

CONTRACT REQUESTS FORM (CRF)

CEC-94 (Revised 5/11)

CALIFORNIA ENERGY COMMISSION


 New Contract 500-12-009 Amendment to Existing Contract: _____ Amendment Number: _____

Division	Contract Manager:	MS-	Phone	CM Training Date
ERDD - Transportation	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 Riverside campus	94-3067788

Title of Project
Impact of Natural Gas Composition on the Performance and Emission of Heavy/Medium-Duty Natural Gas Vehicles -

Term	Start Date	End Date	Amount
New/Original Contract	6/19/2013	3/31/2015	\$ 400,963

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	Marla Mueller	Time Needed:	5 minutes

Agenda Item Subject and Description

REGENTS OF THE UNIVERSITY OF CALIFORNIA. Possible approval of Agreement 500-12-009 with the Regents of the University of California for \$400,963 to evaluate the impacts of various natural gas compositions on the performance and emissions of natural gas powered heavy/medium-duty vehicles. The length of this agreement is 22 months.

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 this research is to address issues relating to the impacts of using a broader range of natural gas compositions on vehicles, such as those that would be expected with greater introduction of gases with higher or lower wobble than California traditional gases.

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	\$400,963	Yes	NG Subaccount,	11-12	501.001F	\$400,963
ECAA	\$		\$					\$
State- ERPA	\$		\$					\$
Federal	\$		\$					\$
PIER - E	\$		\$					\$
PIER - NG	\$400,963		\$					\$
Reimbursement	\$		\$					\$
Other	\$		\$					\$
TOTAL:	\$400,963	TOTAL:	\$400,963		TOTAL:			\$400,963
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
<input type="checkbox"/> Private Company (including non-profits) <input checked="" 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 <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 Interagency

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. Justification: 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"/> B. Advanced Payment	<input type="checkbox"/> One-time		
<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 rates charged in this contract are in accordance with the industry standard for like work.

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 type="checkbox"/> No	<input checked="" type="checkbox"/> Yes
If yes, give company name and identify if they are a Small Business (SB), Micro Business (MB) and/or DVBE:	_____	
Mark Wilson	<input type="checkbox"/> No	<input checked="" 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.		

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 type="checkbox"/> N/A	<input checked="" type="checkbox"/> Attached

Contract Manager _____ Date _____ Office Manager _____ Date _____ Deputy Director _____ Date _____

CONTRACT REQUESTS FORM (CRF)



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	N/A	Vehicle Emissions and Performance Testing and Data Analysis

KEY NAME LIST

Task #	Key Personnel	Key Subcontractor(s)	Key Partner(s)
1	Tom Durbin		
2			California Air Resources Board

GLOSSARY

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

Acronym	Definition
ARB	California Air Resources Board
CCM	Commission Contract Manager
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
CPR	Critical Project Review
LNG	Liquefied Natural Gas
NG	Natural Gas
NH ₃	Ammonia
NMHC	Non-Methane Hydrocarbons
NO _x	Nitrogen Oxides
PAC	Project Advisory Committee
PIER	Public Interest Energy Research
PM	Particulate Matter
THC	Total Hydrocarbons

Problem Statement

The California Air Resources Board (ARB)¹ is in the process of updating its specifications for natural gas (NG) used in transportation applications. As mentioned in the Natural Gas Vehicle Research Roadmap (CEC-500-2008-044-F), gas variability poses challenges for NG vehicle technologies. Although some vehicle testing has been completed, there is a gap in information about the effects of gas variability on the performance of engine technology exhaust aftertreatment, and ultimately on urban air quality.

Past research has shown that the impact of varying NG composition on emissions may be greater than previously expected. For older legacy vehicles (2001-03), increases in oxides of nitrogen (NOx) emissions ranged from about 20-240 percent for gases varying in wobble number from 1339 to the pipeline limit of 1385 (i.e., within pipeline limits). These increases were especially strong for a refuse hauler (52-240 percent) and for one of the transit buses (32-53 percent). The impact of NG composition on emissions was not as prevalent for a newer technology, 2007+ ISL-G bus. However, testing on newer vehicles was only performed on one vehicle, and only for the transit bus application.

Higher emissions of air pollutants such as NOx, are precursors to ozone. California is largely not in compliance with federal standards for ozone, and the ARB and air districts are spending considerable resources to find ways to reduce ozone pollution. Increases in NOx emissions from Compressed Natural Gas (CNG) vehicles will exacerbate air quality problems.

Goals of the Agreement

The goal of this Agreement is to address issues relating to the impact of using a broader range of NG compositions, such as those that would be expected with greater introduction of gases with higher or lower wobble than gases traditionally used in California. This program will evaluate the impact of new NG compositions on the performance and emissions of NG-powered heavy and medium-duty vehicles.

Objectives of the Agreement

The objectives of this Agreement are to:

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

¹ This project is being co-funded by ARB.

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 (CCM), the Contracts Officer, and a representative of the Accounting Office. The Contractor shall bring its Project Manager, Contracts Administrator, Accounting Officer, and any other individuals designated by the CCM to this meeting. The administrative and technical aspects of this Agreement will be discussed at the meeting. Prior to the meeting, the CCM 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 CCM’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)

The CCM shall designate the date and location of this meeting.

