 3.6 Automatic Control – If the system VAR point violates a predetermined threshold, the Capacitor Control System shall be capable of automatically sending field commands to the CBC's in the field to trip or close the switched capacitor bank to correct the VAR flow and return between the thresholds. Furthermore, system shall continue to trip or close additional capacitors as needed to correct VAR flow.
  
- 3.7 Automatic Control – System will use substation VAR data for confirmation that tripped or closed for one-way or two-way communicating controllers. The system will indicate pass, fail or questionable states based on VAR data received from the substation. The system shall have the intelligence to receive and analyze two-way communicating controller's response and validate it against the VAR flow verification methodology. All two-way controllers will report a trip or close response back to the master station.
  
- 3.8 Automatic control – System will have multiple automatic control algorithms. The system shall be able to control based on :
  - 3.8.1 VAR correction
  - 3.8.2 Power Factor correction
  - 3.8.3 Voltage correction
  - 3.8.4 Volt/VAR correction
  - 3.8.5 Conservation Voltage Reduction (CVR) by using voltage reduction methodologies
  
- 3.9 Maintain reports on all bank states; passed, questionable, existing state and failure of capacitor operations.
  
- 3.10 Provide reports of banks that failed validation.
  
- 3.11 The system shall have the ability to provide command retries. Retry delay time and the quantities of how many retries will be user selectable. Retry rates can be globally set and individually set at the substation or feeder level.

- 3.12 Retries will not be attempted during CBC's reclose period.
- 3.13 The ability to immediately or schedule validation of the bank state. Validation will send field commands to operate the controller to confirm the bank state.
- 3.14 System shall offer the ability of the operator to manually send through the air commands to trip or close the bank.
- 3.15 The system shall have "Through the Air programming" of the CBC's control settings. The CBC's settings shall be maintained in the software. The system shall offer group commands
- 3.16 The system shall provide the ability to change a group of CBC's settings from the user's browser display.
- 3.17 The vendor shall quote an option on a capacitor control inventory database with at least the following functions:
  - 3.17.1 Store CBC device location, substation and feeder data.
  - 3.17.2 Store CBC devices information, installation history, installer information and device work order history.
- 3.18 Allow the operator to access, via a browser user interface, to operate, change system settings, provide a summary of control history, and view other information about the capacitor control program.
- 3.19 Allow the operator, via a browser user interface, to program control parameters within the CBC's. This will include the ability for operators to select from among a number of programs offered by the utility and the control system reprogramming the control device so that it responds to the control messages directed to that program's control devices.
- 3.20 The ability to accept unsolicited DNP 3.0 messages from the CBC's, and initiate Class 0,1, 2, 3, and integrity scans of the CBC for real-time status and states.
- 3.21 The ability to receive unsolicited DNP 3.0 messages and provide alarms of over voltage/under voltage operations, Neutral Current violations, three analog voltage input violations, failed bank notification, etc.
- 3.22 Provide for the operator and administrator alarm notification and violations by e-mail, text message or IVR.
- 3.23 Operators shall be able to easily acknowledge alarms, and shall have visual indication of an alarm condition if audible alarms are disabled.
- 3.24 The ability to operate substation capacitors and/or receive status of substation capacitor from the utility SCADA system to include the substation capacitor banks into the VAR management algorithm to reduce capacitor bank hunting.
- 3.25 Administrators and operators shall have the ability to have off peak and on peak settings. Operator can select the peak and off peak setting. On/off Peak settings can be set globally, at the substation and at the feeder level.
- 3.26 System shall have the ability to display operational summaries and engineering details by area, substation, feeder and capacitor banks.

