

**CONTRACT REQUESTS FORM (CRF)**

CEC-94 (Revised 5/11)

CALIFORNIA ENERGY COMMISSION


 New Contract 500-12-010     Amendment to Existing Contract: \_\_\_\_\_ Amendment Number: \_\_\_\_\_

Division	Contract Manager:	MS-	Phone	CM Training Date
ERDD - Environmental Area	David Stoms	43	916-327-2381	7/11/2012

Contractor's Legal Name	Federal ID Number
DOE- Lawrence Berkeley National Laboratory	94-2951741

Title of Project
Investigations of Potential Induced Seismicity Related to Geologic Carbon Dioxide Sequestration in California

Term	Start Date	End Date	Amount
New/Original Contract	6/19/2013	12/31/2015	\$ 575,423

Line up the Amendment information as best as possible within the following table.

Amendment #	End Date (mm/dd/yy)	Amount

### Business Meeting Information

Proposed Business Meeting Date	5/8/2013	<input type="checkbox"/> Consent	<input checked="" type="checkbox"/> Discussion
Business Meeting Presenter	David Stoms	Time Needed:	5 minutes

### Agenda Item Subject and Description

Possible approval of contract 500-12-010 with the Lawrence Berkeley National Laboratory for \$575,423 to evaluate the potential for induced seismicity from geologic sequestration in the southern San Joaquin Valley of California. The proposed project will analyze information on the occurrence of oil and gas production-related induced seismicity, conduct laboratory measurements of the fracture permeability of natural cap rock samples and model pressure rise due to mixing of methane and supercritical CO<sub>2</sub>. The agreement is for 30 months. (PIER Natural Gas funding)

**Business Meeting approval is not required for the following types of contracts:** *Executive Director's signature is required in all cases.*

- Contracts less than \$10k (*Policy Committee's signature is also required*)
- Amendment for a no-cost time extension. Must be first extension, less than one year and original contract less than \$100k.
- Contracts less than \$25k for Expert Witness in Energy Facility licensing cases and amendments.

### Purpose of Contract or Purpose of Amendment, if applicable

The purpose of the agreement is to assess the potential for induced seismicity from geologic carbon sequestration in California.

### California Environmental Quality Act (CEQA) Compliance

- Is Contract considered a "Project" under CEQA?
  - Yes: skip to question 2
  - No: complete the following (PRC 21065 and 14 CCR 15378):  
Explain why contract is not considered a "Project":  
Contract will not cause direct physical change in the environment or a reasonably foreseeable indirect physical change in the environment because .
- If contract is considered a "Project" under CEQA:
  - a) Contract **IS** exempt. (Draft NOE required)
    - Statutory Exemption. List PRC and/or CCR section number: \_\_\_\_\_
    - Categorical Exemption. List CCR section number: 14 CCR 15306
    - Common Sense Exemption. 14 CCR 15061 (b) (3)
 Explain reason why contract is exempt under the above section:  
Class 6 - Basic data collection, research, experimental management, and resource evaluation activities that do not result in major disturbances to an environmental resource.
  - b) Contract **IS NOT** exempt. The Contract Manager needs to consult with the Energy Commission attorney assigned to their division and the Siting Office regarding a possible Initial Study.

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CALIFORNIA ENERGY COMMISSION



Budgets Information								
Contract Amount Funded		Breakdown by FY			Funding Sources			
Funding Source	Amount	FY	Amount	Approved?	Funding Source	FY	Budget List No.	Amount
ARFVTF	\$	12-13	\$575,423	Yes	NG Subaccount,	11-12	501.001F	\$575,423
ECAA	\$		\$					\$
State- ERPA	\$		\$					\$
Federal	\$		\$					\$
PIER - E	\$		\$					\$
PIER - NG	\$575,423		\$					\$
Reimbursement	\$		\$					\$
Other	\$		\$					\$
<b>TOTAL:</b>	<b>\$575,423</b>	<b>TOTAL:</b>	<b>\$575,423</b>		<b>TOTAL:</b>			<b>\$575,423</b>
Reimbursement Contract #:					Federal Agreement			

