OWEN Electric

A Touchstone Energy® Cooperative

OWEN ELECTRIC COOPERATIVE

CASE #2006-00314

8205 Hwy 127 N • P.O. Box 400 • Owenton, Kentucky 40359-0400 • 800/372-7612 • Fax - 502/484-2661 • www.owenelectric.com

OWEN Electric

A Touchstone Energy® Cooperative

August 2, 2006

Beth O'Donnell, Executive Director
Commonwealth of Kentucky
Public Service Commission
211 Sower Boulevard
PO Box 615
Frankfort KY 40602-0615

RE: Case No. 2006-00314

Dear Ms. O'Donnell:

Enclosed please find the information requested in your letter of July 18, 2006 concerning Owen Electric's decision to install an Automated Meter Reading (AMR) system.

If you need further information or assistance, please contact me at 502-563-3549.

Sincerely,

Owen Electric Cooperative

Robert Hood
Sr. VP of Engineering and Operations

1. Provide a narrative explanation of Owen's decision to implement an automated meter reading ("AMR") system. Include in the explanation all factors leading to Owen's decision including financial, safety, reliability, and operational reasons. Also include the proposed starting date and ending date for implementation of the AMR system.

Answer: After several years of studying the automated meter reading (AMR) systems available, Owen believed that the technology had improved to a point that Owen could achieve the expectations that it wanted from an AMR system. They are as follows:

1. A reasonable return on investment. See Section #1 in enclosed binder.
2. A higher level of customer service as it relates to:
    a. Quick response on customer billing issues.
    b. A system that would integrate with our outage management system (OMS) to move quickly, identify, and pinpoint outages and would also assist Owen on assuring the customer was restored to service quicker and that in fact all the customers had been restored in the geographical area of the outages.
    c. To more quickly, detecting voltage related problems on our system.
    d. To allow us in the future to offer our customers load management capabilities.
3. Safety – reduction of approximately 200,000 miles of travel each year.

Start date for implementation will be January 2007. This date is contingent upon a System Acceptance Test (SAT) which will be conducted in September 2006. The ending date is projected to be no later than December 2009.

2. Refer to Exhibit 5 of Owen's June 22, 2006 application. Explain whether Owen is aware that its 2005-2007 Work Plan has not been filed with the Commission.

Answer: Please see Letter addressed to Mr. Mark Goss, Chairman of Kentucky PSC. Also an additional copy of the 2005-2007 Work Plan is included with this correspondence in a separate binder. See Section #2 in the enclosed binder.

3. Provide additional detail of the expected cost of Owen's AMR meter replacement program. Include with the total cost a breakdown between labor costs and the cost of materials. Also include the costs of the required annual customer premise meter inspections. Provide all supporting calculations.

Answer: See Section #3 in the enclosed binder.

4. Has Owen performed a cost justification analysis of the proposed AMR system?

    a. If yes, provide the results of the analysis and all assumptions used.
    b. If no, explain whether a cost justification analysis will be performed and, if so, when. If a cost justification analysis will be not performed, explain why not.

Answer: Yes – See Section #4 in the enclosed binder.

5. Explain whether Owen expects that the AMR meter replacement program will cause Owen to increase rates sooner than would be required if the AMR program were not in place. If the need for a rate increase is expedited by the AMR meter program, provide an estimate of the impact upon the need for a rate increase.

Answer: Owen does not expect to increase rates at any time due to the implementation of the AMR program.

6. Provide the total number of meters by customer classification that Owen plans to replace each year until the replacement program is complete. Include with the response, the total number of meters within each customer classification.

Answer: See Section #5 in the enclosed binder.

7. Explain whether Owen plans to use a competitive bidding process when purchasing the necessary AMR equipment. Include in the explanation a discussion of the bidding process to be used.

Answer: Owen did use a competitive bidding process, See Section #7 in the enclosed binder. RFP was submitted to four vendors, Cannon Technologies, DCSI, Hunt Technologies, and Tantalus. See vendor rating by category for each of the four vendors. Included in this section is a list of other utilities we evaluated and a vendor evaluation matrix we utilized in selecting a vendor.

8. Provide Owen's best estimate of the annual cost of meter reading, meter turn-ons and turn-offs, and any other expenses that will be eliminated with the implementation of its AMR program. Include all labor savings (including employee benefits), mileage or vehicle savings and other savings expected through elimination of monthly meter readings at the customer's premises. Provide all calculations and workpapers needed to derive the estimated annual cost.

Answer: See Section #7 in the enclosed binder.

Present Dashboard Results

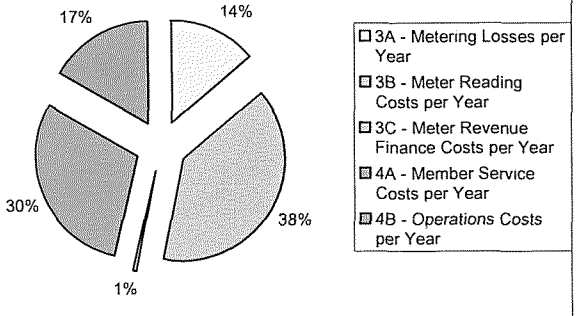
More Information

Owen Electric Cooperative, Inc.

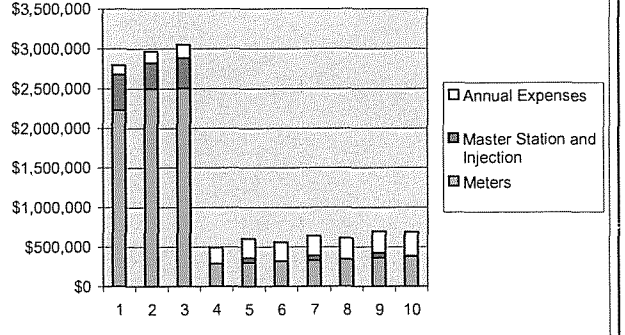
Decision Dashboard for AMR Planning

	I want to change the item below -	from:	to:
1	Energy diversion reduction	0.25%	
2	Number years for AMR *meter* installation.	3	
3	Residential Meter Growth (see sheet 3 for original)	4.00%	
4	Escalation (Inflation) Rate (see sheet 7 for original)	3.60%	
5	Vendor (see sheet 6 for original)	Cannon	
6	Number of disconnect collars (see sheet 6 for orginal)	500	
7	% of Single Phase Meters replaced due to AMR (see sheet 3 for original)	100%	
8	Percentage of Capital Costs to be financed.	100%	

Annual Operational Savings Potential by Category



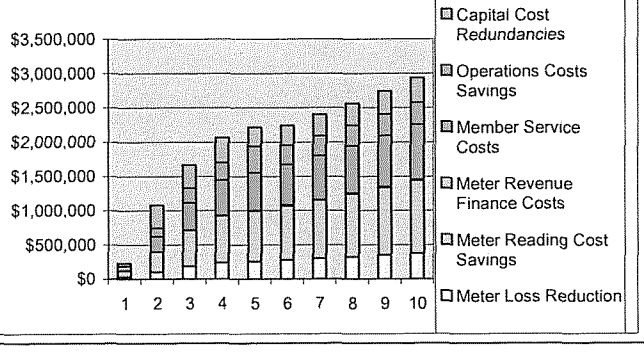
Annual Project Costs



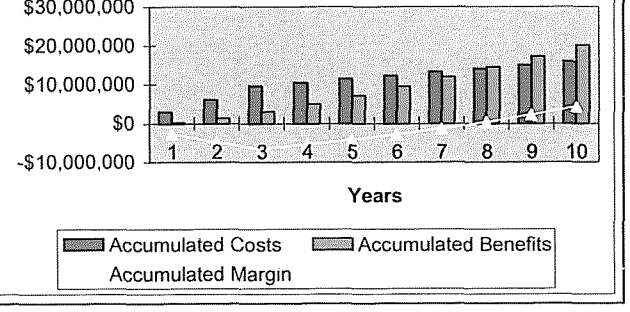
Financial Measures			
Net Present Value			$1,360,010
Finance Rate	5.00%		Interest costs included
Breakeven Point	7.8 Years		
Benefit/Cost Ratio	1.53	IRR	16%

Cost Projections	
10-Year Projection of Total Project Costs	$15,893,118
Sum of Capital Costs	$10,915,732
Sum of annual operational expenses	$2,166,721
Sum of annual interest payments	$2,810,665

Development of Benefits over Time



Breakeven Analysis



Mr. Mark Goss
Chairman
Public Service Commission
211 Sower Blvd.
P.O. Box 615
Frankfort, Kentucky 40602-0615

Dear Mr. Goss;

Enclosed are an original and one copy of Owen Electric Cooperative's (OEC) 2005-2007 Distribution Construction Work Plan for your information, review and file. OEC's 2005-2007 Work Plan has been approved by the OEC Board and by Rural Utilities Services (RUS). The Cooperative shall finance the proposed extensions and additions through funds generated internally from normal operations during the work plan period.

If you or your staff needs any additional information or needs to discuss the plan, feel free to contact me.

Sincerely,

Charles R. Gill, PE
Chief Information Officer

Contact Information:
Phone: Office 502-563-3510
Cell 859-393-3728
Email cgill@owenelectric.com

Purchase Price Of Base System	$6,425,978
Estimated Labor and Material Required To Implement The System	$1,289,735
Estimated Cost Of Installed System	$7,715,713
Estimated Cost For Required Annual Customer Premise Meter Inspection – One Year's Cost*	$105,997
Total Estimated Cost	**$7,821,710**

*See Estimate Detail (Next Page)

Estimate Cost For Required Annual Customer Premise Meter Inspections

Meter Readers	Rate/Hr	Annual Hrs	Annual Cost	
2	11.45	2080	47632	Labor Cost
			28579	Employee Benefits & Overhead Estimate 60% of Labor Cost
Vehicles				
2	7.16	2080	29786	Vehicle Cost
			105997	**Total Est. Meter Reader Cost**

Present Dashboard Results

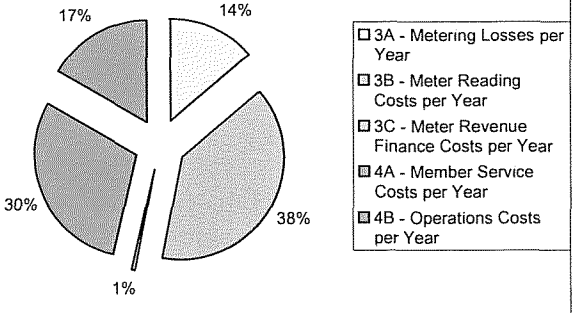
More Information

Owen Electric Cooperative, Inc.

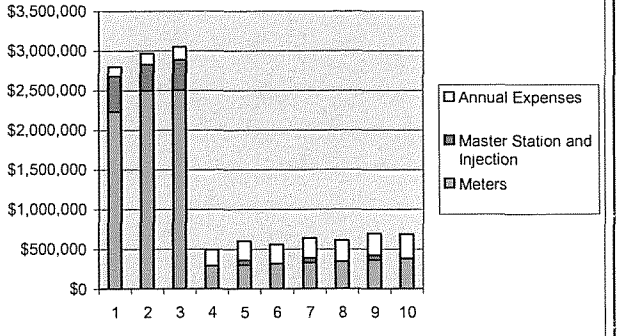
Decision Dashboard for AMR Planning

	I want to change the item below -	from:	to:
1	Energy diversion reduction	0.25%	
2	Number years for AMR meter installation.	3	
3	Residential Meter Growth (see sheet 3 for original)	4.00%	
4	Escalation (Inflation) Rate (see sheet 7 for original)	3.60%	
5	Vendor (see sheet 6 for original)	Cannon	
6	Number of disconnect collars (see sheet 6 for orginal)	500	
7	% of Single Phase Meters replaced due to AMR (see sheet 3 for original)	100%	
8	Percentage of Capital Costs to be financed.	100%	

Annual Operational Savings Potential by Category



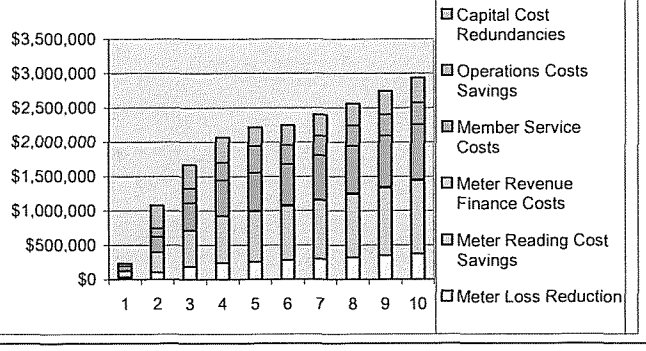
Annual Project Costs



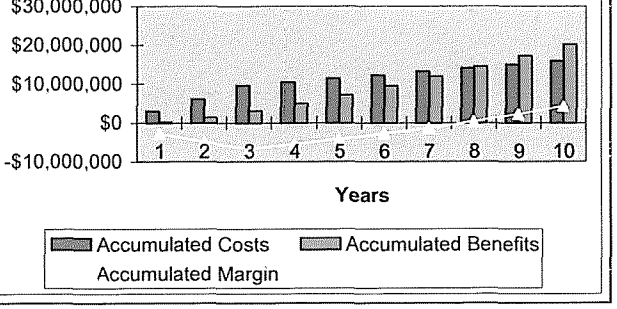
Financial Measures			
Net Present Value			$1,360,010
Finance Rate	5.00%	Interest costs	
Breakeven Point	7.8 Years	included	
Benefit/Cost Ratio	1.53	IRR	16%

Cost Projections	
10-Year Projection of Total Project Costs	$15,893,118
Sum of Capital Costs	$10,915,732
Sum of annual operational expenses	$2,166,721
Sum of annual interest payments	$2,810,665

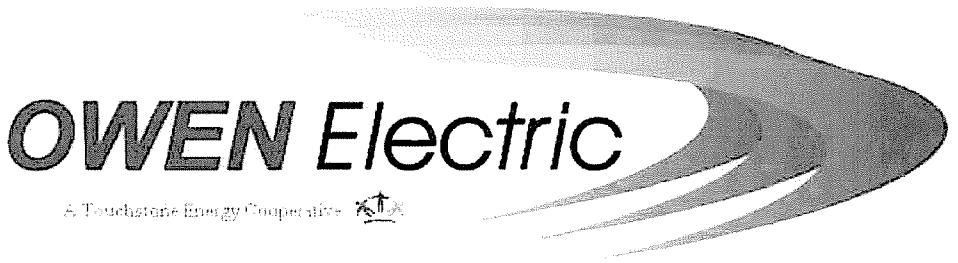
Development of Benefits over Time



Breakeven Analysis



Number of Residential Customers Served **Approximately one-third will be changed out per year**	**52,039**
Number of Commercial Customers Served **Approximately one-third will be changed out per year**	**1,671**
Number of Industrial Customers Served **Approximately one-third will be changed out per year**	**279**
Number of other Customer Served **Approximately one-third will be changed out per year**	**227**
Total number – all classes	**54,216**



Owen Electric Cooperative
Owenton, Kentucky

Request for Proposal for
Advanced Automatic Meter Reading System

February 3, 2006

Prepared by
Katama Technologies, Inc.
Business Associate
NRECA National Consulting Group
16100 Whitesail Dr.
Charlotte, NC 28278

Table of Contents

1. COMMERCIAL REQUIREMENTS 3

2. TERMS AND CONDITIONS 10

3. GENERAL SYSTEMS REQUIREMENTS 24

4. AMR SERVER COMPUTERS 28

5. BULK COMMUNICATIONS (OPERATION CENTER TO SUBSTATIONS) 30

6. DISTRIBUTION LINE CARRIER INJECTION & COMMUNICATIONS 31

7. RESIDENTIAL AMR METERS 32

8. COMMERCIAL AND INDUSTRIAL (C/I) AMR METERS 33

9. DISTRIBUTION AUTOMATION APPLICATIONS 34

10. SYSTEM ADMINISTRATION AND MAINTENANCE 34

11. DOCUMENTATION 35

12. QUALITY ASSURANCE, TESTING AND SYSTEM ACCEPTANCE 35

13. TRAINING 37

14. IMPLEMENTATION ROLES & REQUIREMENTS 39

15. APPENDICES 40

1. Commercial Requirements

This document is a Request for Proposal for an Advanced Automatic Meter Reading (AMR) System. Vendors who respond to this specification shall provide an electronic submission and hard copies of their Proposal before 4:30 pm EST on March 17, 2006 to each of the following addresses:

3 Hard Copies to:
Owen Electric Cooperative
8205 HWY 127 N
PO Box 400
Owenton, Kentucky 40359
Attn: Rusty Williams
Electronic Submission to:
Email: rwilliams@owenelectric.com

1 Hard Copy to:
Katama Technologies, Inc
16100 Whitesail Dr.
Charlotte, NC 28278
Attn: Greg Johnson
Electronic Submission to:
Email: gjohnson@katamatech.com

Electronic versions shall be received by the time and date listed above; hardcopy backups must have a date stamp that shows submission before the referenced time and date.

All Proposals made in response to this specification shall be valid and binding for a period of 120 days after the bid opening.

Any questions during the bid process shall be directed to:

Greg Johnson
Email: gjohnson@katamatech.com
Fax: 704 587 4615
Phone: 704 225 7864

1.1 Overview

1.1.1 General

Owen Electric Cooperative (OEC) based in Owenton, KY is soliciting a proposal from Vendor for an Automatic Meter Reading (AMR) system based on bi-directional communication technology. In addition to remote metering, the AMR system shall support applications for load management, distribution automation, member services and outage restoration.

As defined in this specification, a standard AMR system with little if any custom designed functions is expected. Where strict compliance with requirements of the technical specification is costly, Vendor is encouraged to offer reasonable alternatives. However, system performance requirements and alternatives which deviate significantly from the required approach should be proposed as cost reduction options. It is **not expected** that any one vendor will meet all of the requirements of this specification. The technical and commercial requirements of this specification have been "weighted" according to **Owen Electric Cooperative's** needs and corporate strategies. Your responses should reflect your system's **present** functionality.

The functional requirements of the system, when matched against Vendor's standard hardware and software may cause Vendor to conclude that there are needs for items or other functions which may not be specifically mentioned in this Specification. Vendor shall identify and propose all such items and explain how the design of these items meets **Owen Electric Cooperative's** requirements.

1.1.2 Vendor's General Obligations

Vendor shall assume responsibility for the design, fabrication, testing, start-up and specified commissioning of subsystems and components. Vendor's obligations shall include, but not be limited to, the responsibilities in the following list and those necessary to meet the requirements described in this Specification:

- End-to-end System engineering
- Analysis and programming
- Operating system software, database, and application software
- Processors, workstations/consoles, all user interface and other peripheral equipment, signal and power requirements, related hardware, and the interconnection of all Vendor supplied equipment
- Communication hardware, except that specifically to be provided by **Owen Electric Cooperative** (such as telephone lines, channels, microwave and radio equipment)
- Integration of Vendor supplied hardware and software as specified
- Factory, field and availability tests
- Shipment of all Vendor supplied equipment to designated **Owen Electric Cooperative** destinations
- Installation supervision as specified
- Support **Owen Electric Cooperative** with creation of system databases
- Appropriate and relevant field deployment and change-out tools
- Providing integrated meters[1] and other end-point devices as specified
- Training of **Owen Electric Cooperative's** operating personnel

[1] Electric Cooperative may elect to purchase meters from appropriate OEM's and have communication modules installed at meter factory, and/or purchase retrofitted meters from designated meter services provider.

- Engineering and programming assistance for **Owen Electric Cooperative's** engineers and programmers during the contract period
- Complete list of spare parts and special test equipment (if any)
- Instruction books, drawings, and all documentation
- Notification services for field updates to hardware and software to ensure zero forced obsolescence
- Service and assurance of the availability of spare parts after system acceptance.