- 3.27 System shall have the ability to turn on/off flyover command menus for ease of viewing and operation.
- 3.28 System shall have a search feature similar to typical browser-based search engines. The search feature will find data entered in the capacitor control software application.
- 3.29 System shall have multiple operation counters that are operator settable. System shall have a maximum control operations counter that shall inhibit control commands. If the maximum is reached, alarming notification shall be sent to users. Individual operation counters shall be included at the area, substation, feeder and capacitor bank.
- 3.30 The operation counters shall be allowed to be overridden at an operators discretion if the system is in need of further VAR support.
- 3.31 System shall have the ability to create pseudo points that can be derived from multiple points or a mathematical offset to acquire a pseudo point value.
- 3.32 The setup and operation of the system software is menu-driven, with context-sensitive help lines for each menu option or data field, and help screens for more in-depth help on each field.
- 3.33 Operators shall be able to easily toggle various flags which govern the output of information to the cap control system event log, such as logging of all capacitor bank commands, logging all failed operations, and logging all communication errors.
- 3.34 Database Functions and Editing Overview:
  - 3.34.1 Database editing functions and privileges shall be settable by the software so user rights can be restricted if needed. This function shall be settable per user.
  - 3.34.2 All user database editing done to the system shall be logged to a system log so user changes can be tracked.
  - 3.34.3 Editing the database should allow editing of single fields, using either cursor control or pointer. Lookup tables referencing existing data should be available.
  - 3.34.4 The software database should allow multiple points to be defined for each field hardware item, including status of the item.
  - 3.34.5 The system database should have provisions for setting alarms that would occur if polled data is outside of high or low limits.
  - 3.34.6 The system database shall allow devices or points to be removed from service temporarily.
  - 3.34.7 If a CBC is placed into local mode the CBC shall report the local operation mode to the master station via unsolicited messaging. Upon receipt of the message the capacitor control application shall be able to indicate, via tagging, that the bank is in local mode. Conversely when the CBC is placed into remote mode the CBC shall report the remote operation mode to the master station via unsolicited messaging. Also upon receipt of the message the capacitor control application shall be able to indicate, via tagging, that the bank is, again, in remote mode.
  - 3.34.8 It shall be possible to use third party software, such as Microsoft Access or Crystal reports, to query the database and create custom reports. The vendor shall provide the data schema and instructions to accomplish the integration.
- 3.35 Data Analysis:
  - 3.35.1 The trending analysis facility shall allow for trending of analog or pseudo-type points. The facility shall be an easy to use graphical interface, editing by cursor or by pointing device. The functions shall include but not be limited to these and the following:
    - 3.35.1.1 The trending application shall allow for multiple values to be trended.

- 3.35.1.2 The trending application shall allow for different value scales to be trended. (kW, kVAR, Voltage, etc)
- 3.35.1.3 The trending application shall allow for historical data to be viewed.
- 3.35.1.4 All trends shall have the option to view data in graphical or tabular (data only) format.
  
- 3.36 System Integration with SCADA Software:
  - 3.36.1 The system shall have the ability to exchange real time data with the SCADA system or coporate data historian.
  - 3.36.2 The system shall have a bi-directional interface for both analog and point data with time stamp and quality information.
  - 3.36.3 The system shall also be able to send and receive control commands with the SCADA system
  - 3.36.4 It shall be possible to route periodic data directly to the SCADA system.
  - 3.36.5 Such data shall be useable in SCADA just as if it were telemetered from a SCADA RTU in a substation.
  - 3.36.6 The system shall be capable of collecting data from SCADA and storing it as an interval data record.
  
- 3.37 The communications subsystem for the communications software must maintain communications statistics on all devices and communication channels.
  
- 3.38 The system shall be designed so as to function as an extensible 'platform.' Vendor shall describe how additional protocols, types of devices and forms of communication can be integrated into the system.