Contractor's Administrator/ Officer		Contractor's Project Manager	
Name:	Francis Rubenstein	Name:	Rick Inada
Address:		Address:	Sponsored Projects Office 1 Cyclotron Rd MS 90R2000
City, State, Zip:		City, State, Zip:	Berkeley, CA 94720-2000
Phone/ Fax:	510-486-4096 / 510-486-4089	Phone/ Fax:	/
E-Mail:		E-Mail:	RMIInada@lbl.gov

Contractor Is
<input type="checkbox"/> Private Company (including non-profits) <input type="checkbox"/> CA State Agency (including UC and CSU) <input checked="" type="checkbox"/> Government Entity (i.e. city, county, federal government, air/water/school district, joint power authorities, university from another state)

Selection Process Used
<input type="checkbox"/> Solicitation <u>Select Type</u> Solicitation #: _____ # of Bids: _____ Low Bid? <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> Non Competitive Bid (Attach CEC 96) <input checked="" type="checkbox"/> Exempt Other Government Entity

Civil Service Considerations
<input type="checkbox"/> Not Applicable (Contract is with a CA State Entity or a membership/co-sponsorship) <input checked="" type="checkbox"/> Public Resources Code 25620, et seq., authorizes the Commission to contract for the subject work. (PIER) <input type="checkbox"/> The Services Contracted: <input type="checkbox"/> are not available within civil service <input type="checkbox"/> cannot be performed satisfactorily by civil service employees <input type="checkbox"/> are of such a highly specialized or technical nature that the expert knowledge, expertise, and ability are not available through the civil service system. <input type="checkbox"/> The Services are of such an: <input type="checkbox"/> urgent <input type="checkbox"/> temporary, or <input type="checkbox"/> occasional nature that the delay to implement under civil service would frustrate their very purpose. <b>Justification:</b> Public Resources Code 25620, et seq., authorizes the Commission to contract for the subject work. (PIER)

# CONTRACT REQUESTS FORM (CRF)



Payment Method			
<input checked="" type="checkbox"/> A. Reimbursement in arrears based on:			
<input type="checkbox"/> Itemized Monthly	<input checked="" type="checkbox"/> Itemized Quarterly	<input type="checkbox"/> Flat Rate	<input type="checkbox"/> One-time
<input checked="" type="checkbox"/> B. Advanced Payment			
<input type="checkbox"/> C. Other, explain:			

Retention			
1. Is contract subject to retention?		<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes
If Yes, Do you plan to release retention prior to contract termination?		<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes

Justification of Rates
The contract price is reasonable, particularly considering the facility provided by the contract terms. The research will be conducted by a national laboratory; salaries and wages are in accordance with costing practice for all Department of Energy programs.

Disabled Veteran Business Enterprise Program (DVBE)
1. <input checked="" type="checkbox"/> Not Applicable
2. <input type="checkbox"/> Meets DVBE Requirements      DVBE Amount:\$ _____ DVBE %: _____
<input type="checkbox"/> Contractor is Certified DVBE
<input type="checkbox"/> Contractor is Subcontracting with a DVBE: _____
3. <input type="checkbox"/> Requesting DVBE Exemption (attach CEC 95)

Is Contractor a certified Small Business (SB), Micro Business (MB) or DVBE?		<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes
If yes, check appropriate box:		<input type="checkbox"/> SB	<input type="checkbox"/> MB <input type="checkbox"/> DVBE

Is Contractor subcontracting any services?		<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes
If yes, give company name and identify if they are a Small Business (SB), Micro Business (MB) and/or DVBE:			
	<input type="checkbox"/> No	<input type="checkbox"/> SB	<input type="checkbox"/> MB <input type="checkbox"/> DVBE
	<input type="checkbox"/> No	<input type="checkbox"/> SB	<input type="checkbox"/> MB <input type="checkbox"/> DVBE
	<input type="checkbox"/> No	<input type="checkbox"/> SB	<input type="checkbox"/> MB <input type="checkbox"/> DVBE
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	<input type="checkbox"/> No	<input type="checkbox"/> SB	<input type="checkbox"/> MB <input type="checkbox"/> DVBE
	<input type="checkbox"/> No	<input type="checkbox"/> SB	<input type="checkbox"/> MB <input type="checkbox"/> DVBE
	<input type="checkbox"/> No	<input type="checkbox"/> SB	<input type="checkbox"/> MB <input type="checkbox"/> DVBE

