

**RESEARCH CALL TO DOE/FEDERAL LABORATORIES**



**Technical Support for Cybersecurity for Energy Delivery Systems**  
**RC-CEDS-2010**

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**ISSUING OFFICE: U.S. DEPARTMENT OF ENERGY**  
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## SECTION I – GENERAL INFORMATION

### A. SUMMARY

The Department of Energy's (DOE) National Energy Technology Laboratory (NETL) on behalf of the DOE, Office of Electricity Delivery and Energy Reliability (OE), is seeking proposals that will lead to improvements in the cybersecurity of control systems and information technology systems (IT) for energy transmission and distribution, including electricity, oil, and natural gas, as well as protect the electric grid and enhance integration of smart grid technologies that are adequately protected against cyber attacks. This laboratory research call includes six (6) project areas:

Project 1 - Configuration Management to Sustain Hardened Cybersecurity Posture

Project 2 - Management of Access Control

Project 3 - Baseline Normal Communications Pattern of Control System Routine Operation

Project 4 - Enhance Existing, Industry-Accepted Power System Reliability Safeguards

Project 5 - Energy-Sector Component Security and Functional Performance Testing

Project 6 - Innovative and Revolutionary Projects to Enhance Cyber Security in the Energy Sector

### B. BACKGROUND INFORMATION

The objective of this Laboratory Call is to conduct research, development, and demonstrations leading to next generation system products/tools that will become widely adopted to enhance the cybersecurity of communication and control systems specific-to the U.S. energy infrastructure (including the production, refining, storage, and distribution of oil and gas) in accordance with DOE's energy infrastructure role defined in Homeland Security Presidential Directive (HSPD) 7. This also includes tools to assist in the compliance with North American Electric Reliability Corporation-Critical Infrastructure Protection (NERC-CIP) requirements for cybersecurity. These projects are expected to complement and enhance the development and implementation of key milestones and objectives called for in the Roadmap to Secure Control Systems in the Energy Sector (<http://www.oe.energy.gov/csroadmap.htm>). In a step toward attaining this vision, the Secure Control Systems for the Energy Sector Program Area of Interest requests proposals that address one or more of the projects outlined in the six (6) Projects listed below. Solutions should be interoperable, scalable, cost-effective, innovative advanced technologies and processes that implement common methods and best practices and should include a strategy for commercializing/implementing the solutions throughout the energy sector. Solutions must recognize the real-time control system operation imperative and must not introduce unacceptable latency. Collaboration among multiple laboratories is highly recommended. Collaborations should be clearly identified in the proposal. However, each laboratory is expected to submit individual proposals for evaluation.

### C. PROJECT AREAS

**Project 1 - Configuration Management to Sustain Hardened Cybersecurity Posture**

Develop automated configuration management tools that allow timely testing and application, across the complex control system architecture, of operating system upgrades, patches and security software/firmware updates, or of appropriate counter-measures if offline tests determine that the new security software/firmware has the potential to compromise power system reliability. The tools are to be used by control system personnel.

### **Project 2 - Management of Access Control**

Research and development is required to design and develop automated tools, preferably centralized, to manage access controls that enforce role-based access privileges within the control system environment, including remote access to the control system components. These tools include the granting and revocation of access privileges and the enforcement of least-privileges so that access is granted according to job requirements and is easily modified as employees/contractors/third-parties/etc. arrive, depart or change roles within the utility. The tools are to be used by control system personnel.

### **Project 3 - Baseline Normal Communications Patterns of Control System Routine Operation**

Communication patterns among control system components are reasonably predictable during routine operation. Develop automated tools to baseline the routine operation communications patterns within control system architectures so that departures from this baseline can be detected and reported. Solutions must recognize the real-time operation imperative, must not introduce unacceptable latency and must be scalable.

### **Project 4 - Enhance Existing, Industry-Accepted Power System Reliability Safeguards**

Research and development is needed to build cybersecurity capability into an existing industry-accepted power system reliability analysis tool or automation process. That is, integrate the additional capability to detect, prevent, inform operator response decisions, and survive a cyber-attack with an existing, industry-accepted reliability analysis tool or automation process. Power system engineers have, over decades, developed industry-accepted, sophisticated analysis tools and automation processes that manage reliable power system operation for normal conditions, and for resilient operation under physical contingencies such as the loss of a generator or transmission line. Examples include the built-in power system reliability capabilities of SCADA/EMS, protective relay devices, contingency analysis applications, substation automation, and distribution automation systems. The solution should consider system availability and data integrity, as well as data confidentiality for individual participants in a multi-party data stream which will be critical to the success of the smart grid.

### **Project 5 - Energy-Sector Component Security and Functional Performance Testing**

The capability to conduct cybersecurity vulnerability testing of smart grid components and systems by enhancing existing test beds is needed. A graded risk-based approach should be used to prioritize the selection of components to undergo vulnerability testing. The capability should identify vulnerabilities to, and mitigations for, the unintended inclusion or malicious insertion of undesirable insecure functions. In addition to

cybersecurity vulnerabilities that jeopardize system availability and data integrity, the protection of data confidentiality for individual participants in multi-party data streams, which is critical to customer-acceptance of the smart grid, must be considered.