#### **4 MASTER STATION APPLICATIONS**

- 4.1 The Master Station shall support additional applications beyond capacitor control to ensure the platform has the capability to grow and expand as the City of Dover's needs change. The vendor shall describe its extended capabilities but shall include as a minimum:
  - 4.1.1 Ability to collect data from substation and distribution feeder equipment.
  - 4.1.2 Ability to collect data from IED's.
  - 4.1.3 Provide a general purpose graphical user interface that supports one-line displays, trends and alarms.
  - 4.1.4 Ability to collect data directly from C&I Meters using the meter's native protocol. The vendor shall list the supported protocols.
  - 4.1.5 A general purpose calculation engine that can combine two or more data points to make a pseudo point. The calculation engine shall include basic mathematical operators (+, -, \*, /) and support general mathematical functions (sin, cos, sqrt, etc.) and engineering calculations (power factor, etc.)
  - 4.1.6 Ability to control other devices beyond capacitor controllers to optimize the performance of a feeder or substation.
  - 4.1.7 Ability to integrate with feeder protection devices.
- 4.2 The Master Station shall be deployed at multiple utilities for Capacitor Control and Other Applications. The vendor shall describe the installation of five current systems that provide the Capacitor Control and Other Applications.
- 4.3 The Master Station shall support a model where the system can be operated from a hosted environment for offsite backup.

#### **5 COMMUNICATIONS**

Master station shall support multiple communications routes and protocols.

- 5.1 The Utility recognizes that overall system performance is dependent on reliable communications from the Master Station to the capacitor bank controller. Because of this, the Utility has the following requirements with respect to communications.
- 5.2 The system shall support the following communication providers and protocols.
  - 5.2.1 900 MHz FLEX paging
  - 5.2.2 VHF digital paging by Pocsog or Golay
  - 5.2.3 Power Line Carrier
  - 5.2.4 TCP/IP connections such as; WiFi, BPL, IP Stack by DNP 3.0
    - 5.2.4.1 TCP/IP support shall include both static and dynamic addressing
  - 5.2.5 Licensed and unlicensed radio by DNP 3.0
  - 5.2.6 Digital Cellular (GPRS/1xRTT) by DNP 3.0
- 5.3 The utility Master Station computer shall communicate to the 900 MHz FLEX paging provider by using the industry standard TAPP protocol to the paging company TAPP terminal via an Internet connection. It shall also offer WCTP for secure Internet connection. It shall be possible to configure a backup dial-up connection for use in the event of a communication failure.
- 5.4 For the 900 MHz FLEX paging system, one capcode shall be used per configuration. A second capcode can be used per configuration as a back up. The vendor's communication protocol shall be encoded into the alphanumeric page. Thus it shall be possible to control one or more capacitor bank controllers individually or as groups. An all call command or group command can also be sent to all capacitor controllers under control with a single page. The actual control message is sent through a single pager ID, and is embedded in the actual page. No special equipment or software is needed at the paging provider location.
- 5.5 The utility Master Station shall support industry standard public cellular providers. The Master Station shall connect via the Internet using UDP TCP/IP socket connection technology. For a secure connection, the system shall have the ability to connect via a virtual private network (VPN) or the utilities own private network.
- 5.6 The utility Master Station shall support TCP/IP connection via the Internet to end field devices by industry standard WiFi, BPL or WiMax systems. For a secure connection, the system shall have the ability to connect via a virtual private network (VPN) or the utilities own private network.
- 5.7 The utility Master Station shall support power line carrier for communication with devices in remote areas.
- 5.8 Two-way communications shall be DNP 3.0 compliant and the Master Station must support unsolicited messages from the CBC's. The Master Station shall support Class 0,1, 2, 3 and integrity scans.

## **6 Capacitor Bank Controllers (CBC's)**

- 6.1 The Capacitor Controller shall be able to control utility capacitor banks by oil switch or vacuum switch. The controller shall have the ability to operate remotely with backup "failsafe" operational modes or as a stand-alone controller without communications. All CBC's shall be "Communications agile," offering multiple pluggable communications modules that can be changed to select a new communication network and "frequency agile" meaning they shall be capable of receiving signals on more than one frequency so that the utility is never "locked in" to a single frequency. Vendor must

describe in detail its experience with frequency agile designs including how many frequency agile devices it has in the field.