Miscellaneous Contract Information			
1. Will there be Work Authorizations?		<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes
2. Is the Contractor providing confidential information?		<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes
3. Is the contractor going to purchase equipment?		<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes
4. Check frequency of progress reports			
<input type="checkbox"/> Monthly <input checked="" type="checkbox"/> Quarterly <input type="checkbox"/> _____			
5. Will a final report be required?		<input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes
6. Is the contract, with amendments, longer than a year? If yes, why?		<input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes
The Department of General Services has agreed to give the Commission blanket authority to execute multi-year contracts to support the Commission's RD&D Programs.			

# CONTRACT REQUESTS FORM (CRF)



The following items should be attached to this CRF			
1. Scope of Work, Attach as Exhibit A.	<input type="checkbox"/> N/A	<input checked="" type="checkbox"/> Attached	
2. Budget Detail, Attach as Exhibit B.	<input type="checkbox"/> N/A	<input checked="" type="checkbox"/> Attached	
3. CEC 96, NCB Request	<input checked="" type="checkbox"/> N/A	<input type="checkbox"/> Attached	
4. CEC 30, Survey of Prior Work	<input checked="" type="checkbox"/> N/A	<input type="checkbox"/> Attached	
5. CEC 95, DVBE Exemption Request	<input checked="" type="checkbox"/> N/A	<input type="checkbox"/> Attached	
6. Draft CEQA Notice of Exemption (NOE)	<input type="checkbox"/> N/A	<input checked="" type="checkbox"/> Attached	
7. Resumes	<input type="checkbox"/> N/A	<input checked="" type="checkbox"/> Attached	
8. CEC 105, Questionnaire for Identifying Conflicts		<input checked="" type="checkbox"/> Attached	
9. CEC 106, IT Component Reporting Form		<input type="checkbox"/> Attached	

\_\_\_\_\_  
 Contract Manager                      Date                      Office Manager                      Date                      Deputy Director                      Date

The following signatures are only required when contract approval is delegated to the Executive Office and not approved at a Business Meeting. See Business Meeting Information Section.

\_\_\_\_\_  
 Presiding Policy Committee                      Date                      Associate Policy Committee                      Date                      Executive Director                      Date

## **Exhibit A - Statement of Work**

### **Title of project**

Investigations of Potential Induced Seismicity Related to Geologic Carbon Dioxide Sequestration in California

### **Background**

Carbon dioxide capture and storage in geological formations is expected to be one of the main venues that could be used to drastically reduce net greenhouse gas emissions in California in the next decades. However, this practice may be hampered by concerns that injecting carbon dioxide underground could induce seismic events. For this reason, the Energy Commission decided to initiate this study to gain a better understanding of the potential for induced seismic events and how to minimize or avoid this risk.

The Energy Commission selected Lawrence Berkeley National Laboratory (LBNL) to conduct this study. The U.S. Department of Energy, in turn, has authorized LBNL to perform the work stated in this scope of work for the Energy Commission.

The U.S. Department of Energy has directed Lawrence Berkeley National Laboratory (LBNL) to perform the work stated in this Appendix A for the Energy Commission. LBNL, a laboratory of the Department of Energy, is located at One Cyclotron Road, Berkeley, California, 94720 and is operated by the Regents of the University of California, a not-for-profit corporation organized under the laws of the State of California, with its principal place of business at University of California, Office of the President, 1111 Broadway, Suite 1450, Oakland, CA 94607-4081, manages and operates LBNL under DOE Contract No. DE-AC03-76SF00098.

