STATE OF CALIFORNIA

GRANTS/CONTINGENT AWARD REQUEST

CEC-270 (Revised 03/10) CALIFORNIA ENERGY COMMISSION

To: Grants and Loans Office Date: 09 / 17 / 2012

Project Manager: Phil Cazel Phone Number: (916) 653-1590 ext.

Office: Emerging Fuels & Technology Office Division: Fuels and Transportation MS- 27

Project Title: SMUD/Argonne Biomethane AD Project

Type of Request: *(check one)*

☐ **New Agreement:** *(include items A-F from below)* Agreement Number: ARV-10-043

Program:

Solicitation Name and/or Number:

Legal Name of Recipient: SMUD Energy Research and Development Department

Recipient's Full Mailing Address: 6201 S Street, MS B257

Sacramento, CA 95817

Recipient's Project Officer: Valentino M. Tiangco, Ph.D. Phone Number: (916) 732-6795 ext.

Agreement Start Date: 06 / 24 / 2011 Agreement End Date: 06 / 01 / 2015

☒ **Amendment :** *(Check all that apply)* Agreement Number: ARV-10-003

- ☒ Term Extension – New End Date: 06 / 30 / 2015
- ☒ Work Statement Revision *(include Item A from below)*
- ☒ Budget Revision *(include Item B from below)*
- ☐ Change of Scope *(include Items A – F as applicable from below)*
- ☒ Other: Related adjustments to Schedule of Products and Due Dates

ITEMS TO ATTACH WITH REQUEST:

A. Work Statement
B. Budget
C. Recipient Resolution, if applicable. (Resolution may be requested in Special Conditions if not currently available.)
D. Special Conditions, if applicable.
E. CEQA Compliance Form
F. Other Documents as applicable
- Copy of Score Sheets
- Copy of Pre-Award Correspondence
- Copy of All Other Relevant Documents

California Environmental Quality Act (CEQA)

☐ CEC finds, based on recipient's documentation in compliance with CEQA:

- ☐ Project exempt: NOE filed: / /
- ☐ Environmental Document prepared: NOD filed: / /
- ☐ Other:

☐ CEC has made CEQA finding described in CEC-280, attached

Funding Information:

*Source #1:	Amount: $	Statute:	FY:	Budget List #:	
*Source #2:	Amount: $	Statute:	FY:	Budget List #:	
*Source #3:	Amount: $	Statute:	FY:	Budget List #:	

If federally funded, specify federal agreement number:

*** Source Examples include ERPA, PIER-E, PIER-NG, FED, GRDA, ARFVT, OTHER.**

Business Meeting Approval: *(refer to Business Meeting Schedule)*

Proposed Business Meeting Date: 11 / 14 / 2012 ☐ Consent ☒ Discussion

Business Meeting Participant: Phil Cazel Time Needed: 5 min.

Agenda Notice Statement: *(state purpose in layperson terms)*

Possible approval of a ☐ Grant / ☐ Contingent Award to…

novation of Grant Agreement ARV-10-003 from Eurisko Scientific, LLC to the Sacramento Municipal Utility District (SMUD) to implement the originally approved project to demonstrate a patented additive process to optimize the production of biomethane from anaerobic digestion and reduce the amount of CO2 produced. Minor revisions to the scope of work, budget, and schedule were made to facilitate this transfer.

Project Manager	Date	Office Manager	Date	Deputy Director	Date

EXHIBIT A

SCOPE OF WORK

Technical Task List

Task #	CPR	Task Name
1	N/A	Administration
2		Resource Assessment/Verification and Procurement Plan
3	X	Bench and Pilot Digester Tests for Additives Optimization
4	X	Field Demonstration of the Use of Additives at American River Packaging (ARP)
5	X	Biomethane Testing and Clean Up to Fuel Quality Methane
6		Distribution as Transportation Fuel
7		Commercialization Plan
8		Data Collection and Analysis

Key Name List

Task #	Key Personnel	Key Subcontractor(s)	Key Partner(s)
1	Valentino Tiangco		
2	Valentino Tiangco; Kathleen Ave		Clean World Partners (CWP)
3	Valentino Tiangco	Argonne National Laboratory	Metropolitan Water Reclamation District of Greater Chicago (Chicago WWTP); CWP
4	Valentino Tiangco	Argonne National Laboratory	CWP
5	Valentino Tiangco	CWP	
6	Valentino Tiangco	CWP	
7	Valentino Tiangco	Argonne National Laboratory	CWP
8	Valentino Tiangco	Argonne National Laboratory	CWP

Glossary

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

Term/ Acronym	Definition
AD	Anaerobic Digester
ARFVT	Alternative and Renewable Fuel and Vehicle Technology
ARP	American River Packaging
BTU	British Thermal Unit
CNG	Compressed Natural Gas
CO2	Carbon dioxide
CPR	Critical Project Review

Term/ Acronym	Definition
FTD	Fuels and Transportation Division
GHG	Greenhouse Gas
LNG	Liquid Natural Gas
SMUD or Recipient	Sacramento Municipal Utility District
WWTP	Wastewater Treatment Plant

