

CONTRACT REQUESTS FORM (CRF)

CEC-94 (Revised 5/11)

CALIFORNIA ENERGY COMMISSION


 New Contract 500-11-032 Amendment to Existing Contract: _____ Amendment Number: _____

Division	Contract Manager:	MS-	Phone	CM Training Date
Energy Research and Development	Bryan Lee		916-327-1414	10/8/2009

Contractor's Legal Name	Federal ID Number
Schlumberger Carbon Services, a division of Schlumberger Technology Corporation	22-1692661

Title of Project
WESTCARB PHASE III - Schlumberger Carbon Services

Term	Start Date	End Date	Amount
New/Original Contract	6/29/2012	12/31/2014	\$ 2,731,000

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	8/9/2012	<input type="checkbox"/> Consent	<input checked="" type="checkbox"/> Discussion
Business Meeting Presenter	Bryan Lee	Time Needed:	5 minutes

Agenda Item Subject and Description

This agenda item should be sent to the Research List Serve (Energy RD&D/PIER program)
Possible approval of Contract 500-11-032 for \$2,731,000.00 with Schlumberger Carbon Services to provide well logging, core sampling, and related geotechnical services for the West Coast Regional Carbon Sequestration Partnership's Sacramento Basin Geologic Characterization Project. Schlumberger Carbon Services will also conduct seismic surveys, reprocess commercial seismic survey data, and run static and dynamic geologic reservoir models to identify additional locations for WESTACRB geologic characterization wells to assess long-term CO2 storage suitability (WESTCARB federal funding.) Contact: Bryan Lee. (5 minutes)

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

SCS will perform logging and sampling handling operations coincident with the schedule for the well plan and test plan for WESTCARB's Northern California Characterization Project. This work is scheduled to take place during the fourth quarter of 2011 (using match funding). The suite of logging tools to be deployed includes SCS proprietary technology: Platform Express, Elemental Capture Spectroscopy, Natural Gamma Ray Spectroscopy for geologic characterization, Formation Microlmager for structural, stratigraphic and fault identification, Modular Dynamic Tester for fluid sampling, Sonic Scanner for rock geo-mechanical data and seismic calibration parameters, and Mechanical Sidewall Cores for extracting rock samples. In support of data acquisition and interpretation to support regional and field characterization activities, SCS will acquire legacy seismic data in high CCS-potential areas as identified by the project technical team. This seismic data will be re-processed by SCS using modern techniques and utilized in site down-selection. This activity will occur during the first half of 2012. In the area identified in the down-select process as the area with the highest CCS potential, SCS will mobilize a seismic crew to undertake seismic data acquisition operations and subsequent signal processing. This seismic activity will take place in the second half of 2012. These field services will be provided by SCS through a contract directly between the Energy Commission and SCS. This will enable purchase of the data that SCS acquires during the field activities associated with the project and will pay for handling, transport and analyses of samples by both SCS and other project research laboratories. Funds for this work will be: \$2,731,000 Federal and SCS \$2,000,000. The SCS cost share consists of labor provided at no charge in support of project risk assessment activities, a software donation of commercial modeling applications utilized by project researchers, and in-kind service donation at a discount from published rates as per an umbrella agreement between SCS and DOE. The subsurface data and rock and fluid samples analysis produced by SCS activities will provide critical input into project technical team decision making, geologic models developed by Lawrence Livermore National Lab, and injection models developed by LBNL and are fundamental to all project research activities. The work will be reported to the Energy Commission and thence to the DOE in quarterly reports, weekly updates, and a final report.

CONTRACT REQUESTS FORM (CRF)



California Environmental Quality Act (CEQA) Compliance	
1. Is Contract considered a "Project" under CEQA? <input checked="" type="checkbox"/> Yes: skip to question 2 <input type="checkbox"/> No: complete the following (PRC 21065 and 14 CCR 15378): Explain why contract is not considered a "Project":	
2. If contract is considered a "Project" under CEQA: <input checked="" type="checkbox"/> a) Contract IS exempt. (Draft NOE required) <input checked="" type="checkbox"/> Statutory Exemption. List PRC and/or CCR section number: <u>PRC 21080(b)(14); 14 CCR 15277</u> <input type="checkbox"/> Categorical Exemption. List CCR section number: _____ <input type="checkbox"/> Common Sense Exemption. 14 CCR 15061 (b) (3) Explain reason why contract is exempt under the above section: Projects or portions of projects located in another state that will be subject to NEPA or state environmental review consistent with NEPA.	
<input type="checkbox"/> 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.	