The California Energy Resources Conservation and Development Commission (Energy Commission) is an agency organized under the laws of the State of California with a principal place of business at 1516 Ninth Street, Sacramento, California 95814. Funding for this project represents part of the Energy Commission match funding for the West Coast Regional Carbon Sequestration Partnership (WESTCARB), which is one of seven research partnerships co-funded by the U.S. Department of Energy to characterize regional carbon sequestration opportunities and conduct technology validation projects.

### **Project Goals and Objectives**

#### **Problem Statement**

Induced seismicity is known to accompany a wide variety of fluid injection activities and has been explained using Mohr-Coulomb theory as resulting from the decrease in effective stress arising from increase in fluid pressure. The potential for induced seismicity to occur as a result of the injection of large amounts of carbon dioxide (CO<sub>2</sub>) into the deep subsurface for geologic carbon dioxide sequestration (GCS) is well recognized but not well researched. Additional to concerns about hazards to buildings and structures are concerns that cap-rock integrity could be compromised by seismic events induced by CO<sub>2</sub>-injection (e.g., Zoback and Gorelick, 2012). Because the successful implementation of GCS is predicated on storing CO<sub>2</sub> for long periods with minimal CO<sub>2</sub> leakage, the implication that induced seismicity could cause degraded caprock integrity is significant with regard to leakage resulting in atmospheric emissions, compromised carbon credits, and local environmental impacts (groundwater degradation, root-zone effects).

It is unclear what available data can be used to address these concerns because there are as

yet no relevant datasets specific to large-scale GCS projects and no comprehensive analyses of the value and applicability of analog data. This project aims to address this research gap with a strong focus on California. This research also is recognized as integral to meeting the goals of West Coast Regional Carbon Sequestration Partnership (WESTCARB) and the Department of Energy/National Energy Technology Laboratory (DOE/NETL) Regional Carbon Sequestration Partnership Program. The lack of understanding of potential induced seismicity related to GCS is a limitation to permitting carbon capture and storage (CCS) projects in California, and the results of this research will assist California regulatory and permitting agencies in developing appropriate methods to address induced seismicity issues in the context of CCS project permitting. Given that the California Air Resources Board must develop CCS cap-and-trade quantification methodologies within the next three years and that the Energy Commission and the California Public Utilities Commission are in the process of considering permitting California's first commercial-scale CCS project (Hydrogen Energy California, HECA), this research is urgent and timely.

We propose to investigate induced seismicity related to GCS with a specific focus on California's opportunities and geologic conditions. To perform this work, LBNL has assembled a team of experts in seismology, geophysics, hydrogeology, reservoir modeling, experimental petrophysics, and geochemistry. Experts from the California Geological Survey will also be subcontracted to assist with parts of this research. The work spans data collection and analysis, numerical simulation, laboratory measurements, and risk assessment. Two phases of research are planned: (1) Data identification and assessment in support of the scope of data-driven tasks along with sample collection and acquisition in support of the laboratory measurement activities; and (2) Data analysis, laboratory measurements and risk assessment for one or more California potential GCS sites. The first technical task will conclude with a Project Advisory Activity review meeting, which will guide the direction of research in the second technical task. Task 2.2, as outlined below, spans a range of potential research that depends on various types of data and samples. The emphases of Task 2.2 research will depend on the PAC assessment of which aspects can be reasonably supported based on the findings of Task 2.1.

### **Technical and economic/cost performance objectives**

- A. The overall technical goal of this project is to evaluate what existing data and rock samples can be applied to address the problem of induced seismicity related to CO<sub>2</sub>-injection and to use these data and samples to investigate potential seismic hazards related to geologic sequestration projects in California.

The specific, technical objectives upon which this project's success will be evaluated are:

- Identify and acquire data on: seismic events associated with subsurface fluid injection, including oil and gas and other geologically relevant injection and production operations; in-situ stress states for high-potential GCS sites; CO<sub>2</sub> phase change behaviors that may impact pressure evolution and stress in GCS reservoirs; and oil/gas migration potentially related to faults and seismic events
- Identify and acquire samples of relevant storage reservoir caprock formations. The formations of interest have been previously identified by WESTCARB and the California Geological Survey.
- Use a team of experts (Project Advisory Committee, PAC) to assess the data and sample sets with respect to supporting further studies
- Using acquired data or samples, perform studies as directed by the PAC relevant to understanding correlations between injection, fluid migration, seismic occurrences, and associated seismic hazards, including analyses, modeling, and laboratory

measurements or experiments (detailed list below)

- B. The overall economic/cost goal of this project is to reduce the costs and expedite the permitting of future geologic sequestration projects in California by improving understanding of the potential for seismic hazards associated with CO<sub>2</sub> injection.

