REQUEST FOR PROPOSAL (RFP)

Proposal Title: Advanced Distribution Management System (ADMS) Implementation/Integration Services

Proposal Number: 1170  Date Issued: February 28, 2017
Response Due Date: March 27, 2017  Time: 2:00PM EDT
KUB Contact: Drew Antunes  Phone Number: (865) 558-2691
E-mail Address: Drew.Antunes@kub.org

The Knoxville Utilities Board will receive Proposals in an electronic format sent to the Procurement Department, as instructed below.

All proposals are subject to the instructions, conditions, specifications, addenda, and any other elements of this Request for Proposal, including those incorporated by reference.

This RFP is prepared in both Adobe PDF and Microsoft Word, with Attachments also in Excel file formats. Any alterations to this document made by the Proposer may be grounds for rejection of the Proposal, cancellation of any subsequent award, or any other legal remedies available to the Knoxville Utilities Board.

E-mail the Proposal response to: bids@kub.org with the following in the subject line:

- RFP 1170 – Advanced Distribution Management System Implementation/Integration Services
- by 2:00PM EDT time by the “RFP Close Date” referenced in Section 3.0.
- Proposer will receive an auto response within a reasonable time frame; otherwise please follow-up with Drew Antunes and/or re-send your response.
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1.0 STATEMENT OF INTENT

The Knoxville Utilities Board (KUB) is a governmental agency existing under the laws of the State of Tennessee and an independent agency of the City of Knoxville. KUB is a distribution-only utility which provides electricity, gas, water, and wastewater services to approximately 430,000 customers in Knoxville and parts of seven surrounding counties. KUB currently utilizes an OMS from Intergraph Corporation, InService, to manage trouble calls and abnormal events, identify and verify outages, and coordinate outage response during blue-sky days and storms. The system is used for outages on the electric, gas, and water networks, though outage prediction is only provided for electric outages. As the current OMS nears its end of life, KUB is deploying AMI meters (full deployment is underway and expected to be completed by 2020), and KUB considers expanding distribution automation and other grid modernization initiatives, KUB is looking for significant improvements in its ability to manage its various systems and respond to abnormal events through the implementation of a new instance of Oracle Utilities’ Network Management System.

KUB seeks proposals from interested firms and companies to provide professional services for design, development, integration, testing, training, deployment, and documentation of Oracle Utilities’ Network Management System, as outlined in this RFP. KUB’s goal is to improve the ability to effectively manage and operate four utility systems, to enhance the ability to respond to abnormal events and customer service interruptions, and to assimilate data from various sources to produce actionable information for the system operators to utilize in decision making.

2.0 SCOPE OF SERVICES

The scope of services includes design, development, integration, testing, training, deployment, and documentation of Oracle Network Management System as indicated below. KUB is in the process of purchasing Oracle Network Management System (NMS) licenses by module as listed below.

KUB intends to deploy a single instance of the Oracle NMS software displaying its Gas, Water, Wastewater, and Electric systems. All available functionality within the listed NMS modules are expected to be deployed for KUB’s Electric system. Network connectivity models and outage prediction are not requirements for Gas, Water, and Wastewater systems; however, basic outage management functionality should be provided (display Gas, Water, and Wastewater systems, create and display outage events, assign and manage crews for created outage events). Functionality expectations can be found in Attachment 2; however, this list should not be taken as an exhaustive functionality requirements list. The following modules will be implemented as Phase 1 of KUB’s ADMS project and should form the basis for scope and price of all proposals. **Bold** modules are expected to be implemented for Electric system only.

<table>
<thead>
<tr>
<th>Planned Oracle NMS Modules</th>
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</thead>
<tbody>
<tr>
<td>Oracle Utilities NMS Base (up to 350,000 customers)</td>
<td>Oracle Utilities NMS SCADA Adapter (up to 350,000 customers)</td>
</tr>
<tr>
<td>Oracle Utilities OMS Adapters (up to 350,000 customers)</td>
<td>Oracle Utilities NMS Training Simulator (up to 350,000 customers)</td>
</tr>
<tr>
<td>Oracle Utilities OMS Call Center (up to 350,000 customers)</td>
<td>Oracle Utilities Outage Analytics (50 application users)</td>
</tr>
<tr>
<td>Oracle Utilities OMS Paging (up to 350,000 customers)</td>
<td>Oracle Utilities NMS Extractors and Schema (up to 350,000 customers)</td>
</tr>
<tr>
<td>Oracle Utilities OMS Storm Management (up to 350,000 customers)</td>
<td>Oracle Utilities DMS Fault Location Analysis (up to 210,000 customers)</td>
</tr>
<tr>
<td>Oracle Utilities OMS Switching and Schematics (up to 350,000 customers)</td>
<td>Oracle Utilities DMS Power Flow (up to 210,000 customers)</td>
</tr>
<tr>
<td>Oracle Utilities Operations Mobile Application (up to 350,000 customers)</td>
<td>Oracle Utilities DMS Advanced Feeder Mgmt (up to 210,000 customers)</td>
</tr>
</tbody>
</table>
In addition to the modules planned for Phase 1, KUB is interested in the Electric system functionality below (not listed by module) for inclusion in potential future project phases. The following functionality should not be included in price and scope of proposals; however, experience in implementation of this functionality may be considered during evaluation.

<table>
<thead>
<tr>
<th>Function</th>
<th>Estimated Time (Eastern Time)</th>
<th>Estimated Date</th>
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<tbody>
<tr>
<td>Intelligent Alarms</td>
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<tr>
<td>Field Device Monitoring and Control</td>
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<td></td>
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<tr>
<td>NMS Control of SCADA Points</td>
<td></td>
<td></td>
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<tr>
<td>FLISR</td>
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<td></td>
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<tr>
<td>VVO/IVVC/CVR</td>
<td></td>
<td></td>
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<tr>
<td>Energy Losses</td>
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<tr>
<td>Power Factor</td>
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<tr>
<td>Short Circuit</td>
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<tr>
<td>Relay Protection</td>
<td></td>
<td></td>
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<tr>
<td>Optimal Power Flow</td>
<td></td>
<td></td>
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<tr>
<td>Overload and Harmonics</td>
<td></td>
<td></td>
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<tr>
<td>Performance Indices</td>
<td></td>
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<tr>
<td>Load Shedding</td>
<td></td>
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<tr>
<td>Overload Switching</td>
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<tr>
<td>Dynamic Equipment Rating</td>
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<tr>
<td>Load Transfer/Load Relief</td>
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<tr>
<td>Topology Analysis</td>
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<tr>
<td>Feeder Reconfiguration</td>
<td></td>
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<tr>
<td>Long-term Load Forecasting</td>
<td></td>
<td></td>
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<tr>
<td>T&amp;D Planning</td>
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<tr>
<td>Optimal Equipment Placement</td>
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<tr>
<td>Short-term Load Forecasting</td>
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<tr>
<td>Construction Planning</td>
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<tr>
<td>Breaker/Fuse Capacity</td>
<td></td>
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<tr>
<td>Low Voltage</td>
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</tbody>
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3.0 RFP TENTATIVE TIMELINE

<table>
<thead>
<tr>
<th>Function</th>
<th>Estimated Time (Eastern Time)</th>
<th>Estimated Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Release Request for Proposals</td>
<td></td>
<td>February 28, 2018</td>
</tr>
<tr>
<td>Questions Cut-off Date</td>
<td>2:00 PM EDT</td>
<td>March 13, 2018</td>
</tr>
<tr>
<td>Answers to Questions Posted</td>
<td>2:00 PM EDT</td>
<td>March 16, 2018</td>
</tr>
<tr>
<td>Proposal Due Date</td>
<td>2:00 PM EDT</td>
<td>March 27, 2018</td>
</tr>
<tr>
<td>Short-List Selection Notification</td>
<td>2:00 PM EDT</td>
<td>April 3, 2018</td>
</tr>
<tr>
<td>Vendor Interviews</td>
<td></td>
<td>April 3 – April 13, 2018</td>
</tr>
<tr>
<td>Vendor Selection Announced Approximately</td>
<td></td>
<td>April 16, 2018</td>
</tr>
<tr>
<td>Project Kickoff (Tentative)</td>
<td></td>
<td>May 2018</td>
</tr>
</tbody>
</table>

4.0 VENDOR INSTRUCTIONS

Responses to this RFP must meet KUB's requirements and specifications as outlined herein. Evaluation and final award, if any, of the contract will be contingent upon the responses in the submitted proposals and, for short-listed Proposers, performance during interviews/demonstrations and site visits.