Budgets Information								
Contract Amount Funded		Breakdown by FY			Funding Sources			
Funding Source	Amount	FY	Amount	Approved?	Funding Source	FY	Budget List No.	Amount
ARFVTF	\$	11-12	\$2,731,000	Yes	FED	11-12	901.004	\$2,731,000
ECAA	\$		\$					\$
State- ERPA	\$		\$					\$
Federal	\$2,731,000		\$					\$
PIER - E	\$		\$					\$
PIER - NG	\$		\$					\$
Reimbursement	\$		\$					\$
Other	\$		\$					\$
TOTAL:	\$2,731,000	TOTAL:	\$2,731,000				TOTAL:	\$2,731,000
Reimbursement Contract #:					Federal Agreement			

Contractor's Administrator/ Officer		Contractor's Project Manager	
Name:	Wayne Rowe	Name:	Wayne Rowe
Address:	1875 Lawrence St, Suite 500	Address:	1875 Lawrence St, Suite 500
City, State, Zip:	Denver, CO 80127	City, State, Zip:	Denver, CO 80127
Phone/ Fax:	(303) 594-1219 /(303) 297-9007	Phone/ Fax:	(303) 594-1219 /(303) 297-9007
E-Mail:	rowe5@slb.com	E-Mail:	rowe5@slb.com

Contractor Is
<input checked="" type="checkbox"/> Private Company (including non-profits) <input type="checkbox"/> CA State Agency (including UC and CSU) <input 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 Select Type Solicitation #: _____ # of Bids: _____ Low Bid? <input type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> Non Competitive Bid (Attach CEC 96) <input type="checkbox"/> Exempt Select Exemption

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)

CONTRACT REQUESTS FORM (CRF)



The Services Contracted:

- are not available within civil service
- cannot be performed satisfactorily by civil service employees
- are of such a highly specialized or technical nature that the expert knowledge, expertise, and ability are not available through the civil service system.

The Services are of such an:

- urgent
- temporary, or
- occasional nature

that the delay to implement under civil service would frustrate their very purpose.

Justification:
Public Resources Code 25620, et seq., authorizes the Commission to contract for the subject work. (PIER)

Payment Method

A. Reimbursement in arrears based on:

- Itemized Monthly Itemized Quarterly Flat Rate One-time

B. Advanced Payment

C. Other, explain:

Retention

1. Is contract subject to retention? No Yes

If Yes, Do you plan to release retention prior to contract termination? No Yes

Justification of Rates

Rates are competitive with other contractors on this contract, and fall under the guidelines of the WESTCARB grant issued to the Energy Commission by the Department of Energy.

Disabled Veteran Business Enterprise Program (DVBE)

1. Not Applicable

2. Meets DVBE Requirements DVBE Amount:\$ _____ DVBE %: _____

- Contractor is Certified DVBE
- Contractor is Subcontracting with a DVBE: _____

3. Requesting DVBE Exemption (attach CEC 95)

Is Contractor a certified Small Business (SB), Micro Business (MB) or DVBE? No Yes

If yes, check appropriate box: SB MB DVBE

Is Contractor subcontracting any services? No Yes

If yes, give company name and identify if they are a Small Business (SB), Micro Business (MB) and/or DVBE:

Stanford University No SB MB DVBE

Miscellaneous Contract Information

1. Will there be Work Authorizations? No Yes

2. Is the Contractor providing confidential information? No Yes

3. Is the contractor going to purchase equipment? No Yes

4. Check frequency of progress reports

- Monthly Quarterly _____

5. Will a final report be required? No Yes

6. Is the contract, with amendments, longer than a year? If yes, why? No 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 type="checkbox"/> N/A	<input checked="" type="checkbox"/> Attached	
4. CEC 30, Survey of Prior Work	<input type="checkbox"/> N/A	<input type="checkbox"/> Attached	
5. CEC 95, DVBE Exemption Request	<input type="checkbox"/> N/A	<input checked="" 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
SCOPE OF WORK