The specific, economic/cost objectives upon which project's success will be evaluated are:

- not applicable

## 1.0 Preliminary Activities

### 1.1 Attend Kick Off Meeting

The Facility Operator's Project Manager (Principal Investigator) shall attend a "kick off" meeting with the Commission Contract Manager to review the Energy Commission's expectations for: accomplishing tasks described in the work statement; administrative requirements in the terms and conditions of the contract (e.g., invoicing, statements vesting title, prior approvals, data disclosure limitations, monthly progress reporting format and content, etc.); and the Energy Commission's roles and responsibilities. The location of this meeting shall be designated by the Commission Contract Manager.

### 1.2 Describe Synergistic Projects

There are no synergistic projects associated with this project. However, this project is part of the portfolio of research that the Energy Commission has contracted as part of its mission to administer the DOE/NETL West Coast Regional Sequestration Partnership (WESTCARB). The results of this project will be included in the WESTCARB reports and other deliverables that the Energy Commission provides to DOE/NETL.

### 1.3 Identify Required Permits

No permits are required to undertake this project.

### 1.4 Obtain Required Permits

No permits are required to undertake this project.

### 1.5 Prepare Production Readiness Plan

A Production Readiness Plan is not applicable to this project.

## TECHNICAL TASKS

## GLOSSARY

*Specific terms and acronyms used throughout this work statement are defined as follows:*

CCS	Carbon capture and storage
CH <sub>4</sub>	Methane

CO <sub>2</sub>	Carbon dioxide
CPR	Critical Project Review
DOE/NETL	Department of Energy/National Energy Technology Laboratory
GCS	Geologic carbon sequestration
HECA	Hydrogen Energy California
LBNL	Lawrence Berkeley National Laboratory
PAC	Project Advisory Committee
PIER	Public Interest Energy Research
WESTCARB	West Coast Regional Carbon Sequestration Partnership

**SCOPE OF WORK**

This agreement includes a set of administrative tasks and a set of Technical Tasks. The remainder of this work statement defines these Technical Tasks. Task descriptions include goals, Contractor activities, and deliverables. The deliverables, such as test plans, technical reports and other interim deliverables, for each task are defined to the extent possible, but are subject to change based on recommendations from the Project Manager and the approval of the Commission Contract Manager. The Contractor shall submit a draft of each deliverable, unless described differently in the Technical Tasks, to the Commission Contract Manager for review and comment in accordance with the approved Schedule of Deliverables. Deliverables not requiring a draft version are indicated by marking “(no draft)” after the deliverable name.

The Commission Contract Manager will provide written comments back to the Contractor on the draft deliverable within 10 working days of receipt. Once agreement has been reached on the draft, the Contractor shall submit the final deliverable to the Commission Contract Manager. The Commission Contract Manager shall provide written approval of the final deliverable within 5 working days of receipt. Key elements from this deliverable shall be included in the Final Report for this project.

When creating technical deliverables, the Facility Operator shall use and follow, unless otherwise instructed in writing by the Commission Contract Manager, the latest version of the PIER Style Manual published on the Energy Commission's web site:

<http://www.energy.ca.gov/contracts/pier/contractors/index.html>

**Technical Task List**

Task 2.1	<i>Acquire Data and Samples</i>
Task 2.2	<i>Analysis, Measurement, Experiments, and Simulation</i>

**Task 2.1 Acquire Data and Samples**

The goal of this task is to identify, acquire and evaluate data and rock samples that can be applied to address the problem of induced seismicity related to CO<sub>2</sub>-injection. As a repository for much of California’s geologic data, the Department of Conservation, through the experts provided by California Geologic Survey under subcontract, will assist in data identification, acquisition and evaluation.