All materials submitted pursuant to this RFP shall become the property of KUB. Solutions and approaches described in the proposal are not considered protected intellectual property unless documented in the proposal as a registered trademark or patented.

4.1 COMMUNICATION WITH KUB

To create a fair bidding environment for Proposers, all communication with KUB related to this RFP must be done through Drew Antunes at Drew.Antunes@kub.org in KUB's Procurement Department. Failure to comply may be grounds for rejection of the Proposer's proposal.
4.2 QUESTIONS AND ANSWERS PROCESS
KUB follows competitive bidding for the selection process that is both fair and equitable for all participating Proposers. KUB will provide Proposers with sufficient information to prepare meaningful and thorough proposals. To address these objectives, KUB will use a formal question and answer process.

Proposers may submit questions related to the RFP to the e-mail address detailed below from the time they receive this RFP until March 13, 2018. Proposers must submit all questions in writing to the following e-mail address: Drew.Antunes@kub.org. KUB will compile all questions and post the questions and the answers online at www.kub.org by March 16, 2018.

4.3 CONFIDENTIALITY OF PROPOSAL
To the extent permitted by law, all documents pertaining to the RFP shall be kept confidential until the evaluation is complete and a contract is awarded. No information about any proposals submitted, other than the names of the Proposers who submitted a proposal, shall be released to anyone until the process is complete, except to members of KUB’s evaluation and selection committees who are evaluating these proposals, other appropriate KUB staff, and, if necessary, KUB’s General Counsel.

4.4 PROPOSAL SUBMISSION
The proposal will be submitted electronically to bids@kub.org by 2:00 PM EDT, March 27, 2018, or 5 hard copies mailed to 4505 Middlebrook Pike, Attn: Procurement, Knoxville, TN 37921.

4.5 COST LIABILITY
All costs and expenses incurred by a Proposer relating to preparation or presentation of its RFP Response or in any way related to this RFP shall be borne by the Respondent. KUB will not be liable for, nor shall it reimburse any Respondent for, any costs, fees, or expenses which are incurred in the preparation or submission of any RFP Response.

4.6 GENERAL INSTRUCTIONS
Proposers should read this RFP in its entirety, including the appendices, before preparing their proposals. Proposers should respond as detailed as necessary to the RFP.

- Proposers are responsible for referring back periodically to this RFP posting online for KUB’s responses to Proposers’ questions and for any addenda to this RFP.
- All proposals must be submitted electronically to bids@kub.org or 5 hard copies mailed to 4505 Middlebrook Pike, Attn: Procurement, Knoxville, TN 37921.
- Proposers must understand and accept all Instructions, Terms, and Conditions in Section 7.0.
- Proposers are encouraged to include comments wherever the Proposer believes this will help KUB understand the Proposer’s response.
- Proposers shall complete the pricing template provided as Attachment 3. All cost items are to be itemized as set up within the pricing template.

4.7 PROPOSAL CONTENT AND ORGANIZATION
Proposers are required to submit the following content in the order provided to KUB electronically at bids@kub.org:
1. Cover Page
2. Executive Summary
3. Design Methodology
4. Project Management Methodology
5. Installation, Configuration, Testing, and Documentation
6. Training Methodology
7. Licensing
8. Vendor's Implementation Background and Examples of Vendor’s Deployments
9. Proposer’s Contact Information Form
10. Client Reference Form
11. Exceptions to Terms and Conditions Form
12. IRS W-9 Form
13. Certificate of minority, woman-owned, or small business status (if applicable)
15. Completed Pricing Template – Separate File (Attachment 3)

4.7.1 Cover Page
The cover page must provide the complete name of the Proposer’s organization, name of the contact who will be the primary contact for the entire RFP process, and contact’s telephone number. This must be the same individual named on the Proposer’s Contact Information Form.

4.7.2 Executive Summary
The executive summary must provide a high-level, brief summary of the most important aspects of the proposal. The summary should describe the proposer’s background regarding Oracle Utilities NMS, differentiators from competitors, a concise description of the proposed solution, a summary of costs, and the benefits to KUB. Proposer should clearly identify the staff expectations on KUB internal resources for each element of the project.

4.7.3 Design Methodology
KUB’s IT Standards for KUB RFPs (Attachment 1) provides a listing of KUB’s preferred technology and IT standards, a current description of each of KUB’s enterprise systems and integrations, and the preferred architectural standards for all enterprise and business unit class systems.

KUB desires to deploy all available functionality of the planned Oracle NMS modules as intended by utilizing proven successful and reliable systems, architectures, methodologies, and processes. These proposed standards and approaches have proven successful in the implementation of other enterprise applications; however, the Proposer should make any changes necessary to ensure the successful implementation of Oracle NMS. Proposers should note any proposed changes to KUB standards, explain the reason for the change, and explain the advantages to KUB.

This section should describe in detail the Proposer’s design and approach to implementation of Oracle Utilities Network Management System. Describe a recommended landscape based on the requirements provided including all hardware (servers) and server OS required for the proposed solution. Include recommended firewalls and switches. Note where redundancy is in place. The proposer should provide a detailed description of the following areas and provide examples, where possible:

- Highly Available (HA) Production Environment
- Disaster Recovery (DA) Environment
- Non-production Environments (Development, Test, Stage)
- Security/Firewall Design
- Interfaces between NMS and KUB’s other enterprise systems (see Section 6
4.7.4 Project Management Methodology

The Proposer shall describe the project management approach and implementation methodology for the proposed solution. The Proposer should ensure that this section describes each of the following:

- Describe how implementation of the project will be organized and managed, including a description of the project management plan.
- Describe major milestones and deliverables. Pay items should be tangible deliverables.
- Identify which tasks will be performed onsite and which tasks will be performed remotely.
- Identify which tasks are to be performed by provider and which by KUB resources.
- Identify project communications and reporting.
- Identify project change control processes.

4.7.4.1 Project Organization

This section must describe the qualifications and experience of the specific staff members to be involved in the project. The Proposer should list all vendor personnel and contractors and specific assignments.

The Proposer should define any and all KUB resources needed to support the project, including project management, architecture design, functionality workshops, participation in testing, participation in training, and deliverable reviews with approximate time commitments. Include an estimate of KUB’s level of effort.

KUB has proposed the following list of KUB personnel for project support; however, Proposers should adjust as necessary to reflect the proposed project structure, schedule, and cost:

<table>
<thead>
<tr>
<th>Project Team</th>
<th>Technical Team</th>
<th>Subject Matter Experts (Available as required)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Manager</td>
<td>Business Analyst</td>
<td></td>
</tr>
<tr>
<td>IT Lead</td>
<td>System Administrator</td>
<td></td>
</tr>
<tr>
<td>Testing and Deployment Lead</td>
<td>Business Analyst</td>
<td></td>
</tr>
<tr>
<td>Process Lead</td>
<td>Business Analyst</td>
<td></td>
</tr>
<tr>
<td>Development Lead</td>
<td>IT Developer</td>
<td></td>
</tr>
<tr>
<td>Development Support</td>
<td>IT Developer x 2 (Part-time, as required)</td>
<td></td>
</tr>
<tr>
<td>Database Administrator</td>
<td>Database Administrator</td>
<td></td>
</tr>
<tr>
<td>Engineering</td>
<td>Distribution Automation</td>
<td></td>
</tr>
<tr>
<td>Operations Technology</td>
<td>System Operations</td>
<td></td>
</tr>
<tr>
<td>Operations/Dispatch</td>
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<td></td>
</tr>
</tbody>
</table>

4.7.4.2 Roles and Responsibilities

The Proposer must include a RACI Matrix that describes participation (Responsible, Accountable, Consulted, and Informed) by various roles in completing tasks and deliverables. Additionally, the Proposer will indicate the location where tasks will be conducted. The proposer should include each of the following:

- Describe the qualifications and experience of specific staff members to be involved in the project. Proposers are encouraged to include a complete profile for each staff member and include a description of their role on the project team.
- Describe the typical work hours and location for each staff member.
4.7.4.3 Project Schedule/Project Plan
The Proposer must provide an implementation schedule by major task showing tasks in the critical path. The project schedule shall specify payment milestones and reflect the delivery of specific functionality. The specific duration will be negotiated with the selected Proposer.