TECHNICAL TASK LIST

Task #	CPR	Task Name
1	N/A	Administration
2		Seismic Hazards
3		Arizona Field Site Characterization
4	X	Simulation and Modeling Validation and Risk Assessment Support in Arizona and California
5		Well Plan, Risk Management, and Other Permitting in California
6	X	Characterization Well Drilling and Associated Activities in California
7		Technology Transfer Activities

KEY NAME LIST

Task #	Key Personnel	Key Subcontractor(s)	Key Partner(s)
1,2,3,5,6,7	Wayne Rowe – Schlumberger Carbon Services (SCS)		
2	Ken Hnottavange-Telleen - SCS		
4	Wayne Rowe – SCS Alan Brown – SCS	Stanford University	
5	Ken Hnottavange-Telleen - SCS		

GLOSSARY

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

Acronym	Definition
CCS	carbon capture and storage
CO ₂	carbon dioxide
CPR	Critical Project Review
DOE	United States Department of Energy
Energy Commission	California Energy Commission
EOR	Enhanced Oil Recovery
PAC	Project Advisory Committee

Acronym	Definition
PIER	Public Interest Energy Research
SCS	Schlumberger Carbon Services
UCC.1	Uniform Commercial Code (Financing Statement)
WESTCARB	West Coast Regional Carbon Sequestration Partnership

Problem Statement

The United States Department of Energy (DOE) has awarded a grant to the California Energy Commission (Energy Commission) to administer and manage Phase III of the West Coast Regional Carbon Sequestration Partnership (WESTCARB). The project's overall objective is identifying, assessing and characterizing Carbon Capture and Storage opportunities in California, six other western states, and the Canadian province of British Columbia. Schlumberger Carbon Services will provide key emerging technology and expertise to assist WESTCARB in accomplishing this objective.

Schlumberger Carbon Services (SCS) is a global leader in the emerging carbon capture and storage industry, involved in projects worldwide. SCS specializes in the storage of carbon dioxide (CO₂); deploying the geology, engineering and measurement expertise.

Goals of the Agreement

The goal of this Agreement is to identify and characterize deep underground geologic formations in California and Arizona suitable for large-volume CO₂ injection in a manner suitable for securing long-term storage. The project will provide a real-world understanding of the methods necessary for developing models simulating injecting, storing, monitoring containment verification of CO₂ in a deep geologic formation representative of those found in the western United States. It also will assess the effectiveness of the associated characterization methods, models, instruments, injection techniques, and safety assurance approaches used in the test, including innovative and novel engineering and geologic techniques.

Objectives of the Agreement

The objective of this Agreement is to meet the goal of Public Resources Code 25620.1(b)(3) "advance electricity generation technologies that exceed applicable standards to increase reductions in greenhouse gas emissions from electricity generation, and that benefit the electric utility customers" by demonstrating that formations suitable for storing commercial quantities of carbon dioxide exist and can be safely and economically identified and characterized and that the related modeling and measurements of this storage technology confirm the efficacy of the technology and related processes.

TASK 1.0 ADMINISTRATION

MEETINGS

Task 1.1 Attend Kick-off Meeting

The goal of this task is to establish the lines of communication and procedures for implementing this Agreement.

The Contractor shall:

- Attend a “kick-off” meeting with the Commission Contract Manager, the Contracts Officer, and a representative of the Accounting Office. The Contractor shall bring their Project Manager, Contracts Administrator, Accounting Officer, and others designated by the Commission Contract Manager to this meeting. The administrative and technical aspects of this Agreement will be discussed at the meeting. Prior to the kick-off meeting, the Commission Contract Manager will provide an agenda to all potential meeting participants.

The administrative portion of the meeting shall include, but not be limited to, the following:

- Terms and conditions of the Agreement
- CPRs (Task 1.2)
- Match fund documentation (Task 1.7)
- Permit documentation (Task 1.8)

The technical portion of the meeting shall include, but not be limited to, the following:

- The Commission Contract Manager’s expectations for accomplishing tasks described in the Scope of Work;
- An updated Schedule of Deliverables
- Progress Reports (Task 1.4)
- Technical Deliverables (Task 1.5)
- Final Report (Task 1.6)
- Establish the PAC (Task 1.10)
- PAC Meetings (Task 1.11)

The Commission Contract Manager shall designate the date and location of this meeting.