**The Contractor shall:**

- Identify sources of relevant data and acquire and evaluate datasets on:
  - oil and gas injection and production and seismic/microseismic events;
  - other relevant deep fluid injection (e.g., waste disposal) and seismic/microseismic events;
  - in-situ stress states for high potential geologic sequestration sites in California (site selection based on previous WESTCARB studies); and
  - oil/gas migration associated with faults and seismicity, which may be used to understand whether seismicity played a role in creating so-called “missing” or dry hydrocarbon reservoirs
  - fundamental data on CO<sub>2</sub> phase changes in the subsurface that may affect pressure and stress field evolution in storage reservoirs, with focus on CO<sub>2</sub>/CH<sub>4</sub> (methane) mixing
- Prepare a technical memo summarizing data and sample acquisition results
- Prepare a listing of datasets evaluated for this task
- Contribute to WESTCARB deliverables and reports as requested by the WESTCARB P.I. or Technical Director
- Identify and obtain samples of caprock from cores or outcrops of key sealing formations of high potential storage reservoirs in California (formation selection based on previous WESTCARB studies) that can be used for measuring fracture-related flow properties
- Prepare and present results in Powerpoint at a Critical Project Review meeting for recommendations to be made by selected members of the WESTCARB Project Advisory Committee
- Prepare a technical memo on guidance from PAC meeting for Task 2.2

**Deliverables:**

- Technical memo of data and sample acquisition results (electronic, no draft)
- Dataset listings (electronic, no draft)
- Contributions to WESTCARB deliverables and reports as requested by the WESTCARB P.I. or Technical Director
- Powerpoint presentation at CPR (no draft)
- Technical memo on guidance from PAC meeting for Task 2.2 (no draft)

**Task 2.2 Analysis, measurement, experiments, and simulations**

The goal of this task is to analyze data and samples collected in Task 2.1 to investigate potential seismic hazards related to geologic sequestration projects in California. Investigations may include modeling, simulation, laboratory measurements and experiments, with the relative emphasis on the components of the task as detailed below to be determined by the PAC review at the end of Task 2.1.

**The Contractor shall:**

- Analyze data sets collected in Task 1 above to determine:
  - The correlation between induced seismicity and fluid injection related to oil or gas production or waste disposal in California;
  - The relationship between “missing” or dry reservoirs and seismicity producing faulting and loss of caprock integrity;
  - The potential for CO<sub>2</sub>-phase changes produced by fluid mixing or other subsurface processes to affect storage reservoir pressure evolution and stress states
  - The range and magnitudes of in-situ stress states at key, high potential storage sites in California
- Prepare a technical memo summarizing results of data analyses
- Perform data analyses and/or simulations to provide preliminary risk assessment information relevant to informing development of seismic hazards regulations or permitting for GCS projects in California
- Prepare a technical memo (or other format such as movie animation) documenting simulation results
- Perform laboratory measurements and experiments to determine caprock properties that control the potential for leakage due to induced seismicity; these properties include but are not limited to permeability, porosity, relative permeability, and capillary pressure.
- Contribute to WESTCARB deliverables and reports as requested by the WESTCARB P.I. or Technical Director

**Deliverables:**

- Technical memo of data analyses (electronic, no draft)
- Technical memo (or other format such as movie animation) of simulation results (no draft)
- Contributions to WESTCARB deliverables and reports as requested by the WESTCARB P.I. or Technical Director

**Task 2.3 Technology Transfer Activities**

The goal of this task is to develop a plan to make the knowledge gained, experimental results and lessons learned available to key decision-makers. The results of this research will be documented in Energy Commission reports and will be included in WESTCARB materials developed for public and policy outreach, for technical meetings, and internal Commission processes. The deliverables and contractor tasks described below shall be fulfilled and included in the larger scope of WESTCARB’s outreach plan.