4.7.4.4 Workshops
The Proposer must provide an estimate of the number of workshops to be conducted with KUB in the areas of functionality development, architecture, integrations, impact on existing processes, and testing.

4.7.4.5 Project Communications
The Proposer will participate in biweekly Status Meetings with KUB in addition to a written biweekly Status Report, to be crafted at the start of the project. Biweekly Status reports will report on, at a minimum:

- Major work completed the previous two weeks
- Major work forecasted for next two weeks
- Project status - Schedule, scope, and budget
- Newly identified issues
- Status of ongoing issues
- Major vacations or time off scheduled in the next six weeks

Additionally, the Proposer will be available for monthly status reports to KUB’s PMO, as well as any special called meetings. The Proposer will indicate the senior point of contact and contact information to whom senior KUB management can reach out regarding any issues.

4.7.4.6 Contract Changes
During the project, the Proposer will identify any changes in scope, schedule, or budget and follow KUB contract change control procedures.

4.7.4.7 Project Completion
The Provider will describe the post-deployment services through go-live and the stabilization phase.

4.7.5 Installation, Configuration, Testing, and Documentation
The Proposer shall describe the installation, configuration, testing, and documentation for Oracle NMS. The Proposer should ensure that this section describes each of the following:

- Describe the solution development, configuration, and documentation processes
- Describe the process of installing the application and its components (hardware and software) at KUB, as applicable
- Describe the file migration approach and quality control procedures
- Describe the unit, system, and performance testing approaches and overall quality control program for out of the box and custom code delivery
- Describe the approach to deployment (cut-over or go-live) and the activities involved to ensure that users are able to perform their work using it. Identify any potential user impacts such as downtime or loss of functionality, such as during a freeze to migrate existing files.
- Describe the approach to acceptance testing, consisting of the execution of test plans developed in previous tasks
4.7.6 Training Methodology
The Proposer shall describe the training program provided for all deployed functionality. The training program details should include:

- Specific training provided – application, operations, architecture, other
  - IT support and administration including supporting tools
  - End user training
- Specific training channels used – On-site, remote, online, etc.
- Hours of training provided
- Customization allowed by KUB
- Costs of additional training, if available

4.7.7 Licensing
KUB will purchase licenses directly from Oracle Corporation for the Network Management System (ADMS) and the underlying database. The proposer will provide a list of other peripheral software necessary to operate the proposed solution. Describe how to proposer’s implementation team and KUB will work together to ensure appropriate licensing is in place to support the solution. The proposer’s implementation team will work with KUB and Oracle to obtain license compliance certification from Oracle.

4.7.8 Vendor’s Implementation Background and Examples of Vendor’s Deployments
In this section, the Proposer will provide background information regarding their Oracle NMS implementation experience including detailed examples of Proposer’s deployments of Oracle NMS. KUB would like a table listing deployments of Oracle NMS at North America utilities, both those deployed and underway. This table should include:

- Name of utility
- Type(s) of utility – Electric, gas, water, wastewater
- Number of meters
- Number of AMI meters
- Specific functionality deployed – Individual functionality and/or modules
- Vendors of major integrated systems (SCADA, GIS, AMI)

4.7.9 Proposer’s Contact Information Form
The Proposer will complete, in its entirety, and include the Proposer’s Contact Information Form that appears in Appendix B.

4.7.10 Client Reference Form
The Proposer will complete and include the Client Reference Form that appears in Appendix C. Complete the form in its entirety. Provide references for clients for whom you provided a solution that most closely reflects your proposed solution for KUB. KUB prefers at least three (3) references. By providing this information, it is understood by the Proposer that KUB may contact these clients.

4.7.11 Exception to Terms and Conditions Form
The Proposer will complete and include the Exception to Terms and Conditions Form that appears in Appendix D. If there are no exceptions, indicate ‘No Exceptions’ on the form and sign it. If any exceptions are taken to any of the Terms and Conditions, they must be noted on the form, and the form must be signed.
4.7.12 IRS W-9 Form

A completed W-9 Form (Request for Taxpayer Identification Number and Certification) must be returned.

4.7.13 Certification of Minority, Woman-Owned, or Small Business Status (if applicable)

Provide copies of appropriate certifications from a recognized source showing minority, woman-owned, or small business status, if applicable.

4.7.14 Completed Functional Elements Spreadsheet – Separate Spreadsheet (Attachment 2)

Attachment 2 reflects KUB’s general functional elements by module including specified process purpose/outcomes, as well as a detailed list of expected functionality for the Network Management System; however, these lists should not be taken as an exhaustive list of system functional requirements. KUB expects proposals to include all available functionality for the planned Phase 1 modules listed in Section 2.0. KUB is also seeking professional expertise and consultation for solution development and process optimization utilizing the native tools and functionality of Oracle Utilities NMS.

- Review and respond to each of the functional elements listed in Attachment 2. Responses should provide an acknowledgement and description of previous experience to successfully implement the software referenced above for each specified element.
- The proposer is allowed to attach documents to further explain answers provided. Attached documents should clearly reference the applicable functional elements.

4.7.15 Completed Pricing Template – Separate Spreadsheet (Attachment 3)

Proposers shall use the pricing template spreadsheet provided by KUB in Attachment 3. The pricing proposal should take into consideration the following:

- Prices quoted shall be itemized by major task and all-inclusive, firm fixed prices with payments at milestones.
- Line items in pricing template should correspond to major tasks listed in proposed project plan and must include the basis for the cost provided (required resources, rates, and time)
- The proposer will include the rate for each required resource in the Resources tab
- Prices must detail all design, development, testing, integration, deployment, and installation costs, including labor, materials, shipping, fees, training, support, installation, travel expenses, overhead, profit, warranty, etc.

KUB will retain approximately 10 percent of the total contract value pending final acceptance of the solution plus 60 calendar days. A mutual agreement on expected resolution of issues will be documented. All issues must be addressed before final acceptance.

4.8 DISQUALIFICATION

KUB, at its sole discretion, without liability, cost or penalty, may disqualify any RFP Response before the RFP is fully evaluated if, in the opinion of KUB:

A. The RFP Response contains false information; or B. The Respondent has failed to satisfy any of the requirements or terms and conditions specified in this RFP.

4.9 AWARD OF CONTRACT

KUB reserves the right to award the contract to one or more Proposer, or not at all, at KUB’s sole discretion. The selected Proposer(s) shall be required to enter into a written contract or contracts with KUB in a form approved by legal counsel for KUB. This RFP and the proposal, or any part thereof, shall be incorporated
into and made a part of the final contract(s) in the sole discretion of KUB. KUB reserves the right to negotiate
the terms and conditions of the contract(s) with the Proposer(s).

4.10  CONTRACT NEGOTIATIONS

After a review of the proposals, in-person presentations, demonstrations and site visits, KUB intends to
enter into contract negotiations with the selected Proposer. These negotiations could include all aspects
of services and fees.

5.0  PROPOSAL EVALUATION

KUB shall be the sole judge of the proposal(s) and the resulting negotiated agreement. KUB reserves the
right to ask for additional information, as it deems necessary, to evaluate the ability of any Proposers to
perform the work or service requested.

KUB reserves the right to contract for all services, no services, or any portion of services proposed.

KUB reserves the right to evaluate and accept any bid, which in KUB’s sole opinion, offers the most
acceptable solution to KUB. KUB reserves the right to reject any or all proposals, and, in its sole discretion,
KUB reserves the right to award a contract to either one or more Proposers if it is deemed to be in the best
interest of KUB.