- 6.2 Each Controller shall have the following capabilities:
  - 6.2.1 The controller shall operate on 60hz, 120 VAC single phase power with an operational range of +/- 20%.
  - 6.2.2 The controller shall accept valid commands from the Master Station located at the utilities site.
  - 6.2.3 The controller shall require pluggable communication modules that shall offer the ability for the utility to easily upgrade or change communication types and protocols.
  - 6.2.4 List the communications modules that your company offers and the protocols supported:
- 6.3 Controller shall monitor all status data and display that data on the CBC's front panel. Two-way controllers will communicate DNP 3.0 and have the ability, through the air, to change set points in the CBC, scan the CBC, and provide unsolicited report by exception events from the CBC to the Master Station.
- 6.4 Minimum features or requirements:
  - 6.4.1 Local/Remote selector on the CBC front panel. (For safety concerns this is not programable by Master Station, this shall only be scannable and unsolicited reportable only)
  - 6.4.2 Trip/Close (Through the air and at the CBC's front panel)
  - 6.4.3 Over voltage(OV)/Under voltage(UV) user selectable voltage points in at least whole volt increments (through the air and at the CBC's front panel)
  - 6.4.4 Device modes Normal/Failed status point
  - 6.4.5 Neutral Current Sensor input
  - 6.4.6 Under voltage override close set-point in half volt increments
  - 6.4.7 Over-voltage override trip set-point in half volt increments
  - 6.4.8 Enable/disable under-voltage/over-voltage override
  - 6.4.9 OV/UV override track timer
  - 6.4.10 Enable/disable voltage control
  - 6.4.11 Emergency under voltage override close set-point in half volt increments
  - 6.4.12 Emergency over-voltage override trip set-point in half volt increments
  - 6.4.13 Enable/disable emergency under-voltage/over-voltage override
  - 6.4.14 Emergency voltage track timer
  - 6.4.15 Set backup mode operation control analysis timer
  - 6.4.16 Operation counter
  - 6.4.17 Under-voltage close counter
  - 6.4.18 Over-voltage trip counter
  - 6.4.19 Clear operations counters
  - 6.4.20 Signal Quality Level by RSSI
  - 6.4.21 Firmware Version
- 6.5 The CBC shall run diagnostics at power up and have continuous error checking.
- 6.6 The CBC shall have a USB port to upload and download operational parameters, send commands, and to read the data logs.
- 6.7 System firmware and user configuration will be maintained in flash memory so not to be lost during power interruptions.
- 6.8 CBC shall have a real-time clock to maintain time stamps if power is lost. Controller will also accept periodic through the air time syncs.
- 6.9 Enclosure
  - 6.9.1 CBC shall be a minimum of a NEMA 3R enclosure

