

CONTRACT REQUESTS FORM (CRF)

CEC-94 (Revised 5/11)

CALIFORNIA ENERGY COMMISSION



New Contract _____ Amendment to Existing Contract: 500-07-012 Amendment Number: 2

Division	Contract Manager:	MS-	Phone	CM Training Date
Energy Research and Development	Marla Mueller	43	916-327-1716	8/19/2002

Contractor's Legal Name	Federal ID Number
The Regents of the University of California on behalf of the UC Riverside Campus	94-3067788

Title of Project
Effect of Natural Gas Fuel Composition on Vehicle Performance and Emissions

Term	Start Date	End Date	Amount
New/Original Contract	12/4/2007	12/4/2010	\$ 400,000

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

Amendment #	End Date (mm/dd/yy)	Amount
Amendment 1	3/30/2012	\$0
Amendment 2	3/29/2013	\$0

Business Meeting Information			
Proposed Business Meeting Date	1/11/2012	<input checked="" type="checkbox"/> Consent	<input type="checkbox"/> Discussion
Business Meeting Presenter	Marla Mueller	Time Needed:	

Agenda Item Subject and Description
Possible approval of Amendment #2 to Contract 500-07-012 with the Regents of the University of California on behalf of the UC Riverside Campus to extend the term by 12 months. This will allow for continued coordination with the California Air Resources Board (CARB) on this comprehensive program to evaluate the impact of different natural gas compositions on the engine/vehicle performance, criteria emissions, and gaseous toxic pollutants from both light-duty and heavy-duty vehicles. Contact: Marla Mueller

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

<input type="checkbox"/> Contracts less than \$10k (<i>Policy Committee's signature is also required</i>)
<input type="checkbox"/> Amendment for a no-cost time extension. Must be first extension, less than one year and original contract less than \$100k.
<input type="checkbox"/> 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 this amendment is to extend the contract by one year to allow for continued coordination with the California Air Resources Board (CARB) on the Effect of Natural Gas Fuel Composition on Vehicle Performance and Emissions program. This is a comprehensive program to evaluate the impact of different natural gas compositions on the engine/vehicle performance, criteria emissions, and gaseous toxic pollutants from both light-duty and heavy-duty vehicles. CARB is in the process of providing additional funds to the contractor to conduct additional testing. These additional funds will be used for retesting a transit bus that experienced engine failure during testing and testing of another legacy transit bus with any remaining funds. CARB has requested PIER extend this contract to continue our coordination.

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CALIFORNIA ENERGY COMMISSION

**California Environmental Quality Act (CEQA) Compliance**

1. 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 the contract involves testing vehicles in their existing condition. There will be no changes to the emissions control systems.
2. 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: _____
 Common Sense Exemption. 14 CCR 15061 (b) (3)
 Explain reason why contract is exempt under the above section:
- 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	\$		\$					\$
ECAA	\$		\$					\$
State- ERPA	\$		\$					\$
Federal	\$		\$					\$
PIER - E	\$		\$					\$
PIER - NG	\$		\$					\$
Reimbursement	\$		\$					\$
Other	\$		\$					\$
TOTAL:	\$0	TOTAL:	\$0		TOTAL:			\$0
Reimbursement Contract #:					Federal Agreement			

Contractor's Administrator/ Officer		Contractor's Project Manager	
Name:	Ursula Prins	Name:	Thomas Durbin
Address:	200 University Office Building University of California	Address:	1084 Columbia Ave
City, State, Zip:	Riverside, CA 92521-0001	City, State, Zip:	Riverside, CA 92507-2134
Phone/ Fax:	951 827-4808 / 951 827-4483	Phone/ Fax:	951 781-5794 / 951 781-5790
E-Mail:	ursulap@ucr.edu	E-Mail:	durbin@cert.ucr.edu

Contractor Is

- Private Company (including non-profits)
 CA State Agency (including UC and CSU)
 Government Entity (i.e. city, county, federal government, air/water/school district, joint power authorities, university from another state)

Selection Process Used

- Solicitation Select Type Solicitation #: _____ # of Bids: _____ Low Bid? No Yes
 Non Competitive Bid (Attach CEC 96)
 Exempt Interagency

Civil Service Considerations

- Not Applicable (Contract is with a CA State Entity or a membership/co-sponsorship)
 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:

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

The overhead rates charged by the Regents of the University, California Riverside are standard negotiated rates with the Energy Commission. The Labor Rates are standard University rates for each classification. Hourly rates and fees were adjusted for the additional year.