5.1  EVALUATION PROCESS

A multimember evaluation team will review all proposals and short-list the best responses for further
consideration. Once notified of short-list selection, KUB will schedule vendors for interviews. Upon
completion of all interviews, the evaluation team will make a recommendation to KUB’s Project
Management Office (PMO). The PMO will approve the final decision prior to notifying selected Proposer(s).

5.2  EVALUATION CRITERIA

The KUB evaluation team will evaluate Proposers’ responses using the following criteria:

<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>Criteria Description</th>
</tr>
</thead>
</table>
| Ability to Meet or Exceed Service Expectations | The team will evaluate the Proposers with regard to their ability to implement Oracle NMS based on the following:  
• Project management methodology  
• Prior experience implementing similar functionality  
• Ability to answer questions in Section 4.7  
• Qualifications of staff  
• Results of client reference checks |
| Total Fixed Price Cost                   | The team will conduct a cost-benefit analysis of the proposed solution that will, in KUB’s sole judgment, best meet its needs. Pricing must include all associated costs referenced in Section 4.7.15. |
6.0 SOLUTION SPECIFICATIONS AND REQUIREMENTS

6.1 KUB DISTRIBUTION SYSTEM

**Electric Service Area**
- Number of Customers: 202,843
- Service Area: 688 square miles
- Service Lines: 5,321 miles
- Substations: 63

**Natural Gas Service Area**
- Number of Customers: 99,808
- Service Area: 284 square miles
- Service Mains: 1,411 miles

**Water Service Area**
- Number of Customers: 78,980
- Service Area: 188 square miles
- Treatment Plants: 5,321 miles
- Booster Pump Stations: 24
- Storage Facilities: 28
- Service Mains: 1,411 miles

**Wastewater Service Area**
- Number of Customers: 70,265
- Service Area: 245 square miles
- Treatment Plants: 4
- Lift Stations: 75
- Storage Facilities: 6
- Service Mains: 1,217 miles
• AMI Meters
  o All meters will be AMI meters or have AMI modules; deploying through 2020 (currently 40,000 meters deployed)
  o Electric meters – Installing primarily Sensus Stratus meters, some Elster A3 and ION meters
  o Gas meters – Retrofitting American meters with Sensus module
  o Water meters – Installing Sensus iPearl meters; above 1-inch will be retrofitted with module

• Distribution automation (DA) and DER/EE/DR
  o Minimal DA, but installing reclosers and smart switches
  o Hundreds of faulted circuit indicators, some of which are connected to the SCADA system
  o 45 small solar facilities (non-utility-owned); approximately 20-25 residential/commercial customers with solar installed
  o 5 MW methane facility
  o Constructing 50kW solar array and investigating microgrid for KUB campus

6.2 CURRENT INTEGRATIONS DIAGRAM
The following diagram shows the current integrations of OMS with other systems at KUB. It is expected that most of these integrations will still be required upon the installation of Oracle NMS. Those that may not be required are indicated in the notes following the diagram. KUB plans to build integration services for the existing enterprise system and middleware layer, with the Proposer building integration into and out of Oracle NMS.
6.2.1 OMS
Current system is Intergraph InService (Version 8.01.03.120). Outage-related integrations with CIS, IVR, KUB.org, AMI, GIS, AMS, and iMobile TC.

6.2.2 iMobile TC
Mobile work management functionality of Intergraph InService OMS. KUB will move mobile solution to KUB-developed application called Fieldwork.

6.2.3 ESB
KUB’s enterprise service bus (ESB) is implemented to eliminate direct connections between system. The ESB utilizes MultiSpeak with current outage-related connections including IVR, Web/KUB.org/KUBApps, CIS, and AMI. The ESB is IBM’s WebSphere Enterprise Service Bus 7.0.0.5.

6.2.4 SCADA
Current SCADA systems are the Siemens TELEGYR (Version 9.1.2) for electric, gas and wastewater, and the Schneider Electric Wonderware (Version 10.1 SP3) for water. Proposers should provide options for both one-way integration (outage event creation with no SCADA device control) and two-way integration (outage event creation with control of electric SCADA devices through NMS) with Oracle NMS.

6.2.5 GIS
Current system is ESRI ArcGIS (Version 10.2.1). Servers are Version 10.3. Integrations with OMS, CIS, AMS, KUB.org, and other Utility Modeling Systems. Not connected through the ESB.

6.2.6 Asset Management System (AMS)
Current system is Maximo (Version 7.5.0.6) with an AMS Offline App created within OMS in case crew is in area of lost connectivity. Planning to discontinue use of offline app and store all information in KUB’s Fieldwork.

6.2.7 CIS
Current system is PeopleSoft (Version 8.9)

6.2.8 IVR
Hosted solution (West Corporation). Connects to ESB.

6.2.9 Website
Internally developed websites connected to ESB. Reads information from OMS and CIS and has a “Storm Mode”. Displays Customer Outage Map (KUB.org) and Internal Outage Map (KUBApps).

6.2.10 AMI
Current system is Sensus (private cloud). Sensus ESB connects to KUB ESB.

6.2.11 Fieldwork
Internally developed mobile app that presents on any device. Future platform for field crew for both planned and unplanned outages. The Fieldwork application is a web-based application that runs on IBM’s WebSphere Liberty application server (version 8.5.5.9 to be upgraded to 17.0.0.1 or later). Deployment is planned prior to NMS deployment. **KUB expects to integrate through web services available in Oracle Utilities Operations Mobile Application.**
6.2.12 Automatic Vehicle Location (AVL)

AVL is currently accomplished through the GPS capability of iMobileTC devices. In the future, the plan is to use the GPS of devices using the KUB Fieldwork application.

6.2.13 Meter Data Management (MDM)

MDM is Harris Utilities MeterSense. The MDM is not currently used in the outage management process as AMI alarms and events do not come through the MDM to the OMS.

7.0 INSTRUCTIONS, TERMS, AND CONDITIONS

A. Instructions: These documents constitute the complete set of specifications, requirements, and proposal request instructions. The Proposer is responsible for insuring that all pages and all addenda are received. KUB advises all proposers to closely examine this proposal response, and to immediately direct any questions regarding the completeness of this RFP and any addenda to the Procurement Department.

B. Rights: KUB reserves the right to reject any or all proposals and to waive irregularities therein, and the undersigned hereby agrees that such rejection or waiver shall be without liability on the part of KUB for any damage or claim brought by the undersigned because of such action, nor shall the undersigned seek any recourse of any kind against KUB because of such action. There is no obligation to buy. All proposals submitted to KUB become the property of KUB upon submission and after the execution of a contract become subject to Tennessee’s Public Records law, as codified in Tenn. Code Ann. §§10-7-101 et. seq.

C. Request for Proposal Definitions: This section describes the procedures for companies submitting a response to this Request for Proposal (RFP). The term “Proposer” refers to the person or entity to which a contract is awarded.

D. Time and Date for Submitting Proposals: Each Proposer shall respond to this RFP on or before the time and date indicated on the Request for Proposal cover sheet. Proposals will not be made available for public inspection until after the RFP process is completed and a purchase order has been issued. The Proposal shall be delivered by email to bids@kub.org with the subject line of RFP 1170 – Advanced Distribution Management System Implementation/Integration Services before 2:00PM EDT time on the “Proposal Due Date” referenced in Section 3.0.

E. Response: Each Proposer must acknowledge that it accepts and understands each of the Instructions, Terms, and Conditions of this RFP. If a Proposer is unwilling to accept any one or more of the Instructions, Terms, and Conditions, they must clearly identify in their proposal the Instructions, Terms, and Conditions to which they take exception and note it on the enclosed exception sheet. In its sole discretion, KUB reserves the right on a non-discriminatory basis to: a) consider any Proposal(s) which takes exception(s) to any one or more of the Terms and Conditions; or b) reject any Proposal(s) which takes exception(s) to any one or more of the Terms and Conditions.

F. Ex Parte Communication: KUB does not permit contact concerning this RFP process with any KUB personnel other than as identified in the RFP until the selection process has been completed. All exchanges of information concerning this RFP must be in writing, with e-mail as the preferred method of communication. Failure to honor this requirement will be viewed negatively in the selection process and may result in the disqualification of the Proposer. Any questions or requests for clarification will be responded to in writing or by email with a copy of the response being sent to each proposer on record.