**The Contractor shall:**

- Prepare a Technology Transfer Plan. The plan shall explain how the knowledge gained in this project will be made available to the public. The level of detail expected is least for research-related projects and highest for demonstration projects. Key elements from this report shall be included in the Final Report for this project.
- Conduct technology transfer activities in accordance with the Technology Transfer Plan. These activities shall be reported in the Quarterly Progress Reports.

**Deliverables:**

- Draft Technology Transfer Plan
- Final Technology Transfer Plan

**Task 3.0 Reporting Tasks**

All reports shall be delivered to:

Accounting Office, MS-2  
California Energy Commission  
1516 9<sup>th</sup> Street, 1<sup>st</sup> Floor  
Sacramento, CA 95814

### **Task 3.1 Quarterly Progress Reports**

The Contractor shall prepare *written* Quarterly Progress Reports to the Commission Contract Manager by the 30th of the following month, starting after the Department of General Service's contract approval date and shall continue each month until the Final Report has been accepted by the Commission Contract Manager. The progress report should summarize all Agreement activities conducted by the Contractor for the reporting period, including an assessment of the ability to complete the Agreement within the current budget and any anticipated cost overruns. Attachment A-2 provides a recommended format and content requirements for the Quarterly Progress Report.

### **Task 3.2 Final Report**

The Final Report shall be a public document. If the Contractor will be preparing a confidential version of the final report as well, the Contractor shall perform the following tasks for both the public and confidential versions of the Final Report. When creating the Final Report, the Facility Operator shall use and follow, unless otherwise instructed in writing by the Commission Contract Manager, the latest version of the PIER Style Manual published on the Energy Commission's web site:

<http://www.energy.ca.gov/contracts/pier/contractors/index.html>

#### **Subtask 3.2.1 Final Report Outline**

- Contractor shall prepare and submit to the Commission Contract Manager for review an outline of the Final Report describing the original purpose, approach and results of the project.
- The outline shall be submitted to the Commission Contract Manager for review. The Commission Contract Manager shall determine if the outline is satisfactory. If the Commission Contract Manager determines that the outline is unsatisfactory, he or she will, in a timely manner, provide to the Contractor written comments, which indicate how the outline can be improved. The Contractor shall revise the outline to meet the Commission Contract Manager's requirements. Upon finding the final report outline satisfactory, the Commission Contract Manager shall provide to the Contractor written approval of it.

#### **Subtask 3.2.2 Draft Final Report for Comment**

- The Contractor shall prepare and submit to the Commission Contract Manager a draft Final Report on the project. The format of the report shall follow the approved outline.
- The draft final report shall be submitted to the Commission Contract Manager for review and to determine, in a timely manner, if it is satisfactory. If the Commission Contract

Manager determines that it is unsatisfactory, he or she will, provide to the Contractor written comments, which indicate how it can be improved. The Contractor shall revise the draft final report incorporating the Commission Contract Manager's corrections and required changes. Upon finding the revised draft to be satisfactory, the Commission Contract Manager shall provide to the Contractor written approval of it.

### **Subtask 3.2.3 Final Report**

- The Contractor shall prepare Final Report and submit it to the Commission Contract Manager after receiving the Commission Contract Manager's written approval of the draft Final Report. This task shall be deemed complete and accepted by the Commission only when the Commission Contract Manager approves the Final Report in writing. Upon approval, the Contractor shall submit two unbound copies of the Final Report to the Commission Contract Manager.

### **Task 3.3 Final Meeting**

Contractor shall meet with the Commission Contract Manager to present findings, conclusions, and recommended next steps (if any) for the project.

Contractor will also discuss with the Commission Contract Manager the following contract close-out items:

- What to do with any state-owned equipment (Options), if applicable
- Commission's request for specific "generated" data (not already provided in contract deliverables)
- Need to document Contractor's disclosure of "subject inventions" developed under the contract
- Need to file UCC-1 form re: Commission's interest in patented technology
- Other "surviving" contracts provisions.