### **Project 6 – Innovative Technologies that Enhance Cyber Security in the Energy Sector**

*The Roadmap to Secure Control Systems in the Energy Sector* provides a strategic framework that directs research and development of cybersecurity solutions for the energy sector. However, the cybersecurity landscape is continuously changing and new technologies are being rapidly deployed while legacy technologies are being utilized in ways that were never envisioned, which is introducing new vulnerabilities and security considerations. While a great deal of research and development has been accomplished or is currently underway to accomplish the Roadmap goals, some gaps remain in the research and development efforts needed to satisfy all Roadmap goals. This project requests a proposal that identifies, and proposes a technical solution to fill, a gap in research and development coverage of the Roadmap goals. This includes proposals for innovative technical solutions that could provide an approach to enhance the cyber security of the energy sector. The proposal must include a comprehensive evaluation that confirms the identified research and development gap exists, and that demonstrates no other entity has addressed the identified research and development gap, in either the public or private-sectors.

## **SECTION II – AWARD INFORMATION**

### **A. TYPE OF AWARD INSTRUMENT**

DOE anticipates providing DOE funding for selected projects to National Laboratories. Any project awarded as a result of the Research Call will be processed through NETL as a Field Work Proposal, an Inter Entity Work Order, Interagency Agreement or any other allowable method deemed appropriate by the Government

### **B. ESTIMATED FUNDING**

Approximately \$13 million is expected to be available for awards under this announcement.

### **C. EXPECTED NUMBER OF AWARDS**

DOE anticipates making up to 5 awards under this announcement. The Government reserves the right to fund, in whole or in part, any, all, or none of the proposals submitted in response to this Research Call and will award that number of instruments which serves the public purpose and is in the best interest of the Government.

### **D. ANTICIPATED AWARD SIZE**

DOE anticipates that it will issue several awards of varying size with up to \$3 million per award. This includes awards that have more than one laboratory participation. This information is for estimating purposes only and in no way commits the Government.

### **E. PERFORMANCE PERIOD**

DOE anticipates making awards within 60 days from the date of release of this Research Call with an anticipated performance period of up to 2 years. Projects may be divided into phases, with go/no-go decision points at end of each phase. A decision will be made regarding continuation, redirection, or termination of the project at each decision point.

**F. TYPE OF PROPOSAL**

DOE will accept only new proposals under this Research Call -- requests for renewal of a current project will not be considered.

**SECTION III – ELIGIBILITY INFORMATION**

**A. ELIGIBLE OFFERORS**

Only DOE National Laboratories are eligible to apply as prime. Collaboration involving multiple DOE National Laboratories and other entities (such as educational institutions, vendors, research and development organizations, utilities, etc.) is highly encouraged.

**SECTION IV – SUBMISSION REQUIREMENTS**

**A. SUBMISSION INSTRUCTIONS**

Proposals shall be submitted electronically to the following email address no later than July 30, 2010 at 03:00:00 PM Eastern Daylight Time:

**E-mail: CEDSLabCall@netl.doe.gov**

Phone: (304) 285-5229

The applicant is encouraged to request a return notification to verify receipt of proposal.

**SECTION V – EVALUATION AND SELECTION**

**A. INITIAL REVIEW CRITERIA**

Prior to a comprehensive merit evaluation, DOE will perform an initial review to determine that (1) the applicant is eligible for an award; (2) the information required by the Research Call has been submitted; (3) all mandatory requirements are satisfied; and (4) the proposed project is responsive to the objectives of the Research Call.

**B. MERIT REVIEW CRITERIA**

Proposals submitted in response to this Research Call will be evaluated and scored in accordance with the criteria and weights listed below:

**Criterion 1: Technical Approach and Project Management (60%)**

This criterion will evaluate the approach taken by the applicant and the degree to which the proposed technology or methodology meets the stated objectives of the Research Call:

- Feasibility that the proposed technology or product will address the need or problem.
- Soundness of the proposed approach and likelihood of success as demonstrated through scientific or engineering merit of the proposed approach.
- Reasonableness and completeness of the proposed Statement of Work (SOW) to achieve project objectives and measure success.
- Adequacy, appropriateness, and reasonableness of the budget. This includes the labor distribution, purchases, and effort by work breakdown budget structure to accomplish the stated objectives.
- Degree to which the applicant demonstrates sound management principles, and plans for project oversight in the Project Management Plan (PMP) to achieve the project objectives on time and within budget.

**Criterion 2: Project Impact (25%)**

This criterion will evaluate the degree to which the proposed technology or methodology will impact the cyber security of the energy infrastructure:

- Significance of the benefits and impact of the proposed technology or product compared with current technologies, products or practices.
- Extent to which the benefits and impact of anticipated performance improvements, including technical, operational and environmental performance; cost savings; societal benefits; and potential for the project to meet or exceed the DOE program goals or program vision.
- Capability of the proposed approach to provide a path for industry acceptance and commercialization.