G. Discrepancies, Errors and Omissions: Any discrepancies, errors, omissions, or ambiguities in this RFP or the requirements / guidelines or addenda (if any) stated herein should be reported to KUB. At KUB’s option, a written addendum may be issued and the addendum will be incorporated in the RFP and will become part of the Contract Documents. KUB will not be responsible for or bound by any oral instructions, clarifications or other communications and no such oral communication may be relied on by any Proposer.
H. Agreement: Each successful Proposer will be required to sign a contract with KUB. The entire agreement shall include the Proposer’s response to this proposal, the RFP, and an agreement (the “Contract Documents”). If the RFP and the Proposer’s response to this proposal are modified in negotiation between KUB and the Proposer, then the modified proposal shall be included as addenda to the successful Proposer’s contract with KUB. Should any conflict or discrepancy arise between the Instructions, Terms, and Conditions of the RFP and the Instructions, Terms and Conditions of the Agreement, the Instructions, Terms and Conditions of the Agreement shall control. The individual who signs this document must be empowered to sign the Agreement, or if sent by email the name that appears on the proposal response must be empowered to sign the Agreement. KUB reserves the right to withdraw the RFP or condition the award on additional or different terms proposed to be included in such contract, and KUB shall not incur any obligation to the successful Proposer except as provided in the Agreement. To produce the Agreement, KUB reserves the right to provide its own draft contract terms or request draft contract terms from the Proposer. Notification of award of the or acceptance of a RFP, in whole or in part, shall not restrict KUB’s discretion with regard to the terms of the definitive contract, shall not preclude KUB from terminating the proposal or withdrawing the proposal prior to execution of the Agreement, and shall not limit KUB’s right to consider and act on additional information that may come to its attention from any source.

I. Cancellation: KUB reserves the right to cancel the agreement without cost or penalty to KUB, if, in KUB’s opinion, there is a failure at any time by the Contractor to adequately perform the Agreement, or if there is any attempt to willfully impose upon KUB service workmanship which is, in the opinion of KUB, of an unacceptable quality or time requirements. Cancellation of the Agreement shall not impair any rights or claim of KUB to damages for the breach of any covenants of the Agreement by the successful proposer.

J. General: KUB recognizes that the highest price Proposal does not necessarily indicate the best Proposal in terms of capabilities, quality or service. As a result, the selection of a Proposer to which the contract will be awarded will be determined on the basis of which Proposal is in the best interest of KUB based on the factors described in the Proposal Evaluation (Section IV.) of this RFP. KUB reserves the right to reject any or all Proposals, to waive technicalities or informalities and to accept any proposal determined to be in the best interest of KUB. KUB will not be responsible for misinterpretations that are caused by failure of a Proposer to follow the RFP format or to give proper and specific references when citing referenced material. The selection criteria are described in the RFP. KUB reserves the right, in its discretion and without incurring any liability to any Proposer, to modify or terminate this RFP at any time prior to the execution of a definitive contract, and to accept or reject any Proposal for any reason.

K. Documents: Each proposal must include the following documents 1) A fully completed Proposal, including any KUB data sheets or addenda, 2) A signed Exceptions document to Instructions, Terms, and Conditions, attached to Proposal.

L. Communication: KUB reserves the right to communicate with the Proposers, individually or collectively, formally or informally. KUB requires that questions and other communications concerning the RFP be submitted to KUB only in writing and must be directed to the appropriate person identified on this RFP cover sheet.

M. Response Times: Response times will be made as described in the RFP. Failure to respond to as specified and in accordance with the Proposal submitted, including promised lead times, will constitute sufficient grounds for cancellation of the contract, and KUB shall incur no cost or penalty for cancellation. All Proposals must include all applicable transportation, service charges, sales and use taxes, assembly, and all other applicable charges.

N. Minimum Performance: The services in accordance with this RFP (including optional items selected by KUB) shall be fully in compliance with all federal, state, and local laws, rules, and regulations.

O. Guarantee: In making a proposal, each Proposer certifies that it is fully aware of the conditions of service and that its offer will meet these requirements of service and purpose to the satisfaction of KUB. Proposer warrants and guarantees to KUB all services and products to be provided and that work and products will be of good quality, and in conformance with the Contract Documents.
work not conforming to these standards may be considered defective by KUB.

P. **Insurance**: Insurance Requirements

- **Proposer's Insurance**: The successful Proposer shall provide KUB with the types and amounts of insurance coverage that the Proposer maintains in its RFP response. The insurance coverage required by KUB for this project will be mutually agreed upon by KUB and the Proposer before a contract is signed. The successful Proposer shall not allow any subcontractor to commence service on their subcontract until all similar insurance required of the subcontractor has been obtained and approved. All insurance policies shall be with insurers approved and admitted to do business in Tennessee. KUB shall be furnished proof of coverage of insurance by certificates of insurance accompanying the contract documents and shall name KUB as an additional insured as respects commercial general liability and business automobile liability. The successful Proposer shall provide KUB a thirty (30) day cancellation notice in the event any insurance required by fair agreement is canceled.

- **Employer’s Liability Insurance**: The successful Proposer shall secure and maintain during the term of the Agreement if applicable, Employer’s Liability Insurance.

- **Worker’s Compensation Insurance**: The successful Proposer shall secure and maintain during the term of the Agreement if applicable, worker’s compensation insurance for all of their employees connected with the work on this project and, in case any work is sublet, shall require the subcontractor similarly to provide worker’s compensation insurance for all of the latter’s employees unless such employees are covered by the protection afforded by the successful Proposer. Such insurance shall comply fully with Tennessee Worker’s Compensation Law. In case any class of employees engaged in hazardous work under this contract at the site of the project is not protected under the Worker’s Compensation Statute, the successful Proposer shall provide, and cause each Subcontractor to provide, adequate insurance satisfactory to KUB, for protection of their employees not otherwise protected.

- **Commercial General Liability and Business Auto Liability**: The successful Proposer shall secure and maintain during the term of the Agreement, comprehensive general liability and comprehensive automobile liability insurance which shall protect them from claims for damage for personal injury, including accidental death, as well as claims for property damages which may arise from operations under this Agreement whether such operation be by themselves or by anyone directly or indirectly employed by them.

- **Indemnification Rider**: The successful Proposer agrees to indemnify and hold harmless KUB, its agents, or employees from and against all loss or expense (including cost and attorney’s fees) by reason of liability for damages because of bodily injury, including death, at any time resulting there from, sustained by any person or persons or damage to property, including loss of use thereof, arising out of or in consequences of the performance under the Agreement to be entered into whether such injuries to persons or damage to property is due or claimed to be done due to the negligence of the Proposer, his/her subcontractor, KUB, their agents or employees, except only such injury or damage as shall have been occasioned by the sole negligence of KUB. Compliance with the foregoing requirements shall not relieve the Proposer of its liability and obligations under this section or under any other portion of the contract. Proposers regulated by the Tennessee Regulatory Authority or other regulatory authority are required to respond by stating what provisions of their tariff satisfy the requirements of this paragraph.

R. **Taxes**: All taxes of any nature arising out of or in connection with the work above shall be the responsibility of the successful Proposer.

S. **Nondiscrimination**: KUB is an equal opportunity employer and as such requires that its suppliers not discriminate on the basis of race, color, sex, religion, or ethnic origin. Submitting a RFP constitutes Proposer's acknowledgement of this provision. KUB encourages the use of small business, minority, and women owned business enterprises.

T. **Title VI**: Proposer shall comply with the requirements of all federal statutes relating to nondiscrimination, including but not limited to, Title VI of the Civil Rights Act of 1964, which prohibits discrimination on the basis of race, color, sex, or national origin (“Title VI”). No person on the grounds of race, color, or national origin shall be excluded from participation in, denied benefits of, or be otherwise subject to discrimination in the performance of the proposal. The proposer if
awarded the proposal shall upon request, show proof of such nondiscrimination.

U. **Damages**: The proposer will be responsible for any damages to property of KUB or others caused by it, its employees, or sub-suppliers, and will replace and make good such damages to the satisfaction of KUB.

V. **Choice of Law**: This proposal and any subsequent contract or agreement related to this proposal shall be governed by and construed with the Laws of the State of Tennessee.