1.1.3 **Owen Electric Cooperative's** General Obligations

Owen Electric Cooperative shall supply the following items and services as part of this implementation:

- Power sources at **Owen Electric Cooperative** locations (including offices and substations), and power distribution to Vendor supplied equipment
- Communication circuits and their appropriate connection to Vendor supplied devices or within **Owen Electric Cooperative's** facilities
- Appropriate site space and access to communication locations, e.g., substations, radio towers, or other locations necessary to deploy the AMR system
- Facilities access and location to install AMR Server and associated remote access link with necessary security measures
- Technical review of Vendor's designs and test procedures
- Participation in factory (optional at **Owen Electric Cooperative's** discretion) and site acceptance tests
- Coordination of Vendor's activities with **Owen Electric Cooperative**'s operating requirements
- Develop operational reports after training by Vendor (if necessary)
- Installation assistance at **Owen Electric Cooperative**'s operation center(s)
- Construction or modification of building and support facilities as needed to accommodate Vendor supplied equipment

1.2 Instruction to Vendors

1.2.1 General

The following items shall be included with the Proposal:

- Executive Summary
- Project Implementation Schedule
- Table of Compliance
- Lists of Deliverables
- Price Proposal
- Experiences/References

Please Note: To facilitate the proposal evaluation, the Table of Compliance will serve as the primary source of information. Unsolicited parts of the proposal will be regarded as supplementary information and may not be fully reviewed and/or evaluated. The Table of Compliance, Price/Delivery Schedules and Lists of Deliverables (see section 1.2.5), **must** be supplied in an editable format (e.g., MS-Word, MS-Excel). Non-editable formats (e.g., Acrobat .PDF) will **not** be accepted for these documents and will result in vendor **disqualification**. Itemized pricing must be supplied for all system components for the base offer; Lump sum pricing may only be used for discounts.

1.2.2 Executive Summary

Vendor shall provide an executive summary, which captures in a few pages the essence of the proposed system and services.

1.2.3 Project Implementation Schedule

Vendor shall provide a preliminary version of the project schedule, including documentation submittal dates, showing major system delivery/implementation activities and indicating milestone events with the interdependencies between events.

1.2.4 Table of Compliance

Vendor shall prepare a Table of Compliance. Non Compliance is defined as any section, paragraph or sentence that is not fully compliant with the specification. Vendor shall use the form detailed in Fig. 1.2.4 to present its table with the associated compliance symbols as described below:

Figure 1.2.4
Table of Compliance

SECTION	PARA/LINE	SYMBOL	DESCRIPTION

Where:

SECTION	=	Specification section	
PARA/LINE	=	Paragraph or line number in section If entire section, this field left blank	
SYMBOL	=	C – Comply	Vendor Complies
		A – Alternate	Vendor Proposes Functional Equivalent
		CL – Clarification	Vendor Needs to Clarify/State assumption for its compliance
		X – Exception	Vendor does not propose the functionality specified
Description	=	Explanation for the deviation from the specification	
Please note:		Unless a specific section, paragraph, line or word is listed in this table, it is clearly understood that vendor fully complies with the specification.	

1.2.5 List of Deliverables

A complete list of the hardware and software items that will be provided under this Contract is to be provided. Where options have been requested or are advised by Vendor, the list shall clearly indicate which items of hardware and/or software will be provided only if a specific option is chosen or recommended. If data sheets or supplementary brochures/documentation are provided to clarify the offering, specific references to model numbers are to be given in the Table of Compliance so that **Owen Electric Cooperative** may easily find the proposed equipment among the supplementary information. In addition, a complete list of hardware and software that is expected to be supplied by **Owen Electric Cooperative** is to be included. This list includes such items as software licenses, transformers, capacitors, fuse cutouts, etc. Finally, a list of all recommended spare parts and consumables that are required to operate the system is also required.

1.2.6 Price Proposal

The Price Quotation Forms (attached Excel file) must be used by Vendor to present the proposal.

1.2.7 Experiences/References

Vendor shall provide references for systems delivered within the last two years comparable to the system being proposed to **Owen Electric Cooperative**. Such reference sites will include name and contact details of the customer's project manager and operation supervisor of those using the system.

1.3 Proposal Evaluation and Contract Award

1.3.1 Owen Electric Cooperative will evaluate the proposal considering the following:

- Compliance to Specifications
- Delivery Schedule
- Similar system experience
- Applicability of standard product
- Maintenance support
- Price

Owen Electric Cooperative reserves the right to reject the Proposal in whole or in part, or to waive any and all informalities.

Owen Electric Cooperative may conduct such investigation as is deemed necessary to assist in the evaluation of the proposal and to establish the responsibility, qualifications and financial ability of Vendor to do the work in accordance with the Contract. Vendor shall assist **Owen Electric Cooperative** in obtaining information needed to satisfy this investigation.

1.3.2 Owen Electric Cooperative will evaluate the proposal to determine a minimum level of compliance with the Request for Proposal through negotiation and price adjustment.

Determination of the final evaluated proposal price shall include project coordination costs, operating costs, maintenance considerations, warranties, contractual considerations, payment schedules, as well as the price proposal for materials and equipment.

1.3.3 Owen Electric Cooperative and selected Vendor shall negotiate a Contract Document and Final Proposal Price acceptable to both parties. The detailed Contract Document shall be based on (1) Request for Proposal document, (2) Vendor's Table of Compliance and Questionnaire responses as amended during initial negotiations, and (3) other material and commitments supplied and/or arrived at during the proposal evaluation process including a System Acceptance Test Document. The resulting Contract Document shall be used as the basic project document and shall be considered binding on both parties.

The Contract Document shall be a document complete unto itself, from which the proposed system shall be built, containing a functional description of each operational capability with enough detail provided to make the intent clear. It shall contain a Project Schedule clearly defining all milestones for both Vendor and **Owen Electric Cooperative**. It shall list and define all deliverable hardware, software and

documentation and completely describe interfaces with **Owen Electric Cooperative** furnished equipment, as applicable. The Contract shall clearly describe the duties and responsibilities of all parties.

1.3.4 If agreement cannot be reached with Vendor, **Owen Electric Cooperative** may cease further negotiations with Vendor and enter into contract negotiations with another Vendor as determined by **Owen Electric Cooperative**.

Owen Electric Cooperative will be free of any obligation to reimburse Vendor for expenses incurred, or for any work performed in anticipation of a contract.

1.3.5 After completion of the Contract Document, **Owen Electric Cooperative** will forward to Vendor the Contract Document for signature. Within ten (10) working days after the date the Contract Document is mailed, Vendor shall forward to **Owen Electric Cooperative** the signed Contract Document and the required Certificate(s) of Insurance, the Performance Bond, and shall initiate work per the Contract. The date of mailing the required documents back to **Owen Electric Cooperative** establishes the start date of the Contract for performance purposes.

1.4 Estimated Timeline

Figure 1.4 describes the planned timeline for the procurement process.

Figure 1.4
Timeline of Events

Dates	Activity/Event
February 3, 2006	Distribution of RFP to bidders
March 17, 2006 (4:30 PM EDT)	Proposals due from bidders
May 15, 2006	Completion of bid evaluations
End of May, 2006	Presentation to Board for preliminary approval
On or about June 1, 2006	Selection of Preferred Vendor
June 1 – June 30, 2006	Negotiations with Vendor
On or before June 30, 2006	Contract signature
August 31, 2006	Install AMR Server and first WAN Controller (e.g., Network Controller, substation injector) and associated meters (paragraph 2.7.1)
September 30, 2006	Begin SAT (paragraph 2.7.2)

2. Terms and Conditions

2.1 General

Terms and conditions contained herein are the complete set of Terms for a contract with **Owen Electric Cooperative**.

2.2 Definitions

2.2.1 Acceptance Date

The date of the successful completion of entire system (~51,000) meters.

2.2.2 AMR Meter

A complete device comprised of a Vendor supplied communications module and a meter/measurement device supplied by a 3rd party meter manufacturer that will either be purchased as a part of this contract or exists in **Owen Electric Cooperative's** current asset base.

2.2.3 AMR Communication Module

Vendor's portion of AMR meter comprising communication components and ancillary measurement and microprocessor functionality.

2.2.4 Base Contract

The contract for acquisition of The System as herein defined and specified.

2.2.5 Bulk Communications

Cooperative-supplied medium used for data communications from headquarters' AMR server to substations, towers, etc where vendor-supplied communication system is located.

2.2.6 Commencement Date

The date of approval of the Base Contract for the initial system.

2.2.7 Contract

The Contract includes the all items under a Base Contract including meters, software/hardware, radios, injection equipment, etc.

2.2.8 Contract Document

The Contract Document shall include the Vendor's proposal, the Statement of Work (if created), System Acceptance Test Plan, Request for Proposal, and any other documents as may be produced during the process of negotiation, including any modifications agreed to during the negotiation process. The order of precedence shall be the Table of Compliance, Statement of Work, System Acceptance Test Plan, the RFP and, finally, the Vendor's proposal.

2.2.9 Default

Omissions, failures or neglect to take steps required for completion of the contract.

2.2.10 Delivery Date

The date the Vendor notifies **Owen Electric Cooperative** that the system is ready for System Acceptance Testing or the mutually agreed upon date, whichever is sooner.

2.2.11 Expandable

Additional capacity attained through additions or expansion of equipment.

2.2.12 Field Equipment

The group of system components that includes Load Control Receivers, Remote Meters, Connect/Disconnect Switches, and other Transponders.

2.2.13 Installation Date

The date of the successful completion of the System Acceptance Testing of the system.

2.2.14 LAN Communications

Communication (typically wireless) medium supplied by AMR Vendor and used to communicate locally between field devices. For example, for wireless/radio systems, this is the communication medium between a centralized or "collector" device and all local meters. For all systems this could be the communication medium from electric meters to gas/water meters using unlicensed spread spectrum.

2.2.15 Notice

Communication in accordance with or required by the terms of the Contract. Written notice shall be deemed to have been duly served when delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by facsimile or by registered mail, certified mail or mailgram to the last business address known to him who gives the notice.

2.2.16 Owner or Purchaser

Owen Electric Cooperative
8205 HWY 127 N
PO Box 400
Owenton, Kentucky 40359

2.2.17 SAT system

Initial system delivery that is used to verify functionality and performance of Vendor's AMR system. This system will also be used by **Owen Electric Cooperative** for parallel testing of business and operational processes.

2.2.18 Statement of Work

Document which specifies and describes the deliverables to be provided by the Vendor.

2.2.19 The System

All items, including hardware and software, which make up the **Owen Electric Cooperative** system, and such quantities of field equipment as specified.

2.2.20 Upgradeable

Additional capacity attained through replacement of unit(s) of equipment.

2.2.21 Vendor

2.2.22 Anyone submitting a proposal and anyone who, as a result of that proposal; enters into a contract with **Owen Electric Cooperative**. Where more than one party is involved in a "team" proposal, this term shall apply to the party which acts as the prime contractor.

2.2.23 WAN communications

Vendor-supplied communication medium. For power-line-carrier based systems this is PLC from substation to meters. For radio based systems this is wireless from radio tower to field meters that serve as "collectors" for local (LAN) meters.

2.3 Owen Electric Cooperative's Rights and Privileges

2.3.1 Owen Electric Cooperative or its duly authorized representative shall have the authority to disapprove or reject work which is unsatisfactory, faulty, or defective or does not conform to the requirements of the Statement of Work, or does not meet the requirements of any inspection or test. **Owen Electric Cooperative** shall be the final judge of the quality and fitness of all equipment, software, material and workmanship incorporated into the project.

2.3.2 Owen Electric Cooperative or its duly authorized representative may witness all tests. It may condemn any work, material, software, or equipment, either at the factory, on the site, or after installation, which does not fully conform to the Statement of Work. The purchaser may condemn any faulty workmanship or materials, at any time prior to final acceptance of the work, notwithstanding that such faulty workmanship or material or software may previously have been overlooked or may have become damaged after previous inspections.

2.3.3 Owen Electric Cooperative retains the sole right to determine the proper amounts on any extensions of time provided for under this agreement.

2.3.4 Owen Electric Cooperative reserves the right to modify the system following the warranty period.

2.4 Owen Electric Cooperative's Right to Operate Equipment

Owen Electric Cooperative reserves the right to operate the equipment as long and as soon as it is in safe operating condition, whether or not such equipment has been accepted or is satisfactory as to specified characteristics, and provided that such operation will not damage the equipment. **Owen Electric Cooperative** shall have the right to operate any unsatisfactory equipment for as long as necessary, until it can be taken out of service without inconvenience to **Owen Electric Cooperative** to permit an attempt by the Vendor to correct the defects or omissions or to replace the equipment.

2.5 Owen Electric Cooperative's Right to Correct Deficiencies

If any deficiencies are found during testing, and within 15 working days after receipt of written notice from **Owen Electric Cooperative,** the Vendor has not made corrections or made arrangements for corrections satisfactory to **Owen Electric Cooperative**, **Owen Electric Cooperative** may, after written Notice to the Vendor and without

prejudice to any other remedy it may have, make good such deficiencies. In such cases, **Owen Electric Cooperative** will deduct from the payments then or thereafter due the Vendor the cost of correcting such deficiencies, including the cost of consulting services, if any, made necessary to correct such deficiencies. If payments then or thereafter due the Vendor are not sufficient to cover such amount, the Vendor shall pay the difference to **Owen Electric Cooperative**.

2.6 Access to Work

Owen Electric Cooperative and its agents shall, for any purpose consistent with furthering the work of this project, have reasonable access to the work and the premises used by the Vendor, Vendor team members, or subcontractors, and shall be provided proper and safe facilities.

2.7 Project Schedule

Soon after the final contract negotiations, the Vendor shall submit to **Owen Electric Cooperative** a complete critical path schedule for the project. Delivery Date shall be as mutually agreed upon during the negotiations, and as approved in writing by **Owen Electric Cooperative.**

The Vendor shall update the critical path schedule as appropriate, and shall provide the schedule to **Owen Electric Cooperative** as part of the Vendor's monthly report.

The project schedule shall be able to achieve the following milestone dates:

2.7.1 Availability of demonstration system for System Acceptance Testing - Three (3) months from date of execution, a demonstration system will be implemented that verifies end-to-end communications availability. This system will then be available for System Acceptance Testing (SAT). The SAT system will include the AMR Server hardware & software, wide-area-network communications technology (e.g., power-line-carrier injection equipment on one substation, radio transmitter, etc), approximately 2,000 – 2,500 meters and any miscellaneous equipment/software required to operate system.

2.7.2 Begin Site Acceptance Testing – Within one (1) month from start of initial demonstration of the system, SAT will begin.

The SAT shall involve testing of the equipment available for **Owen Electric Cooperative**'s use. Details of the test will be determined during contract negotiations; it is essential to have sufficient field equipment in place to demonstrate and test functionality and performance of the system.

2.8 Prices and Method of Payment

Payments will be made by **Owen Electric Cooperative** to the Vendor of certain sums following successful completion of milestone activities. The final payment shall be made within 30 days after Acceptance Date. At the time final payment is made, all rights, title and interest in the equipment and software rights and/or licenses shall become vested in **Owen Electric Cooperative**.

For the Base Contract, three payment schedules shall apply.

2.8.1 The AMR Server including all peripherals and software, project management, bond, and system engineering costs, the payment schedule shall be as follows:

- 90% upon passing the SAT
- 10% upon final Acceptance Date

2.8.2 For signal injection at first substation, associated meters and other field equipment, the payment schedule shall be as follows:

- 90% upon passing the SAT
- 10% upon final Acceptance Date

2.8.3 For signal injection, meters and other field equipment, the payment schedule shall be as follows:

- 90% after receipt of shipment and invoice
- 10% upon final Acceptance Date

2.8.4 Price escalation for AMR meters and signal injection equipment purchased in addition to the contracted quantity will not exceed the sums of the increases for the CPI during the equivalent period for a term of 15 years from contract signature. In addition, prices charged to **Owen Electric Cooperative** for AMR meters and signal injection equipment will not exceed the average market price for electric Cooperatives for similar equipment.

2.9 Warranty

2.9.1 All material, software, or equipment which develop defects before installation, or before the expiration of the warranty period following completion, shall be repaired, replaced or modified by the Vendor, notwithstanding that it may have previously passed inspections and tests.

2.9.2 Any materials or equipment delivered to **Owen Electric Cooperative** for uses which are condemned by **Owen Electric Cooperative** as unsuitable or not in conformity with the proposal shall be immediately removed by the Vendor. Failure or omission on the part of **Owen Electric Cooperative** or any of its agents to condemn defective or inferior material, work, or equipment, shall not imply acceptance of the material, software, work or equipment.

2.9.3 The vendor guarantees that the software and equipment submitted will be as specified and will be free from defects in design, workmanship, and materials. If within the warranty period the work fails to meet the provisions of this guarantee, the Vendor shall upon Notice promptly correct any defects, including non-conformance with the specifications, by adjustment, repair, or replacements of all defective materials, equipment, or software.

2.9.4 The Vendor will be given an opportunity to confirm the existence of the defect within the time allotted, but it shall not delay the correction while making such determination.

2.9.5 If within 15 days after **Owen Electric Cooperative** has notified the Vendor of a defect, failure or abnormality in the equipment or software, the Vendor has not started to

make the necessary adjustments or corrections to the satisfaction of **Owen Electric Cooperative**, **Owen Electric Cooperative** is hereby authorized to make such repairs or corrections or to order the work to be done by a third party, with the cost of such work being paid by the vendor.

2.9.6 The warranty period for the computer systems shall extend for a period of not less than one year after the date of the System Acceptance Test. The guarantee shall be extended to cover all repairs and replacements furnished under the warranty.

2.9.7 For the field equipment (signal injection, meters and other end-use field equipment) the warranty period shall extend for a period of not less than 18 months after the delivery date. During this warranty period, the Vendor shall promptly repair or replace all defective parts at no cost to **Owen Electric Cooperative**.

2.9.8 The end-use field equipment shall be warranted to achieve a failure rate of no more than 1 % per year for five years after original invoice for applicable items. The Vendor shall promptly repair or replace the equipment that exceeds the failure rate at no cost to **Owen Electric Cooperative**.

2.9.9 The communications path between the remote controllers and the end-use field equipment shall be warranted to achieve a communications success rate of at least 97.5% for two-way communications as measured during any one-hour period over the two years after System Acceptance. A successful communication during a one-hour period may require more than one attempt for retrieval. The Vendor shall furnish the necessary equipment and technical labor resources to bring the communications success rates into compliance at no cost to **Owen Electric Cooperative**

2.9.10 System is intended to generate data to accurately bill 100% of customers each month with minimal manual meter readings and zero estimated bills. To achieve this, AMR system must have communications performance that provides 99.75% of required monthly meter readings on the day each billing cycle is due.

2.10 Acceptance

2.10.1 Maintenance during Testing

Vendor agrees to provide maintenance services during all testing. Such services shall be provided at no additional expense to **Owen Electric Cooperative**.

2.10.2 Failure to Complete Testing Successfully

In the event the system or any applicable component is deemed not to have successfully completed any phase of the testing, then **Owen Electric Cooperative** may, in its sole discretion, elect one of the following options, which shall be effective upon written notification to the Vendor by **Owen Electric Cooperative**.

- **Owen Electric Cooperative** may terminate the contract and any related contract modifications and request the removal of the system or components failing to meet the applicable phase of testing, and any related product at no cost to **Owen Electric Cooperative.**
- **Owen Electric Cooperative** may demand and Vendor shall agree to install, within such time period as may be mutually agreed upon in writing by **Owen**

Electric Cooperative and the Vendor prior to **Owen Electric Cooperative**'s election hereunder, a direct replacement of the components or system failing to meet the applicable phase of acceptance testing. Such replacements and the applicable system shall be subject to field acceptance testing as provided in this document. Vendor shall use due care in the removal and replacement of such products.

- **Owen Electric Cooperative** may pursue any other remedy hereunder or available at law or in equity to seek to enforce any damages including damages that may be specifically set forth in the contract or the bonds.
- Use shall not constitute acceptance. In no event shall use of any product by **Owen Electric Cooperative** for business, profit, revenue or any other purpose during any phase of the testing constitute acceptance of any product by **Owen Electric Cooperative**.

2.10.3 Equipment use During System Down Time

During a period of system failure down time, **Owen Electric Cooperative** may use operable equipment when such action does not interfere with the maintenance or repair of the inoperable equipment. Whenever the operable equipment is not released to the Vendor upon request, then all such usage period shall not be considered in computing the availability level.

2.11 Changes in Price

Any adjustment in the price resulting from changes ordered by **Owen Electric Cooperative** after award of a contract shall be determined as follows:

2.11.1 By such applicable unit prices, if any, as are set forth in the proposal.

2.11.2 If no such unit prices are set forth, then by unit price or a lump sum that is mutually agreed upon by **Owen Electric Cooperative** and the Vendor and that is at most equal to the prevailing Vendor's bid prices for similar competitive bids.

2.12 Shipment

Delivery of all equipment and software shall be made with freight prepaid and allowed. Equipment and software shall be delivered to the facilities of **Owen Electric Cooperative** or additional sites as specified by **Owen Electric Cooperative**.

2.13 Omissions

Any minor omissions of specification details to make a unit complete and operable shall not relieve the Vendor of the obligation to furnish said items at no additional charge. Vendor warrants that the proposed system includes all components necessary for the equipment to perform as described in Vendor's published and/or submitted specifications. Vendor warrants that the system is complete and will perform according to **Owen Electric Cooperative**'s requirements as described in the Statement of Work.