**Criterion 3: Collaboration (15%)**

This criterion will evaluate the degree to which the Applicant builds on past efforts and collaborations to achieve the best possible outcomes at the best value for the government including.

- Effectiveness of the proposed strategic approach to establish a partnership with Federally Funded Research and Development Centers (FFRDCs), industry and vendors for collaborations and cooperation.
- Extent to which the Applicant’s approach would lead to dissemination of lessons learned and foster collaboration with entities not immediately involved with the project.
- Degree to which commitment of the collaboration to the proposed project is demonstrated by including letters of intent from all proposed team members.

**Program Policy Factors**

The following Program Policy Factors may be used by the Selection Official to assist in determining which of the ranked proposals shall receive DOE funding support:

1. It may be desirable to select project(s) that has collaborative effort between FFRDC's, academia, industry and vendor.
2. It may be desirable to select project(s) that demonstrate solutions that are scalable and cost-effective with a clear industry acceptance for commercialization
3. It may be desirable to select complementary project(s) and/or duplicative efforts or projects, which, when taken together, will best achieve the research goals and objectives;
4. It may be desirable to select for award a group of projects which represents a diversity of technical approaches and methods;
5. It may be desirable to select a group of projects which represent a diversity of technologies and Topic Areas in order to provide a balanced programmatic effort and a variety of different technical perspectives;
6. It may be desirable, because of the nature of the energy source, the type of projects envisioned, or limitations of past efforts, to select a group of projects with a broad or specific geographic distribution;
7. It may be desirable to select project(s) of less technical merit than other project(s) if such a selection will optimize use of available funds by allowing more projects to be supported and not be detrimental to the overall objectives of the program.
8. It may be desirable to select project(s) that reduce Federal investment and maximize corporate commitment as demonstrated by cost sharing or industry participation.
9. It may be desirable to select project(s) that demonstrate the proposed technology in a real-time environment and includes a commercialization entity and an electric utility (investor owned, municipal or rural electric cooperative).

**C. SUBMISSIONS FROM SUCCESSFUL OFFERORS**

If selected for award, DOE reserves the right to request additional or clarifying information for any reason deemed necessary, including, but not limited to:

- Indirect cost information;
- Other budget information;
- Name and contact information of the cognizant Contracting Officer.

**SECTION VI – PROPOSAL PREPARATION**

**A. PREPARATION**

It is requested that the entire proposal be single spaced, 1" margins (top, bottom, left, right), and when printed will fit on size 8 1/2" by 11" paper. The type must be legible and not smaller than 11 point. In order to produce a comprehensive proposal for this Research Call, the offeror shall address, at a minimum, the areas listed in the Table of Contents below. The offeror shall use the following Table of Contents:

<b>Section</b>	<b>Page</b>
Table of Contents	I
List of Tables (if applicable)	II

List of Figures (if applicable)	III
List of Acronyms	IV
Technical Content	#
- Technical Objectives.	#
Project Summary	#
Project Management Plan with Statement of Work	#
Resume File	#
Commitment Letters	#
Budget Files	#
Budget Justification File	#

- A proposal should address only one project area
- DOE reserves the right to disqualify any proposal that addresses multiple project areas.
- A Laboratory may submit a separate proposal for each project area
- A Laboratory may serve as a team member on multiple proposals.

The entire proposal, that includes all materials included in the Table of Contents, should be saved as a single PDF file under the following file name: “Project \*number\* - \*lab name\* - \*PI\*”, e.g., “Project3 – NETL – Smith”

## B. TECHNICAL CONTENT

The Technical Content must not exceed twenty 20 pages, when printed using standard 8.5” by 11” paper with 1” margins (top, bottom, left, and right). EVALUATORS WILL REVIEW ONLY THE NUMBER OF PAGES SPECIFIED IN THE PRECEDING SENTENCE. The font must not be smaller than 11 point. Do not include any Internet addresses (URLs) that provide information necessary to review the proposal.

### Technical Objectives.

This section should include adequate background of how the proposed research will address the project areas, to which the lab is proposing. In addition, the lead Lab is encouraged to directly address the Merit Review Criteria included in Section V-B

## C. PROJECT SUMMARY

The project summary/abstract must contain a summary of the proposed activity suitable for dissemination to the public. It should be a self-contained document that identifies the lead National Laboratory and other team members, the project director/principal investigator(s), the project title, the objectives of the project, a description of the project, outcomes). This document must not include any proprietary or sensitive business information as DOE may make it available to the public. The project summary must not exceed 2 pages when printed using standard 8.5” by 11” paper with 1” margins (top, bottom, left and right) with font not smaller than 11 point.