W. **Statutory Disqualification**: By submitting a proposal the proposer represents that neither it nor any of its officers, directors, shareholders, members or partners has been convicted or plead guilty or nolo contendere to any violation of the Sherman Anti-Trust Act, mail fraud, or other state, or federal criminal violation in connection with a contract let by the State of Tennessee or any other state or any political subdivision of the State of Tennessee.

X. **Conflict of Interest**: By submitting a proposal, proposer represents that no commissioner or officer of KUB or other persons whose duty is to vote for, let out, oversee, or in any manner supervise any work on any contract for KUB has a “direct interest” in the proposer or in the work which is subject to this proposal.

Y. **"Right to Know Law"**: Manufacturers and Distributors that are regulated by and complying with the provisions of the OSHA hazard communication standard must provide KUB a material data safety sheet (MSDS) for any element, chemical, or mixture that presents a physical hazard or a health hazard as defined by the OSHA standard or any hazardous substance. The data sheet must be provided to KUB at the time of delivery. Manufacturers and Distributors must insure that each container of hazardous chemical delivered to KUB be properly labeled, tagged, or marked in accordance with OSHA standards. Labels and other forms of warning for each incoming hazardous chemical will be inspected for compliance with the standard.

Z. **Copyright, Trademark, Service Mark, or Patent Infringement**: 
   a. Proposer shall, at its own expense, be entitled to and shall have the duty to defend any suit which may be brought against KUB to the extent that it is based on a claim that the products or services furnished infringe a copyright, trademark, service mark, or patent. Proposer shall further indemnify and hold harmless KUB against any award of damages and costs made against KUB by a final judgment or a court of last resort in any such suit.
   b. If the products or services furnished under this proposal or contract are likely to, or do become, the subject of such a claim of infringement, then without diminishing Proposer’s obligation to satisfy the final award, Proposer may at its option and expense:
      i. Procure for KUB the right to continue using the product or service.
      ii. Replace or modify the alleged infringing products or services with other equally suitable products or services that are satisfactorily to KUB, so that they become non-infringing.
      iii. Remove the products or discontinue the services and cancel any future charges pertaining thereto. Provided, however, that Proposer will not exercise options b.i., or b.ii. when they are impractical.

AA. **Ownership of Intellectual Property**: Any and all intellectual property, including but not limited to copyright, invention, trademark, trade name, service mark, and/or trade secrets created or conceived pursuant to or as a result of this contract and any related subcontract (“Intellectual Property”), shall be work made for hire and KUB shall be considered the creator of such Intellectual Property. KUB shall own the entire right, title and interest to the Intellectual Property throughout the world. Contractor shall notify KUB, within thirty (30) days, of the creation of any Intellectual Property by its or its subcontractor(s). Contractor, on behalf of itself and any subcontractor(s), agrees to execute any and all document(s) necessary to assure ownership of the Intellectual Property vests in KUB and shall take no affirmative actions that might have the effect of vesting all or part of the Intellectual Property in any entity other than KUB. The Intellectual Property shall not be disclosed by contractor or its subcontractor(s) to any entity not KUB without the express written authorization of KUB.

BB. **Property of KUB**: Any materials, including reports, computer programs, and other deliverables created under the Contract Documents are the sole property of KUB. The successful Proposer is not entitled to a patent or copyright on those materials and may not transfer the patent or copyright to anyone else. The Proposer shall not use or release these materials without the prior written
consent of KUB.

CC. **Force Majeure:** No party shall have any liability to the other hereunder by reason of any delay or failure to perform any obligation or covenant if the delay or failure to perform is occasioned by *force majeure*, meaning any act of God, storm, fire, casualty, flood, earthquake, embargo, civil disturbance, acts of terrorism, governmental regulation, or causes similar nature beyond its control.

DD. **Possession of Weapons:** All Proposers vendors, suppliers, and service providers and their employees, agents, or subcontractors are prohibited from possessing any weapons on KUB property.

EE. **Search:** All persons, packages, and vehicles on KUB property are subject to being searched. Routine unannounced searches by KUB may be conducted. Refusal to submit to random searches will be grounds for removal from KUB property and prohibited access in the future. All vehicles leaving the KUB facilities are subject to being searched.

FF. **Traffic:** Traffic regulations are to be observed at all times.
8.0 APPENDICES

8.1 APPENDIX A: GLOSSARY

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>KUB</td>
<td>Knoxville Utilities Board</td>
</tr>
<tr>
<td>OMS</td>
<td>Outage Management System</td>
</tr>
<tr>
<td>ADMS</td>
<td>Advanced Distribution Management System</td>
</tr>
<tr>
<td>CIS</td>
<td>Customer Information System</td>
</tr>
<tr>
<td>GIS</td>
<td>Geographic Information System</td>
</tr>
<tr>
<td>IVR</td>
<td>Interactive Voice Response</td>
</tr>
<tr>
<td>AMI</td>
<td>Advanced Metering Infrastructure</td>
</tr>
<tr>
<td>SCADA</td>
<td>Supervisory Control and Data Acquisition</td>
</tr>
<tr>
<td>ERT</td>
<td>Estimated Restoration Time</td>
</tr>
<tr>
<td>AMS</td>
<td>Asset Management System</td>
</tr>
<tr>
<td>ESB</td>
<td>Enterprise Service Bus</td>
</tr>
<tr>
<td>AVL</td>
<td>Automated Vehicle Location</td>
</tr>
<tr>
<td>MDM(S)</td>
<td>Meter Data Management (System)</td>
</tr>
</tbody>
</table>
8.2 APPENDIX B: PROPOSER'S CONTACT INFORMATION FORM

Please provide the following information:

Company Name: ________________________________
Company Address: ______________________________
City / State / Zip: ______________________________
Telephone #: _________________________________
Fax #: _________________________________
Web Address: ________________________________

Primary Sales Contact: ______________________________
Title: ________________________________
Telephone #: ________________________________
Mobile #: ________________________________
Fax #: ________________________________
E-Mail Address: ________________________________

Person Authorized to Sign Contracts: ________________________________
Title: ________________________________
Telephone #: ________________________________
Mobile #: ________________________________
Fax #: ________________________________
E-Mail Address: ________________________________
8.3 APPENDIX C: CLIENT REFERENCE FORM

List references that most closely reflect similar scope of service within the past three (3) years.

Reference Company #1:
Street Address:
City, State, Zip:
Contact’s Name:
Contact’s Title:
Contact’s Phone #:
E-Mail Address:
Type of Service Performed/Project Description:
Dates of Performance:

Reference Company #2:
Street Address:
City, State, Zip:
Contact’s Name:
Contact’s Title:
Contact’s Phone #:
E-Mail Address:
Type of Service Performed/Project Description:
Dates of Performance:

Reference Company #3:
Street Address:
City, State, Zip:
Contact’s Name:
Contact’s Title:
Contact’s Phone #:
E-Mail Address:
Type of Service Performed/Project Description:
Dates of Performance:
APPENDIX D: EXCEPTION TO TERMS AND CONDITIONS FORM

The Proposer hereby declares that the following list states any and all variations from and exception to the requirements of the Terms and Conditions and that, otherwise, it is the intent of the Proposer that the materials and services work be performed in strict accordance with the Contract Documents. The Proposer acknowledges that the listing of any exception, which is unacceptable to KUB, will have the effect of voiding the proposal. NOTE: If you have no exceptions, indicate 'No Exceptions.'

__________________________________________________________
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__________________________________________________________
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__________________________________________________________
__________________________________________________________
__________________________________________________________
__________________________________________________________
__________________________________________________________
__________________________________________________________

The Proposer hereby accepts the Terms and Conditions described herein except for the list of exceptions described immediately above.

Date: ______________________________

Signed: ______________________________

Title: ______________________________
9.0 ATTACHMENTS

9.1 ATTACHMENT 1: IT STANDARDS FOR KUB RFP

9.2 ATTACHMENT 2: FUNCTIONAL ELEMENTS SPREADSHEET
Proposers should follow instructions in the spreadsheet and complete the entire spreadsheet. Proposers are encouraged to provide additional relevant information which will enable the evaluators to have a full understanding of the Proposer’s experience with expected functionality.