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:

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 checked="" type="checkbox"/> N/A	<input 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 checked="" type="checkbox"/> N/A	<input type="checkbox"/> Attached
7. Resumes	<input checked="" type="checkbox"/> N/A	<input type="checkbox"/> Attached
8. CEC 105, Questionnaire for Identifying Conflicts		<input checked="" type="checkbox"/> Attached
9. CEC 106, IT Component Reporting Form		<input checked="" 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		Literature Review
3	X	Develop Test Plans
4		Test Engines
5		Test <u>V</u> ehicles/ <u>E</u> ngines
6		Data <u>A</u> nalysis and Final Reporting

KEY NAME LIST

Task #	Key Personnel	Key Subcontractor(s)	Key Partner(s)
1	Thomas Durbin		
	J. Wayne Miller		
2	Thomas Durbin		
	J. Wayne Miller		
	Kent Johnson		
3	Thomas Durbin		
	J. Wayne Miller		
	Kent Johnson		
4	Thomas Durbin		
	J. Wayne Miller		
	Kent Johnson		
5	Thomas Durbin		
	J. Wayne Miller		
	Kent Johnson		
6	Thomas Durbin		
	J. Wayne Miller		
	Kent Johnson		

GLOSSARY

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

Acronym	Definition
CEC	California Energy Commission
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
CPR	Critical Project Review
GTI	Gas Technology Institute

Acronym	Definition
LNG	Liquefied Natural Gas
NG	Natural Gas
NMHC	Non-Methane Hydrocarbons
NO _x	Nitrogen Oxides
PAC	Project Advisory Committee
PIER	Public Interest Energy Research
PM	Particulate Matter
THC	Total Hydrocarbons
UCC.1	Uniform Commercial Code (Financing Statement)

Problem Statement

Natural gas (NG) is an important resource that is used throughout the state in transportation, residential and electrical power generation applications. Currently, domestic production and Canadian imports provide most of the natural gas supply for California. It is estimated, however, that current sources of natural gas will not keep pace with the growth in demand through 2023. Liquefied Natural Gas (LNG) that can be imported from Asia and other areas in the Pacific Rim is being considered as an alternative in meeting California's natural gas demands.

One issue with the use of foreign sources of LNG is that its composition differs from that of natural gas sources that are currently being used in California and has a wider compositional range. Since equipment is designed or adjusted to operate on NG of a more standardized quality, the broader ranges of NG could create operational issues in engine under in-use conditions. This could impact the performance or emissions of the equipment/engines, both issues that need to be better understood.

The proposed program is designed to address issues relating to the impact of using a broader range of natural gas compositions, such as those that would be expected with greater introduction of LNG.

Goals of the Agreement

The goal of this Agreement is to address issues relating to the impact of using a broader range of natural gas compositions, such as those that would be expected with greater introduction of LNG. This program will evaluate the impact of new NG compositions on the performance and emissions of NG powered equipment and engines.

Objectives of the Agreement

The objectives of this Agreement are to:

1. Facilitate the integration of broader and more diverse sources of NG into the NG gas system for use in vehicles.
2. Reduce environmental impacts of broader and more diverse sources of NG when used in vehicle applications.
- Ensure new and existing NG engines can operate effectively and with no environmental disadvantages when using broader and more diverse sources of NG.

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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~~Energy 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.

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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)

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

- The ~~Commission~~Energy Commission Contract Manager’s expectations for accomplishing tasks described in the Scope of Work;
- An updated Schedule of Deliverables
- An updated Gantt Chart
- 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)

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

Contractor Deliverables:

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

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CommissionEnergy 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 CommissionEnergy 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 CommissionEnergy 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. If the CommissionEnergy Commission Contract Manager concludes that satisfactory progress is not being made, this conclusion will be referred to the Energy Commission’s Research, Development and Demonstration Policy Committee for its concurrence.
- 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.