2.14 Defaults

Any default by the Vendor may result in the forfeiture of the performance bond to **Owen Electric Cooperative**.

2.15 Subcontractors and Manufacturers

The Vendor shall furnish a list of subcontractors and manufacturers for major equipment items. The Vendor shall not deviate from the list of subcontractors or manufacturers submitted with his proposal without the written consent of **Owen Electric Cooperative**.

The Vendor shall be fully responsible to **Owen Electric Cooperative** for the acts and omissions of any of its subcontractors or manufacturers as the Vendor is responsible for the acts and omissions of persons directly employed by the Prime Vendor.

Nothing contained herein shall create any contractual relationship between any subcontractor, manufacturer and **Owen Electric Cooperative**, or any obligation on the part of **Owen Electric Cooperative** to pay or to seek payment of any kind, to the subcontractor or manufacturer except as may be required by law. **Owen Electric Cooperative** shall have the right to review the contracts between the Vendor and the subcontractors.

2.16 Origin of Components

Insofar as possible, all components utilized shall conform to RUS requirements governing the use and installation of materials on RUS projects.

2.17 Compliance with Laws

Vendor agrees that it will comply with the provisions of the Fair Labor Standards Act of 1938, as amended, and all other applicable federal, state, county, and local laws, ordinances, regulations, and codes in the performance of this agreement, including the procurement of permits and certificates where needed. Vendor further agrees to indemnify and hold **Owen Electric Cooperative** harmless against any loss or damage that may be sustained by reason of Vendor's failure to comply with the aforementioned federal, state, county and local laws, ordinances, regulations and codes.

2.18 General Liability Provision

The Vendor shall take out and maintain at its expense throughout the duration of this agreement, insurance of such amounts and types as may be necessary to protect Vendor and the interest of **Owen Electric Cooperative** and others against all hazards or reasonable risks of loss as a direct result of the Vendor's operations under these specifications. Vendor shall be deemed to be an independent contractor hereunder and shall not be considered or permitted to be an agent, servant, joint venture, or partner of **Owen Electric Cooperative**. Vendor agrees to take such steps as may be necessary to insure that each subcontractor of Vendor will be deemed to be an independent contractor and will not be considered or permitted to be an agent, servant, joint venture or partner of **Owen Electric Cooperative**. All persons furnished, used, retained, or hired by or on behalf of the Vendor or any of its subcontractors shall be considered to be employees or agents of the Vendor or subcontractor, and Vendor shall be responsible for payment of any and all unemployment, social security and other payroll taxes for such persons, including related assessments or contributions required by law.

The Vendor hereby agrees to indemnify, hold harmless and defend **Owen Electric Cooperative** and its agents from and against any and all actions or causes of actions, claims, demands, liabilities, loss or damage or expense, of whatsoever kind and nature, including attorney fees, or expenses whatsoever, which may arise or result from the performance by the Vendor or its subcontractor(s) of work under this contract by reason of bodily injury; including death to a person- or persons, or .by reason of damage to or destruction of any property, including the loss of use thereof, or which **Owen Electric Cooperative** may sustain in connection with any litigation, investigation, or any other expenditure incident thereto, including any suit instituted to enforce the obligation of this agreement of indemnity, whether or not due in part or in whole to any act or omission or negligence of **Owen Electric Cooperative** or any of its agents or employees (except insofar as such indemnity arising out of such injury or damage caused by the' sole negligence of **Owen Electric Cooperative** or such agents or employees may be found to be contrary to the law, in which case this agreement of indemnity shall in all other respects be and remain effective and binding).

2.19 Force Majeure

Neither party hereto shall be deemed to be in default of any provision of this agreement, or for any failure in performance, resulting from acts or events beyond the reasonable control of such party. For purposes of this agreement, such act shall include, but not be limited to, acts of God, civil or military authority, civil disturbance, war, strikes, fires, other catastrophes, or other "Force Majeure" events beyond the party's reasonable control; provided, however, that the provisions of this subsection shall not preclude **Owen Electric Cooperative** from canceling or terminating this agreement or any order for any product included herein, as otherwise permitted hereunder regardless of any force majeure event occurring to the Vendor except that, in such event, **Owen Electric Cooperative** shall not cancel or terminate this agreement to the extent that it involves an order for products specifically produced or fabricated for **Owen Electric Cooperative**'s unique use unless **Owen Electric Cooperative** shall have given Vendor 120 days prior written notice of its intent to so cancel or terminate this agreement and, during said 120 day period, Vendor shall have failed to cure such delay or failure in the performance or delivery.

2.20 Applicability of Uniform Commercial Code

Except to the extent the provisions of this agreement are clearly inconsistent therewith, this agreement shall be governed by the applicable provisions of the Uniform Commercial Code as adopted by the State of Kentucky. To the extent this agreement entails delivery or performance of services, such services shall be deemed "goods" within the meaning of the Uniform Commercial Code, except when deeming such services as "goods" would result in a clearly unreasonable interpretation.

2.21 Publicity

Vendor agrees to submit to **Owen Electric Cooperative** all advertising, promotional and other publicity-related material for any product furnished by the Vendor wherein **Owen Electric Cooperative**'s name is mentioned or language used from which the connection of **Owen Electric Cooperative**'s name therewith may, in **Owen Electric**

Cooperative's judgment, be inferred or implied. Vendor further agrees not to publish or use any such promotional or publicity material without the prior written consent of **Owen Electric Cooperative**.

2.22 Site Rules and Regulations

Vendor shall use his best efforts to insure that his employees and agents, while on the premises of **Owen Electric Cooperative**, shall comply with **Owen Electric Cooperative**'s rules and regulations.

2.23 Non-Waiver

No term or provision of this agreement shall be deemed waived and no breach thereof shall be deemed excused, unless such waiver or consent shall be in writing and signed by the party claimed to have waived or consented. No consent by any party to, or waiver of, a breach by the other, whether expressed or implied, shall constitute consent to, waiver of, or excuse for, any different or subsequent breach.

2.24 Partial Invalidity

If any term or provision of this agreement shall be found to be illegal or unenforceable then, notwithstanding any such illegal or unenforceable terms or provisions, the remainder of this agreement shall remain in full force and effect and such illegal or unenforceable terms or provisions shall be deemed to have been deleted.

2.25 Successors and Assignees

This agreement shall inure to the benefit of, and be binding upon, the respective successors and assigns, if any, of the parties hereto, except that nothing contained in this subsection shall be construed to permit any attempted assignment which would be unauthorized or void pursuant to any other provision of this agreement.,

2.26 Assignments

The Vendor shall not assign this contract to any other company, corporation, partnership, or individual without the written consent of **Owen Electric Cooperative**.

2.27 Headings

Section, subsection, paragraph and subparagraph headings used in this agreement are for reference purposes only and shall not be deemed to be part of this agreement.

2.28 Survival of Representations and Warranties

The terms, provisions, representations, and warranties contained in this agreement that by their sense and context are intended to survive the performance thereof by either or both parties hereunder shall so survive the completion of performance and termination of this agreement, including, without limitation, the making of any and all payments due hereunder.

2.29 Entire Agreement

This agreement together with all subordinates and other documents incorporated by reference herein and items included on the actual purchase agreement constitutes the entire agreement between the parties with respect to the subject matter contained herein and may only be modified by an amendment executed in writing by both parties.

2.30 State Law to Apply

This agreement shall be governed by and construed in all respects in accordance with the laws of the State of Kentucky.

2.31 Provisions Relative to Employment

This agreement is subject to all applicable laws and executive orders relating to equal opportunity and nondiscrimination in employment. Vendor shall not discriminate in its employment practices against any person by reason of race, color, religion, sex or national origin. Vendor agrees to comply with the provisions of all such laws and orders, as well as laws and orders related to the employment of the handicapped, the employment of veterans and the use of minority business enterprises, to the extent any such laws and orders are applicable in the performance of work or furnishing of services, materials or supplies hereunder. Provisions of this paragraph shall apply unless the Vendor is exempt under the rules and regulations of the Secretary of Labor or other proper authorities.

2.32 OSHA Compliance

The Vendor shall take all steps necessary to insure that its personnel are afforded all protection intended under OSHA rules, regulations, and ordinances.

2.33 LIQUIDATED DAMAGES

For non-delivery of equipment or software **Owen Electric Cooperative** may, at its option, require that the Vendor pay to **Owen Electric Cooperative**, as fixed and agreed liquidated damages for each calendar day delay beginning with the SAT completion date. The liquidated damage schedule shall be as follows:

1 - 29 days	$0/day
30-120 days	$500/day
Beyond 120 days	$1,000/day

The liquidated damages shall not exceed 10% of the total Base Contract amount.

2.34 Project Implementation

2.34.1 Project Coordination

- **Owen Electric Cooperative**'s Interface

  The Vendor shall coordinate with and direct all communication to **Owen Electric Cooperative**'s Project Manager.

- Vendor's Interface

The Vendor shall appoint one Project Manager. All communication by **Owen Electric Cooperative** will be directed through the Vendor's Project Manager. Appointment of person(s) other than those candidates designated in the Proposal to key project positions shall be subject to **Owen Electric Cooperative**'s approval.

- Vendor's Organization

During final contract negotiations and in no event later than 15 days following the contract signing, the Vendor shall describe the general management organization, as it relates to project support and control, and the project organization intended to support the project. In the project organization description, all design, implementation and testing areas of the project and their interrelationships shall be indicated. A description of the Project Manager in relation to these areas, and the manager's control over their timely scheduling shall be provided. The Vendor shall also provide a list of all engineering, programming and other personnel to be assigned to the project. The list shall include brief biographical information and the responsibilities to be undertaken by individuals. The Vendor shall notify **Owen Electric Cooperative** of personnel changes in the project staff within two weeks of their occurrences throughout the project's duration.

- Technical Meetings and Reports

Technical discussion meetings shall be held on an as-needed basis between **Owen Electric Cooperative** and Vendor but not less frequently than once every two months at **Owen Electric Cooperative**'s headquarters.

For each meeting a proposed agenda, mutually agreeable to the Vendor and **Owen Electric Cooperative** shall be prepared and exchanged in advance. The agenda will serve to indicate which project members should be present at each meeting.

The Vendor shall submit to **Owen Electric Cooperative** a Meeting Report within five days following completion of each technical discussion meeting.

- Monthly Reports

By the 10th day of each month during the life of the contract, the Vendor shall submit a progress report to **Owen Electric Cooperative**. This report shall contain an updated Project Schedule (reflecting any advances or slippages incurred), a tabulation of slippages (with their causes and projected effect on the total schedule), problem areas (including whether they were or were not solved), major decisions made, and major tasks performed during the previous calendar month. It is intended that the monthly report will be of major assistance in detecting any potential problem areas as far in advance as possible.

2.34.2 Schedules

- The Vendor shall maintain a schedule covering all major project activities from the signing of a contract to the completion of field acceptance tests.

A simplified Gantt chart shall be used which utilizes a uniform time base along the horizontal axis and clearly shows the relationship of the various events in the schedule. The Vendor's schedule shall clearly define all critical activities along with estimates for **Owen Electric Cooperative** activities during document approval, Site Acceptance Testing and Installation.

To support effective monitoring of the project's progress, meaningful and measurable performance milestones shall be scheduled frequently. These milestones shall be defined with the understanding that achievement of a later milestone will not be recognized unless all prior milestones have already been achieved.

- The Gantt chart shall express the scope, delivery schedule and quantities of the system documentation required by **Owen Electric Cooperative**.

- Software Implementation Schedule

A detailed software implementation schedule supplementing the overall project schedule shall be submitted following the approval of the preliminary software design documentation. The software implementation schedule shall correspond in detail to the preliminary software design documentation and shall employ the same simplified design documentation and shall employ the same simplified Gantt chart format used for the overall project schedule.

- Tagging of Deliverables

Documentation with each deliverable shall identify the sections in the Statement of Work that are addressed by that deliverable. The intent is to track the sections of the Statement of Work that have been addressed as the project progresses.

2.34.3 Quality Assurance

The Vendor shall perform all quality assurance inspections, tests and reporting in accordance with an approved quality assurance plan. The Vendor shall describe the proposed quality assurance plan in its proposal.

2.34.4 System Activision

The Vendor shall furnish a system activation plan and procedure. **Owen Electric Cooperative** and Vendor will work together to accomplish a secure and smooth system activation and cutover.

2.35 Escrow Account

An escrow account shall be established and periodically updated with Vendor's proprietary hardware design, software, firmware and communication protocols. Should the Vendor fail to provide the necessary technical support or decide to leave the business area during the life of the system' (i.e., 15 years after Final Acceptance), **Owen Electric Cooperative** shall have the right to the proprietary information.

2.36 Arbitration and Litigation Fees

In the event of arbitration or litigation to enforce any of the terms of the Contract Documents, the prevailing party shall be entitled to an additional award for its reasonable attorney fee at arbitration, hearing, trial and on appeal.

2.37 Venue and Jurisdiction

The parties agree that personnel and subject matter jurisdiction shall be in the Owen Circuit Court for the State of Kentucky. Venue for any litigation or arbitration shall be in the Owen Circuit Court for the State of Kentucky. Vendor submits to the jurisdiction of the Owen Circuit Court, Owenton, Kentucky, for any and all litigation to enforce any of the terms of the Contract Documents.

3. GENERAL SYSTEMS REQUIREMENTS

3.1 General

This section specifies requirements, which concern the system as a whole. The details of the system's functions, user interface, and the system's supporting hardware and software, are specified in subsequent sections.

3.2 Owen Electric Cooperative Overview

Owen Electric Cooperative is based in Owenton, Kentucky and serves 52,600 members increasing at 4% per year. Our power supplier is the East Kentucky Power Cooperative located in Winchester, Kentucky. We have approximately 50,500 single phase meters, 800 Polyphase meters and 150 single phase meters that are transformer rated. We have currently 23 substations with ratings as defined in Appendix 15.2 and Appendix 15.5. At present, communications from our operations center to substations is not in place. We solicit your input on recommendations as a part of this RFP.

3.3 System expectations

Based on bi-directional communication technology, the AMR system is intended to be used on 100% of **Owen Electric Cooperative's** residential and commercial/industrial meters. In addition to remote metering, the AMR system shall support applications for load management, distribution automation, power quality, member services and outage restoration. Preference will be given to a system that can demonstrate potential for growth of applications and services for member services and distribution automation.

Owen Electric Cooperative intends on maximizing the capability of an AMR system therefore will evaluate proposals on the basis of cost of ownership from purchase, training, installation and on-going maintenance of the AMR system plus the capability of the system to perform the above support applications. It is also expected that the Vendor's system be managed as a standard product with minimum customized features. The system must be flexible with a maximum of configurable parameters and features which can be modified and changed through the AMR Server by **Owen Electric Cooperative**.

System must be able to:

- Self-diagnose communications health and performance
- Execute all basic meter reading functions for scheduled or on-demand activities
- Incorporate TOU in the future without significant upgrade or revisiting meters already deployed in the field
- Enable **Owen Electric Cooperative** to expeditiously isolate locations of system faults and to determine status of restoration by having it serve as a "front-end" to **Owen Electric Cooperative's** existing outage management system In the Table of Compliance of your quotation, state the time it would take to detect and inform the OMS system for a single customer outage, a single outage of 50 customers, 10 outages of 1000 customers, and 20 outages of 10,000 customers

- Enable **Owen Electric Cooperative** to locate outages expeditiously. Please describe how to best use your system to locate outages that have not been called in by a member/customer
- Enable **Owen Electric Cooperative** to locate momentary outage problems. In the Table of Compliance, please describe how to best use your system to know where there are momentary outage problems. Once known, how your system would be used to monitor the situation to determine success in resolution attempts.
- Allow **Owen Electric Cooperative's** Customer Service Representatives to use the existing SEDC UPN billing system user interface to perform functions such as disconnects, read-ins/read-outs, high-bill complaints, # of blinks, meter changes, etc. In the Table of Compliance, please describe the steps required to:
    - Disconnect and reconnect a member's residential service
    - Evaluate a member's complaint regarding blinks or short cycle outages
    - Respond to a high-bill complaint
- Reduce energy theft via remote detection of meter tampering consumption anomalies, or other suspicious behavior.
- Collect and manage non-revenue data such as feeder voltage, power quality and phase amps wherever appropriate monitoring devices are installed.
- Remotely and safely disconnect and reconnect 200-Amp (or other ratings if available from AMR Vendor) service at select locations anywhere in **Owen Electric Cooperative's** service territory.
- Maintain operability during changes to the electrical network configuration. In the Table of Compliance, describe processes/steps required to reconfigure your communication network if the electric network changes (load transfers, abnormal feeds, etc).

3.4 System Configuration

3.4.1 General Requirements

An open-system architecture using industry standard products is required. The system shall include the following major components/requirements

- Fit into **Owen Electric Cooperative's** IT infrastructure and deliver multiple applications across this communications infrastructure in a cost-effective fashion
- Adopt low-cost standard off-the-shelf communication equipment and technology for bulk communication, delivering end-to-end communications reliably using readily available and cost-effective back-haul technologies.
- Controlled from an AMR Server that will easily integrate to other utility automation applications (CIS, OMS, etc) and provides access to users, both within the **Owen Electric Cooperative's** facilities and from remote locations with appropriate security access.
- System shall support remote access and diagnostics.

- Fit into **Owen Electric Cooperative**'s IT environment and provide data to desktop tools such as Microsoft Excel and Access, SQL servers, etc
- Provide Time Of Use functionality which can be reconfigured from the AMR Server should the Energy Bill require such a change with little or no additional hardware or site work.

3.4.2 Architecture Requirements

The system architecture shall have the following characteristics:

- Vendor shall recommend and/or supply computer hardware and bulk communication hardware from standard and widely available vendors.
- The software must be scalable to accommodate current operating conditions and future growth on scalable computer platforms and communication links.
- The system must be expandable, allowing resources, such as additional stations, communication lines, field units, peripherals, network bridges, application processors, additional printers, additional computer memory, additional disk storage, to be added without the need for software change.
- In order to reduce labor hours required to operate and maintain system and to train personnel vendor shall demonstrate that the delivered system is a standard release compliant with widely available present and future operating systems. System should be maintained commercially across a broad and large base of users. The system shall have minimum set of customized features. However, it shall include a maximum of configurable parameters and features.
- The system must be based on an open architecture documented with published data dictionary and application programming interfaces.
- The system must adhere to relevant industry standards for operating systems, user interface, network communications and an integrated language for information management.
- The system must support user access of real-time data through a browser program such as Microsoft Internet Explorer. Local access using a native client program installed in the Windows environment shall also be supported.
- The system must support controlled remote access by approved third parties such as consultants and business partners, and Electric Cooperative employees from remote locations (with appropriate security).
- All software must be written in standard ANSI high-level languages.

3.5 Performance Requirements

3.5.1 Communications Availability (on demand)

The communications path between the remote controllers and the end-use field equipment shall be warranted to achieve a communications success rate of at least 97.5% for two-way communications as measured during any one-hour period over the two years after System Acceptance. A successful communication during a one-hour period may require more than one attempt for retrieval. The Vendor shall furnish the

necessary equipment and technical labor resources to bring the communications success rates into compliance at no cost to Owen Electric Cooperative.

3.5.2 Communications Availability (monthly billing)

System is intended to generate data to accurately bill 100% of customers each month with minimal manual meter readings and zero estimated bills. To achieve this, AMR system must have communications performance that provides 99.75% of required monthly meter readings on the day each billing cycle is due.

3.5.3 Meter and End-Point Device Failure rate

Each type of end-use field equipment shall have an in-service failure rate of at most 1 % per year. This requirement shall hold for the first five years from the date of the original invoice. The following formula shall be used to compute the failure rate:

$$\text{Failure Rate (\%)} = \frac{\text{Number of Units Failed to Date}}{\text{Unit-Years of Operation}}$$

Where:

$$\text{Unit-Years of operation} = 1/12 \sum_{=1}^{n} \text{units, i}$$

n = Number of months since the first units were installed

Units, I = Number of units installed at the end of month, i.

n = Number of months since the first units were installed; Units, i, = Number of units installed at the end of month, i.

3.6 Operating Life

The full system shall be designed to have a useful life of at least 15 years after system acceptance test.

3.7 Design Standards

Except where otherwise specified in this document, the design, construction, and performance of all equipment and software furnished shall conform, as applicable, to the latest standards listed below:

Institute of Electrical and Electronic Engineers (IEEE) standards,

National Electrical Manufacturers Association (NEMA) standards,

American National Standards Institute, Inc. (ANSI) standards,

Electrical Industry Association (EIA) standards,

International Standards Organization (ISO) standards.

In case of conflict between the requirements of any of these authorities, the conflict shall be referred to the **Owen Electric Cooperative** for resolution.