- 6.9.2 CBC shall have four or six jaw meter base configuration with an added option of a surface mount enclosure.
- 6.9.3 Enclosure shall have a locking clasp.
- 6.10 Capacitor Controller Parameter requirements
  - 6.10.1 The CBC shall be supplied to the utility with the utilities chosen operational settings.
  - 6.10.2 The CBC shall have the ability to receive and change operational settings through the air by the Master Station
  - 6.10.3 The CBC shall have the ability to receive and change operational settings at the CBC's front panel.
  - 6.10.4 The CBC shall have the ability to receive and change operational settings by the USB port and a handheld service tool or laptop.
  - 6.10.5 The CBC shall have the ability to receive and change operational settings wirelessly by Bluetooth and a handheld service tool or laptop.
  - 6.10.6 Display true RMS Voltage with a +/- .25 accuracy.
  - 6.10.7 Display and log the reason for last control.
  - 6.10.8 Control (Trip/Close)
  - 6.10.9 Offer control strategies of date, time and season schedule. These can also be used as backup settings with voltage override if communication is interrupted.
  - 6.10.10 Settable voltage set points.
  - 6.10.11 Settable track timer monitoring time
  - 6.10.12 A random generator track timer with minimum and maximum random generation times. This is to minimize hunting.
  - 6.10.13 Secondary voltage band "emergency voltage band." User selectable emergency voltage points that have its own settable track timer.
  - 6.10.14 Delta voltage monitor. CBC shall monitor the voltage of the last eight control actions. At the time of control action determine if the action would cause a voltage violation. If it is determined that it would the action would be aborted.
  - 6.10.15 CBC shall have a maximum control counter. If the control number is violated the control can lock out until the next day. The CBC shall have the ability to be reset by the Master Station.
  - 6.10.16 When the CBC loses communications it shall revert to a stand-alone operation mode.
  - 6.10.17 CBC shall provide datalog with the bank state, reason for last control, RMS Voltage, Voltage before the control action, Log all alarms and store it in nonvolatile memory. The CBC shall write to the data log in (user selectable) increments of 15 minutes.
  - 6.10.18 The CBC shall have LED indication of AC Power, Signal Strength, Transmit, Receive, and Open/Close state.
  - 6.10.19 The CBC shall have input line fuse protection.
  - 6.10.20 The CBC shall have an LCD to view the configuration, settings and status points.
- 6.11 Communication Interfaces
  - 6.11.1 The CBC shall have an interchangeable communications module. The supplier will offer multiple communications modules that offer both one-way and two-way communications. The CBC shall have the ability to be upgraded to a new communications network by changing the module. The utility shall be able to field upgrade the CBC's communications.
  - 6.11.2 The CBC shall have the ability to support the following protocols.
    - 6.11.2.1 Motorola 900 MHz FLEX Paging
    - 6.11.2.2 VHF Digital Paging via Pocsag or Golay
    - 6.11.2.3 DNP 3.0
    - 6.11.2.4 Digital Cellular Packet Radio (1xRTT and GPRS)
    - 6.11.2.5 Dynamic IP/Stack for BPL, WiFi, WiMAX or other IP based radio's
  - 6.11.3 The CBC shall have the ability to be remotely tripped or closed by the Master Station. When two-way communications are present the CBC shall confirm the trip and close action to the Master Station.

- 6.11.4 The CBC Shall Log and Report alarms. Minimum alarms are:
  - 6.11.4.1 Over voltage and under voltage operations
  - 6.11.4.2 Neutral current violations
  - 6.11.4.3 Trip or close operation failure
  - 6.11.4.4 Relay failed alarm
  - 6.11.4.5 Delta voltage alarm
  
- 6.11.5 The CBC shall have the following status points that can be scanned
  - 6.11.5.1 RMS line voltage
  - 6.11.5.2 Capacitor bank controller's state
  - 6.11.5.3 Capacitor bank controller's serial number
  - 6.11.5.4 Reason for last control
  - 6.11.5.5 Neutral current
  - 6.11.5.6 Temperature reading
  - 6.11.5.7 Each analog input
  - 6.11.5.8 Communications network settings; such as IP address, communications loss counters, and signal strength.
  
- 6.11.6 The CBC shall have the ability to change the operation parameters or update the configuration by commands from the Master Station. Minimum points that are through the air programmable:
  - 6.11.6.1 Over voltage and under voltage set points
  - 6.11.6.2 The duration of time for tracking the over voltage and under voltage
  - 6.11.6.3 Emergency over voltage and under voltage set points
  - 6.11.6.4 The duration of the emergency over voltage and under voltage track time.
  - 6.11.6.5 Delta or adaptive voltage points.
  - 6.11.6.6 Neutral current set points
  
- 6.12 The CBC shall have a minimum of a 30 Amp Relay for 30 second operation both the motor drive type and solenoid type capacitor switches. Relay drive time is user settable from 1 second to 3 minutes
  
- 6.13 The CBC shall have 3 analog inputs.
  
- 6.14 The CBC shall optionally include a temperature sensor that can be used as a backup operation mode in the event communications are lost.
  
- 6.15 The CBC shall optionally include a ground lug.
  
- 6.16 The CBC shall optionally have the ability to detect neutral current imbalance. Supplier shall optionally provide a split core current sensor for detection of neutral current.
  