Contractor Deliverables:

- An Updated Schedule of Deliverables
- An Updated List of Match Funds
- An Updated List of Permits
- Schedule for Recruiting PAC Members

Commission Contract Manager Deliverables:

- Final Report Instructions

Task 1.2 CPR Meetings

The goal of this task is to determine if the project should continue to receive Energy Commission funding to complete this Agreement and if it should, are there any modifications that need to be made to the tasks, deliverables, schedule or budget.

CPRs provide the opportunity for frank discussions between the Energy Commission and the Contractor. CPRs generally take place at key, predetermined points in the Agreement, as determined by the Commission Contract Manager and as shown in the Technical Task List above and in the Schedule of Deliverables. However, the Commission Contract Manager may schedule additional CPRs as necessary, and any additional costs will be borne by the Contractor.

Participants include the Commission Contract Manager and the Contractor, and may include the Commission Contracts Officer, the PIER Program Team Lead, other Energy Commission staff and Management as well as other individuals selected by the Commission Contract Manager to provide support to the Energy Commission.

The Commission Contract Manager shall:

- Determine the location, date and time of each CPR meeting with the Contractor. These meetings generally take place at the Energy Commission, but they may take place at another location.
- Send the Contractor the agenda and a list of expected participants in advance of each CPR. If applicable, the agenda shall include a discussion on both match funding and permits.
- Conduct and make a record of each CPR meeting. One of the outcomes of this meeting will be a schedule for providing the written determination described below.
- Determine whether to continue the project, and if continuing, whether or not to modify the tasks, schedule, deliverables and budget for the remainder of the Agreement, including not proceeding with one or more tasks.
- Provide the Contractor with a written determination in accordance with the schedule. The written response may include a requirement for the Contractor to revise one or more deliverable(s) that were included in the CPR.

The Contractor shall:

- Prepare a CPR Report for each CPR that discusses the progress of the Agreement toward achieving its goals and objectives. This report shall include recommendations and conclusions regarding continued work of the projects. This report shall be submitted along with any other deliverables identified in this Scope of Work. Submit these documents to the Commission Contract Manager and any other designated reviewers at least 15 working days in advance of each CPR meeting.
- Present the required information at each CPR meeting and participate in a discussion about the Agreement.

Contractor Deliverables:

- CPR Report(s)

- CPR deliverables identified in the Scope of Work

Commission Contract Manager Deliverables:

- Agenda and a List of Expected Participants
- Schedule for Written Determination
- Written Determination

Task 1.3 Final Meeting

The goal of this task is to closeout this Agreement.

The Contractor shall:

- Meet with the Energy Commission to present the findings, conclusions, and recommendations. The final meeting must be completed during the closeout of this Agreement.

This meeting will be attended by, at a minimum, the Contractor, the Commission Contracts Officer, and the Commission Contract Manager. The technical and administrative aspects of Agreement closeout will be discussed at the meeting, which may be two separate meetings at the discretion of the Commission Contract Manager.

The technical portion of the meeting shall present findings, conclusions, and recommended next steps (if any) for the Agreement. The Commission Contract Manager will determine the appropriate meeting participants.

The administrative portion of the meeting shall be a discussion with the Commission Contract Manager and the Contracts Officer about the following Agreement closeout items:

- What to do with any state-owned equipment (Options)
 - Need to file UCC.1 form re: Energy Commission's interest in patented technology
 - Energy Commission's request for specific "generated" data (not already provided in Agreement deliverables)
 - Need to document Contractor's disclosure of "subject inventions" developed under the Agreement
 - "Surviving" Agreement provisions, such as repayment provisions and confidential deliverables
 - Final invoicing and release of retention
- Prepare a schedule for completing the closeout activities for this Agreement.

Deliverables:

- Written documentation of meeting agreements and all pertinent information
- Schedule for completing closeout activities

REPORTING

See Exhibit D, Reports/Deliverables/Records.