## D. PROJECT MANGEMENT PLAN WITH STATEMENT OF WORK

The applicants under this research call shall prepare a project management plan for each proposal submitted. See Attachment B. In addition, prepare a statement of work for each proposal submitted. See Attachment A

#### **E. RESUME FILE**

Provide a resume for each key person proposed, including subawardees and consultants if they meet the definition of key person. A key person is any individual who contributes in a substantive, measurable way to the execution of the project.

Each resume must not exceed 2 pages when printed on 8.5” by 11” paper with 1” margins (top, bottom, left, and right) with font not smaller than 11 point and should include the following information, if applicable:

*Education and Training:* Undergraduate, graduate and postdoctoral training, including institution, major/area, degree and year.

*Professional Experience:* Beginning with the current position list, in chronological order, professional/academic positions with a brief description.

*Publications:* Provide a list of up to 10 publications most closely related to the proposed project. For each publication, identify the names of all authors (in the same sequence in which they appear in the publication), the article title, book or journal title, volume number, page numbers, year of publication, and website address if available electronically. Patents, copyrights and software systems developed may be provided in addition to or instead of publications.

*Synergistic Activities:* List no more than 5 professional and scholarly activities related to the effort proposed.

#### **F. COMMITMENT LETTERS**

Commitment Letter from partnership with Federally Funded Research and Development Centers (FFRDCs and other entities (such as educational institutions, vendors, research and development organizations, utilities, etc.), if applicable

#### **G. BUDGET FILES**

Provide Budget Summary tables for the total project and for each year of the project. The tables should include estimated costs for various budget categories such as personnel (including fringe benefits), equipment, materials and supplies, travel, subcontract, and other direct costs and indirect costs (general and administrative).

#### **H. BUDGET JUSTIFICATION FILE**

You must justify the costs proposed in each Cost Category (e.g., identify key persons and personnel categories and the estimated costs for each person or category; provide a list of equipment and cost of each item; identify proposed subaward/consultant work and cost of each subaward/consultant; describe purpose of proposed travel, number of travelers and number of travel days; list general categories of supplies and equipment and amount for

each category; and provide any other information you wish to support your budget). Provide the name of your cognizant/oversight agency, if you have one, and the name and phone number of the individual responsible for negotiating your indirect rates. See Attachment C-Sample Budget Justification.

## **SECTION VII – OTHER INFORMATION**

### **A. MODIFICATIONS**

Notices of any modifications to this Research Call will be sent via e-mail directly to the National Laboratories. The e-mail will contain a web link to the modified version located at NETL and OE website.

### **B. GOVERNMENT RIGHT TO REJECT OR NEGOTIATE**

DOE reserves the right, without qualification, to reject any or all proposals received in response to this Announcement and to select any proposal, in whole or in part, as a basis for negotiation and/or award.

### **C. EVALUATION AND ADMINISTRATION BY NON-FEDERAL PERSONNEL**

In conducting the merit review evaluation, the Government may seek the advice of qualified non-Federal personnel as reviewers. The Government may also use non-Federal personnel to conduct routine, nondiscretionary administrative activities. The offeror, by submitting its proposal, consents to the use of non-Federal reviewers/administrators. Non-Federal reviewers must sign conflict of interest and non-disclosure agreements prior to reviewing a proposal. Non-Federal personnel conducting administrative activities must sign a non-disclosure agreement.

### **D. NOTICE REGARDING ELIGIBLE/INELIGIBLE ACTIVITIES**

Eligible activities under this program include those which describe and promote the understanding of scientific and technical aspects of specific energy technologies, but not those which encourage or support political activities such as the collection and dissemination of information related to potential, planned or pending legislation.

## ATTACHMENT A - STATEMENT OF WORK INSTRUCTIONS

A Statement of Work shall be developed that addresses how the project objectives will be met. The Statement of Work must contain a clear, concise description of all activities to be completed during project performance and follow the structure discussed below. The Statement of Work may be released to the public by DOE in whole or in part at any time. It is therefore required that it shall not contain proprietary or confidential business information.

### TITLE OF WORK TO BE PERFORMED

(Insert the title of work to be performed. Be concise and descriptive. Avoid non-descriptive terms, such as 'novel' or 'innovative')

#### A. OBJECTIVES

Include one paragraph on the overall objective(s) of the work. Also, include objective(s) for each phase of the work.

#### B. SCOPE OF WORK

This section should not exceed one-half page and should summarize the effort and approach to achieve the objective(s) of the work for each Phase.

#### C. TASKS TO BE PERFORMED

Tasks, concisely written, should be provided in a logical sequence and should be divided into the phases of the project, as appropriate. This section provides a brief summary of the planned approach to this project. An outline of the Project Management Plan (referenced in Task 1.0 below and submitted with your application) is provided later in this Part.