Background:
Assembly Bill 118 (Nùñez, Chapter 750, Statutes of 2007), created the Alternative and Renewable Fuel and Vehicle Technology Program (ARFVT Program). The statute, subsequently amended by AB 109 (Nùñez, Chapter 313, Statutes of 2008), authorizes the Energy Commission to develop and deploy alternative and renewable fuels and advanced transportation technologies to help attain the state's climate change policies. The Energy Commission has an annual program budget of approximately $100 million and provides financial support for projects that:

- Develop and improve alternative and renewable low-carbon fuels;
- Optimize alternative and renewable fuels for existing and developing engine technologies;
- Produce alternative and renewable low-carbon fuels in California;
- Decrease, on a full fuel cycle basis, the overall impact and carbon footprint of alternative and renewable fuels and increase sustainability;
- Expand fuel infrastructure, fueling stations, and equipment;
- Improve light-, medium-, and heavy-duty vehicle technologies;
- Retrofit medium- and heavy-duty on-road and non-road vehicle fleets;
- Expand infrastructure connected with existing fleets, public transit, and transportation corridors; and
- Establish workforce training programs, conduct public education and promotion, and create technology centers.

The California Energy Commission issued solicitation PON-09-003 to provide funding opportunities under the ARFVT Program for projects that involve the design, construction, and operation of biomethane facilities. To be eligible for funding under PON-09-003, the projects must also be consistent with the ARFVT Investment Plan updated annually. In response to PON-09-003, Eurisko Development LLC (d.b.a. Eurisko Scientific LLC) submitted application #16 which was proposed for funding in the Energy Commission's Notice of Proposed Awards released April 7, 2010. The Eurisko Development LLC application #16 is incorporated by reference to this Agreement in its entirety.

Problem Statement
The nation and the State of California need the development of an economical process that will create a new industry to produce biomethane for use as a transportation fuel. The use of biomethane as a transportation fuel will reduce greenhouse gas (GHG) emissions, reduce petroleum fuel demand, stimulate economic development, and re-

duce environmental impacts associated with the State's major waste sources. Multiple approaches have been developed to improve anaerobic digester (AD) performance but none shows the promise that the unique process patented by Argonne National Labs does for biomethane production. The barrier to increased use of digesters in feedlots, water treatment plants and for green wastes has been the marginal economics; this new process addresses this issue.

Goal of the Agreement
The goal of this Agreement is to develop, demonstrate, and deploy an innovative approach of enhancing biogas that will produce a biomethane transportation fuel that stimulates economic development and co-produce power while reducing GHG emissions, petroleum demand, and the environmental impacts associated with co-digestion of waste water, sludge, food waste and other organic wastes.

Objective of the Agreement
The objective of this Agreement is to optimize and demonstrate that a patented additive process developed at Argonne National Labs can increase the productivity of anaerobic digestion process up to five times and reduce the amount of carbon dioxide CO_2 produced simultaneously.

The success of this program will be measured by comparing real time baseline anaerobic digester performance to new process performance. The success of the project will result in proof of an inexpensive additive process that will increase biomethane production dramatically.

Quantitative performance and cost objectives are shown below for a single digester used in demonstration:

- Divert 10 tons per day of wet waste feedstock from area landfills in Sacramento to single digester
- Provide renewable energy supply of over 50,000 standard cubic feet of compressed natural gas (CNG) per day and displace over 500 gallons of gasoline per day.
- Co-produce over 6,000 kWh per day of electricity at field demonstration (for parasitic use)
- Ultimate target cost for added biomethane production is less than $5 to $7 per Million British Thermal Units (BTU).

TASK 1 ADMINISTRATION

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 Recipient shall:

- Attend a "Kick-Off" meeting with the Commission Project Manager, the Grants Officer, and a representative of the Accounting Office. The Recipient shall bring its Project Manager, Agreement Administrator, Accounting Officer, and others designated by the Commission Project 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 Project Manager will provide an agenda to all potential meeting participants.

  The administrative portion of the meeting shall include, but not be limited to, discussion of the following:
  - Agreement Terms and Conditions
  - Critical Project Review (Task 1.2)
  - Match fund documentation (Task 1.6) No reimbursable work may be done until this documentation is in place.
  - Permit documentation (Task 1.7)
  - Subcontracts needed to carry out project (Task 1.8)

  The technical portion of the meeting shall include, but not be limited to, discussion of the following:
  - The Commission Project Manager's expectations for accomplishing tasks described in the Scope of Work
  - An updated Schedule of Products
  - Progress Reports (Task 1.4)
  - Final Report (Task 1.5)

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

Recipient Products:
- Updated Schedule of Products
- Updated List of Match Funds
- Updated List of Permits

Commission Project Manager Product:
- Kick-Off Meeting Agenda

Task 1.2 Critical Project Review (CPR) Meetings

The goals of this task are to determine if the project should continue to receive Energy Commission funding to complete this Agreement and to identify any needed modifications to the tasks, products, schedule or budget.