Task 1.4 Monthly Progress Reports

The goal of this task is to periodically verify that satisfactory and continued progress is made towards achieving the research objectives of this Agreement.

The Contractor shall:

- Prepare progress reports which 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. Each progress report is due to the Commission Contract Manager within 10 working days after the end of the reporting period. Attachment A-2, Progress Report Format, provides the recommended specifications.

Deliverables:

- Monthly Progress Reports

Task 1.5 Test Plans, Technical Reports and Interim Deliverables

The goal of this task is to set forth the general requirements for submitting test plans, technical reports and other interim deliverables, unless described differently in the Technical Tasks. When creating these deliverables, the Contractor 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/>

The Contractor shall:

- Unless otherwise directed in this Scope of Work, submit a draft of each deliverable listed in the Technical Tasks to the Commission Contract Manager for review and comment in accordance with the approved Schedule of Deliverables. 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.

Task 1.6 Final Report

The goal of this task is to prepare a comprehensive written Final Report that describes the original purpose, approach, results and conclusions of the work done under this Agreement. The Commission Contract Manager will review and approve the Final Report. The Final Report must be completed on or before the termination date of the Agreement. When creating these deliverables, the Contractor 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/>

The Final Report shall be a public document. If the Contractor has obtained confidential status from the Energy Commission and will be preparing a confidential version of the Final Report as well, the Contractor shall perform the following subtasks for both the public and confidential versions of the Final Report.

Task 1.6.1 Final Report Outline

The Contractor shall:

- Prepare a draft outline of the Final Report.
- Submit the draft outline of Final Report to the Commission Contract Manager for review and approval. The Commission Contract Manager will provide written comments back to the Contractor on the draft outline within 10 working days of receipt. Once agreement has been reached on the draft, the Contractor shall submit the final outline to the Commission Contract Manager. The Commission Contract Manager shall provide written approval of the final outline within 5 working days of receipt.

Deliverables:

- Draft Outline of the Final Report
- Final Outline of the Final Report

Task 1.6.2 Final Report

The Contractor shall:

- Prepare the draft Final Report for this Agreement in accordance with the approved outline.
- Submit the draft Final Report to the Commission Contract Manager for review and comment. The Commission Contract Manager will provide written comments within 10 working days of receipt.

Once agreement on the draft Final Report has been reached, the Commission Contract Manager shall forward the electronic version of this report for Energy Commission internal approval. Once the approval is given, the Commission Contract Manager shall provide written approval to the Contractor within 5 working days.

- Submit one bound copy of the Final Report with the final invoice.

Deliverables:

- Draft Final Report
- Final Report

MATCH FUNDS, PERMITS, AND ELECTRONIC FILE FORMAT

Task 1.7 Identify and Obtain Matching Funds

The goal of this task is to ensure that the match funds planned for this Agreement are obtained for and applied to this Agreement during the term of this Agreement.

The costs to obtain and document match fund commitments are not reimbursable through this Agreement. While the PIER budget for this task will be zero dollars, the Contractor may utilize match funds for this task. Match funds shall be spent concurrently or in advance of PIER funds during the term of this Agreement. Match funds must be identified in writing, and the associated commitments obtained before the Contractor can incur any costs for which the Contractor will request reimbursement.

The Contractor shall:

- Prepare a letter documenting the match funding committed to this Agreement and submit it to the Commission Contract Manager at least 2 working days prior to the kick-off meeting:
 1. If no match funds were part of the proposal that led to the Energy Commission awarding this Agreement and none have been identified at the time this Agreement starts, then state such in the letter.
 2. If match funds were a part of the proposal that led to the Energy Commission awarding this Agreement, then provide in the letter:
 - A list of the match funds that identifies the:
 - Amount of each cash match fund, its source, including a contact name, address and telephone number and the task(s) to which the match funds will be applied.
 - Amount of each in-kind contribution, a description, documented market or book value, and its source, including a contact name, address and telephone number and the task(s) to which the match funds will be applied. If the in-kind contribution is equipment or other tangible or real property, the Contractor shall identify its owner and provide a contact name, address and telephone number, and the address where the property is located.
 - A copy of the letter of commitment from an authorized representative of each source of cash match funding or in-kind contributions that these funds or contributions have been secured.
- Discuss match funds and the implications to the Agreement if they are significantly reduced or not obtained as committed, at the kick-off meeting. If applicable, match funds will be included as a line item in the progress reports and will be a topic at CPR meetings.