#### PHASE I

Task 1.0 – Project Management and Planning  
(Description includes work elements required to revise and maintain the Project Management Plan and to manage and report on activities in accordance with the plan)

Subtask 1.1 (Optional)

(Description)

Task 2.0 - (Title)

#### PHASE II (Optional)

Task 3.0 - (Title)

#### D. DELIVERABLES

The periodic, topical, and final reports shall be submitted in accordance with the attached "Reporting Checklist" and the instructions accompanying the checklist. [Note: The Laboratory shall provide a list of deliverables other than those identified on the "Reporting Checklist" that will be delivered. These reports shall also be identified within the text of the Statement of Work.] See the following examples:

- Task 1.1 - (Report Description)
- Task 2.2 - (Report Description)

#### E. BRIEFINGS/TECHNICAL PRESENTATIONS (If applicable)

The Laboratory shall prepare detailed briefings for presentation to the DOE Project Manager. Location(s) and time(s) shall be done by mutual agreement between the Project Manager and the Laboratory.

## ATTACHMENT B - PROJECT MANAGEMENT PLAN INSTRUCTIONS

A project management plan shall be developed that clearly indicates how the projects will be managed. The Project Management plan may be released to the public by DOE in whole or in part at any time. It is therefore required that it shall not contain proprietary or confidential business information.

### PROJECT MANAGEMENT PLAN

{Project Title}<sup>1</sup>

{Date Prepared}

### WORK PERFORMED UNDER PROJECT

{Project Number}

### SUBMITTED BY

{Organization Name}

{Organization Address}

{City, State, Zip Code}

### PRINCIPAL INVESTIGATOR

{Name}

{Phone Number}

{Fax Number}

{E-Mail}

### SUBMITTED TO

U. S. Department of Energy  
National Energy Technology Laboratory

{FPM Name}

{FMP Email}

<sup>1</sup>NOTE: { } denotes required information.

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## 1. EXECUTIVE SUMMARY

Provide a description of the project that includes the objective, project goals and expected results. The summary should also include a succinct project background and project rationale. For purposes of the application, this information should be a summary of the pertinent information that is included in the proposal so that the Project Management Plan is a stand-alone document.

## 2. RISK MANAGEMENT

The Laboratory shall provide a summary description of the proposed approach to identify, analyze, and respond to perceived risks associated with the proposed project. Project risk events are uncertain future events that, if realized, impact the success of the project. Since risk is inherent to all projects, regardless of the level of complexity, cost or visibility, project risk must be addressed to the appropriate level for every project. It is recognized that the depth of analysis and the complexity and cost of the resulting risk management approach (and plan) will differ from project to project and among organizations. Commonly accepted approaches, such as those supported by The Project Management Institute's A Guide to the Project Management Book of Knowledge, should be considered.

As a minimum, the Laboratory should provide sufficient information with the application to demonstrate an appropriate approach to managing risks during project execution. This must include the initial identification of significant technical, resource and management issues that have the potential to impede project progress and strategies to minimize impacts from those issues. For fundamental research and modeling studies it is anticipated that risks would focus on technical uncertainties that are the result of this type of work.

## 3. MILESTONE LOG

The Laboratory is to provide milestones for each phase of the project. Each milestone is to include a title, planned completion date and a description of the method/process/measure used to verify completion. The milestones developed should be quantitative and show progression towards phase and/or project goals. It is expected that the Laboratory will have a milestone at least semi-annually or every six months of the project schedule: however, milestones should not be developed to meet this expected schedule. Milestones are different than success criteria (Section 6) in that milestones typically show progress through the execution of the phase and project, whereas success criteria are used by the DOE to determine if specific goals were met at phase ends or other appropriate points in project execution.

Format for the milestone log should be as follows:

**Title:** {Milestone Title}  
**Planned Date:** {Planned Completion Date}  
**Verification Method:** {Milestone Verification Method}

#### **4. FUNDING AND COSTING PROFILE**

The Laboratory shall provide a table that shows, by “Phase”, the amount of government funding going to each member and cost share (if any) provided by members. The table shall also calculate totals and cost sharing percentages. Table 1 “Project Funding Profile” below is an example.

The Laboratory shall also provide a table that projects, by month, the expenditure of the government funds in the current phase, as a minimum. While it is recognized that out year costing profiles are less certain and the nature of specific tasks are dependent on successful or unsuccessful completion of the current RD&D approach, the Laboratory should provide their estimates of out-year costs to the extent practical. Table 2 – “Project Spending Plan” provides an example. Note that the spending plan total equals the Phase 1 total government funds (\$300,000) and that Phase 1 is 12 months in duration; Phases can be more or less than 12 months in duration.

#### **5. PROJECT TIMELINE**

The Laboratory shall provide a timeline of the project broken down by each task and subtask, as described in the Statement of Work. The timeline shall include for each task, a start date, end date, approximate cost and team members participating on the task and their role. The timeline shall also show any interdependencies with other tasks and note the milestones identified in the Milestone Log (Section 3). It is highly recommended that the Laboratory consider using a commercial software package to generate the timeline as a Gantt chart (see Figure 1 as an example) or other applicable format.