- 6.17 The CBC shall have the ability to receive trip and close commands through the air by the utilities chosen network. The CBC shall have trip, close and reclose delays. Purpose for these delays are for personnel safety.
  - 6.17.1 The controller shall have visual indication of the bank state, delay actions, OV/UV tracking and self test operations.

## **7 SET-UP, SYSTEM TESTING, AND TRAINING**

- 7.1 System Testing:

- 7.1.1 Preliminary Field Test – After initial installation and adjustment of hardware, the vendor, with the owner's assistance, shall conduct tests verifying that correct data interchange is occurring with all interfaces and that the hardware and software is fully operational before the system is placed online.
- 7.1.2 Factory Test And Inspection – The vendor shall submit to the purchaser a written description of Factory Test Procedures.  
The purchaser's representative shall, at reasonable times, be permitted to visit the vendor's premises for the purpose of examining the equipment or any of its parts to ensure that materials, workmanship, etc., are in conformance with the specifications. The purchaser may, if he so elects, waive this right to inspection, which shall in no way whatsoever be construed to mean that the purchaser waives any rights as far as equipment operation and workmanship are concerned.
- 7.1.3 Operation Test – Upon completion and acceptance of the preliminary field test, the owner shall perform an operational test of not less than five (5) days, twenty-four (24) hours per day, on the complete system to demonstrate that it is functioning properly. All two-way devices will be read, and the operation of one-way devices verified by local indicating lights. A 98% cumulative success rate for all functional requirements shall be met.
- 7.2 Training:
  - 7.2.1 The vendor shall provide training instruction for the purchaser's personnel in operation of the system. Training shall be conducted by experienced personnel and supported by training aids.
  - 7.2.2 The vendor shall offer detailed instructions for the purchaser's engineering and maintenance personnel covering every item of equipment furnished as part of the contract. The quality of instructions shall be such that the purchaser's trainee will be able to maintain the system to the manufacturer's satisfaction in regard to the warranty requirements.
  - 7.2.3 The vendor shall offer instructions to describe all system software, applications and support programs for the Utility's operators. Operator manuals shall be provided.

## **8 SUPPORT, SERVICE and MAINTENANCE, and USER GROUP**

- 8.1 Installation – The Utility will install all equipment associated with the Capacitor Control Systems under the technical assistance of a field engineer provided by the Bidder. The field engineer shall be knowledgeable with the construction and operation of the system. Cost of this service shall be listed separately from the materials list.
- 8.2 Service/Maintenance – The vendor shall state recommended modes of maintenance of system and shall describe preventive maintenance procedures. The vendor shall describe the source and type of service available and its estimated cost. The vendor shall offer as an option a full service one-year maintenance contract covering all software included in the system. This contract shall include telephone support service. The owner has the right to accept or reject this agreement.
- 8.3 Software Support – The vendor shall provide firm pricing for software support for up to two years from date of initial order. Bidder will provide information on software update policy. It is important to the utility to have ready access to local support and for the vendor to provide a dial-in support option allowing the vendor to remotely diagnose and remedy system problems.

- 8.4 User Group – The vendor shall advise if it has a User Group that is organized and if it has active annual group meetings. If so, include as part of your bid, a copy of the last users group meeting agenda and an estimate of the number of users who attended.
- 8.5 Documentation – The system shall not be considered complete until documentation has been delivered to the utility. The vendor shall furnish one (1) copy of all applicable instruction books, including system descriptions, equipment layouts and wiring diagrams. In addition, two (2) sets of instruction manuals, including installation, operation, maintenance and troubleshooting procedures, shall be supplied for master and remote terminals.
- 8.6 Warranty – All materials shall be warranted for a period of one year from date of installation or 18 months from the date of shipment or which ever comes first, against material defects and workmanship. The warranty shall include parts and labor to repair the defective component at the Supplier's facility. The Contractor also warrants that all equipment and materials supplied thereunder are new.