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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 CommissionEnergy 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.

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Contractor Deliverables:

- CPR Report(s)
- CPR deliverables identified in the Scope of Work

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Commission Contract Manager Deliverables:

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

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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.

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This meeting will be attended by, at a minimum, the Contractor, the CommissionEnergy 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 CommissionEnergy Commission Contract Manager will determine the appropriate meeting participants.

The administrative portion of the meeting shall be a discussion with the CommissionEnergy 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.

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Deliverables:

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

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REPORTING

See Exhibit D, Reports/Deliverables/Records.

Task 1.4 Monthly-Quarterly 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 CommissionEnergy Commission Contract Manager within 10 working days after the end of the reporting period. Attachment A-2, Progress Report Format, provides the recommended specifications.

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Deliverables:

- Monthly-Quarterly Progress Reports

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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 CommissionEnergy 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>

The Contractor shall:

- Submit a draft of each deliverable listed in the Technical Tasks to the CommissionEnergy Commission Contract Manager for review and comment in accordance with the approved

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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~~Energy 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/index.html>

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~~Energy 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.

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- Submit the draft Final Report to the ~~Commission~~Energy 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~~Energy Commission Contract Manager shall forward the electronic version of this report to the PIER Technology Transfer Group for final editing. Once final editing is completed, 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

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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~~Energy 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.

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- 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.

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- 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.

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- 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.

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- Provide the appropriate information to the ~~Commission~~Energy Commission Contract Manager if during the course of the Agreement additional match funds are received.

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- Notify the ~~Commission~~Energy 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.

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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)

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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:

- 1. Prepare a letter documenting the permits required to conduct this Agreement and submit it to the ~~Commission~~Energy Commission Contract Manager at least 2 working days prior to the kick-off meeting:

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- 1. If there are no permits required at the start of this Agreement, then state such in the letter.

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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.

2. 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.

3. 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 CommissionEnergy Commission Contract Manager.

4. As permits are obtained, send a copy of each approved permit to the CommissionEnergy Commission Contract Manager.

5. If during the course of the Agreement permits are not obtained on time or are denied, notify the CommissionEnergy Commission Contract Manager within 5 working days. Either of these events may trigger an additional CPR.

Deliverables:

- 6. A letter documenting the Permits or stating that no Permits are required
- 7. Updated list of Permits as they change during the Term of the Agreement
- 8. Updated schedule for acquiring Permits as it changes during the Term of the Agreement
- 9. 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 CommissionEnergy 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.

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- 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.

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Deliverables:

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

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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 Contractor’s Project Manager and the

~~Commission~~Energy Commission Contract Manager shall act as co-chairs of the PAC. 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

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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.

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- 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~~Energy 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.

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Deliverables:

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

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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:

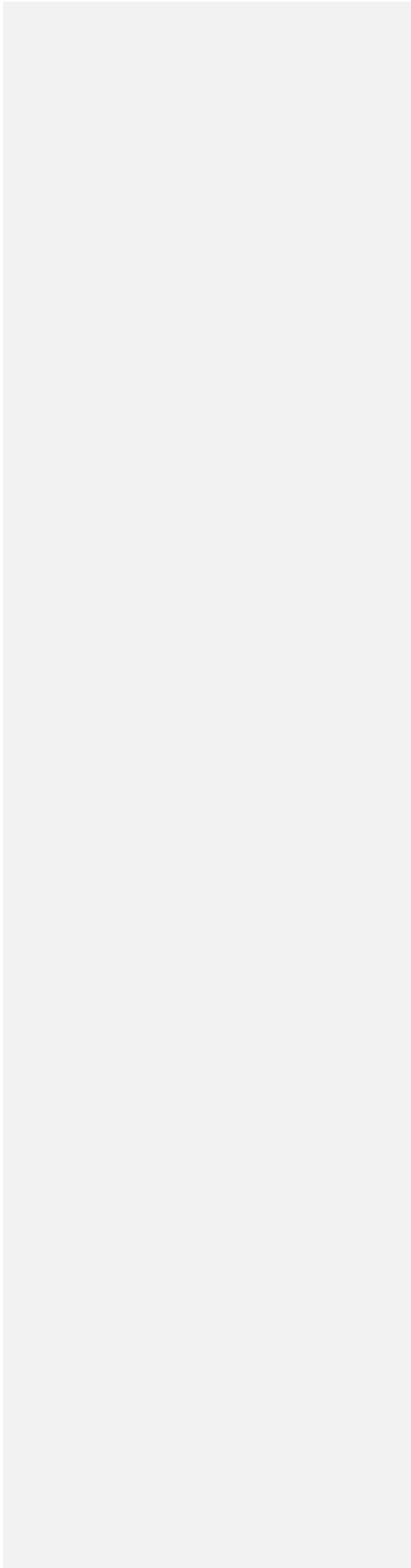
1. Discuss the PAC meeting schedule at the kick-off meeting. The number of face-to-face meetings and teleconferences and the location of PAC meetings shall be determined in consultation with the ~~Commission~~Energy Commission Contract Manager. This draft schedule shall be presented to the PAC members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

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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

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TECHNICAL TASKS

Unless otherwise provided in the individual Task, the Contractor shall prepare all deliverables in accordance with the requirements in Task 1.5.

Task 2 Literature Review

The goal of this task is to review the applicable literature and other available information in the areas of engines/vehicles tested, performance of varying LNG blends, and outstanding issues that can be used for the development of ~~a~~-comprehensive test program that will be used in this project.

The Contractor shall:

- Conduct a review of the applicable literature and other available information in the areas of testing of engines/vehicles, performance of engines/vehicles using varying LNG and off-specification NG blends, and outstanding issues that can be used for the development of a comprehensive test program.
- Identify outside sources of information. To the extent possible, identify and review information outside of the peer review or open literature related to NG engine emissions.
- Prepare a Summary Memo of the Literature Reviewed. This information shall be incorporated into the Final Report and shall include, but not be limited to:
 - The key findings of the various studies.
 - Information on the various test methods used in the studies reviewed and the relationship of those methods to the current program.
 - The applicability of the studies to the current test program.
 - A review of the compositional range of LNG that can be expected in California, based in large part on Gas Technology Institute (GTI)-report CEC-500-2006-096, published October 2006.
 - A discussion of any materials identified outside of the peer review literature that are relevant to the current program.
- ~~Based on the literature reviewed, p~~Prepare a List Of Recommended Test Engines, Vehicles And Fuel Blends ~~To Test~~based on the literature reviewed.

Deliverables:

- Summary Memo of the Literature Reviewed
- List Of Recommended Test Engines, Vehicles And Fuel Blends ~~To Test~~

Task 3 Develop Test Plans

The goal of this task is to develop ~~a~~-comprehensive test plans for use in Tasks 4 and 5 that will~~to~~ provide more specific details of the experimental methodology including the types of engines/vehicles, test cycles, test fuels, and other elements.

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The Contractor shall:

- Prepare a Task 4 Emissions and Performance Test Plan for testing under Task 4, and a Task 5 Emissions and Performance Test Plan for testing under Task 5. These plans shall include, but not be limited to:
 - A description of the testing to be done.
 - The rationale for why the tests are needed.
 - Test objectives and technical approach.
 - A test matrix showing the number of tests and replicate runs.
 - A description of the facilities, equipment and instrumentation required to conduct the tests.
 - A description of the test procedures, including parameters to be controlled and how they will be controlled, parameters to be measured and instrumentation to measure them, calibration procedures to be used, recommended calibration interval, and maintenance of the test log book.
 - A description of tests that will be used to evaluate performance including engine maps and determination of fuel economy via carbon balance.
 - A description of the data analysis procedures.
 - A description of quality assurance/quality control procedures.
 - Contingency measures to be considered if the test objectives are not met.
 - The mode in which those engines will be tested (i.e., engine and/or chassis).
 - The cycles/operational conditions under which the engines will be tested.
- Modify the Task 4 and Task 5 Emissions and Performance Test Plans based on feedback received from the PAC.
- ~~Modify the test plan based on feedback received from the PAC.~~
 - Prepare the CPR report.
 - Participate in the CPR.