#### **6. SUCCESS CRITERIA AND DECISION POINTS**

The success criteria should be objective and stated in terms of specific, measurable and repeatable data. Usually, the success criteria pertain to desirable outcomes, results and observations from the experimental efforts. The success criteria should not be based on interpretations. Typically, the expected performance parameters should be established with a technical and economic comparison made to the competing technologies or methods. A discussion should be included on the probable advantages and possible disadvantages. Advantages could include, but are not limited to:

- Validation/confirmation/identification of scientific/engineering knowledge
- Cost savings expected over existing technologies
- Performance enhancements to existing technologies
- Reduction in health and safety risks to the public and workers, and reduction in environmental risks.
- Ease of installation, operation, and maintenance.
- Decrease in capital, operating, and maintenance cost.

Success Criteria are different than milestones (Section 3) in that milestones typically show progress through the execution of the phase and project, whereas success criteria are used by the DOE to determine if specific goals and objectives were met at the phase end. Typically, these goals and objectives represent requirements established by the R&D program as evidence of progress in advancing a technology area or

scientific/engineering knowledge. The success criteria may be used to assist DOE in deciding whether to proceed into subsequent phase(s), if required.

## **7. PROJECT STATEMENT OF WORK**

The Statement of Work (SOW) from the Agreement will be inserted here. Note that Task 1.0 (or other designation) of the SOW entails the work necessary to manage the project and to update the Project Management Plan submitted with the application. The Project Management Plan submitted as a work product under Task 1.0 (or other designation) serves as the base project cost, schedule and scope and is the basis for reporting quarterly progress in the Progress Report defined in the “Reporting Checklist and Instructions”

**Table 1 – Project Funding Profile**

	<b>Phase 1</b>		<b>Phase 2</b>		<b>Total</b>		
	<b>Gov. Funding</b>	<b>Cost Share</b>	<b>Gov. Funding</b>	<b>Cost Share</b>	<b>Gov. Funding</b>	<b>Cost Share</b>	
<b>Prime Laboratory</b>	\$250,000	\$0	\$150,000	\$0	\$400,000	\$0	
<b>Team Member<sup>(1)</sup></b>	\$50,000	\$0	\$150,000	\$0	\$200,000	\$0	
<b>Team Member</b>	\$0	\$0	\$50,000	\$0	\$50,000	\$0	
<b>Team Member</b>	\$0	\$0	\$0	\$0	\$0	\$0	
<b>Total:</b>	\$300,000	\$0	\$350,000	\$0	\$650,000	\$0	\$650,000

<sup>(1)</sup> A Team Member is typically an organization participating on the project. It is typically not an individual person unless that person serves as a consultant or the single representative of a company.

**Table 2 – “Project Spending Plan”**

<b>Phase 1 – Nov. 2004 – Oct. 2005</b>	
November	10
December	15
January	25
February	30
March	25
April	25
May	50
June	30
July	30
August	20
September	25
October	15
<b>Total (\$s in thousands)</b>	<b>300</b>

**Figure 1 – Sample Project Timeline (Gantt Chart)**

Year	2007				2008				2009			
Quarter	1	2	3	4	1	2	3	4	1	2	3	4
Task 1.0 Project Management and Planning		←————→										
Task 2.0 Descriptive Title		←————→										
Subtask 2.1 Descriptive Title		←————→										
Subtask 2.2 Descriptive Title			←————→									
Task 3.0 Descriptive Title							←————→					
Subtask 3.1 Descriptive Title							←——→					
Subtask 3.2 Descriptive Title									←————→			
Continue with Additional Phases & Tasks												

A, B, C etc. – Milestones from Milestone Log

1,2,3 etc – Decision Points

Note: Timelines for each task and subtask has an associated level of effort, typically budgeted cost

**XXXXXX National Laboratory  
XXXXXXXXX Project  
Budget Justification**

**Federal Funds Budget**

All direct and indirect costs included in this proposed project budget are to be paid from Federal funds. The budget for each year of the three-year term is summarized as follows and is discussed below:

<u>Class Category</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Three-Year Total</u>
a. Personnel	\$100,740	\$102,542	\$104,380	\$ 307,662
b. Fringe Benefits	32,068	33,200	34,377	99,645
c. Travel	4,000	3,000	3,000	10,000
d. Equipment	93,000	0	0	93,000
e. Supplies	77,675	2,000	2,000	81,675
f. Contractual	1,000	3,000	3,000	7,000
g. Construction	0	0	0	0
h. Other	<u>75,023</u>	<u>12,403</u>	<u>11,349</u>	<u>98,775</u>
Sub-Total Direct Charges	\$383,506	\$156,145	\$158,106	\$ 697,757
i. Indirect Charges	<u>23,079</u>	<u>12,424</u>	<u>12,581</u>	<u>48,084</u>
Sub-Total Federal Funds	\$406,585	\$168,569	\$170,687	\$745,841
<b>TOTALS</b>	<b><u>\$434,085</u></b>	<b><u>\$208,569</u></b>	<b><u>\$203,187</u></b>	<b><u>\$ 845,841</u></b>

**a. PERSONNEL** (total of 24):

Personnel are categorized into three classifications: (1) Bi-weekly or full-time permanent employees (total of 1), (2) for the purposes of this proposal, those on Payroll are existing faculty that will be working outside of the scope of their normal working week with compensation being in the form of a stipend (total of 2 individuals), and (3) Student Help. The salary for the one Bi-weekly Project Coordinator has been budgeted to increase 3.0% in Years 2 and 3; no annual increases are planned for the other budgeted positions.