4. AMR Server Computers

4.1 Overview

The computer system shall manage all application and database functions and interfaces to appropriate external (e.g., CIS, Outage) applications. The AMR Server shall be delivered complete with all appropriate licenses and application software. **Owen Electric Cooperative** may elect to install the AMR Server on its existing servers. Thus, the vendor shall list the requirements, hardware and software, for an operating platform if provided by the utility.

4.2 Hardware

Vendor shall also provide quotation for the servers, preloaded and configured. Vendor hardware platform shall meet the following minimum specifications:

- Ability to communicate over **Owen Electric Cooperative's** existing local area networks allowing users to access AMR information from their existing workstations
- Vendor software must operate on current state-of-the-industry processors. Vendor supplied processor must have speeds and memory appropriate to run applications and meter volumes as described in this specification. Rack mounted equipment is preferred.
- Hard drives with capacities to manage specified applications and support 18 months of on-line data with up to 31 days of on-screen data.
- Vendor supplied platform must include appropriate Monitor, Keyboard and Mouse/Pointing device
- Modem/communication equipment and capability to interface between AMR Server and WAN control locations (e.g., substation injection, radio towers, etc.)
- UPS/Battery Back-up
- Fully supported LAN-based operating system
- Non-proprietary database engine (e.g., Oracle, SQL Server, etc)
- Any other third party licenses required (please list)
- All cabling for above

4.3 Software

4.3.1 The AMR Server shall communicate to the WAN Control points (Section 6) via any of a number of Bulk Communications options (Section 5). The AMR Server shall continuously monitor WAN and LAN performance and shall simultaneously monitor the status of all devices across the electrical distribution system to insure that the

communication system is functioning properly. Vendors are invited to assist **Owen Electric Cooperative** with the design and implementation of bulk communications system.

4.3.2 At a minimum, AMR Server software will manage the following functions:

- Report on overall communications network health
- Scheduled (batch) meter reads
- Perform service connect/disconnect
- Provide Time-of-Use functionality and schedules
- Provide group addresses and commands for load control, outage evaluation, etc
- Identify outage locations and service restoration
- MultiSpeak compliant interface to the utility's billing system. (MultiSpeak version 3.0 based on "web services" is preferred.)
- Load Profile data collection and reports
- On-demand data collection and display
- Provide error handling and notification for system operator
- Creating user defined reports (may be done with internal or with external applications).

4.3.3 Software shall have proven interfaces to 3rd party software applications in use at **Owen Electric Cooperative**. Response shall include list of references for each interface application and a brief description of the method for the interface (e.g., Multi-Speak 2.0, flat file, etc.). These interfaces will remain operational through future software updates of the listed companies and software applications. The specific companies and applications are listed below:

- SEDC UPN – Billing/Accounting/CIS
- Milsoft Windmil – Engineering and Analysis
- MilSoft DisSPatch – Outage Management System

4.3.4 The system must be capable of supporting multiple "enterprises" or utilities[2] such that end-point data can be collected and transported across the same communications system, but remain secure and accessible only to approved users.

4.3.5 Software releases shall be backward compatible with previous performance and functionality.

4.3.6 The system should be able to determine the phase of service for residential meters.

4.3.7 Please provide a list of all the 3rd party software programs that you interface.

[2] Cooperative departments such Engineering and Operations, water and gas utilities leveraging this AMR system or municipalities within a cooperative service area are examples of these types of "enterprises."

4.3.8 The following applications are desired as possible future applications for **Owen Electric Cooperative**. Vendor should state availability or plans for these applications and whether the applications will be provided through a 3rd party or directly by vendor:

- Load Control for water heaters, air conditioners, etc. Load Control functionality including schemes for group addressing, cold-load pick-up, etc should be defined in the Table of Compliance.
- Data retrieval and control from equipment such as Regulators, Capacitor, Reclosers, Fault Indicators, Power Analyzers, etc.
- Graphical presentation software (e.g., ESRI/equivalent) for outage presentation
- Time synchronized hourly or momentary customer load data or demand data.
- Improved member services via software or web-based applications
- Prepayment metering services
- Ability to measure outage data, ideally on off times for outages and outage times for "momentarys", so that **Owen Electric Cooperative's** OMS system can accurately calculate SAIDI, CAIDI, CAIFI, SAIFI, MAIFI, etc. for the system or any part of the system.

4.3.9 The system should be provided with real time clock functionality such that the time or data will not have to be re-initialized after momentary or prolonged power outage, and so that the communications network and all associated end-points are time synchronized.

4.3.10 All Data gathered by the system and control actions taken by the system shall be logged to disk for historical use. It shall be possible to setup alarm notification profiles for data points on the system along with alarm notification groups; these parameters and groups must be remotely reconfigurable. This feature will be used by the utility to notify maintenance personnel of important changes on the system, such as abnormal voltage levels, communications failures, etc.

5. Bulk Communications & Back-Haul

5.1 Bulk communications options

The system shall support, at a minimum, any and all of the following bulk communications media. Mixing any of these on a system shall be transparent and straightforward:

- Leased telephone line
- Licensed 220 MHz data radio
- Licensed 900 MHz data radio
- Unlicensed 900 MHz data radio (spread spectrum)
- Satellite (VSAT)
- Dial-up telephone

- Microwave
- Fiber
- Any available TCP/IP communications link

5.2 Communication Support

It is preferred that the vendor have in-house engineering services available to assist **Owen Electric Cooperative** in selecting and configuring bulk communications.

6. WAN & LAN Communications

6.1 WAN and LAN communication networks must self-heal if the primary communication "path" becomes unavailable. For PLC networks, this would include alternate distribution network configurations due to outages, growth, load balancing, etc. For wireless networks this could include lost collectors, etc.

6.2 WAN and LAN communication networks must either operate on or be capable of supporting an IP-addressable environment.

6.3 WAN and LAN networks must support all bulk communication options detailed in this specification.

6.4 Future generations of Vendor's equipment introduced in the next 15 years must be backward compatible to AMR meters and software purchased under this contract.

6.5 LAN communications must support the future inclusion of additional applications such as water and gas meter reading, load management, or smart thermostats should they be introduced at **Owen Electric Cooperative**.

6.6 LAN communications must be capable of supporting multiple "enterprises" or utilities[3] such that AMR data can be collected and transported across the same communications system, but remain secure and accessible only to approved users.

6.7 All WAN and LAN equipment offered should be appropriately rated for **Owen Electric Cooperative**'s environmental conditions or includes appropriate outdoor enclosures.

6.8 Owen Electric Cooperative has an extensive amount of underground cross-link polyethylene cable that is being replaced. Portions of this cable have failed in the past. If Vendor's communications technology is PLC based, it must be able to be used on this cable without loss of signal and without excessive costs of repeaters. Vendor shall state method for ensuring signal availability and/or limiting the use of repeater's to a fixed quantity.

[3] Cooperative departments such Engineering and Operations, water and gas utilities leveraging this AMR system or municipalities within a cooperative service area are examples of these types of "enterprises."

7. Residential AMR Meters

7.1 AMR Functionality

Owen Electric Cooperative may choose to use a mix of new, under-glass, solid-state meters and retrofitted electromechanical meters for residential applications. For electromechanical meters, AMR Vendor should clearly list which meters are supported and which of the following specification clauses are met. This information must be clearly stated in the Table of Compliance. Exceptions should be clearly noted in rows g and h for the Communication Modules in the "Meters" tab of the Excel price sheets.

Owen Electric Cooperative intends to purchase complete solid-state AMR meters directly from AMR vendor. **Owen Electric Cooperative** will specify the meter brands and quantities based upon recommendation of available options from AMR vendor selected for the contract. All solid-state residential AMR meters must list their ability to support the following AMR functionality. Compliance for each meter offered (e.g., Itron, L+G, Sensus, GE and Elster) must be clearly stated in the Table of Compliance for each paragraph of the specification. Exceptions should also be clearly noted in rows g and h on the "Meters" tab of the Excel price sheets.

7.1.1 KWh consumption and daily kWh and kW peak demand readings

7.1.2 Load profile storage for 15 days worth of 24 hourly profiles

7.1.3 Local display of consumption.

7.1.4 Meters should automatically detect availability and value of voltage at the meter to within +/- 1%.

7.1.5 Residential meter sites must allow for the integration of a local device or module that supports remote disconnect and reconnect.

7.1.6 Vendors must support expansion to add gas and water meter reading through hardwired or wireless LAN interface

7.1.7 Meters must support later addition of load control modules for switching air conditioners, water heaters, etc.

7.1.8 Meters must stay in time sync with each other.

7.1.9 Vendors should state their ability to offer meters capable of adding a current limiting device.

7.1.10 Meters must provide a count of momentary sags and swells. Vendor should provide specifications of event capture including time stamp, duration, magnitude, programmability, number of events and availability of history.

7.1.11 Vendors must provide details of meter's functions and specifications for tamper detection.

7.1.12 Vendors must describe process required to modify data that may be retrieved from meters. For example, if voltage quantities or kWh profile data is desired from a meter to evaluate load characteristics for a one month period, what steps are required to retrieve this new/temporary data?

7.1.13 Meters (and AMR system) must support outage detection and restoration. Vendor should provide details and specifications determining what events are considered as outages, how events are managed and what history of data is available.

7.1.14 Meters must be able to be associated with a specific "enterprises" or utility such that AMR data can be channeled to the appropriate AMR Server and user group.

7.1.15 Meters (and AMR system) must support net-metering functionality for select residential locations. Functionality must be provided with revenue accurate measurement.

7.1.16 Vendors offering meters and system functionality capable of prepaid metering are preferred.

7.2 Meter Devices

Owen Electric Cooperative plans to use a mix of new, under-glass solid-state meters and retrofitted electromechanical meters for residential applications. **Owen Electric Cooperative** will purchase complete solid-state AMR meters directly from AMR vendor. **Owen Electric Cooperative** will specify the meter brands and quantities based upon recommendation of available options from AMR vendor selected for the contract.

7.2.1 Vendor should list supplier and product names of all meters that they interface and recommend.

7.2.2 Glass meter covers are required.

7.2.3 Vendor should provide a list of suppliers/meters that will be interfaced by the end of Q3 in calendar year 2006.

7.2.4 Vendor should provide meter accuracy curves and specifications for solid state meters that they interface.

7.2.5 Forms 2S, 3S and 4S must be available.

7.2.6 AMR Communication module must be "under glass" of AMR Meter.

7.2.7 Vendor must clearly state which functions (e.g., PQ, voltage, etc) are supported by each of the meters offered including the functionality available from electromechanical meters retrofitted with AMR modules.

8. Commercial and Industrial (C/I) AMR Meters

8.1 AMR Functionality

8.1.1 All C/I meters must support the minimum functionality with two-way communication:

8.1.2 KWh and kVARh consumption and daily kWh and kW/kVAR peak demand and PF readings

8.1.3 Load profile storage for 15, 30 and 60 minute intervals

8.1.4 Local display of consumption

8.1.5 Meters must have output relays to support switching or alarming to customer

8.1.6 Meters must provide a count of momentary sags and swells by phase. Vendor should provide specifications of event capture including time/date, duration, magnitude, programmability, number of events and availability of history

8.1.7 Vendors should provide details of meter's functions and specifications for tamper detection

8.1.8 Vendors must describe process required to modify data retrieved from meters. For example, if voltage quantities or kWh profile data is desired from a meter to evaluate load characteristics for a one month period, what steps are required to retrieve this new/temporary data?

8.1.9 Meters (and AMR system) must support outage detection and restoration. Vendor should provide details and specifications determining what events are considered as outages, how events are managed and what history of data is available

8.2 Meter Devices

Owen Electric Cooperative plans to use solid-state meters for C/I applications. **Owen Electric Cooperative** will purchase complete AMR meters from AMR vendor or upgrade compatible/supported meters currently in inventory. **Owen Electric Cooperative** will specify the meter brands and quantities based upon recommendation of available options from AMR vendor selected for the contract.

8.2.1 Vendor should list supplier and product names of all meters that they interface and recommend.

8.2.2 Vendor should provide a list of suppliers/meters that will be interfaced by the end of Q3 in calendar year 2006.

8.2.3 Vendor must clearly state which functions (e.g., PQ, voltage, etc) are supported by each of the meters offered

8.2.4 AMR Communication module must be "under glass" of AMR Meter.

8.2.5 Vendor should provide meter accuracy curves and specifications for solid state meters that they interface.

9. Distribution Automation Applications

Vendor should describe how their system could be used for distribution automation and list available applications and devices and specifications supporting distribution automation functions and outline how additional communications capacity will be delivered to Electric Cooperative should Distribution Automation applications be deployed in the future. These functions are not required for initial system delivered as a part of the initial system delivery but will be considered for system expansion.

10. System Administration and Maintenance

10.1 Security and User Management

10.1.1 General

A user-name and password process must be available to enable access control for all users. The meter system shall support the concept of Areas of Responsibility and Users. Users can be assigned to Areas of Responsibility (AOR). Data, control functions, and interfaces can be assigned to areas. Users are then limited on what functions they can access in each area, based upon access tables and are given only read, write, or control functions as defined in the tables.

10.1.2 Users

As a default, the system shall support the following User Authorizations:

- Operator - Operators shall be permitted to perform all functions necessary for accessing/viewing data. These functions are typical for Customer Service Reps, Engineers, Billing and Marketing personnel.
- Analyst - In addition to the functions of an Operator, the Analyst shall be permitted to perform all database and report maintenance functions
- Administrator - The Administrator shall have access to all functions of the master system and "super user" access to the operating system. In particular, the Administrator manages the user privileges and sets the security policy for the system.

11. Documentation

The following documentation shall be provided in hard copy as well as electronically. The on-line help system shall include all documentation.

11.1 User's Guide

This document introduces Vendor's AMR system to the first-time user/developer and others at the **Owen Electric Cooperative** that interact with the AMR system. It should provide background information about AMR system and provide guided instructions for the first time user.

11.2 Reference Manual

This manual shall describe all features of the system, including communications management, troubleshooting and configuration. In particular, all options and 3rd-party interfaces available through the AMR Server shall be described in details. Combined with training during the installation process, this manual enables the operator and/or programmer to manage the basic system functionality.

12. Quality Assurance, Testing and System Acceptance

12.1 Quality Assurance

Owen Electric Cooperative's intent is to acquire a standardized, best-of-class system without customization. Therefore it is essential that the vendor be certified as ISO 9001 compliant organization.

All business processes and procedures used for product and project development and implementation must be clearly documented and administered.

Vendor shall demonstrate that he has implemented a Quality Management System (QMS) which provides the foundation used by product and project development and implementation activities to ensure basic quality requirements are met.

The following procedure shall be documented and available to **Owen Electric Cooperative** (upon request):

- Project Management Procedure
- Software Development Procedure
- Software and Document Configuration Management Procedure
- Internal Audits and Corrective and Preventative Action Procedures
- Project Level Procedures and Instructions
- Records, forms, and reports

12.2 Testing /System Acceptance

Testing will be done for the purpose of proving the ability of the system to run on-line and provide the performance and functionality as described in the standard documentation. Before **Owen Electric Cooperative** begins testing, it is understood that vendor shall have thoroughly tested all applications and hardware within reasonable expectations. For problems uncovered during testing, **Owen Electric Cooperative** reserves the right to retest any areas where critical problems arise.

A mutually acceptable acceptance test plan must be provided as part of the contracting process.

12.2.1 System Installation/End-to-End Communications Continuity

A complete operational portion of the System shall be delivered after the Vendor's factory-based standard functionality testing has been successfully completed. The operational portion shall be comprised of the AMR server and PLC injection/radio equipment for at least one WAN installation and an adequate number of meters (70 - 100 single-phase and polyphase units) to verify end-to-end communications continuity.

The AMR Server and associated equipment for at least one substation/radio tower furnished by Vendor shall be installed by **Owen Electric Cooperative** under technical direction of Vendor. **Owen Electric Cooperative** will place the equipment on site, interconnect Vendor furnished equipment using Vendor supplied cables, and install cables external to the control system including wiring to communications equipment and the electrical power supply.

Vendor shall be responsible for the startup of the AMR Server after its installation. Vendor shall:

- Inspect the system for proper installation.

- Power up the system and run diagnostics to verify the proper operation of all system hardware.
- In cooperation with **Owen Electric Cooperative**, activate communications with 70 – 100 meters, and other systems that interface with the AMR Server system.
- Load the software and boot the system.

12.2.2 Commissioning/System Acceptance Test (SAT)

Commissioning/Site Acceptance is intended to occur immediately after System Installation and verification of end-to-end communications viability. The SAT shall include delivery and installation of all remaining (approximately 2,000 – 2,500) meters for a selected substation or radio tower. **Owen Electric Cooperative** will arrange for installation of meters and inform Vendor of schedule and methodology for this process.

During contract discussions, **Owen Electric Cooperative** will provide selected vendor with details regarding:

- Form, voltage and quantity of required meters
- Substation or radio tower characteristics
- Generic SAT test plan

During contract discussions/negotiations, delivery schedules and test plan details will be mutually agreed to by Vendor and **Owen Electric Cooperative.** All functional and performance related items of this technical specification are subject to verification during the SAT. The SAT is expected to last approximately 30 days. After the successful completion of SAT **Owen Electric Cooperative** will authorize shipment of remaining system components according to a schedule agreed to during contract negotiations.

The customer's completion of acceptance testing does not remove vendor from the responsibility of correcting a problem discovered after testing until warranty expires on all contracted meters. Unstructured custom testing by **Owen Electric Cooperative** shall also be considered as part of this test.

13. Training/Support

13.1 General Requirements

The User-Interface of the selected system is expected to conform to MS-Windows standards allowing **Owen Electric Cooperative** personnel to intuitively operate many of the system's functions. The best-in-class system is also expected to be standardized with thorough and comprehensive manuals/guides.

General requirements for required training are specified below:

- Training courses shall be conducted by personnel who speak understandable English and who are experienced in instruction.
- All necessary training materials shall be provided by Vendor. Each trainee shall receive individual copies of the technical manuals and pertinent documents;

these shall be sent to the trainee at least one month before the scheduled commencement of the particular training course.

13.2 Training Plan and Schedule

A training plan that meets the needs of **Owen Electric Cooperative** shall be included with the Proposal. Training class descriptions shall be included, and **Owen Electric Cooperative** reserves the right to defer the selection of any or all classes to appropriate times during project implementation. The plan shall identify standard classes, which are available on a periodic basis, and classes (if any) prepared specifically for **Owen Electric Cooperative**. The training schedule shall be compatible with the project schedule, and shall be designed to prepare **Owen Electric Cooperative** to assume their responsibilities in a timely fashion. The schedule shall be arranged in such a way that the same person will be able to attend all classes offered.

Training Plan shall include a list of all proposed classes. For each class the following information shall be included:

- Description of the contents of the class.
- Duration of the class.
- Class prerequisites.
- The recommended site of training.
- If the class is not conducted by Vendor, an identification of the organization (e.g., subcontractor or equipment supplier) that will conduct it.

13.3 Operator Training

During the installation/commissioning of the system at site, the operators will be introduced to the system and trained in its use. A suitable training course shall be proposed or material shall be made available for **Owen Electric Cooperative** to use employees to train some operators. Operators training shall include:

System Overview:

- System configuration
- Functional overview
- Overview of system capabilities and performance.

General Operating Procedures:

- Display capabilities
- Display call up
- User procedures such as log on and user access restrictions, error messages, etc.
- Interfaces to 3rd party software applications

13.4 System Administration Training

System Administration training shall familiarize **Owen Electric Cooperative**'s System Administrator with all system software, its functionality and operation. The training shall include:

13.4.1 Software Documentation

Vendor will orient **Owen Electric Cooperative** with all system software documentation.

13.4.2 Hands-on Training

During Commissioning/Installation, practical experience under supervision of Vendor's software personnel in those aspects of software operation best learned by example.

13.5 System Level Hardware Training

Selected system is to utilize standard hardware suitable for MS-Windows operating environment. Therefore, there should be no requirement for System Level Hardware Training.

13.6 Support services

In the Table of Compliance, state the hours of operation for your support service and a description of services offered and an overview of the support staff including number of persons on the team.