### **Critical Project Reviews**

The Energy Commission will conduct critical project reviews at the conclusion of the following tasks:

- Task 2.1

Critical project reviews are meetings between the Facility Operator, the Energy Commission Contract Manager and other individuals selected by the Commission Contract Manager to provide objective, technical support to the Energy Commission. The purpose of these meetings is to discuss with the Facility Operator the status of the project and its progress toward achieving its goals and objectives. These meetings may take place at the Energy Commission offices in Sacramento, or at another, reasonable location determined by the Commission Contract Manager.

Prior to the critical project review meeting, the Facility Operator will provide the task deliverable(s) to the Commission Contract Manager sufficiently in advance to allow the Contract Manager's review of the deliverable document(s) before the review meeting. If not already defined in the Work Statement, the Commission Contract Manager shall specify the contents of the deliverable document(s).

At the critical project review meeting, the Facility Operator shall present the required technical information and participate in a discussion about the project with the Commission Contract Manager and other meeting attendees, if any.

Following the critical project review meeting, the Energy Commission will determine whether the Facility Operator is complying satisfactorily with the Work Statement and whether the project is demonstrating sufficient progress toward achieving its goals and objectives to warrant continued PIER financial support for the project.

### **Sponsor's Key Personnel and Agreement Management**

- A. The name and area code/phone number of the California Energy Commission's Contract Manager is listed on Exhibit F and is the official technical contact for the Energy Commission.

The Sponsor's Contract Manager is responsible for the day to day project status, decisions and communications with the Facility Operator Project Manager (Principal Investigator). The Commission Contract Manager will review and approve all project deliverables, reports, and invoices.

The Sponsor may change the Contract Manager by notice given to the Facility Operator at any time signed by the Contract Officer of the Energy Commission.

- B. The name and area code/phone number of the California Energy Commission's Contract Officer is listed on Exhibit F and will be the Contract Officer for the Agreement and is the official administrative contact for the Energy Commission.

### **Facility Operator's Key Personnel and Agreement Administration**

The Facility Operator is obligated to comply with the terms and conditions of its Management and Operating (M&O) Contract with the DOE when performing work under this agreement. The DOE may require substitution of the named "key personnel" under this agreement should the DOE determine that the services of the Project Manager (Principal Investigator) or other named key personnel are necessary to meet the Facility Operator's M&O Contract obligations to the DOE. Should the DOE direct the Facility Operator to substitute the named key personnel under this agreement, the Facility Operator shall inform the Energy Commission of the directed substitution in accordance with paragraphs A and B below. In the event that the Energy Commission does not concur with the substitution of named key personnel as directed by the DOE, this agreement shall be terminated in accordance with the Termination provision of the terms and conditions.

- A. The name and area code/phone number of the National Laboratory's Project Manager (Principal Investigator) is on Exhibit F and will be the Project Manager (Principal Investigator) for this project and is the official technical contact for LBNL.

The Facility Operator's Project Manager (Principal Investigator) is responsible for the day to day project status, decisions, and communications with the Sponsor's Contract Manager. The Facility Operator's Project Manager (Principal Investigator) will review and approve all project deliverables and reports.

The Facility Operator's Project Manager (Principal Investigator) is designated as "key

personnel” under the Agreement. The Energy Commission reserves the right to prior written concurrence of any substitution of the Project Manager (Principal Investigator).

- B. The key personnel are listed on Exhibit F in this agreement.

Facility Operator’s key personnel may not be substituted without the Commission Contract Manager’s prior written concurrence. Such concurrence shall not be unreasonably withheld. All other personnel may be substituted by Facility Operator, with written notification made to the Commission Contract Manager.

- C. The name and area code/phone number of National Laboratory Agreement Administrator is on Exhibit F and will be the Agreement Administrator for this Agreement and is the official administrative contact for LBNL.

**Facility Operator’s key subcontractors**

The Facility Operator’s key subcontractors are listed on Exhibit F in this agreement.

Facility Operator’s key subcontractors may not be substituted without the Commission Contract Manager’s prior written concurrence. Such concurrence shall be timely provided and not unreasonably withheld. Delay in written concurrence may result in a work stoppage of subcontract work. All other subcontractors may be substituted by Facility Operator, with written notification made to the Commission Contract Manager.