Payroll (salaries) costs can be summarized as follows, with a discussion to follow:

<u>Position</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Three-Year Total</u>
Project Coordinator	\$ 60,060	\$ 61,862	\$ 63,700	\$185,622
Advisors (2)	27,000	27,000	27,000	81,000
Student Help	<u>13,680</u>	<u>13,680</u>	<u>13,680</u>	<u>41,040</u>
<b>TOTALS</b>	<b><u>\$100,740</u></b>	<b><u>\$102,542</u></b>	<b><u>\$104,380</u></b>	<b><u>\$307,662</u></b>

1. Bi-Weekly Personnel – Total Budget: \$185,622 (to be hired)

The Project Coordinator is required for the daily administration, supervision, and oversight of the project. The Project Coordinator will monitor critical project information for accuracy, consistency, and reliability. Additionally s/he will set up and ensure that all required meetings take place and will maintain and track all student recruitment, outreach, and job placement activities. These duties will include establishing student qualifications for program enrollment, assisting in the marketing program, and creating a strong bond with high schools and job placement agencies.

There is one Project Coordinator position budgeted, which is for an individual to be hired. S/he will be located on our XXXXX campus and will have the responsibility to cover all four of our campuses. The position is budgeted to work 35 hours/week for 52 weeks each year with a starting hourly rate of \$33/hr. for a starting annual salary of \$60,060 (35 x 52 x \$33).

2. Lecturer's Payroll – Total Budget: \$81,000

There are two positions on Lecturer's Payroll: a Project Manager and a Curriculum Coordinator. These positions will be filled by existing faculty members, each of whom will receive a \$4,500 stipend per semester (3 semesters per year for each of the 3 years of the award). Their work on this program extends beyond their normal weekly academic responsibilities.

- a. There is one (1) Project Manager, a position that will be held by the Engineering Department Chairperson. The Project Manager is required to oversee execution of the entire project and ensures academic, program and departmental goals are being met.
- b. There is one (1) Curriculum Coordinator, who is necessary to oversee faculty participation in the design, development, and delivery of the project curriculum. The Curriculum Coordinator will report to the Project Manager and is the primary focus for all participating faculty member project assignments and reporting. The Curriculum Coordinator will also be responsible for administering the professional development activities of participating faculty members, and assisting the Project Coordinator with student recruitment and career outreach activities.

3. Student Help – Total Budget: \$41,040

Part-time positions for students are necessary to assist faculty members in the development of course materials. Students will be an asset especially for testing and evaluating laboratory experiments and projects. A number of students (the number of hours a student will work will vary) will be compensated at a rate of \$8.00 per hour (38 hrs. per week x 15 weeks per semester x 3 semesters x \$8.00 per hour = \$13,680 per year).

**b. FRINGE BENEFITS**

The Bi-weekly employee – the Project Coordinator - has health insurance benefits (assumed to be at the family rate of \$14,389 per year), retirement (TIAA) at 9.0% of total payroll, FICA at 7.65% of payroll, and Assessed Fringe Benefits at 6.3% of payroll. Health insurance is budgeted to increase 5.0% in years 2 and 3, while the stated percentages for the other benefits remain constant each year for budgeting purposes.

Lecturer employees – the Project Manager and Curriculum Coordinator - have FICA and Assessed Fringe Benefits applied at the rate of 7.65% and 2.90% of payroll, respectively.

Student help fringe benefits are limited to FICA at 7.65% of total payroll.

Fringe Benefits are summarized as follows:

<u>Position</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Three-Year Total</u>
Project Coordinator	\$ 28,173	\$ 29,305	\$ 30,482	\$ 87,960
Faculty Advisors (2)	2,849	2,849	2,849	8,547
Student Help (2)	<u>1,046</u>	<u>1,046</u>	<u>1,046</u>	<u>3,138</u>
<b>TOTALS</b>	<b><u>\$ 32,068</u></b>	<b><u>\$ 33,200</u></b>	<b><u>\$ 34,377</u></b>	<b><u>\$ 99,645</u></b>

**c. TRAVEL**

<u>Class Category</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Three-Year Total</u>
Travel	\$ 4,000	\$ 3,000	\$ 3,000	\$ 10,000

Travel consists of two domestic conferences in Year 1, two in Year 2, and one in Year 3. These trips will be for professional development for faculty members working on this project as required; it is possible that some of this funding will be for meetings required of grant participants. The budget has been structured for the following conference activities (dollar values include possible conference fees): XXXXXXXX (in XXXX, TX) in Year 1 \$1,800 (4 days/3 nights XXXXX (in XXXXXXX, TX) in Year 1 \$2,200 (4 days/3 nights); XXXX in Year 2 for two individuals (in XXXXXXX) \$3,000 in total (3 days/2 nights for each of the two individuals); one or two unidentified conferences in Year 3 with an estimated cost of \$3,000 (budgeted for a total of 3 days/2 nights).