14. Implementation Roles & Requirements

14.1 Overview

14.2 Project Management

14.2.1 Project Organization and Procedures

- **Owen Electric Cooperative** Project Manager - All project contacts with **Owen Electric Cooperative** shall be through the person designated as the Project Manager. Review and approval of documents, scheduling of project meetings, and participation in training and testing, and all other project activities shall be coordinated through **Owen Electric Cooperative's** Project Manager.
- Vendor Project Manager - Vendor shall submit resume for proposed Project Manager to **Owen Electric Cooperative** for approval. This designate should an experienced Project Manager who shall be the single point of contact for coordination of all the project work and communications between Vendor and **Owen Electric Cooperative**. This Project Manager shall not be changed or substituted by another person without express written consent by **Owen Electric Cooperative**. The project manager may be changed through mutual agreement between vendor and **Owen Electric Cooperative**.
- Vendor Correspondence - Vendor correspondence shall be addressed to:

  Owen Electric Cooperative
  8205 HWY 127 N

PO BOX 400
Owenton, Kentucky 40359

- Invoicing Procedures - Invoices submitted to **Owen Electric Cooperative** shall bear the purchase order number and shall be mailed to the project manager. **Owen Electric Cooperative** will review the invoices for accuracy and verify that the payment conditions have been met. Invoices which cannot be verified will be returned to Vendor for corrections or processed for partial payment. If partial payment is approved, the invoice will be paid accordingly within thirty (30) calendar days. No equipment shall be shipped without written approval by **Owen Electric Cooperative**. On receipt of notice of intent to ship, **Owen Electric Cooperative** will verify and process the request. Rejected notices of intent will be returned to Vendor along with the reason for rejection.

14.2.2 Project Schedule

A tentative project schedule shall be included in the proposal. A detailed project schedule shall be submitted for approval by **Owen Electric Cooperative** within one month of the signing of the Contract. The duration of project activities and scheduling of deliverables in the detailed schedule shall be the same as in the tentative schedule included in the proposal, except as otherwise agreed during Contract negotiations.

Owen Electric Cooperative activities which impact the schedule, such as review and approval of documents, preparation of database, etc., shall be included in the schedule.

15. Appendices

15.1 General

Appendix 15.2, Substation, Feeder and Tower details, is a table that describes **Owen Electric Cooperative's** 69 KV and 138 KV substations including data regarding transformers and feeders. This file also contains tower details for wireless communication needs. If a PLC signal injection method is recommended that reduces the functionality of the overall system or of a portion of the meters (e.g., limitations on phase detection, throughput, etc.), limitations must be clearly noted on the price forms.

Appendix 15.3 defines **Owen Electric Cooperative's** is a table that defines the high level project delivery/schedule options and meter forms/quantities that are required. All solid-state, under-glass AMR meters are to be quoted as a complete unit for each meter manufacturer (e.g., L+G, Itron, GE, Sensus and Elster). Unless otherwise noted, **Owen Electric Cooperative** will assume that it can "mix and match" AMR meters and communication modules using the prices quoted. **Owen Electric Cooperative** understands that it is responsible for retrofitting communication modules to existing electromechanical meters.

Appendix 15.4 is the Table of Contents for the required pricing forms. The actual price form that **must** be used by the Vendor is included in the Excel document that

accompanies this RFP. Fields for data entry have comments associated with them to guide you.

Appendix 15.5 Substation Schematics is a .PDF file that contains schematics for all of the **Owen Electric Cooperative** substations. This file may assist you in determining equipment required for power-line-carrier injection.

Owen Electric Cooperative

Appendix 15.2 Substation Summary Sheet (1)

AMR Substation Details

Sub #	Sub Name	Primary (KV)	Secondary (KV)	# of Transformer	% Impedence	Circuits	MVA BASE	Total Meters	Comments
1	Banklick	69.0	7.2	3	7.2,7.22,7.33%	5	14.0	2,697	3 - 4666 KVA transformers
2	Bavarian	138.0	7.2	1	8.66%	2	20.0	371	
3	Big Bone	69.0	7.2	3	7.2,6.94,6.99%	3	11.0	1,497	3 - 4666KVA
4	Boone	69.0	7.2	1	8.00%	4	15/20/25	3,134	New xfmr fall 2005
5	Bristow	69.0	7.2	2	8.35%	3	11.2	3,083	2nd xfmr spring 2006
6	Bromley	69.0	7.2	1	8.48%	3	11.2	1,721	
7	Bullittsville	69.0	7.2	1	8.10%	4	14.0	2,347	
8	Carson	69.0	7.2	1	8.25%	3	11.2	1,680	
9	Downing	69.0	7.2	2	8.10%	2	14.0	1,107	2nd xfmr spring 2006
10	Duro	69.0	7.2	2	8.36, 8.2%	5	11.2, 14	1,515	
11	Gallatin	138.0	7.2	2	6.90%	2	12.0	813	50MVA xfmr to Gallatin Steel
12	Grantslick	69.0	7.2, 14.4	2	8.34, 8.01%	6	14,14	5,013	
13	Griffin	69.0	7.2	1	8.23%	4	11.2	1,660	
14	Hebron	138.0	7.2	1	8.95%	4	20.0	1,768	
15	Keith	69.0	7.2	3	6.72, 6.78, 6.82%	4	10.0	2,291	3 3333KVA xfmrs
16	Munk	69.0	7.2	1	8.15%	7	11.2	3,508	
17	Noel	69.0	7.2	1	8.10%	3	11.2	1,382	
18	Penn	69.0	7.2	3	7.14, 7.22, 7.22%	4	10.0	2,656	3 3333KVA xfmrs
19	Richardson	69.0	7.2	2	7.81 ,8.05%	4	14, 14	3,329	
20	WMSmith	69.0	7.2	2	8.087, 8.31%	4	11.2, 14	460	
21	WRSmoot	69.0	7.2	2	8.15, 8.27%	5	14, 14	3,649	
22	Turkeyfoot	69.0	7.2	3	6.81, 6.97, 7.04%	6	14.0	1,651	3 4666KVA xfmrs
23	Williamstown	69.0	7.2	3	7.03, 7.03, 7.14%	6	14.0	3,941	3 4666KVA xfmrs
							Total	**51,273**	

Distribution Line Details

Total Miles	Overhead	Underground
4836	4131	705

Approximate meter quantity

1-phase	3-phase	Fm 3S/4S
50,345	797	131

Owen Electric Cooperative

Appendix 15.2 Substation Summary Sheet (2)

AMR Substation Details (page 2) (Includes locations of towers and offices)

Sub #	Sub Name	Latitude (degrees)	Longitude (degrees)	Comments
1	Banklick	38.91344508	-84.56355600	
2	Bavarian	38.86467766	-84.65192377	
3	Big Bone	38.88584150	-84.73728835	
4	Boone	38.97469886	-84.71891063	
5	Bristow	38.94846609	-84.59282010	
6	Bromley	38.62071114	-84.84908052	
7	Bullittsville	39.06487791	-84.73539000	
8	Carson	38.68442590	-85.00470351	
9	Downing	39.08056080	-84.69322995	
10	Duro	38.92036823	-84.60669802	
11	Gallatin	38.76002526	-85.00100292	
12	Grantslick	38.85614856	-84.38739685	
13	Griffin	38.73059089	-84.38466974	
14	Hebron	39.09078592	-84.72963186	
15	Keith	38.50097952	-84.78948999	
16	Munk	38.78476431	-84.71498752	
17	Oakley Noel	38.72425003	-84.68949510	
18	Penn	38.39993923	-84.65045426	
19	Richardson	38.97163553	-84.54866419	
20	WMSmith	39.06031025	-84.62614781	
21	WRSmoot	38.98911276	-84.69814303	
22	Turkeyfoot	38.97285149	-84.58997934	
23	Williamstown	38.64511074	-84.59100188	

Office Name	Height of Tower	Latitude (decimal)	Longitude (decimal)	Altitude (m)
Owen County	120	38.63617753	-84.85224431	274
Tower Name				
Renaker	300	38.44589233	-84.40883560	285
Vevay	200	38.85201816	-84.99791788	285
Walton S.C.	70	38.85433802	-84.62767295	266
Folsom (Comm Tower)	300	38.70021452	-84.71941661	270
Stanley Parker Switchyard (Comm Tower)	120	38.89573349	-84.57960570	291

Owen Electric Cooperative

Project Schedule & Meter Requirements

Projected Delivery Schedules

1	Planned contract signature on or before:	**June 30, 2006**

Delivery of master station, first substation and associated meters.

2	Owen Electric Cooperative's desired completion date for Commissioning and Acceptance testing for initial system based on a single substation or tower:	**October 31, 2006**
3	**Option 1 - Delivery of remaining materials in 18 monthly consignments of equal amounts starting:**	**December 1, 2006**
4	**Option 2 - Delivery of remaining materials in 24 monthly consignments of equal amounts starting:**	**December 1, 2006**
5	**Option 3 - Delivery of remaining materials in 36 monthly consignments of equal amounts starting:**	**December 1, 2006**

Meter Requirements

(Vendor should base meter prices on the following list. These quantities are approximate and may be changed +/- 10% each)

	Meter Form/Type	Voltage	Quantity
6	Form 2S	240	50,345
7	Form 3S/4S	240	131
9	Form 5S or 5A Estimate only	120	797
10	Form 8S/9S or 8A/9A Estimate only	120/240/277	
15	Form 15S/16S	120/240	
16	Form 16S	240	
21	**Disconnect Collars**		500

Owen Electric Cooperative

Table of Contents: Pricing

Section	Contents	Printed Page #	Excel Tab Name
I	Master Station Software and Hardware	1	Master Station
II	Substation Injection Equipment	3	PLC_Injection
III	Line Conditioning Equipment	26	PLC_Line Conditioning
IV	Wireless WAN/LAN Equipment	27	Wireless_WAN_LAN
V	Retrofit Existing Residential Meters	29	Meters_Residential Retrofit
VI	Solid State Residential AMR Meters	34	Meters_Residential New
VII	Retrofit Existing Polyphase Meters	36	Meters_Polyphase Retrofit
VIII	Solid State Polyphase AMR Meters	38	Meters_Polyphase New
IX	Project Management, Support & Training	40	Training & Suppport
X	Options, Spare Parts and Expansion	41	Spares & Expansion

Note: All price sheets should completed by entering data in appropriate yellow highlighted fields. No data should be entered into a field that does not have yellow highlights.

AMR Client Sites Visited

UTILITY NAME:	STATE:	SYSTEM:	% COMPLETED:	TOTAL METERS:
Harrison REMC	IN	DCSI/Cannon Pilot	Selected Cannon	21,000
Nolin RECC	KY	Hunt	90%	29,000
Tri-County Electric Membership	TN	DCSI	90%	49,000
Appalachian Electric Coop	TN	Tantalus	5%	41,000
Bluegrass Energy	KY	Hunt	60%	50,000
Jackson Energy	KY	DCSI	80%	50,000
South Plains Electric Coop	TX	Cannon	85%	41,000
French Broad EMC	NC	Tantalus	15%	34,000

Vendor Evaluation Matrix / Major Categories

Application / Function	Weight
Basic AMR:	
Scheduled data acquisition and meter functionality	10
On-demand data acquisition	7
Software & Billing System Interfaces:	10
Engineering & Operations Applications:	9
Vendor's Potential for Future Member Service Offerings:	6
Systems/Communications Health Management:	9
Vendor:	7
Vendor Support Services:	8

Vendor Evaluation Matrix (p. 1)

Application/Function	Weight	Comments
Basic AMR:		
Scheduled data acquisition and meter functionality	**10**	
Data acquistion from ~100% of each cycle day batch	10	
etc.	10	
Virtual disconnect / Tamper detection	7	
1/4-hour profiles for C/I	8	
Time of use metering	9	
Data retention in field (meter or substation) if backhaul is lost.	5	
Hourly Profiles for residential	9	
Net metering	2	
On-demand data acquisition	**7**	
On-demand meter status/health	10	
Bi-directional communication support remote formatting	10	
On-demand meter data access (Residential)	8	
On-demand meter data access (C/I)	8	
Remote connect/disconnect	10	
Interruptible load verification (2 large C/I)	3	
Software & Billing System Interfaces:	**10**	
Billing data transfer to/from UPN (Master file down - Data up)	10	
month history for selectable daily kWh presentation up to 31 days	10	
End-user GUI and interfaces to allow browser access	10	
Meter malfunction notification	8	
Disconnect/Reconnect (via UPN)	5	

Vendor Evaluation Matrix (p. 2)

Application/Function	Weight	Comments
Engineering & Operations Applications:	**9**	
Interface to Milsoft OMS and Engineering Analysis	10	
Major Outage restoration support	10	
Engineering Units Data , e.g., volts,watts,amps	9	
Major Outage detection support	9	
Power quality evaluation (blink counts & time stamps)	8	
Distribution Automation (operate down-line devices, such as Capacitor banks)	5	
Phase determination	7	
Individual outage support	8	
Out of tolerance - volts, neutral current, kW, etc	7	
Graphical presentation of AMR device location	5	
Vendor's Potential for Future Member Service Offerings:	**6**	
Load control (Water Heater and AC)	8	
Web access to system data for customers	5	
Customer initiated services: service disconnect, new service	7	
Ability to read other meter types (gas & water)	8	
Smart house - e.g., Thermostat I/F	4	
Systems/Communications Health Management:	**9**	
Time synchronization of meters	10	
Ease of master station maintenance, restoration	10	
Communications failure analysis	9	
Simplicity of communication network (less parts)	9	
Network self-healing/lost meter recovery	9	
Signal strength analysis and improvement	8	

Vendor Evaluation Matrix (p. 3)

Application/Function	Weight	Comments
Vendor:	**7**	
Stability of company	10	
Maturity of the system/product	10	
Responsiveness to Coops (vs. IOUs)	8	
Delivery experience of AMR systems similar to Owen needs	8	
Local distributor/agent	5	
Image of company	4	
Other nearby coops with vendor's system	2	
Vendor Support Services:	**8**	
Software customization/adaptation/interface	10	
Remote service and support	9	
Product availability (completed designs vs futures)	9	
Product lead times (can they deliver on time?)	10	
Training	8	
System troubleshooting tools	7	
Hosting options	1	

Vendor Ratings for each Category

Vendor:	Cannon	DCSI	Tantalus	Hunt
Scheduled data acquisition and meter functionality				
Score	4855	4644	4471	3140
Rank	1	2	3	4
Percentage	100%	96%	92%	65%
On-demand data acquisition				
Score	2744	2658	2627	1327
Rank	1	2	3	4
Percentage	100%	97%	96%	48%
Software & Billing System Interfaces:				
Score	3162	2639	3168	3790
Rank	3	4	2	1
Percentage	83%	70%	84%	100%
Engineering & Operations Applications:				
Score	5123	4804	4467	3645
Rank	1	2	3	4
Percentage	100%	94%	87%	71%
Vendor's Potential for Future Member Service Offerings:				
Score	1283	1055	932	1320
Rank	2	3	4	1
Percentage	97%	80%	71%	100%
Systems/Communications Health Management:				
Score	3261	3283	3775	3186
Rank	3	2	1	4
Percentage	86%	87%	100%	84%
Vendor				
Score	2531	2560	1347	2853
Rank	3	2	4	1
Percentage	89%	90%	47%	100%
Vendor Support Services				
Score	3353	2500	2847	3424
Rank	2	4	3	1
Percentage	98%	73%	83%	100%

Overall Vendor Ratings

Vendor:	Cannon	DCSI	Tantalus	Hunt
Total Score	26311	24143	23633	22685
Rank	1	2	3	4
Percentage of point to highest rated vendor	100%	92%	90%	86%

Estimate Of Meter Reading, MeterTurn-Ons and Turn Offs That Will Be Eliminated With The Implementation Of The AMR Program.

Meter Readers	Rate/Hr	Annual Hrs		Annual Cost	
8	11.45	2080		190528	Labor Cost
				114317	Employee Benefits & Overhead Estimate 60% of Labor Cost
Vehicles 8	7.16	2080		119142	Vehicle Cost
				423987	Total Est. Meter Reader Cost
	Number O Trips/Mont	Cost per Trip	Months		
	1670	$16.17	12	324047	Read-in/Read-out*
	25	$16.17	12	4851	Unnecesary Outage Investigations*
	346	$18.72	12	77725	Disconnect/Reconnect Cost *
				830610	**Total Annual Cost Eliminated**

* Includes Overhead & Benefits Cost

CERTIFICATION

KENTUCKY 37 OWEN

September 2005- August 2007 Work Plan

I certify that:

1. Upon completion of the construction of the electrical facilities contained herein, the system will be capable of adequately and dependably serving the projected load as contained in the current RUS approved Power Requirement Study and this Construction Work Plan.
2. The preparation and recommendations of this Construction Work Plan are consistent with the requirements of applicable RUS bulletins.

Charles R. Gill, PE
Kentucky Registered Engineer

OWEN Electric

A Touchstone Energy® Cooperative

BOARD RESOLUTION

WHEREAS, a two-year Construction Work Plan, date 2005-2007 has been prepared by Owen Electric Cooperative, Inc., Engineering staff in the amount of $15,468,170.

NOW, THEREFORE, BE IT RESOLVED that the Board of Directors adopt this Work Plan as a course of action to be followed, or until amended, with the approval of RUS.

Excerpt taken from the Minutes of a Regular Board Meeting
held on June 30, 2005

"Mr. Marshall and Hope Kinman made a presentation on the Summer 2005 through Summer 2007 work plan. Ms. Kinman, on behalf of the Bid Committee, recommended approval of the work Plan. Upon a motion by Hope Kinman, seconded by Frank Jackson, the Board unanimously voted to approve the Summer 2005 through Summer 2007 Work Plan as presented."

I, Stanley Gosney, Secretary-Treasurer of Owen Electric Cooperative, Inc. do hereby certify that the above is a true and correct excerpt from the minutes of a meeting of the Board of Directors of Owen Electric Cooperative, held on June 30, 2005, and that at said meeting a quorum was present.

Stanley Gosney, Secretary-Treasurer
Owen Electric Cooperative, Inc.

(Seal)

OWEN Electric

A Touchstone Energy® Cooperative

September 2005

ENVIRONMENTAL REPORT

KY 37

2005-2007 Construction Work Plan

The projects in this work plan consist of code 300 line conversions and conductor replacements only.

President and CEO

8205 Hwy 127 N • P.O. Box 400 • Owenton, Kentucky 40359-0400 • 800/372-7612 • Fax - 502/484-2661 • www.owenelectric.com

EXECUTIVE SUMMARY

PURPOSE:

The purpose of this report is to document and summarize the proposed capital plant additions and improvements required over the next two years (September 2005 – August 2007) in order for Owen Electric Cooperative, Incorporated (OEC) (KY 37 OWEN) to adequately serve its consumer members. This report provides engineering support in the form of descriptions, maps, economic analysis, and justifications for the proposed new distribution facilities.

RESULTS:

Upon completion of the proposed distribution projects, OEC will provide adequate and dependable service to the following loads:

Residential/Farm	55,765	1,159 KWHr/month average
Small Commercial	2,085	7,500 KWHr/month average
Large Commercial	33	451,667 KWHr/month average
Public/Other	257	4,774 KWHr/month average
Industrial	1	1,200,000,000 KWHr/month average

Approximately 4,000 idle services were in place at the end of 2004.

GENERAL BASIS OF STUDY:

The year 2007 projected number of consumers and total peak system demand were interpolated directly from OEC's 2004 Power Requirements Study (PRS) as approved by RUS. The PRS was developed in conjunction with OEC's wholesale power supplier, East Kentucky Cooperative (EKP). The projections in the Work Plan may vary slightly to include or omit projects that either did not develop or were not anticipated when the PRS was prepared.

The Cooperative's 1993 Long-Range Work Plan (LRP) load projections and recommendations were reviewed and generally found to be adequate for this planning period. All construction projects proposed herein are consistent with the LRP.

The Cooperative's 2003 Operations and Maintenance Review (Review Rating Summary; RUS Form 300) and the data gathered for the review were used to determine construction and maintenance projects. These projects may require physical replacement of deteriorated facilities, upgrade portions of the system to conform to applicable codes or safety requirements, and/or improve reliability or quality of service to OEC's members.

New distribution, transmission, and power supply construction requirements were considered simultaneously as a "one system" approach for the orderly and economical development of the total system. Where applicable, the proposed construction and recommendations herein, relative to OEC's wholesale power supplier, were discussed with EKP.

A complete list of the lines and equipment, and the estimated cost of the facilities required to serve the additional 4,060 members and 26 MW load is contained in the Distribution Line and Equipment Costs Section (page 11). The cost data is based on recent historical cost data.

An analysis, using RUS guidelines as a basis and the design criteria contain herein, was performed on all of the construction projects proposed in this Work Plan. Milsoft's WindMil software was used to analyze the distribution circuits during the appropriate winter and summer peak loads for the Work Plan period. The design criteria, historical load and growth data, and future load growth data formed the rest of the basis of this analysis.