9.3 ATTACHMENT 3: PRICING TEMPLATE
Proposers shall use the pricing template spreadsheet provided by KUB in Attachment 3 to provide details of all costs associated with the design, development, integration, testing, training, deployment, and documentation of Oracle Utilities Network Management System, as described in the Proposer’s response.
Purpose and Scope
The purpose of this document is to list the preferred technology utilized by Knoxville Utilities Board (KUB). To reduce costs and offer the highest level of support possible to our customers, KUB has elected to reuse IT resources, reduce complexity, and become more efficient by implementing service oriented architecture (SOA)-compliant systems and deploying virtualized technologies. These technologies and methodologies should be used whenever possible in any proposal.

Responsibility
IT Operations Management

Instructions
1.0 KUB PREFERRED TECHNOLOGIES
2.0 KUB ENTERPRISE SYSTEM SPECIFICATIONS
   2.1 CUSTOMER INFORMATION SYSTEM (CIS)
   2.2 FINANCIAL MANAGEMENT SYSTEM (FMS)
   2.3 HUMAN RESOURCE MANAGEMENT SYSTEM (HRMS)
   2.4 OUTAGE MANAGEMENT SYSTEM / MOBILE DATA SYSTEM (OMS / MDS)
   2.5 WORK MANAGEMENT SYSTEM
   2.6 ENGINEERING DESIGN
   2.7 MIDDLEWARE
   2.8 LIMS
   2.9 SCADA
   2.10 SCADA
   2.11 GEOGRAPHIC INFORMATION SYSTEM (GIS)
3.0 SYSTEM ARCHITECTURAL STANDARDS
# KUB Preferred Technologies

## TABLE 5-1
KUB Information Technology Standards

<table>
<thead>
<tr>
<th>REQUIREMENT TYPE</th>
<th>KUB PREFERRED TECHNOLOGY &amp; INFRASTRUCTURE INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Server Operating System</td>
<td>Windows 2016 Server or RedHat Ent Linux or RedHat Virtualization</td>
</tr>
<tr>
<td>Enterprise Database</td>
<td>Oracle 12G or SQL Server 2014</td>
</tr>
<tr>
<td>Application Messaging</td>
<td>MQSeries or WebSphere Enterprise Service Bus (ESB) using SOAP, J2EE messaging</td>
</tr>
<tr>
<td>Email and Calendaring</td>
<td>Exchange / Outlook (O365)</td>
</tr>
<tr>
<td>Network Infrastructure</td>
<td>Cisco Routers and Switches</td>
</tr>
<tr>
<td>Backup Server and Client</td>
<td>CommVault</td>
</tr>
<tr>
<td>Load Balancing</td>
<td>F5</td>
</tr>
<tr>
<td>Windows Server Imaging</td>
<td>Acronis True Image, Microsoft WDS, CommVault</td>
</tr>
<tr>
<td>Virtual Server Host</td>
<td>ESX 6.5 or RedHat Virtualization or Microsoft Hyper-V</td>
</tr>
<tr>
<td>Desktop Operating System</td>
<td>Windows 10</td>
</tr>
<tr>
<td>Desktop Type</td>
<td>Lenovo</td>
</tr>
<tr>
<td>Laptop Types</td>
<td>Panasonic Toughbooks</td>
</tr>
<tr>
<td>Desktop Applications</td>
<td>Microsoft O365 &amp; Internet Explorer &amp; Firefox &amp; Chrome</td>
</tr>
<tr>
<td>Internet Connection</td>
<td>Multiple vendors for redundancy ATT-1GB, WOW-500MB, Comcast-100MB</td>
</tr>
<tr>
<td>Web Application Server</td>
<td>Apache 2.4.x, Oracle Weblogic, IIS, WebSphere Liberty 17.0.0.x</td>
</tr>
<tr>
<td>Customer Service Suite</td>
<td>PeopleSoft 8.9 – Customer Information System</td>
</tr>
<tr>
<td>Human Resources App</td>
<td>PeopleSoft 9.2 – HRMS</td>
</tr>
<tr>
<td>Financials Application</td>
<td>PeopleSoft 9.2 – FMS</td>
</tr>
<tr>
<td>Work Management</td>
<td>IBM Maximo 7.5</td>
</tr>
<tr>
<td>Network Backbone</td>
<td>10 GB</td>
</tr>
<tr>
<td>Desktop Connection</td>
<td>1 GB</td>
</tr>
<tr>
<td>Server Connection</td>
<td>1 GB</td>
</tr>
<tr>
<td>Server Hardware</td>
<td>5 year – 24 X 7 vendor supported</td>
</tr>
</tbody>
</table>
## TABLE 5-1
KUB Information Technology Standards

<table>
<thead>
<tr>
<th>REQUIREMENT TYPE</th>
<th>KUB PREFERRED TECHNOLOGY &amp; INFRASTRUCTURE INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security Authentication</td>
<td>Windows Active Directory or IBM Tivoli Directory Services, and Duo Security for Multifactor Authentication, and Cisco Identity Service Engine (NAC)</td>
</tr>
<tr>
<td>SAN Infrastructure</td>
<td>Brocade SAN Fabric Switches / Hitachi Storage Devices</td>
</tr>
<tr>
<td>Virus Detection</td>
<td>Sophos Anti-Virus</td>
</tr>
<tr>
<td>Document Design</td>
<td>Doc1 Designer</td>
</tr>
<tr>
<td>Document Management</td>
<td>N/A</td>
</tr>
<tr>
<td>Document Distribution</td>
<td>IBM Content Manager On-Demand</td>
</tr>
<tr>
<td>Disaster Recovery</td>
<td>Second Data Center attached by Fiber backbone</td>
</tr>
<tr>
<td>Industrial Billing</td>
<td>Oracle Utilities Billing Component</td>
</tr>
<tr>
<td>Telephony Infrastructure</td>
<td>Avaya VOIP</td>
</tr>
<tr>
<td>Meter Reading</td>
<td>Itron –(moving to Sensus AMI)</td>
</tr>
<tr>
<td>Printing / Faxes</td>
<td>Lanier Multi-Functional Devices</td>
</tr>
<tr>
<td>Plotting</td>
<td>Océ or HP Design Jet</td>
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<tr>
<td>Firewall</td>
<td>Check Point</td>
</tr>
<tr>
<td>Web Filtering</td>
<td>Websense</td>
</tr>
<tr>
<td>RAID Levels</td>
<td>5, 6 or 10</td>
</tr>
<tr>
<td>Geographic Information System (GIS)</td>
<td>ESRI v10.0.2 &amp; Telvent ARCFM v10.0.2</td>
</tr>
<tr>
<td>COBOL</td>
<td>Microfocus</td>
</tr>
<tr>
<td>Wireless Access Point</td>
<td>IEEE 802.11 a/b/g/n</td>
</tr>
<tr>
<td>Web Server</td>
<td>IBM IHS, Apache</td>
</tr>
<tr>
<td>Microwave Network</td>
<td>Redline/Dragonwave</td>
</tr>
</tbody>
</table>
KUB Enterprise System Specifications

This section details system specifications for enterprise systems with which the KUB GIS may interact.

CUSTOMER INFORMATION SYSTEM (CIS)

CIS is a PeopleSoft (Oracle/SPL) application. CIS is the system of record for customer information and is the billing system for KUB’s 300,000+ residential, commercial, and industrial customers. Core functionality includes:

- Generates the meter read and billing schedules, receives meter readings, and calculates bills for all metered and non-metered services, except for complex industrial meters.
- Accepts payments and generates appropriate collections, severance, and write-off events.
- Stores all information for customers, accounts, meters, and premises.
- Generates all field requests, including trouble orders, and routes them to OMS/MDS for mobile dispatching or the customer billing print engine (DOC1) for printed orders.
- Maintains new service workflow process.

Users

There are approximately 500 users of CIS in 12 departments. The primary users of CIS are: Customer Service, Meter Department, New Service, Engineering New Service, and Accounting (Billing).