## **9 ENVIRONMENTAL REQUIREMENTS**

- 9.1 The Master Station will be capable of operation within an ambient temperature range of 10 degrees to 40 degrees Celsius, and a relative humidity from 20% to 80%, noncondensing.
- 9.2 All outdoor equipment such as the CBC shall be of weatherproof design, capable of operation within an ambient temperature range of -20 degrees to 65 degrees Celsius and a relative humidity from 0% to 95%, noncondensing.

## **10 WORKLOAD**

- 10.1 All equipment supplied under these contract documents shall be designed for continuous operation, 24 hours per day.

## **11 TEST EQUIPMENT**

The vendor shall describe in its proposal and shall furnish all necessary test equipment for the system.

## **12 SURGE WITHSTAND**

- 12.1 The equipment shall meet a surge withstand capability (SWC) test in accordance with ANSI C37.0a.

## **13 MISCELLANEOUS MATERIAL**

- 13.1 The Vendor shall provide necessary Overhead Line Post Sensors.
- 13.2 The Vendor shall provide necessary Underground Elbow Sensors.
- 13.3 The Vendor shall provide necessary Overhead Neutral Current Sensors.
- 13.4 The Vendor shall provide necessary Underground Neutral Current Sensors.
- 13.5 The Vendor shall provide necessary potential transformers for Overhead banks.
- 13.6 The Vendor shall provide all other necessary material/equipment.

## 14 EVALUATION OF PROPOSALS

Evaluations will be performed according to point system chart stated previously which includes several factors to ensure the purchase of a system that will operate to the utility's benefit. These additional evaluation criteria include, but are not limited to:

The ease of the application of the vendor's design to the intended purpose of the utility.

The reliability of the system to be supplied. Both as a system and its individual components.

The maintenance requirements of the system to be supplied.

The methods of construction used.

The warranty described by the supplier.

The materials used in manufacturing.

Simplicity in operation and maintenance.

The communications medium used.

Vendor shall specify what percentage of one-way and two-way communications will be acceptable system wide.

FCC licensing requirements.

Local support and location of sales, service engineers and software personnel.

Previous experience with the bidder.

Completeness of proposal.

Future adaptability to interface to other foreign systems, and other related utility systems.

**Proposal for RFP 10-0028DPU  
Delivery of a Pilot Centralized Capacitor Controller System**

The undersigned being familiar with all the details, conditions, and requirements hereby proposes to furnish a pilot Centralized Capacitor Controller System to the City of Dover, in strict conformance with the Specifications included in the Request for Proposal documents.

**BASE BID:**

Master Station Hardware:	\$ _____
Master Station Software:	\$ _____
Other system equipment necessary	\$ _____
Capacitor Bank Controllers	\$ _____
Test Equipment	\$ _____
Recommended spare parts	\$ _____
Technical Assistance and Training excluding travel and living expense	\$ _____
Two year software support and maintenance	\$ _____
<b>TOTAL BASE BID:</b>	<b>\$ _____</b>

In support of this pricing, a detailed bill of material in the vendor's chosen format shall be attached.

**Master Station Delivery Schedule:** \_\_\_\_\_ **weeks after receipt of order**

**Capacitor Bank Controller Delivery Schedule:** \_\_\_\_\_

All materials shall be delivered F.O.B., \_\_\_\_\_.

**OPTIONAL ITEMS:**

Including: software options, hardware options, and spare parts options, test equipment options:  
(Please describe...)

Name of bidder: \_\_\_\_\_  
(Individual, Firm, or Corporation)

Point of contact: \_\_\_\_\_  
(Printed name of individual whose signature appears below)

Signature of bidder: \_\_\_\_\_

Business Address: \_\_\_\_\_  
\_\_\_\_\_

Telephone number: \_\_\_\_\_

Fax number: \_\_\_\_\_

Date of bid: \_\_\_\_\_

Local Vendor Preference (Circle one):      Rule 1      Rule 2      Rule 3      None

Minority Vendor Preference (Circle one):      Yes      No