SERVICE AREA & POWER SUPPLY

Owen Electric Cooperative provides service in portions of nine counties in the northern Kentucky region. Founded in 1937, OEC presently distributes power to over 59,171 services through 4,836 miles of distribution lines. Most of OEC's growth has and continues to be in the three northern most counties of Boone, Kenton and Campbell. These counties are suburbs of the Cincinnati Ohio area. Moderate growth has continued in the central area counties of Carroll, Gallatin, Grant, Owen, Pendleton and Scott.

OEC presently owns and maintains distribution circuits that emanate from twenty-three (23) substations. OEC has portions of the system operating at 24.7/14.4 KV and the remainder of the system operating at 12.5/7.2 KV. Additionally, OEC provides the Gallatin Steel Company with a 34.5 KV and a 345 KV feed to the steel mill. All of the distribution substations are owned and maintained by EKP. OEC is one of 16 member owners of the EKP system, whose headquarters is located in Winchester, Kentucky.

The following data is from OEC's RUS Form 7 (12/31/04):

Number of Active Services	53,926
KWHr of Energy Purchased	2,048,527,629
KWHr of Energy Sold	2,008,544,392
Maximum KW of Demand	342,721
Total Utility Plant	$147,760,494
Consumers Per Mile	11.15

SYSTEM ANALYSIS

LONG RANGE PLAN

The Cooperative completed a twenty-year (20) Long Range Work Plan in 1993. All construction projects proposed herein are consistent with the LRP.

VOLTAGE DROPS

The voltage drops analyzed in this work plan are based on the year 2005 summer and winter peaks. Any inadequacy in the voltage levels on a feeder were attempted to be corrected first by one or more of the following tools; balancing the feeder loads, application of switched or fixed capacitors, or transferring load from one feeder to another. If these did not improve voltage drops, conversion from 12.5 to 25 KV, reconductoring, three phasing, regulators, or new feeders were evaluated based on the most effective and economical solution.

DISTRIBUTION LOSSES

The Cooperative has in the past and will continue in the future to place significant emphasis on distribution line losses. These losses are evaluated and steps are taken to reduce these losses. Some of the steps are balancing circuit and substation loads, power factor improvement, economic transformer and conductor analysis, reconductoring, and voltage conversions. The Cooperative has improved the system line losses and the previous twenty years line losses are shown in Appendix I.

SERVICE RELIABILITY

Through the use of the Cooperative's SCADA System, outage report are complied and evaluated on a daily basis. Consumer outage hours have declined in recent years and the Cooperative continually strives to reduce the duration and frequency of outages. The improvement in outage times can be directly attributable to the SCADA System, the Right-of-Way Program and the work done, which began in the late 1970's, to replace vintage conductor. The Coop finished the conversion to its new GIS system (UAI) which included full implementation in the cooperative vehicle fleet. The Construction Department has also made significant strides in the organization of construction crews and the Operation Department has improved its handling of large outages with the coop's Emergency Restoration Plan and improving the data in the system outage software. The summary of the recent outage records by year is located in Appendix II.

PRESENT WORTH ANALYSIS

The projects in this Work Plan have been evaluated with their alternatives on a present worth basis when applicable. All new proposed substation projects will be evaluated with EKP based on a "one-system" concept and on a present worth basis.

ECONOMIC CONDUCTOR ANALYSIS

An economic conductor analysis is done on proposed projects to determine the most effective conductor for the load being served or the load on the circuit. Reliability, standardization, and proposed distribution voltage levels are also considered.

PHYSICAL CONDITION:

The Cooperative has and will continue to fund and provide the manpower necessary to operate and maintain the distribution facilities in a safe and prudent manner. The following is a summary of the program in place to accomplish these goals;

1. Right-of-Way - The Cooperative maintains the rights-of-way for the distribution facilities on a five-year (5) cycle. Residential subdivisions are on a more frequent cycle as needed. The Cooperative is assertive in its duty to maintain these rights-of-way in a proper and safe manner.
2. Low Volume Herbicide Spraying - The Cooperative applies herbicide in its rights-of-way to assist the mechanical clearing in maintaining the rights-of-way. This program was started in 1995 and has been very successful as a supplement to the mechanical program.
3. Pole Treatment - The Cooperative inspects and treats an average of 7000 poles per year and is in a third ten-year (10) cycle. The results of the program have been outstanding and in 2004 the rejection rate was less than 2.09%.
4. Line Patrol – A portion of OEC's overhead distribution facilities are inspected each year by employee patrols. Deficiencies or problems are identified, reported, and corrected as soon as possible. Pole treating, Right-of-Way, and spray crews also identify and report deficiencies. Maintenance crews inspect and repair any problems or deficiencies found in the residential subdivisions. Other Cooperative personnel working in the field also identify and report and deficiencies.
5. Power Factor - Capacitor banks, switched and fixed, are installed on the distribution system in an economical manner in order to improve system voltages and reduce distribution line losses.

6. Load Balancing - The Cooperative assesses substation and feeder circuit loads in order to evaluate the most economical feeds and reduce line losses through circuit balancing.
7. Sectionalizing - The Cooperative began a system-wide sectionalizing study and projects to have it completed in 2006. This study will update the system's sectionalizing and will be incorporating into the outage system and evaluated using the connectivity model in the Milsoft software.
8. Meter Testing - Each year the Cooperative tests a specific number of meters as indicated by the Cooperative's Statistical Meter Test Program. Each year, the previous results are evaluated to determine the percentage of meters that need to be tested in order to meet the statistical standard.
9. Aging Conductor - Since the 1980's, the Cooperative has focused on the replacement of vintage conductor. The Coop has concentrated specifically on 6 and 8 ACWC and all "amerductor" wire. Outage records, field inspections, and discussion with Coop personnel provide the basis for prioritizing the conductor replacement. Conductor replacement will be evaluated on a cost/reliability basis. Underground distribution primary cables, specifically the high molecular weight polyethylene insulation medium cable, are evaluated in a similar manner to prioritize for cable replacement.

   The following is a summary of Owen Electric's aged conductor 6A, 8A and Amerductor in miles;

Phase	As of 9/05 Existing	2005-2007 WP Replacement	Remaining
Single Phase	615	172	443
Two Phase	19.2	5.1	14.1
Three Phase	14.2	3.4	10.8
TOTAL	648.4	180.5	467.9

A field survey of remaining 6A, 8A, and Amerductor will be done prior to the next work plan in order to gain an accurate assessment of the remaining single phase aged conductor remaining.

DESIGN CRITERIA & CONSIDERATIONS

DESIGN CRITERIA

1. The minimum primary voltage on the distribution system is 118 volts and a base on 120 volts. The substation base will be 126 volts. Circuit voltage correction will be limited to one stage of voltage regulators, not including the station regulators.
2. Distribution circuits are not to be loaded more than 75% of their thermal rating.
3. The following distribution line equipment will have a minimum loading not to exceed the percentages below:

a)	Distribution Transformers	130% Winter	100% Summer
b)	Voltage Regulators	130% Winter	100% Summer
c)	Step Down Transformers	130% Winter	100% Summer
d)	Reclosers/Line Fuses	80% Winter	80% Summer

4. Underground conductors will be considered for replacement based on two or more outages attributable to the conductor over the last year or three outages over the last two years. Additionally, all conductors with significant numbers of splices and underground conductors with T-Taps will be evaluated. Replacement of old deteriorated overhead conductor will be done based on outage history and on a systematic basis.
5. Poles and appurtenances are to be replaced if found to be deteriorated during visual or physical inspection.
6. Poles, hardware, and conductors will be rebuilt and/or relocated if they are found to be unsafe or if they fail to meet applicable National Electric Safety Code requirements.
7. New primary construction is to be overhead except where underground facilities are required to comply with governmental or environmental regulations, local restrictions, favorable economics, developmental requests, or safety concerns.
8. All new construction is to be designed and built according to RUS standard construction specifications and guidelines.
9. Single-phase distribution lines with more than 300 KW of load will be evaluated for multi-phasing.
10. Adequate reliability for residential subdivisions, commercial and industrial loads may require backfeed capability and substation ties to improve reliability.

DESIGN CONSIDERATIONS

1. Circuit tie points on urban or industrial substation feeders should be equipped with three phase pole-top switches so that load can be easily shifted during emergency situations.
2. OEC shall standardize on overhead and underground conductor sizes based on an economic conductor analysis. Depending upon circuit loading, all three phase overhead circuits will be 336 ACSR or 1/0 ACSR. Single-phase overhead circuit will be either 1/0 ACSR or #2 ACSR. Underground distribution circuits will 1/0 URD jacketed cable and underground feeder circuits will be 500 MCM jacketed cable. Feeders and circuit ties should be a minimum of 336 ACSR. Deviations from this standard will be evaluated and will be based on site specific criteria and situations.
3. Conversion of feeders or line sections from 12.5 KV to 25 KV to improve voltage levels will be evaluated in conjunction with reconductoring and multi-phasing. All proposed voltage conversions will be analyzed in conjunction with the Long-Range Plan.
4. All three phase circuits will be evaluated for load balancing to reduce system losses and improve circuit voltage levels. Load balancing goals for three phase circuits will be +/- 20% and substation imbalances will be +/- 10% from the average.
5. Capacitors will be placed in an economical manner on the system to maintain a 95% lagging power factor. Switched capacitors banks will be installed to keep the power factor to a minimum of 98% leading.

DISTRIBUTION LINE AND EQUIPMENT COSTS

IMPROVEMENT/REPLACEMENT	COST PER MILE
6A, 8A TO #2 ACSR 1-PH	$17,500
6A, 8A TO 1/0 ACSR 1-PH	$19,500
CONVERSION TO 2-PH #2 ACSR	$35,000
CONVERSION TO 2-PH 1/0 ACSR	$39,000
CONVERSION TO 3-PH 1/0 ACSR	$45,000
CONVERSION TO 3-PH 336 ACSR	$54,800
CONVERSION TO DOUBLE CKT 336 ACSR	$80,700
FAULTY URD REPLACEMNT WITH 1/0 URD	$95,040
500 MCM FEEDER REPLACEMENT/INSTALL	$115,000
1/0 URD REPLACEMENT/INSTALL	$76,560
VOLTAGE CONVERSION 7.2 TO 14.4 KV	$2,940
THREE-PHASE POLE TOP SWITCHES (EACH)	$4,000
STEP TRANSFORMERS (EACH)	
1000 KVA	$4,750
1667 KVA	$6,000

STATUS OF PREVIOUS WORK PLAN

REF #	Project	Completed	Deleted	Carryover	Revised
301	Warsaw Road	X			
302	Glencoe Folsom Road	X			
303	Baker Williams Road				X
304	Duro Circuit 8&9 Double Circuit	X			
305	Carson Voltage Conversion	X			
306	Hogrefe Road				
307	Maher Road @ Glenhurst	X			
308	Holbrook Lane @ Shaker Run	X			
309	Holbrook Lawrenceville Road				X
310	Bavarian Substation DC	X			
311	Graves Road Double Circuit	X			
312	Cody Road (Meadow Glen)	X			
313	Hogg Ridge	X			
314	Lanter Road	X			
315	Kelly Road/Brownfield				X
316	Sweet Owen Road	X			
317	Reuben Lane	X			
318	Steels Bottom	X			
319	Lusbys Mill	X			
320	Bob White & Hwy 20				X
321	Vera Cruz	X			
322	Hwy 16 at Munk		X		
323	Greenup Road	X			
324	Davies A	X			
325	Fishing Creek	X			
326	Symbo Lane				X
327	Taylor/Workman and Pribble	X			
328	Big Bone Church Road	X			
329	Old New Liberty Road	X			
330	Twin Creek	X			
331	Big Bone Church Road #2			X	
332	Davies B	X			
333	Walnut Lick Road		X		
334	Tooten Lane & Clubhouse Drive	X			
335	Evergreen Drive				X
336	Indian Trace				X
337	Pleasant Hill Road				X
338	Ghent Eagle Station Road	X			
339	Old Teresita Road	X			
340	Morgan Creek	X			
341	Sherman Newtown Road	X			
342	Hwy 36		X		

CARRYOVERS:

RUS Ref. # 301 – Big Bone Church Road (Ref#328 in 2003/2004 WP) – The project was postponed from the last work plan because the contractor completed several relocation projects and highway jobs.

REVISIONS:

RUS Ref. # 306 – Baker Williams 3PH (Ref#303 in 2003/2004 WP) – The project was revised due to a revision in the projected date of the proposed Corinth Substation. The original project was a DC 336 ACSR line. The revised project is a single circuit 336 ACSR line.

RUS Ref. # 311 – Hwy 22 Tie (Ref#309 in 2003/2004 WP) – The original project has been revised to include another portion of single phase to three phase.

RUS Ref. # 331 – Kelly/Brownfield Road (Ref#315 in 2003/2004 WP) – The original project has been revised to include another additional areas of single phase 6A to #2 ACSR conductor replacement.

RUS Ref. # 337 – Pond Creek (Ref#336 in 2003/2004 WP) – The original project has been revised to include another additional areas of single phase 6A to #2 ACSR conductor replacement.

RUS Ref. # 338 – Pleasant Hill Road (Ref#337 in 2003/2004 WP) – The original project has been revised to include another additional areas of single phase 6A to #2 ACSR conductor replacement.

RUS Ref. # 339 – Symbo Lane (Ref#326 in 2003/2004 WP) – The original project has been revised to include another additional areas of single phase 6A to #2 ACSR conductor replacement.

RUS Ref. # 340 – Evergreen Drive (Ref#335 in 2003/2004 WP) – The original project has been revised to include another additional areas of single phase 6A to #2 ACSR conductor replacement.

RUS Ref. # 341 – Bob White & Hwy 20 (Ref#320 in 2003/2004 WP) – The original project has been revised to include another additional areas of single phase 6A to #2 ACSR conductor replacement.

SUBSTATION ANALYSIS

Owen Electric Cooperative, in conjunction with East Kentucky Power Coop, added 75 MVA of capacity to the system in the past work plan period. One substation was added (Bavarian), three substations had an additional bay and power transformer added to relieve load on the existing station transformer (Richardson, Duro, and Grant's Lick) and two substations had the power transformer upgraded (Carson, Bromley (old New Liberty)).

OEC and EKP will be installing another landfill gas generating station at the Remke Landfill near Griffin Substation. Boone Substation will be upgraded to a 15/20/25 MVA transformer in the fall of 2005. Bristow and Downing Substations will have an additional 11.2/14 MVA transformer added in the spring of 2006. OEC has completed the substation justification on the proposed Corinth Substation and has delayed it until 2008 or 2009. Additional substations in the Independence area, on Weaver Road between Bristow and Smoot Substations and a Camp Ernest Substation are presently being evaluated and the justifications will be complete this fall. None of the three possible additional substations will be constructed in this work plan. The projected loading on each substation for this work plan period is shown on the Substation Loading Chart on the following page.

SUBSTATION LOADING - Summer

LOCATION	SUB #	SUB MVA	2003 KW	2004 KW	2005 KW	2006 KW	2007 KW	% Loading
BANKLICK	N013	13.8	8,078	8,545	10,385	10,500	11,000	80%
BAVARIAN	N070	16.0		2,732	6,055	6,200	6,400	40%
BIG BONE	N036	13.8	6,450	5,862	6,251	6,500	6,800	49%
BOONE	N015	13.8	10,017	10,904	13,231	13,500	14,500	105%
BRISTOW	N047	14.0	8,545	11,344	11,629	10,000	10,700	76%
BROMLEY	N073	11.2		2,568	5,518	5,800	6,200	55%
BULLITTSVILLE	N028	14.0	10,161	12,113	12,951	11,000	11,500	82%
CARSON	N033	11.2	4,769	5,910	5,420	5,700	6,000	54%
DOWNING	N062	14.0	12,053	10,670	12,908	14,000	14,800	106%
DURO #1	N055	14.0	9,884	7,919	5,875	6,800	7,500	54%
DURO #2	N055A	14.0	1,511	8,157	10,798	10,500	11,000	79%
GALLATIN 138KV M-4		30.0	19,102	18,824	19,228	19,000	19,000	63%
GALLATIN 345KV M-1		210.0	162,259	160,186	156,211	160,000	160,000	76%
GALLATIN DIST.	N057A	16.0	6,474	6,244	6,952	7,000	7,500	47%
GRANTS LICK #1	N012	14.0	5,374	5,616	7,056	7,000	7,400	53%
GRANTS LICK #2	N012A	16.0	10,080	10,616	12,384	12,600	13,200	83%
GRIFFIN	N029	14.0	6,130	6,083	6,890	6,800	7,000	50%
HEBRON	N069	16.0	9,565	12,347	14,414	14,800	15,200	95%
KEITH	N038	9.9	6,009	6,242	6,821	7,200	7,500	76%
MUNK	N021	14.0	12,015	11,301	12,879	8,800	9,000	64%
NEW LIBERTY		0.0	4,441	5,858				
OAKLEY NOEL	N067	14.0	5,253	4,692	6,013	6,500	7,000	50%
PENN	N008	13.8	7,508	8,117	9,418	8,600	8,800	64%
RICHARDSON #1	N058	14.0	9,223	10,117	10,014	10,800	11,200	80%
RICHARDSON #2	N058A	14.0			3,745	4,500	5,500	39%
TURKEYFOOT	N031	13.8	9,539	9,020	13,012	9,500	10,000	72%
W. M. SMITH #1	N048	14.0	3,119	3,491	3,387	4,500	5,000	36%
W. M. SMITH #2	N048A	14.0	7,983	8,070	10,079	9,000	9,500	68%
W. R. SMOOT #1	N052	14.0	3,542	3,957	9,292	4,500	5,500	39%
W. R. SMOOT #2	N052A	14.0	10,558	8,807	8,896	9,800	10,500	75%
WILLIAMSTOWN	N016	13.8	11,871	10,886	12,073	9,500	10,000	72%
Total KW With Gallatin:		629	381,513	397,198	429,785	420,900	435,200	
Total KW W/O Gallatin:			200,152	218,188	254,346	241,900	256,200	

SUBSTATION LOADING - Winter

LOCATION	SUB #	SUB MVA	2003 KW	2004 KW	2005 KW	2006 KW	2007 KW	% Loading
BANKLICK	N013	17.0	7,741	8,027	8,735	9,750	10,200	60%
BAVARIAN	N070	20.0	2,373	2,456	2,565	3,400	3,900	20%
BIG BONE	N036	17.0	4,726	5,404	6,238	6,900	7,400	44%
BOONE	N015	17.0	9,383	9,694	10,898	13,200	14,100	83%
BRISTOW	N047	17.0	14,571	13,383	14,895	15,600	16,200	95%
BROMLEY	N073	14.0			6,929	7,400	7,700	55%
BULLITTSVILLE	N028	17.0	9,941	9,893	10,722	12,200	12,750	75%
CARSON	N033	14.0	5,858	5,864	6,008	6,400	6,800	49%
DOWNING	N062	17.0	5,517	8,934	9,685	10,500	11,200	66%
DURO #1	N055	17.0	10,744	7,422	7,988	9,200	9,800	58%
DURO #2	N055A	17.0		5,080	5,082	6,600	7,400	44%
GALLATIN 138KV M-4		50.0	19,100	18,497	18,824	19,000	19,000	38%
GALLATIN 345KV M-1		210.0	162,259	160,013	163,296	163,000	163,000	78%
GALLATIN DIST.	N057A	20.0	4,736	5,126	6,342	6,800	7,500	38%
GRANTS LICK #1	N012	17.0	7,105	7,327	6,981	8,200	8,600	51%
GRANTS LICK #2	N012A	20.0	13,700	13,893	13,121	14,400	14,750	74%
GRIFFIN	N029	17.0	6,463	6,726	7,301	8,100	8,400	49%
HEBRON	N069	20.0	5,752	7,358	8,248	9,200	10,200	51%
KEITH	N038	13.2	8,381	8,636	8,774	9,700	9,900	75%
MUNK	N021	17.0	13,484	13,755	14,204	15,250	15,750	93%
NEW LIBERTY			6,595	6,820				
OAKLEY NOEL	N067	17.0	4,700	4,860	5,344	7,200	8,100	48%
PENN	N008	17.0	9,863	9,863	9,746	10,400	10,700	63%
RICHARDSON #1	N058	17.0	9,867	10,156	11,807	7,700	8,100	48%
RICHARDSON #2	N058A	17.0				5,500	6,100	36%
TURKEYFOOT	N031	17.0	11,850	11,146	9,798	11,500	12,000	71%
W. M. SMITH #1	N048	17.0	6,884	3,240	2,670	4,000	4,750	28%
W. M. SMITH #2	N048A	17.0		6,368	6,882	8,200	8,600	51%
W. R. SMOOT #1	N052	17.0	14,691	5,616	5,443	6,200	6,900	41%
W. R. SMOOT #2	N052A	17.0		9,176	8,510	9,700	10,300	61%
WILLIAMSTOWN	N016	17.0	11,975	12,200	12,522	13,200	13,650	80%
Total KW With Gallatin:		738	388,259	396,933	409,558	438,400	453,750	
Total KW W/O Gallatin:			206,900	218,423	227,438	256,400	271,750	