CIS Software

- PeopleSoft Revenue Management Solutions Version 8.90.00.317
- PeopleTools Version 8.49
- Oracle 11g

FINANCIAL MANAGEMENT SYSTEM (FMS)

FMS is a PeopleSoft (Oracle) application. All financial-related activities (including reporting and excluding receivables), and all supply chain management (SCM) activities are executed using the FMS application. Receivables are managed in the CIS application.

Financial Activities

The FMS supports the following financial activities:

- General Ledger
  - Maintenance of the general ledger
  - Journal entry processing (both manually input and batch upload)
  - Account analysis
  - Financial reporting
• Accounts payable
  – Vendor maintenance
  – Payables processing
• Plant accounting
  – Asset subledger maintenance
  – Depreciation, capitalization and retirement activities
• Cash management
• Budgeting
  – Departmental forecasting
  – Expenditure vs. actual reporting

Supply Chain Activities

The FMS supports the following supply chain activities:
• Inventory
  – Receiving, issuing, and returns processing
  – Cycle counts
  – Warehouse management
• Purchasing
  – Requisitions and approvals
  – Purchasing function (buyer activities)
  – Vendor management
  – Contract management

Software
• PeopleSoft FMS Version 9.2
• PeopleTools Version 8.54
• Oracle 12g

HUMAN RESOURCE MANAGEMENT SYSTEM (HRMS)

HRMS is a PeopleSoft (Oracle) application. HRMS provides the products that support the Human Resources and Payroll functions within the organization.

Software
• PeopleSoft HRIS Version 9.2
• PeopleTools Version 8.54
• Oracle 12g

OUTAGE MANAGEMENT SYSTEM / MOBILE DATA SYSTEM (OMS / MDS)

KUB has deployed Intergraph’s InService product for outage management and mobile workforce management. The system’s primary purpose is to capture outage reports, perform analysis to identify
where crews should be dispatched, assign and dispatch work to trucks using the MDS component, and track the location of crews and status of service restoration work.

The system transmits event packages (orders) to laptops in trucks over KUB’s private radio network for real-time dispatch of crews. Originally, high-volume and short duration work related to trouble events was dispatched through OMS/MDS. Since the system is the only mechanism KUB has to transmit work orders to trucks in the field, KUB has also leveraged the OMS/MDS for other types of high volume-short, short duration work orders, specifically New Service and Service.

KUB dispatches approximately 1500 orders per day to 200 crews (laptops). KUB Planner/Schedulers like the drag-n-drop functionality of Idispatch, the dispatch component of OMS.

The type of work currently dispatched through OMS/MDS is:

- **Trouble**
  - Electric Outage Management
  - Gas, Water, Wastewater Emergency and Trouble
- **New Service**
  - Marketing Representatives
  - Construction
  - Meter Sets
- **Maintenance**
  - Streetlight Repair
- **Service**
  - Start/Stop Service
  - Meter Movement (Remove, Exchange)
  - Water Quality Complaints
  - Meter Re-reads

The MDS also provides a mechanism to define custom user-forms that facilitate capture of job closure and inspection information in the field including:

- Completion codes
- Cause codes for electric outage
- Asset information for underground utilities (material type, size, corrosion, pressure)
- Meter reading/movement information
- Restoration times
- Travel times
- GPS Location

The system is integrated with CIS for customer-initiated orders through Websphere’s Enterprise Service Bus (ESB).

Basemap data and utility network data is loaded into the OMS from GIS on a regular basis to support OMS analysis and to provide a map interface on the mobile devices.

KUB just completed an upgrade of the current release of Intergraph’s InService product. The version currently in use is listed below.

- Intergraph InService version 8.2
- Oracle 10g
WORK MANAGEMENT SYSTEM

KUB has implemented IBM Maximo 7.5 product for utilities.

- Tivoli Maximo 7.5
- IBM Websphere 7.0 (Application Server)
- Oracle 11g R2
- AIX 6.1 / Windows 2008 R2

ENGINEERING DESIGN

KUB’s engineering staff and contractors primarily use MicroStation as their computer-aided drafting and design package. Since GIS graphics data are stored in MicroStation DGN format, it is easy for engineers to simply reference this base map data from the GIS and for use in their design drawing.

- Bentley MicroStation version 07.01.01.57 for Windows x86
- Bentley MicroStation version 08.05
- LandViewer (used to extract GIS data to MicroStation)

INTEGRATION

KUB integrates systems based on Http, SOAP and/or ReST Api’s.

LIMS

The current LIMS system in use by the KUB Water Quality Laboratory is PerkinElmer Labworks, which was initially installed in October of 1999. The PerkinElmer Labworks software is used to store analytical sampling and analysis data that includes all compliance and noncompliance data that is associated with wastewater, drinking water, creek & river monitoring, customer sampling, and PCB analysis. The software is also used to generate multiple drinking water compliance reports that are required by the Tennessee Department of Environment & Conservation. The server for the Labworks program is located in the E&O building at the Hoskins Center. On average, there are over 18,000 samples per year logged into the Labworks Oracle database.

Software

- PerkinElmer Labworks LIMS version 5.8.311.0
SCADA

GEOGRAPHIC INFORMATION SYSTEM (GIS)
KUB utilizes an ESRI GIS system to produce mapping for utilities and application interfacing.
The architecture of KUB’s ESRI ArcGIS solution is as follows:

- Database
  - Oracle 11g or later with ESRI ArcSDE technology

- Data Model
  - E/G/W/WW utility distribution/collection assets will be modeled as features in an ESRI Enterprise Geodatabase.
  - Some utility asset features will participate in a geometric network within the geodatabase.
  - KUB will maintain a unique identifier for each feature.

- Software Applications
  - ArcFM – primary desktop GIS application for KUB’s mapping group and some advanced GIS users. ArcFM extends the ESRI ArcGIS Desktop suite of applications (ArcMap, ArcCatalog, ArcToolbox, etc.).
  - ArcFM Viewer – primary laptop GIS application for KUB’s field users. ArcFM Viewer with Redliner Extension and ArcFM Viewer with Inspector Extension may also be deployed for some field users.
  - Designer – expected to be deployed in later stages of the GIS implementation for electric utility designers.
  - ArcGIS Server – Web-based mapping application expected to provide access to map information through a web browser to the majority of KUB users.

- Major Interfaces
  - With the OMS/MDS to automate update of spatial basemap and utility data from the GIS to the OMS/MDS.
  - With the Vegetation Management software currently in use.
  - With the kub.org website
  - With the CIS allowing CIS field activities to be generated from within the GIS and to allow customer information to be accessed and viewed through a map interface.
System Architectural Standards

1) For enterprise class systems (Customer Information, Financial Management, Human Resource Management, Customer Website, etc):

KUB utilizes a consistent methodology when architecting enterprise class systems that provides both high availability and redundancy. Two separate Tier-2 grade datacenters are operated, connected by redundant 10gb fiber ethernet and 8gb fiber channel SAN fabric private connections. Systems are configured with multiple web/app servers (and in some cases clustered databases), spread across both datacenters, with client traffic load balanced through a cluster of F5 LTM appliances. This approach not only provides HA, but also supports a fault tolerant configuration allowing for downtime of servers in either location while maintaining the availability of the system. In cases where databases cannot be clustered, the Production database located on the SAN is mirrored to the other datacenter over the connected fabrics. The manual process for switching over to the replicated database requires minimal downtime and does not involve the overhead of a true clustered solution.

Every quarter, KUB conducts live tests of the HA/DR capabilities of one or more enterprise systems. In these exercises, the servers that support the system(s) at one of the datacenters are powered off, while the business maintains normal operations on the reduced server capacity. This serves to validate the highly available configurations are functioning as designed.

In the case where a vendor’s solution for an enterprise class application does not support this type of configuration, KUB will consider an alternate configuration so long as a sound DR approach is proposed and can reasonably be implemented.

2) For business unit class systems (Fleet Management, Lab Information System, Forester Vegetation Management, Engineering Applications, etc):

KUB will either keep an offline copy of the application installed with a mirrored database and ready to operate at the second datacenter, or KUB may elect to back up the entire application and data at an appropriate frequency (daily or hourly) and will rely on a CommVault restore to the second datacenter in the event there is an issue with the application, data, or hardware.