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Deliverables:

- Task 4 Emissions and Performance Test Plan ~~(Draft and Final)~~
- Task 5 Emissions and Performance Test Plan ~~(Draft and Final)~~
- CPR Report ~~(No Draft)~~

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Task 4 Vehicle/Engine Emissions and Performance Testing

Work shall not proceed on this task until the specific engines and fuel blends to test and the Task 4 Emissions and Performance Test Plan have been approved by the ~~Commission~~Energy ~~Commission~~ Contract Manager.

The goal of this task is to test at least three engines on an engine dynamometer on the range of fuel blends identified in Task 3 and over the test cycles identified in the Emissions and Performance Testing Test Plan.

The Contractor shall:

- Conduct emissions tests on at least three engines for a combined total of 15 engine test days, in accordance with the test plan developed under Task 3. The emissions tests shall include the measurement of total hydrocarbons (THC), non-methane hydrocarbons (NMHC), oxides of nitrogen (NO_x), carbon monoxide (CO), particulate matter (PM) and carbon dioxide (CO₂).
- Conduct performance tests on at least three engines in accordance with the Task 4 Emissions and Performance Test Plan developed under Task 3.
- Provide an Engine Evaluation Summary which briefly evaluates Task 4 test results and recommends the number and models of vehicles and/or engines to tests in Task 5.

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Deliverables:

- ~~Summarize emissions and performance test data in progress reports. Detailed analysis will be performed in Task 6.~~
- Engine Evaluation Summary

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Task 5 Continued Vehicle/Engine Emissions and Performance Testing

Work shall not proceed on this task until the specific vehicles and engines and fuel blends to test and the Task 5 Emissions and Performance Test Plan have been approved by the ~~Commission~~ Energy Commission Contract Manager.

The goal of this task is to run additional tests on at least two vehicles or conduct corresponding engine tests on a range of blend levels and test cycles as per the Emissions and Performance Test Summary drafted in Task 4.

The Contractor shall:

- Conduct emissions tests. Emissions tests will be conducted in accordance with the Emissions and Performance Test Plan developed in Task 3. Emissions testing may include chassis dynamometer or engine dynamometer testing.
- ~~The Emissions~~ tests shall include the measurement of ~~total hydrocarbons (THC) (THC, NMHC), non-methane hydrocarbons (NMHC), oxides of nitrogen (NO_x) (NO_x), carbon monoxide (CO), particulate matter (PM) and carbon dioxide (and CO₂) (CO₂).~~
- Conduct performance tests. These tests will be conducted in accordance with the Task 5 Emissions and Performance Test Plan developed under Task 3. Performance tests shall include engine maps and determination of fuel economy via carbon balance.
- Provide Quarterly Progress Reports in accordance with Task 1.4.

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Deliverables:

- ~~Summarize emissions and performance test data in progress reports. Detailed analysis will be performed in Task 6.~~ Update and Progress Reports

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Task 6 Data Analysis

The goal of this task is to conduct a comprehensive analysis on the emissions and performance

data and prepare the project Final Report summarizing the results and analysis.

The Contractor shall:

- Conduct a comprehensive data analysis on the resulting data sets to examine trends in the data and corresponding relationships. This analysis shall include, but not be limited to:
 - Analysis of trends in regulated emissions.
 - Analysis of trends in engine performance maps and fuel economy.
 - Analysis of trends against the fuel composition.
 - Analysis of trends for different test cycles or modes of operation.
 - Analysis and comparison between trends found for different engines.
 - Analysis and comparisons between trends found between engines and vehicles.
- Prepare a journal article for publication in a peer review publication. The journal article will be based on the data and analysis from this project.
- Provide Electronic copies of all data and results ~~will be provided~~ in accordance with Task 1.9.

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Deliverables:

- Journal article to be submitted for peer review publication
- Electronic copies of all data and results

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