HISTORICAL COST DATA

	2003-2004	2005-2007 WP
Overhead		
1. No. of New Services	764	680
2. Linear Feet: Total	287,387	300,000
Primary	216,219	225,000
Secondary & Services	71,168	75,000
3. Aver. Length Feet	376	375
4. Cost of Overhead	$2,737,082	$2,480,000
5. Aver. Cost of Service	$3,583	$3,600
6. No. of New Xfrmrs	656	500
7. Aver. Inst. Cost/Xfrmr	$450	$450
8. No. of 3-PH Polemounts	74	75
9. Aver. Cost of 3-PH Xfrmrs	$1089	$1250
Underground		
10. No. of New Services	3692	3320
11. Linear Feet: Total	515,208	500,000
Primary	194,706	200,000
Secondary & Services	320,502	300,000
12. Aver. Length Feet	140	140
13. Cost of Underground	$4,597,080	$3,984,000
14. Aver. Cost of Service	$1,245	$1,200
15. No. of New Xfmrs	970	800
16. Aver. Inst. Cost/Xfmrs	$1,000	$1250
17. No. of 3-PH Padmounts	32	30
18. Aver. Cost of 3-PH Xfrmrs	$8,823	$9,000
Increased Capacity		
19. No. of New Xfrmrs for C/O	23	25
20. No. of Service Changeouts	140	140
21. Aver. Cost for Service C/O	$1,059	$1,100
Security Lights		
22. No. of Security Lights	706	665
23. Aver. Inst. Cost/Light	$737	$725
Pole Replacement		
24. No. of Pole Replacements	443	475
25. Aver. Cost/Replacement	$2,387	$2,200
Meters		
26. No. of Meters Installed	7003	4500
27. Aver. Cost/Installation	$46	$45
28. No. of Large Power Meters	73	168
29. Aver. Cost/Large Power Meter	$305	$375
Large Power Installations		
30. No. Large Power Installations	58	60
31. Aver. Cost/Installation	$10,890	$11,000

DISTRIBUTION COSTS BY RUS ITEM CODE

RUS ITEM GROUP	DESCRIPTION	COST
100	OH Line Extensions	$ 2,480,000
101	UG Line Extensions	$ 3,984,000
102	Large Commercial Extensions	$ 660,000
300	System Improvements	$ 4,790,795
601	Meters and Transformers	$ 1,854,250
602	Service Upgrades/Change Outs	$ 154,000
606	Pole Change Outs	$ 1,045,000
607	Voltage Conversion Equipment	$ 18,000
701	Area Lights/Street-lighting	$ 482,125
Total 2005-2007 Work Plan Estimate		**$15,468,170**

DETAILED CONSTRUCTION COST

1. NEW SERVICES, OVERHEAD AND UNDERGROUND, SINGLE AND THREE PHASE

CODE	DESCRIPTION	Number	Miles	TOTAL COST
100	Overhead Services, 1 PH	680		$2,480,000
101	Underground Services, 1 PH	3320		$3,984,000
102	Large Commercial Services, 3 PH	60		$660,000
			Total	**$6,527,011**

2. CONVERSION, TIE LINES, AND LINE CHANGES, 300

CODE	Description	Miles	Per Mile	COST
301	3 ph 6A Cu to 3 ph 336 ACSR	2.1	$54,800	$115,080
302	1 ph 6A Cu to 3 ph 336 ACSR 3 ph 1/0 ACSR to 3 ph 336 ACSR	7.0	$54,800	$383,600
303	2 ph 6A Cu to 3 ph 1/0 ACSR	3.41	$45,000	$153,450
304	3 ph 1/0 ACSR to 3 ph 336 ACSR	0.15		$41,950
305	1 ph 6A Cu to 3 ph 1/0 ACSR	4.1	$45,000	$184,500
306	1 ph 6A Cu to 3 ph 336 ACSR	5.4	$54,800	$295,955
307	1 ph 2 ACSR to 3 ph 1/0 ACSR	0.58	$45,000	$26,100
308	3 ph 336 ACSR to DC 336 ACSR	0.7	$80,700	$56,490
309	3 ph 1/0 ACSR to 3 ph 336 ACSR	0.7	$54,800	$38,360
310	1 ph 6A Cu to 3 ph 1/0 ACSR	3.3	$45,000	$148,500
311	1 ph 6A Cu to 3 ph 1/0 ACSR	2.25	$45,000	$101,250
312	1 ph 6A Cu to 3 ph 1/0 ACSR	3.3	$45,000	$148,500
313	1 ph 6A Cu to 3 ph 1/0 ACSR 1 ph 6A Cu to 1 ph #2 ACSR	2.75 0.7	$45,000 $17,500	$125,500
314	3 ph 6A Cu to 3 ph 336 ACSR	1.4	$54,000	$76,720
315	3 ph 1/0 URDJ and 1/0 ACSR	0.047		$33,775
316	1 ph 6A Cu to 3 ph 1/0 ACSR 2 ph 6A Cu to 3 ph 1/0 ACSR	3.7	$45,000	$161,850
317	1ph 6A Cu to 1ph #2 ACSR	4.02	$17,500	$70,350
318	1ph 6A Cu to 1ph #2 ACSR	2.43	$17,500	$42,525
319	1ph 6A Cu to 1ph #2 ACSR	2.16	$17,500	$37,800

DETAILED CONSTRUCTION COST

320	1ph 6A Cu to 1ph #2 ACSR	2.97	$17,500	$51,975
321	1ph 6A Cu to 1ph #2 ACSR	1.79	$17,500	$31,325
322	1ph 6A Cu to 1ph #2 ACSR	2.0	$17,500	$35,000
323	1ph 6A Cu to 1ph #2 ACSR	4.51	$17,500	$78,925
324	1ph 6A Cu to 1ph #2 ACSR	3.88	$17,500	$67,900
325	1ph 6A Cu to 1ph #2 ACSR	4.41	$17,500	$77,175
326	1ph 6A Cu to 1ph #2 ACSR	5.07	$17,500	$88,725
327	1ph 6A Cu to 1ph #2 ACSR	9.25	$17,500	$161,875
328	1ph 6A Cu to 1ph #2 ACSR	2.26	$17,500	$39,555
329	1ph 6A Cu to 1ph #2 ACSR	8.67	$17,500	$151,725
330	1ph 6A Cu to 1ph #2 ACSR	4.67	$17,500	$81,725
331	1ph 6A Cu to 1ph #2 ACSR	6.58	$17,500	$115,150
332	1ph 6A Cu to 1ph #2 ACSR	2.6	$17,500	$113,400
333	1ph 6A Cu to 1ph #2 ACSR	0.9	$17,500	$73,500
334	1ph 6A Cu to 1ph #2 ACSR 1ph 6A Cu to 2ph #2 ACSR	1.2 0.23		
335	1ph 6A Cu to 3ph #2 ACSR	0.15		$35,800
335	1ph 6A Cu to 1ph #2 ACSR	5.56	$17,500	$97,300
336	1ph 6A Cu to 1ph #2 ACSR	5.55	$17,500	$97,125
337	1ph 6A Cu to 3ph 1/0 ACSR 1ph 6A Cu to 1ph #2 ACSR	2.0 3.56	$45,000 $17,500	$152,300
338	1ph 6A Cu to 1ph #2 ACSR	3.3	$17,500	$57,750
339	1ph 6A Cu to 1ph #2 ACSR	3.3	$17,500	$57,750
340	1ph 6A Cu to 1ph #2 ACSR	1.9	$17,500	33,250
341	1ph 6A Cu to 1ph #2 ACSR	2.5	$17,500	$43,750

DETAILED CONSTRUCTION COST

342	1ph 6A Cu to 1ph #2 ACSR	9.57	$17,500	$167,475
343	1ph 6A Cu to 1ph #2 ACSR	1.58	$17,500	$27,650
344	1ph 6A Cu to 1ph #2 ACSR	2.8	$17,500	$49,000
345	1ph 6A Cu to 1ph #2 ACSR	3.28	$17,500	$57,400
346	1ph 6A Cu to 1ph #2 ACSR	2.62	$17,500	$45,850
347	1ph 6A Cu to 1ph #2 ACSR	3.52	$17,500	$61,600
348	1ph 6A Cu to 1ph #2 ACSR	1.2	$17,500	$21,600
349	1ph 6A Cu to 1ph #2 ACSR	5.0	$17,500	$87,500
350	1ph 6A Cu to 1ph #2 ACSR	2.64	$17,500	$46,200
351	1ph 6A Cu to 1ph #2 ACSR	5.8	$17,500	$101,500
352	1ph 6A Cu to 1ph #2 ACSR	5.5	$17,500	$96,250
353	1ph 6A Cu to 1ph #2 ACSR	2.49	$17,500	$43,575
		Total		**$4,790,795**

DETAILED CONSTRUCTION COST

3. TRANSFORMERS AND METERS, 601

CODE	DESCRIPTION	Number	Average Cost	TOTAL COST
601	Transformers for OH services	500	$450	$225,000
	Transformers for UG services	800	$1,250	$1,000,000
	Transformers – Three Phase OH	75	$1,250	$93,750
	Transformers – Three Phase UG	30	$9,000	$270,000
	Meters - Single Phase	4500	$45	$202,500
	Meters - Three Phase	168	$375	$63,000
		Total		**$1,854,250**

4. INCREASE SERVICE CAPACITY, 602

CODE	DESCRIPTION	Number	Average Cost	TOTAL COST
602	Increase Service Capacity	140	$1,100	$154,000
		Total		**$154,000**

5. POLE REPLACEMENTS, 606

CODE		Number	Average Cost	TOTAL COST
606.0	Pole Replacements	475	$2,200	$1,045,000
		Total		**$1,045,000**

5. VOLTAGE CONVERSION DEVICES

CODE		TOTAL COST
607	Step-Transformer Installations	**$18,000**

7. SECURITYLIGHTS

CODE		Number	Average Cost	TOTAL COST
701	Security Lights	665	$725	$482,125
		Total		**$482,125**

CONSTRUCTION SCHEDULE

CODE	DESCRIPTION/PROJECT NAME	2005/2006	2006/2007
100	New Overhead Services	$1,240,000	$1,240,000
101	New Underground Services	$1,992,000	$1,992,000
102	New Large Power/Commercial	$ 330,000	$ 330,000
301	Big Bone Church Road	$ 115,080	
302	Penn Feeder 01	$ 383,600	
303	Glass Pike	$ 153,450	
304	Parkwest Tie	$ 41,910	
305	Hwy 127		$ 184,500
306	Baker Williams 3PH		$ 295,955
307	Williams Woods	$ 26,100	
308	Bristow Double Circuit	$ 56,490	
309	Short Richardson	$ 38,360	
310	Grant's Lick Tie		$ 148,500
311	Hwy 22 Tie	$ 148,500	
312	Hwy 10 Tie		$ 101,250
313	Hwy 16 Three Phase		$ 125,500
314	Possum Path		$ 76,720
315	Narrows Tie		$ 33,775
316	New Columbus Road	$ 161,850	
317	Penn Feeder 4 Taps	$ 70,350	
318	Glass Pike Taps	$ 42,525	
319	Scott's Mill	$ 37,800	
320	Porter Road	$ 51,975	
321	Penn Feeder 3 Taps	$ 31,325	
322	Corinth Exit	$ 35,000	
323	Penn Feeder 2 Taps	$ 78,925	
324	Fisher Road	$ 67,900	
325	Schababele Road		$ 77,175
326	Siry Road		$ 88,725
327	Greenwood Road		$ 161,875
328	Hwy 17		$ 39,555
329	Kincaid Lake		$ 151,725
330	Washington Trace		$ 81,725
331	Kelly/Brownfield Road		$ 115,150
332	Griffin Feeder 4 Taps		$ 113,400
333	Point of Rock	$ 73,500	
334	Cox Road	$ 35,800	
335	Elmer Davis Lake	$ 97,300	
336	Old Monterey Road	$ 97,125	
337	Pond Creek		$ 152,300
338	Pleasant Hill Road		$ 57,750
339	Symbo Lane		$ 57,750

CONSTRUCTION SCHEDULE

CODE	DESCRIPTION/PROJECT NAME	2005/2006	2006/2007
340	Evergreen Drive	$ 33,250	
341	Bob White & Hwy 20		$ 43,750
342	Brush Creek	$ 167,475	
343	East Bend Road Taps	$ 27,650	
344	Salem Creek	$ 49,000	
345	May Road		$ 57,400
346	Issac Road		$ 45,850
347	Swope/Natalee Road	$ 61,600	
348	Hopeful Church Road	$ 21,600	
349	Highway 36	$ 87,500	
350	Lawrenceburg Ferry	$ 46,200	
351	Rockdale Road	$ 101,500	
352	Turner Road		$ 96,250
353	Hwy 36 Taps		$ 43,575
601	Meters and Transformers	$ 927,125	$ 927,125
602	Service Upgrades/Change Outs	$ 77,000	$ 77,000
603	Sectionalizing/Reclosers	$ 112,500	$ 112,500
606	Pole Change Outs	$ 522,500	$ 522,500
607	Step Up/Down Transformers	$ 18,000	
701	Area Lights/Street-Lighting	$ 241,062	$ 241,063
Total 2005-2007 Work Plan		$7,788,327	$7,679,843

NEW DISTRIBUTION CONSTRUCTION / LINE CONVERSION

Code: 301 (Carryover – 331 in 2003-2004 CWP)
Design Criteria: 4,10
Projected Construction Year: 2005/2006
Substation: 12 Circuit: 1
Estimated Cost: $115,080
Length: 2.1 Miles
Project Name: Big Church Road
County: Boone
OEC Map Numbers: 406
Location: Between 61405059133 and 61406111678

Description of Proposed Construction:
3 ph 6A to 3 ph 336 ACSR

Justification of Proposed Construction:
The existing circuit conductor is 6A. Back feed capabilities with circuit ties is limited and feeder reliability is poor with the 6A conductor.

Results of Proposed Construction:
Circuit reliability is increased and back feed capabilities enhanced.

Alternative Corrective Plans Considered:
No other alternatives considered

NEW DISTRIBUTION CONSTRUCTION / LINE CONVERSION

Code: 302
Design Criteria: 4, 10
Projected Construction Year: 2005/2006
Substation: 07 Circuit: 1
Estimated Cost: $383,600
Length: 7.0 Miles
Project Name: Penn Feeder 01
County: Scott
OEC Map Numbers: 16,23,31,40
Location: From Substation to Pole 51016214589

Description of Proposed Construction:
1 ph 6A and 3 ph 1/0 ACSR to 3 ph 336 ACSR

Justification of Proposed Construction:
Extending Circuit 1 to southern Scott County will provide a reliable back feed for Circuit 4 out of Penn Substation and replace old conductor.

Results of Proposed Construction:
Circuit reliability is increased and back feed capabilities enhanced.

Alternative Corrective Plans Considered:
No other alternatives considered

NEW DISTRIBUTION CONSTRUCTION / LINE CONVERSION

Code: 303
Design Criteria: 4, 10
Projected Construction Year: 2005/2006
Substation: 07 Circuit: 1
Estimated Cost: $153,450
Length: 3.41 Miles
Project Name: Glass Pike
County: Scott
OEC Map Numbers: 9,12,13,17
Location: From Pole 51017065772 to Pole 510090677937

Description of Proposed Construction:
2 ph 6A to 3 ph 1/0 ACSR

Justification of Proposed Construction:
Extending Circuit 1 to southern Scott County will provide a reliable back feed for Circuit 4 out of Penn Substation and replace old conductor.

Results of Proposed Construction:
Circuit reliability is increased and back feed capabilities enhanced.

Alternative Corrective Plans Considered:
No other alternatives considered

NEW DISTRIBUTION CONSTRUCTION / LINE CONVERSION

Code: 304
Design Criteria: 2, 10
Projected Construction Year: 2005/2006
Substation: 22 Circuit: 2
Estimated Cost: $41,910
Length: 0.15 Miles UG and 0.45 Miles OH
Project Name: Parkwest Tie
County: Boone
OEC Map Numbers: 499,500
Location: From Switch 62499171698 to Pole 62500062420

Description of Proposed Construction:
3 ph 1/0 ACSR to 3 ph 336 ACSR and install 500 MCM URD.

Justification of Proposed Construction:
Install UG tie and replacing existing 3 ph 1/0 ACSR will relieve overload condition on existing fuses and provide reliable back feed to Downey Sub.

Results of Proposed Construction:
Existing loading problems, circuit reliability is increased and back feed capabilities enhanced.

Alternative Corrective Plans Considered:
Alternative route was examined and not feasible.

NEW DISTRIBUTION CONSTRUCTION / LINE CONVERSION

Code: 305
Design Criteria: 4, 10
Projected Construction Year: 2006/2007
Substation: 06 Circuit: 1
Estimated Cost: $184,500
Length: 4.1 Miles
Project Name: Hwy 127
County: Owen
OEC Map Numbers: 214,234,235,255
Location: From Pole 12214081531 to Pole 12255191210

Description of Proposed Construction:
1 ph 6A to 3 ph 1/0 ACSR

Justification of Proposed Construction:
Extending Circuit 1 to improves system reliability, single phase loading and a back feed to Munk and Gallatin Substations

Results of Proposed Construction:
Single phase loading addressed, circuit reliability is increased and back feed capabilities enhanced.

Alternative Corrective Plans Considered:
No other alternatives considered

NEW DISTRIBUTION CONSTRUCTION / LINE CONVERSION

Code: 306
Design Criteria: 4, 9, 10
Projected Construction Year: 2006/2007
Substation: New (Corinth) Circuit: New
Estimated Cost: $295,955
Length: 5.4 Miles
Project Name: Baker Williams 3PH
County: Grant
OEC Map Numbers: 93,106,107,121,136
Location: Baker Williams Road

Description of Proposed Construction:
1 ph 6A to 3 ph 336 ACSR

Justification of Proposed Construction:
Single phase overloading close to 75% ampacity rating and reliable three phase tie to a radial three phase feeder.

Results of Proposed Construction:
Provides back feed capabilities, corrects single phase overload problem and replaces old conductor.

Alternative Corrective Plans Considered:
Substation justification prepared but not justified at this time.

NEW DISTRIBUTION CONSTRUCTION / LINE CONVERSION

Code: 307
Design Criteria: 2,10
Projected Construction Year: 2005/2006
Substation: 14 Circuit: 2
Estimated Cost: $26,100
Length: 0.58 Miles
Project Name: Williams Woods
County: Kenton
OEC Map Numbers: 425
Location: From Pole 7242507140 to Pole 72425142785

Description of Proposed Construction:
1 ph 2 ACSR to 3 ph 1/0 ACSR

Justification of Proposed Construction:
One existing and one new subdivision are presently served through an existing UG subdivision and the new subdivision will overload the existing circuit.

Results of Proposed Construction:
Three phasing single phase OH line relieves existing and future load problems and back feed capabilities enhanced.

Alternative Corrective Plans Considered:
Upgrading existing UG feeder more expensive.

NEW DISTRIBUTION CONSTRUCTION / LINE CONVERSION

Code: 308
Design Criteria: 10
Projected Construction Year: 2005/2006
Substation: 14 Circuit: 2
Estimated Cost: $56,490
Length: 0.7 Miles
Project Name: Bristow Double Circuit
County: Kenton
OEC Map Numbers: 425
Location: From Substation to Pole 72425109780

Description of Proposed Construction:
3 ph 336 ACSR to double circuit 336 ACSR

Justification of Proposed Construction:
Existing Circuit 1 out of Bristow Substation will be overloaded with new subdivision and additional load in Enterprise V Business Park.

Results of Proposed Construction:
Circuit 1 will be able to handle additional commercial load and new circuit will feed new subdivision and tie with Duro Substation.

Alternative Corrective Plans Considered:
No other alternatives considered

NEW DISTRIBUTION CONSTRUCTION / LINE CONVERSION

Code: 309
Design Criteria: 2, 10
Projected Construction Year: 2005/2006
Substation: 14 Circuit: 2
Estimated Cost: $38,360
Length: 0.7 Miles
Project Name: Short Richardson
County: Kenton
OEC Map Numbers: 438
Location: From Pole 72438039251 to Pole 61438025464

Description of Proposed Construction:
3 ph 1/0 ACSR to 3 ph 336 ACSR

Justification of Proposed Construction:
A small section of Circuit 4 out of Bristow consists of 1/0 ACSR. Conductor loading problems and limited back feed capabilities result from this section.

Results of Proposed Construction:
Conductor loading problems resolved and back feed capabilities enhanced.