**d. EQUIPMENT**

<u>Class Category</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Three-Year Total</u>
Equipment	\$93,000	\$ 0	\$ 0	\$ 93,000

The following capital equipment (with per-unit costs of \$5,000 or higher, with this dollar figure being the threshold for capitalization purposes) has been budgeted

Transformer lab Kit, Lab-Volt (qty.: 1)	\$ 10,000
Electromechanical Power Trainer, Lab-Volt (qty.: 2)	70,000
Direct Burial Transformer Switching Trainer (qty.: 1)	<u>13,000</u>
<b>Total</b>	<b><u>\$ 93,000</u></b>

This equipment provides hands-on experience with setting up and running tests on power circuits, an integral part of the program.

**e. SUPPLIES**

<u>Class Category</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Three-Year Total</u>
Supplies	\$77,675	\$ 2,000	\$ 2,000	\$ 81,675

Supplies, the majority of which are for educational supplies, are required to set up labs that can accommodate up to 22 students. Supplies are necessary for equipping lab space with the capacity to simulate power distribution, measure electrical and mechanical parameters, and collect data.

The detail for the \$77,675 budgeted in Year 1 is as follows:

Motor Relay Wiring Stations (qty.: 5 at \$1,200 ea.)	\$ 6,000
Power Supplies (qty.: 5 at \$1,016 ea.)	5,080
Electricity Kits (qty.: 5 at \$879 ea.)	4,395
Projector, Including Mounting (qty.: 1 at \$2,000)	2,000
Tektronix Oscilloscopes (qty.: 22 at \$1,500)	33,000
Tektronix Meters & Generators (qty.: 22 at \$500)	11,000
Smart White Board for Projections (qty.: 1 at \$3,000)	3,000
Storage Cabinets for Lab Equipment (qty.: 2 at \$1,000)	2,000
Computer Supplies	1,500
Workstation, including Tables and Chairs	7,700
Laboratory Supplies/Consumables	<u>2,000</u>
<b>Total</b>	<u><b>\$ 77,675</b></u>

The supplies budgeted in Years 2 and 3 at \$2,000 are for laboratory supplies/consumables.

**f. CONTRACTUAL**

<u>Class Category</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Three-Year Total</u>
Contractual	\$ 1,000	\$ 3,000	\$ 3,000	\$ 7,000

Repairs due to wear and tear on equipment and furniture are anticipated. The \$7,000 budget in this category is for a maintenance contract for equipment and for the repair of laboratory furniture.

**g. CONSTRUCTION – None Charged**

**h. OTHER**

The various classifications of costs included in “Other” are summarized and discussed below:

<u>Other Cost</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Three-Year Total</u>
Advertising	8,000	3,564	2,500	14,064
Special Services	6,000	6,000	6,000	18,000
<b>TOTALS</b>	<u><b>\$ 75,023</b></u>	<u><b>\$ 12,403</b></u>	<u><b>\$ 11,349</b></u>	<u><b>\$ 98,775</b></u>

Printing – The \$2,000 in Year 1 is for the printing of brochures, posters, and promotional materials necessary to support the marketing of this new program.

Advertising – Promotional advertisements are required for attracting students and informing the community of the new program here at CCRI. Advertisements will be placed in local and regional newspapers, as well as other media.

Special Services – The items contained in the Special Services budget for each year include:

Busses for Student Field Trips	\$ 3,000
Design of Program Marketing Materials	<u>3,000</u>
<b>Total</b>	<b>\$ 6,000</b>

**i. INDIRECT CHARGES**

<u>Class Category</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Three-Year Total</u>
Indirect Charges	\$ 23,079	\$ 12,424	\$ 12,581	\$ 48,084

Indirect charges are calculated on the basis of 8.0% of the total Direct Expenditures for each year, excluding the cost of capitalized equipment.

**j. MATCHING COSTS**

<u>Class Category</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Three-Year Total</u>
Matching Costs	\$ 27,500	\$ 40,000	\$ 32,500	\$100,000

XXXXXX will support XXXX efforts to redesign XXXXXXXX Technology and to develop an XXXX. NG will provide marketing support; basic curriculum; industry-specific training; subject matter expertise; consultation as needed, and serve on the Project Advisory Committee. XXXX will also arrange for professional development opportunities for XXXX faculty, and provide XXXXX students enrolled in the certificate program with hands-on training opportunities at their facility in XXXXX. Students who successfully complete the program will be considered for employment by XXXXX. The estimated cost of these contributions amounts to a minimum of \$100,000.