- Provide the appropriate information to the Commission Contract Manager if during the course of the Agreement additional match funds are received.
- Notify the Commission Contract Manager within 10 working days if during the course of the Agreement existing match funds are reduced. Reduction in match funds may trigger an additional CPR.

Deliverables:

- A letter regarding Match Funds or stating that no Match Funds are provided
- Letter(s) for New Match Funds
- A copy of each Match Fund commitment letter
- Letter that Match Funds were Reduced (if applicable)

Task 1.8 Identify and Obtain Required Permits

The goal of this task is to obtain all permits required for work completed under this Agreement in advance of the date they are needed to keep the Agreement schedule on track.

Permit costs and the expenses associated with obtaining permits are not reimbursable under this Agreement. While the PIER budget for this task will be zero dollars, the Contractor shall show match funds for this task. Permits must be identified in writing and obtained before the Contractor can incur any costs related to the use of the permits for which the Contractor will request reimbursement.

The Contractor shall:

- Prepare a letter documenting the permits required to conduct this Agreement and submit it to the Commission Contract Manager at least 2 working days prior to the kick-off meeting:
 1. If there are no permits required at the start of this Agreement, then state such in the letter.
 2. If it is known at the beginning of the Agreement that permits will be required during the course of the Agreement, provide in the letter:
 - A list of the permits that identifies the:
 - Type of permit
 - Name, address and telephone number of the permitting jurisdictions or lead agencies
 - Schedule the Contractor will follow in applying for and obtaining these permits.
- The list of permits and the schedule for obtaining them will be discussed at the kick-off meeting, and a timetable for submitting the updated list, schedule and the copies of the permits will be developed. The implications to the Agreement if the permits are not obtained in a timely fashion or are denied will also be discussed. If

applicable, permits will be included as a line item in the progress reports and will be a topic at CPR meetings.

- If during the course of the Agreement additional permits become necessary, then provide the appropriate information on each permit and an updated schedule to the Commission Contract Manager.
- As permits are obtained, send a copy of each approved permit to the Commission Contract Manager.
- If during the course of the Agreement permits are not obtained on time or are denied, notify the Commission Contract Manager within 5 working days. Either of these events may trigger an additional CPR.

Deliverables:

- A letter documenting the Permits or stating that no Permits are required
- Updated list of Permits as they change during the Term of the Agreement
- Updated schedule for acquiring Permits as it changes during the Term of the Agreement
- A copy of each approved Permit

Task 1.9 Electronic File Format

The goal of this task is to unify the formats of electronic data and documents provided to the Energy Commission as contract deliverables. Another goal is to establish the computer platforms, operating systems and software that will be required to review and approve all software deliverables.

The Contractor shall:

- Deliver documents to the Commission Contract Manager in the following formats:
 - Data sets shall be in Microsoft (MS) Access or MS Excel file format.
 - PC-based text documents shall be in MS Word file format.
 - Documents intended for public distribution shall be in PDF file format, with the native file format provided as well.
 - Project management documents shall be in MS Project file format.
- Request exemptions to the electronic file format in writing at least 90 days before the deliverable is submitted.

Deliverables:

- A letter requesting exemption from the Electronic File Format (if applicable)

PAC

Task 1.10 Establish the PAC

The goal of this task is to create an advisory committee for this Agreement.

The PAC should be composed of diverse professionals. The number can vary depending on potential interest and time availability. The exact composition of the PAC

may change as the need warrants. PAC members serve at the discretion of the Commission Contract Manager.