- Submit an updated Schedule of Products, List of Match Funds, and List of Permits to the CCM.

Contractor Deliverables:

- An Updated Schedule of Deliverables
- An Updated List of Match Funds
- An Updated List of Permits

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 so, whether any modifications 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 CCM and as shown in the Technical Task List on page 1 of this Exhibit and in the Schedule of Deliverables. However, the CCM may schedule additional CPRs as necessary. Any additional costs will be borne by the Contractor.

Participants include the CCM and the Contractor, and may include the Commission Contracts Officer, the PIER Program Team Lead, other Energy Commission staff and Management, and other individuals selected by the CCM 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 of 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 so whether 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 CCM 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 close out this Agreement.

The Contractor shall:

- Meet with the Energy Commission to present project 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 CCM. The technical and administrative aspects of Agreement closeout will be discussed at the meeting, which may be divided into two separate meetings at the discretion of the CCM.

The technical portion of the meeting shall involve the presentation of findings, conclusions, and recommended next steps (if any) for the Agreement. The CCM will determine the appropriate meeting participants.

The administrative portion of the meeting shall involve a discussion with the CCM and the Contracts Officer of the following Agreement closeout items:

- Disposition of any state-owned equipment
- Need to file a UCC.1 form re: Energy Commission's interest in patented technology
- The Energy Commission's request for specific "generated" data (not already provided in Agreement deliverables)
- Need to document the 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 written documentation of any agreements made between the Recipient and Commission staff during the meeting.
- 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 that 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 CCM 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 CCM, 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 CCM for review and comment in accordance with the approved Schedule of Deliverables. The CCM will provide written comments to the Contractor on the draft deliverable within 10 working days of receipt.
- Once agreement has been reached on the draft, submit the final deliverable to the CCM. The CCM 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 CCM 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 CCM, 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 also prepare a confidential version of the Final Report, 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 CCM for review and approval. The CCM 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, submit the final outline to the CCM. The CCM 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 CCM for review and comment. The CCM will provide written comments within 10 working days of receipt.

Once agreement on the draft Final Report has been reached, the CCM shall forward the electronic version of this report for Energy Commission internal approval. Once the approval is given, the CCM 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 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 CCM 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, 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 a letter including the appropriate information to the CCM if during the course of the Agreement additional match funds are received.
- Provide a letter to the CCM 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 CCM 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 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 an updated list of permits (including the appropriate information on each permit) and an updated schedule to the CCM.
- As permits are obtained, send a copy of each approved permit to the CCM.
- If during the course of the Agreement permits are not obtained on time or are denied, notify the CCM 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 CCM 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 may vary depending on potential interest and availability. The exact composition of the PAC may change as the need warrants. PAC members serve at the discretion of the CCM.

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; and 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 CCM 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, which may be held via teleconference.

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 CCM. 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 CCM.
- 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 Vehicle Emissions and Performance Testing and Data Analysis

The goal of this task is to test at least four heavy/medium-duty vehicles on a dynamometer, using a range of NG fuel blends over test cycles. This task expands the vehicles and fuels tested under PIER contract #500-07-012, Impact of Natural Gas Composition on the Performance and Emissions of Heavy-duty Natural Gas Vehicles.

A vehicle test plan developed under Contract #500-07-012, entitled *The Evaluation of the Performance and Air Pollutant Emissions of Vehicles Operating on Various Natural Gas Blends - Heavy-duty CNG Vehicle Testing Test Plan* (Vehicle Test Plan), will be used as the basis for testing using identified test cycles or other standard cycles that might be representative of different types of activities. Vehicles of particular interest for testing include at least one of each of the following: a refuse hauler, a school bus, and a port truck.

The Contractor shall:

- Collaborate with the CCM and PAC to identify at least six natural gas fuel blends to be used for testing. Obtain CCM approval of blends to test. Prepare a *List of Approved NG Blends*.
- Collaborate with the CCM and PAC to identify at least four heavy/medium-duty vehicles to test. Obtain CCM approval prior to commencing tests.
- Prepare a *Modified Vehicle Test Plan* that modifies the Vehicle Test Plan mentioned above, as appropriate for selected vehicles and fuel blends.
- Conduct emissions testing on at least four heavy-/medium-duty vehicles for a combined total of 22 vehicle test days, in accordance with the Modified Vehicle Test Plan. The emissions tests shall include the measurement of total hydrocarbons (THC), non-methane hydrocarbons (NMHC), oxides of nitrogen (NO_x), nitrous oxide (N₂O), carbon monoxide (CO), particulate matter (PM), and carbon dioxide (CO₂).
- Conduct additional measurements for ammonia (NH₃), carbonyls, and particle count.

- Conduct performance tests on at least four vehicles in accordance with the Modified Vehicle Test Plan to identify fuel economy impacts and operability with fuel blends.
- Conduct a comprehensive data analysis on the resulting data sets to examine trends in the data and corresponding relationships. This analysis will 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 for engines and vehicles.
- Prepare a *Journal Article* for publication and submit to a peer-reviewed publication. The article will discuss the data and analysis from this project.
- Prepare *electronic copies of all data and results* in accordance with the electronic file format specified in this Scope of Work.

Deliverables:

- List of Approved NG Blends (no draft)
- Modified Vehicle Test Plan (no draft)
- Journal article
- Electronic copies of all data and results