Alternative Corrective Plans Considered:
No other alternatives considered

NEW DISTRIBUTION CONSTRUCTION / LINE CONVERSION

Code: 310
Design Criteria: 4, 10
Projected Construction Year: 2006/2007
Substation: 03 Circuit: 2 and 3
Estimated Cost: $148,500
Length: 3.3 Miles
Project Name: Grants Lick Tie
County: Pendleton
OEC Map Number: 339,340,355
Location: From Pole 31399087352 to Pole 31355140816

Description of Proposed Construction:
1 ph 6A to 3 ph 1/0 ACSR

Justification of Proposed Construction:
Provides a circuit tie between Grants Lick Circuits 2 & 3 and improves reliability and replaces old conductor.

Results of Proposed Construction:
Reliability and back feed capabilities enhanced.

Alternative Corrective Plans Considered:
No other alternatives considered

NEW DISTRIBUTION CONSTRUCTION / LINE CONVERSION

Code: 311
Design Criteria: 4, 10
Projected Construction Year: 2006/2007
Substation: 03 and 51 Circuit: 2 and 3
Estimated Cost: $101,250
Length: 2.25 Miles
Project Name: Hwy 10 Tie
County: Pendleton
OEC Map Number: 371, 385
Location: From Pole 313710076435 to Pole 82385153819

Description of Proposed Construction:
1 ph 6A to 3 ph 1/0 ACSR

Justification of Proposed Construction:
Provides a circuit tie between Grants Lick Circuits 1 & 2 and improves reliability.

Results of Proposed Construction:
Reliability and back feed capabilities enhanced.

Alternative Corrective Plans Considered:
No other alternatives considered

NEW DISTRIBUTION CONSTRUCTION / LINE CONVERSION

Code: 312
Design Criteria: 4, 10
Projected Construction Year: 2005/2006
Substation: 13 and 05 Circuit: 2 and 3
Estimated Cost: $148,500
Length: 3.3 Miles
Project Name: Hwy 22 Tie
County: Grant
OEC Map Number: 147,148
Location: From Pole 21147061610 to Pole 21148060488

Description of Proposed Construction:
1 ph 6A to 3 ph 1/0 ACSR

Justification of Proposed Construction:
Provides a circuit tie between Keith Circuit 2 and Williamstown Circuit 3 and improves reliability and replaces old conductor.

Results of Proposed Construction:
Reliability and back feed capabilities enhanced.

Alternative Corrective Plans Considered:
No other alternatives considered

NEW DISTRIBUTION CONSTRUCTION / LINE CONVERSION

Code: 313
Design Criteria: 4,
Projected Construction Year: 2006/2007
Substation: 4 Circuit: 2
Estimated Cost: $125,500
Length: 2.75 Miles 3 ph, 0.7 Miles 1ph
Project Name: Hwy 16 Three Phase
County: Gallatin
OEC Map Number: 254, 274, 275
Location: From Pole 41254009829 to Pole 41275191397

Description of Proposed Construction:
1 ph 6A and 1 ph #2 ACSR to 3 ph 1/0 ACSR
1 ph 6A to 1 ph #2 ACSR

Justification of Proposed Construction:
Load balancing and reliability problems on a long single phase tap and replaces old conductor.

Results of Proposed Construction:
Improves load balance and reliability.

Alternative Corrective Plans Considered:
No other alternatives considered

NEW DISTRIBUTION CONSTRUCTION / LINE CONVERSION

Code: 314
Design Criteria: 4, 10
Projected Construction Year: 2006/2007
Substation: 01 and 08 Circuit: 3 and 2
Estimated Cost: $76,720
Length: 1.4 Miles
Project Name: Possum Path
County: Boone
OEC Map Number: 462,463,474
Location: From Pole 62462173330 to Pole 62474184736

Description of Proposed Construction:
3 ph 6A to 3 ph 336 ACSR

Justification of Proposed Construction:
Limited back feed and circuit loading on 6A conductor and replaces old conductor.

Results of Proposed Construction:
Improves back feed and reliability.

Alternative Corrective Plans Considered:
No other alternatives considered

NEW DISTRIBUTION CONSTRUCTION / LINE CONVERSION

Code: 315
Design Criteria: 4, 10
Projected Construction Year: 2005/2006
Substation: 10 Circuit: 5
Estimated Cost: $33,775
Length: 0.4 Miles 1/0 URD 3 ph, 0.07 Miles 1/0 ACSR 3 ph
Project Name: Narrows Tie
County: Kenton
OEC Map Number: 453
Location: From Pole 72453128749 and Pole 72453131694

Description of Proposed Construction:
Install 3 ph 1/0 URD and 3 ph 1/0 ACSR

Justification of Proposed Construction:
Limited back feed and old UG feeder from Turkeyfoot Substation continually failed and taken out service results in limited back feed capabilities.

Results of Proposed Construction:
Improves back feed and reliability.

Alternative Corrective Plans Considered:
Replacement of existing 350 MCM feeder too expensive.

NEW DISTRIBUTION CONSTRUCTION / LINE CONVERSION

Code: 316
Design Criteria: 4, 10
Projected Construction Year: 2005/2006
Substation: 7 Circuit: 3
Estimated Cost: $161,850
Length: 3.7 Miles of 3 ph 1/0 ACSR
Project Name: New Columbus Road
County: Owen
OEC Map Number: 453
Location: From Pole 11080234287 to Pole 11069187508
From Pole 11080234287 to Pole 11080097678

Description of Proposed Construction:
1 ph 6A to 3 ph 1/0 ACSR, 2 ph 6A to 3 ph 1/0 ACSR

Justification of Proposed Construction:
Reliability and limited back feeding and replaces old conductor.

Results of Proposed Construction:
Improves back feed and reliability.

Alternative Corrective Plans Considered:
No other alternatives considered

CONDUCTOR REPLACEMENTS – Design Criteria 4

Code: 317
Projected Construction Year: 2005/2006
Substation: 7 Circuit: 4
Estimated Cost: $70,350
Length: 4.02 Miles
Project Name: Penn Feeder 4 Taps
County, Roads: Scott, various
OEC Map Numbers: 009, 013, 017, 024, 031, 032, 040, 041
Description: 1 ph 6A to 1 ph #2 ACSR

Code: 318
Projected Construction Year: 2005/2006
Substation: 7 Circuit: 1
Estimated Cost: $42,525
Length: 2.43 Miles
Project Name: Glass Pike Taps
County, Roads: Scott, various
OEC Map Numbers: 009, 012, 013, 016, 017, 024
Description: 1 ph 6A to 1 ph #2 ACSR

Code: 319
Projected Construction Year: 2005/2006
Substation: 7 Circuit: 3
Estimated Cost: $37,800
Length: 2.16 Miles
Project Name: Scott's Mill
County, Roads: Scott, Scott's Mill Road
OEC Map Numbers: 041, 049, 050
Description: 1 ph 6A to 1 ph #2 ACSR

Code: 320
Projected Construction Year: 2005/2006
Substation: 7 Circuit: 3
Estimated Cost: $51,975
Length: 2.97 Miles
Project Name: Porter Road
County, Roads: Scott, Porter Road
OEC Map Numbers: 050, 059, 060
Description: 1 ph 6A to 1 ph #2 ACSR

CONDUCTOR REPLACEMENTS – Design Criteria 4

Code: 321
Projected Construction Year: 2005/2006
Substation: 7 Circuit: 3
Estimated Cost: $31,325
Length: 1.79 Miles
Project Name: Penn Feeder 3 Taps
County, Roads: Scott & Grant, various
OEC Map Numbers: 050, 060, 070, 081, 092, 093
Description: 1 ph 6A to 1 ph #2 ACSR

Code: 322
Projected Construction Year: 2005/2006
Substation: 7 Circuit: 3
Estimated Cost: $35,000
Length: 2.0 Miles
Project Name: Corinth Exit
County, Roads: Grant, Hwy 330 and the I-75 Interchange
OEC Map Numbers: 093
Description: 1 ph 6A to 1 ph #2 ACSR

Code: 323
Projected Construction Year: 2005/2006
Substation: 7 Circuit: 2
Estimated Cost: $78,925
Length: 4.51 Miles
Project Name: Penn Feeder 2 Taps
County, Roads: Owen, various
OEC Map Numbers: 038, 09, 047, 048, 049
Description: 1 ph 6A to 1 ph #2 ACSR

Code: 324
Projected Construction Year: 2005/2006
Substation: 7 Circuit: 3
Estimated Cost: $67,900
Length: 3.88 Miles
Project Name: Fisher Road
County, Roads: Campbell, Fisher Road
OEC Map Numbers: 369, 370, 384
Description: 1 ph 6A to 1 ph #2 ACSR

CONDUCTOR REPLACEMENTS – Design Criteria 4

Code: 325
Projected Construction Year: 2006/2007
Substation: 51 Circuit: 1
Estimated Cost: $77,175
Length: 4.41 Miles
Project Name: Schababele Road
County, Roads: Campbell, Hwy 1121, and Schababele Road
OEC Map Numbers: 384, 385
Description: 1 ph 6A to 1 ph #2 ACSR

Code: 326
Projected Construction Year: 2006/2007
Substation: 7 Circuit: 3
Estimated Cost: $88,725
Length: 5.07 Miles
Project Name: Siry Road
County, Roads: Campbell, Hwy 1280, Siry and Burns Road
OEC Map Numbers: 369, 383
Description: 1 ph 6A to 1 ph #2 ACSR

Code: 327
Projected Construction Year: 2006/2007
Substation: 9 Circuit: 4
Estimated Cost: $161,875
Length: 9.25 Miles
Project Name: Greenwood Road
County, Roads: Pendleton, Butler/Greenwood Road
OEC Map Numbers: 284, 285, 304, 305, 323, 324
Description: 1 ph 6A to 1 ph #2 ACSR

Code: 328
Projected Construction Year: 2006/2007
Substation: 9 Circuit: 4
Estimated Cost: $39,555
Length: 2.26 Miles
Project Name: Hwy 17
County, Roads: Pendleton, Highway 17
OEC Map Numbers: 284
Description: 1 ph 6A to 1 ph #2 ACSR

CONDUCTOR REPLACEMENTS – Design Criteria 4

Code: 329
Projected Construction Year: 2006/2007
Substation: 9 Circuit: 1
Estimated Cost: $151,725
Length: 8.67 Miles
Project Name: Kincaid Lake
County, Roads: Pendleton, Area around Kincaid Lake
OEC Map Numbers: 266, 267, 286, 287
Description: 1 ph 6A to 1 ph #2 ACSR

Code: 330
Projected Construction Year: 2006/2007
Substation: 51 Circuit: 1
Estimated Cost: $81,725
Length: 4.67 Miles
Project Name: Washington Trace
County, Roads: Campbell, Washington Trace Road
OEC Map Numbers: 401, 402
Description: 1 ph 6A to 1 ph #2 ACSR

Code: 331
Projected Construction Year: 2006/2007
Substation: 3 Circuit: 4
Estimated Cost: $115,150
Length: 6.58 Miles
Project Name: Kelly/Brownfield Road
County, Roads: Pendleton, Kelly/Brownfield Road
OEC Map Numbers: 282, 283, 302, 303
Description: 1 ph 6A to 1 ph #2 ACSR

Code: 332
Projected Construction Year: 2006/2007
Substation: 9 Circuit: 4
Estimated Cost: $113,400
Length: 6.48 Miles
Project Name: Griffin Feeder 4 Taps
County, Roads: Pendleton, various
OEC Map Numbers: 184, 203, 204, 223, 224, 243, 244, 263, 264
Description: 1 ph 6A to 1 ph #2 ACSR

CONDUCTOR REPLACEMENTS – Design Criteria 4

Code: 333
Projected Construction Year: 2005/2006
Substation: 3 Circuit: 4
Estimated Cost: $73,500
Length: 4.2 Miles
Project Name: Point of Rock
County, Roads: Owen, Point of Rock Road
OEC Map Numbers: 034, 043, 044
Description: 1 ph 6A to 1 ph #2 ACSR

Code: 334
Projected Construction Year: 2005/2006
Substation: 2 Circuit: 1
Estimated Cost: $35,800
Length: 0.15 Miles 3 ph, 0.23 Miles 2 ph, 1.2 Miles 1 ph
Project Name: Cox Road
County, Roads: Campbell, Cox Road
OEC Map Numbers: 426
Description: 1 ph 6A to 1 ph, 2 ph and 3 ph #2 ACSR

Code: 335
Projected Construction Year: 2005/2006
Substation: 2 Circuit: 1
Estimated Cost: $97,300
Length: 5.56 Miles
Project Name: Elmer Davis Lake
County, Roads: Owen, Lake and Dam Road
OEC Map Numbers: 075, 086, 099
Description: 1 ph 6A to 1 ph #2 ACSR

Code: 336
Projected Construction Year: 2005/2006
Substation: 13 Circuit: 3
Estimated Cost: $97,125
Length: 5.55 Miles
Project Name: Old Monterey Road
County, Roads: Owen, Old Monterey Road
OEC Map Numbers: 026, 035, 044
Description: 1 ph 6A to 1 ph #2 ACSR

CONDUCTOR REPLACEMENTS – Design Criteria 4

Code: 337
Projected Construction Year: 2006/2007
Substation: 51 Circuit: 6
Estimated Cost: $152,300
Length: 2.0 Miles 3ph, 3.56 Miles 1 ph
Project Name: Pond Creek
County, Roads: Campbell, Indian Trace Road
OEC Map Numbers: 413, 397, 428
Description: 1 ph 6A to 3 ph 1/0 ACSR & 1 ph #2 ACSR

Code: 338
Projected Construction Year: 2006/2007
Substation: 51 Circuit: 6
Estimated Cost: $57,750
Length: 3.3 Miles
Project Name: Pleasant Hill Road
County, Roads: Campbell, Pleasant Hill and Harrisburg Hill Road
OEC Map Numbers: 397, 381
Description: 1 ph 6A to 1 ph #2 ACSR

Code: 339
Projected Construction Year: 2006/2007
Substation: 51 Circuit: 6
Estimated Cost: $57,750
Length: 3.3 Miles
Project Name: Symbo Lane
County, Roads: Kenton, Symbo Lane
OEC Map Numbers: 345, 364
Description: 1 ph 6A to 1 ph #2 ACSR

Code: 340
Projected Construction Year: 2005/2006
Substation: 14 Circuit: 4
Estimated Cost: $33,250
Length: 1.9 Miles
Project Name: Evergreen Drive
County, Roads: Boone, Evergreen Drive off Weaver Road
OEC Map Numbers: 451, 437
Description: 1 ph 6A to 1 ph #2 ACSR

CONDUCTOR REPLACEMENTS – Design Criteria 4

Code: 341
Projected Construction Year: 2006/2007
Substation: 51 Circuit: 1
Estimated Cost: $43,750
Length: 2.5 Miles
Project Name: Bob White & Hwy 20
County, Roads: Campbell, California Crossroad to BobWhite lane
OEC Map Numbers: 400, 401, 416, 417
Description: 1 ph 6A to 1 ph #2 ACSR

Code: 342
Projected Construction Year: 2005/2006
Substation: 6 Circuit: 2
Estimated Cost: $167,475
Length: 9.57 Miles
Project Name: Brush Creek
County, Roads: Owen, Brush Creek
OEC Map Numbers: 160, 176, 177, 195, 196, 215
Description: 1 ph 6A to 1 ph #2 ACSR

Code: 343
Projected Construction Year: 2005/2006
Substation: 6 Circuit: 2
Estimated Cost: $27,650
Length: 1.58 Miles
Project Name: East Bend Road Taps
County, Roads: Boone, various
OEC Map Numbers: 434, 435, 448, 449
Description: 1 ph 6A to 1 ph #2 ACSR

Code: 344
Projected Construction Year: 2005/2006
Substation: 12 Circuit: 4
Estimated Cost: $49,000
Length: 2.80 Miles
Project Name: Salem Creek
County, Roads: Boone, Salem Creek Road
OEC Map Numbers: 348, 363
Description: 1 ph 6A to 1 ph #2 ACSR

CONDUCTOR REPLACEMENTS – Design Criteria 4

Code: 345
Projected Construction Year: 2006/2007
Substation: 3 Circuit: 2
Estimated Cost: $57,400
Length: 3.28 Miles
Project Name: May Road
County, Roads: Campbell, May Road
OEC Map Numbers: 371, 385, 386
Description: 1 ph 6A to 1 ph #2 ACSR

Code: 346
Projected Construction Year: 2006/2007
Substation: 12 Circuit: 2
Estimated Cost: $45,850
Length: 2.62 Miles
Project Name: Issac Road
County, Roads: Boone, Issac Road
OEC Map Numbers: 407, 422
Description: 1 ph 6A to 1 ph #2 ACSR

Code: 347
Projected Construction Year: 2005/2006
Substation: 7 Circuit: 2
Estimated Cost: $61,600
Length: 3.52 Miles
Project Name: Swope/Natalee Road
County, Roads: Owen, Swope/Natalee Road
OEC Map Numbers: 068, 069, 079
Description: 1 ph 6A to 1 ph #2 ACSR

Code: 348
Projected Construction Year: 2005/2006
Substation: 53 Circuit: 5
Estimated Cost: $21,600
Length: 1.2 Miles
Project Name: Hopeful Church Road
County, Roads: Boone, Hopeful Church Road
OEC Map Numbers: 451, 464, 465
Description: 1 ph 6A to 1 ph #2 ACSR

CONDUCTOR REPLACEMENTS – Design Criteria 4

Code: 349
Projected Construction Year: 2005/2006
Substation: 21 Circuit: 2
Estimated Cost: $87,500
Length: 5.0 miles
Project Name: Highway 36
County, Roads: Grant, Highway 36
OEC Map Numbers: 178, 197, 198
Description: 1 ph 6A to 1 ph #2 ACSR

Code: 350
Projected Construction Year: 2005/2006
Substation: 21 Circuit: 2
Estimated Cost: $46,200
Length: 2.64 miles
Project Name: Lawrenceburg Ferry
County, Roads: Boone, Lawrenceburg Ferry Road
OEC Map Numbers: 489, 496
Description: 1 ph 6A to 1 ph #2 ACSR

Code: 351
Projected Construction Year: 2005/2006
Substation: 7 Circuit: 2
Estimated Cost: $101,500
Length: 5.8 Miles
Project Name: Rockdale Road
County, Roads: Owen, Rockdale Road
OEC Map Numbers: 489, 496
Description: 1 ph 6A to 1 ph #2 ACSR

Code: 352
Projected Construction Year: 2006/2007
Substation: 5 Circuit: 1
Estimated Cost: $96,250
Length: 5.5 Miles
Project Name: Turner Road
County, Roads: Grant, various
OEC Map Numbers: 120,135,136
Description: 1 ph 6A to 1 ph #2 ACSR

CONDUCTOR REPLACEMENTS – Design Criteria 4

Code: 353
Projected Construction Year: 2006/2007
Substation: 5 Circuit: 1
Estimated Cost: $43,575
Length: 2.49 Miles
Project Name: Hwy 36 Taps
County, Roads: Grant, various
OEC Map Numbers: 136, 150, 151, 165, 166
Description: 1 ph 6A to 1 ph #2 ACSR

APPENDIX - I

DISTRIBUTION LINE LOSSES

YEAR	KWHr BILLED	% LOSSES
1986	84,220,000	7.30
1987	90,510,000	6.56
1988	99,730,000	5.36
1989	99,800,000	4.95
1990	103,380,000	6.38
1991	112,470,000	5.45
1992	110,730,000	5.30
1993	119,730,000	6.16
1994	505,020,115	4.72
1995	847,342,649	2.97
1996	590,065,556	4.19
1997	605,435,650	3.06
1998	634,726,404	4.65
1999	690,936,594	3.42
2000	753,186,257	2.07
2001	859,670,780	5.31
2002	904,359,447	4.14
2003	939,272,738	5.07
2004	989,271,386	4.07

Note: 1995 loss data includes actual Gallatin Steel load. 1996 through 2004 does not included Gallatin Steel, but does include 1% losses associated with that load.

APPENDIX - II
FIVE-YEAR OUTAGE SUMMARY

Listed below is the five-year outage summary for the Cooperative. The outage hours continue to be acceptable and as stated previously, the Cooperative continues to adjust and institute programs to improve these outage times.

Type	2000	2001	2002	2003	2004
Power Supplier	0.63	0.33	0.25	0.02	0.33
Major Storm	0.05	0.11	0.00	0.55	0.44
Scheduled	0.05	0.06	0.09	0.03	0.02
All Other	1.71	1.75	2.65	2.44	2.61
TOTAL	2.44	2.25	2.99	3.04	3.40

5 Year Average = 2.82