The PAC may be composed of qualified professionals spanning the following types of disciplines:

- Researchers knowledgeable about the project subject matter
- Members of the trades who will apply the results of the project (e.g., designers, engineers, architects, contractors, and trade representatives)
- Public Interest Market Transformation Implementers
- Product Developers relevant to project subject matter
- U.S. Department of Energy Research Manager
- Public Interest Environmental Groups
- Utility Representatives
- Members of the relevant technical society committees

The purpose of the PAC is to:

- Provide guidance in research direction. The guidance may include scope of research; research methodologies; timing; coordination with other research. The guidance may be based on:
 - technical area expertise
 - knowledge of market applications
 - linkages between the agreement work and other past, present or future research (both public and private sectors) they are aware of in a particular area.
- Review deliverables. Provide specific suggestions and recommendations for needed adjustments, refinements, or enhancement of the deliverables.
- Evaluate tangible benefits to California of this research and provide recommendations, as needed, to enhance tangible benefits.
- Provide recommendations regarding information dissemination, market pathways or commercialization strategies relevant to the research products.

The Contractor shall:

- Prepare a draft list of potential PAC members that includes name, company, physical and electronic address, and phone number and submit it to the Commission Contract Manager at least 2 working days prior to the kick-off meeting. This list will be discussed at the kick-off meeting and a schedule for recruiting members and holding the first PAC meeting will be developed.
- Recruit PAC members and ensure that each individual understands the member obligations described above, as well as the meeting schedule outlined in Task 1.11.
- Prepare the final list of PAC members.

- Submit letters of acceptance or other comparable documentation of commitment for each PAC member.

Deliverables:

- Draft List of PAC Members
- Final List of PAC Members
- Letters of acceptance, or other comparable documentation of commitment for each PAC Member

Task 1.11 Conduct PAC Meetings

The goal of this task is for the PAC to provide strategic guidance to this project by participating in regular meetings or teleconferences.

The Contractor shall:

- Discuss the PAC meeting schedule at the kick-off meeting. The number of face-to-face meetings and teleconferences and the location of PAC meetings shall be determined in consultation with the Commission Contract Manager. This draft schedule shall be presented to the PAC members during recruiting and finalized at the first PAC meeting.
- Organize and lead PAC meetings in accordance with the schedule. Changes to the schedule must be pre-approved in writing by the Commission Contract Manager.
- Prepare PAC meeting agenda(s) with back-up materials for agenda items.
- Prepare PAC meeting summaries, including recommended resolution of major PAC issues.

Deliverables:

- Draft PAC Meeting Schedule
- Final PAC Meeting Schedule
- PAC Meeting Agenda(s) with Back-up Materials for Agenda Items
- Written PAC meeting summaries, including recommended resolution of major PAC issues

TECHNICAL TASKS

The Contractor shall prepare all deliverables in accordance with the requirements in Task 1.5. Deliverables not requiring a draft version are indicated by marking “(no draft)” after the deliverable name.

Task 2.0 Seismic Hazards

The goal of this task is to assist with and participate in a workshop that utilizes the international scientific expertise of WESTCARB’s partners and associates in addition to outside experts in the field of seismic hazards associated with carbon capture and storage (CCS) or relevant analogous activities (e.g., enhanced geothermal systems, enhanced oil recovery (EOR), waste injection). The workshop will identify gaps in both

scientific knowledge and data on the causes and risks of induced seismicity related to the injection and geologic storage of CO₂ and the impacts of natural seismic events on storage site integrity. The workshop will identify additional studies and tests needed to address these issues. Additionally, participants shall develop methodologies for improving public and regulatory understanding of induced and natural seismic hazards related to CCS. (This task maps to WESTCARB's SOPO Task 5.3).

The Contractor shall:

- Participate in a seismic hazard risk assessment workshop
- Prepare a Seismic Hazard Report to include all required documentation from participation in workshop

Deliverables:

- Draft Seismic Hazard Report
- Final Seismic Hazard Report

Task 3.0 Arizona Field Site Characterization

Task 3.1 Site Selection for Seismic Data Acquisition in Arizona

The goal of this task is to identify gaps in the data sets from Arizona field site selection activities and supplement them by possibly purchasing, re-processing, and analyzing existing geologic seismic data available from commercial vendors. WESTCARB estimates the need to acquire up to 100 miles of existing seismic data, to fill data gaps. These data will be integrated into geologic models to provide more detailed information on the general thickness, continuity and heterogeneity of target formations, as well as thickness and extent of potential seals, and the possible existence of faults. This task maps to WESTCARB's SOPO Task 6.2.

The Contractor shall:

- Purchase and re-process existing seismic data identified in task 6.1.1
- Prepare a Seismic Data Re-Processing Report to include re-processed data and summary of work

Deliverables:

- Draft Seismic Data Re-Processing Report
- Final Seismic Data Re-Processing Report

Task 3.2 Field Seismic Surveys of Candidate Well Sites in Arizona

The goal of this task is to obtain permits, access agreements with land owners, and meet with local stakeholders, as applicable, and conduct two-dimensional seismic surveys in areas where historical data are not available or of limited resolution. WESTCARB estimates that approximately 20-30 miles of seismic data will need to be acquired to address critical data gaps. This task maps to WESTCARB's SOPO Task 6.3.

The Contractor shall:

- Permit, acquire and process a two-dimensional seismic survey
- Prepare a Seismic Acquisition Report to include Permit Summary, Acquired Data, Processed Data and Processing Summary

Deliverables:

- Draft Seismic Acquisition Report
- Final Seismic Acquisition Report

Task 4.0 Simulation and Modeling Validation and Risk Assessment Support in Arizona and California

The goal of this task is to validate and provide model cross-comparisons, parallel static and dynamic modeling will be performed using commercially available software (e.g. ECLIPSE™ and PETREL™). This may also include simulations and other activities to support risk assessments and risk management associated with site selection and field site characterization activities. This task maps to WESTCARB's SOPO Tasks 6.9.3 and 7.9.3.

The Contractor shall:

- Create a static geomodel framework similar to model developed in 6.9.1 and 7.9.1 using Petrel™ software
- Create a dynamic simulation of CO₂ injection similar to model developed in 6.9.2 and 7.9.2 using Eclipse™ software
- Prepare a Project Geomodel Vs Petrel Report to include Comparison of Project Geomodel Results and Petrel Results
- Prepare a Project CO₂ Injection Simulation Vs Eclipse Report to Include Comparison of CO₂ Injection Simulation and Eclipse Results
- Participate in the 1st Critical Project Review
- Prepare the 1st Critical Project Review Report

Deliverables:

- Draft Project Geomodel Vs Petrel Comparison Report
- Final Project Geomodel Vs Petrel Comparison Report
- Draft Project CO₂ Injection Simulation Vs Eclipse Comparison Report
- Final Project CO₂ Injection Simulation Vs Eclipse Comparison Report
- 1st CPR Report (no draft)

Task 5.0 Well Plan, Risk Management, and Other Permitting in California

The goal of this task is to conduct a comprehensive risk assessment and develop a risk management plan. This task maps to WESTCARB's SOPO Task 7.6.2

The Contractor shall:

- Conduct a Comprehensive Risk Assessment Workshop
- Prepare a Risk Assessment Report to Include Features, Events and Process Summary, Workshop Results, Risk Mitigation Plan

Deliverables:

- Draft Risk Assessment Report
- Final Risk Assessment Report

Task 6.0 Characterization Well Drilling and Associated Activities in California

The goal of this task is to assist with the planning and construction activities to accomplish the drilling, logging, coring, testing, completion, and closure or transfer of the characterization well in California in accordance with the approved well plan developed by WESTCARB. Cap and reservoir formation rock samples will be obtained, as well as fluid samples from geologic intervals of interest. This task maps to WESTCARB's SOPO Task 7.7.

The Contractor shall:

- Obtain open-hole and cased well logs
- Perform handling of whole and/or side-wall cores for proper preservation for off-site laboratory evaluation and testing
 - Obtain and assure proper handling of fluid samples off-site laboratory evaluation and testing
- Prepare a Field Activity and Data Collection Report to include Acquisition Data, Processed Data and a Summary of all Core Samples and Fluid Samples
- Participate in the 2nd Critical Project Review
- Prepare the 2nd Critical Project Review Report

Deliverables:

- Draft Field Activity and Data Collection Report
- Final Field Activity and Data Collection Report
- 2nd CPR Report (no draft)

Task 7.0 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 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 Monthly Progress Reports.

Deliverables:

- Draft Technology Transfer Plan
- Final Technology Transfer Plan