CPRs provide the opportunity for frank discussions between the Energy Commission and the Recipient. CPRs generally take place at key, predetermined points in the Agreement, as determined by the Commission Project Manager and as shown in the

Technical Task List above. However, the Commission Project Manager may schedule additional CPRs as necessary, and any additional costs will be borne by the Recipient.

Participants include the Commission Project Manager and the Recipient and may include the Commission Grants Officer, the Fuels and Transportation Division (FTD) team lead, other Energy Commission staff and Management as well as other individuals selected by the Commission Project Manager to provide support to the Energy Commission.

The Commission Project Manager shall:

- Determine the location, date, and time of each CPR meeting with the Recipient. These meetings generally take place at the Energy Commission, but they may take place at another location.
- Send the Recipient 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 modifications are needed to the tasks, schedule, products, and/or budget for the remainder of the Agreement. Modifications to the Agreement may require a formal amendment (please see the Terms and Conditions, Section 8). If the Commission Project Manager concludes that satisfactory progress is not being made, this conclusion will be referred to the Lead Commissioner for Transportation for his or her concurrence.
- Provide the Recipient with a written determination in accordance with the schedule. The written response may include a requirement for the Recipient to revise one or more product(s) that were included in the CPR.

The Recipient 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 products identified in this scope of work. The Recipient shall submit these documents to the Commission Project 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.

Commission Project Manager Products:

- Agenda and a list of expected participants
- Schedule for written determination
- Written determination

Recipient Product:

- CPR Report(s)

Task 1.3 Final Meeting

The goal of this task is to closeout this Agreement.

The Recipient Shall:

- Meet with Energy Commission staff 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 Recipient, the Commission Grants Office Officer, and the Commission Project 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 Project Manager.

  The technical portion of the meeting shall present an assessment of the degree to which project and task goals and objectives were achieved, findings, conclusions, recommended next steps (if any) for the Agreement, and recommendations for improvements. The Commission Project Manager will determine the appropriate meeting participants.

  The administrative portion of the meeting shall be a discussion with the Commission Project Manager and the Grants Officer about the following Agreement closeout items:
  - What to do with any equipment purchased with Energy Commission funds (Options)
  - Energy Commission's request for specific "generated" data (not already provided in Agreement products)
  - Need to document Recipient's disclosure of "subject inventions" developed under the Agreement
  - "Surviving" Agreement provisions
  - Final invoicing and release of retention
  - Prepare a schedule for completing the closeout activities for this Agreement.

Products:

- Written documentation of meeting agreements
- Schedule for completing closeout activities

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 objectives of this Agreement on time and within budget.

The objectives of this task are to summarize activities performed during the reporting period, to identify activities planned for the next reporting period, to identify issues that may affect performance and expenditures, and to form the basis for determining whether invoices are consistent with work performed.

The Recipient shall:

- Prepare a Monthly Progress Report which summarizes all Agreement activities conducted by the Recipient 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 Project Manager within 10 days of the end of the reporting period. The recommended specifications for each progress report are contained in Section 6 of the Terms and Conditions of this Agreement.

Product:

- Monthly Progress Reports

Task 1.5 Final Report

The goals of the Final Report are to assess the project's success in achieving its goals and objectives, advancing science and technology, and providing energy-related and other benefits to California.

The objectives of the Final Report are to clearly and completely describe the project's purpose, approach, activities performed, results, and advancements in science and technology; to present a public assessment of the success of the project as measured by the degree to which goals and objectives were achieved; to make insightful observations based on results obtained; to draw conclusions; and to make recommendations for further projects and improvements to the FTD project management processes.

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

The final report shall include an aggregate of all data reported in the technical tasks.

The Recipient shall:

- Prepare an Outline of the Final Report.
- Prepare a Final Report following the approved outline and the latest version of the Final Report guidelines which will be provided by the Commission Project Manager. The Commission Project Manager shall provide written comments on the Draft Final Report within fifteen (15)

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

Products:

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

Task 1.6 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. Although the Energy Commission budget for this task will be zero dollars, the Recipient may utilize match funds for this task. Match funds shall be spent concurrently or in advance of Energy Commission funds for each task during the term of this Agreement. Match funds must be identified in writing and the associated commitments obtained before the Recipient can incur any costs for which the Recipient will request reimbursement.

The Recipient shall:

- Prepare a letter documenting the match funding committed to this Agreement and submit it to the Commission Project Manager at least 2 working days prior to the kick-off meeting. 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. 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 Recipient shall identify its owner and provide a contact name, address and telephone number, and the address where the property is located.
- Provide 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. For match funds provided by a grant a copy of the executed grant shall be submitted in place of a letter of commitment.

- Discuss match funds and the implications to the Agreement if they are 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 Project Manager if during the course of the Agreement additional match funds are received.
- Notify the Commission Project Manager within 10 days if during the course of the Agreement existing match funds are reduced. Reduction in match funds must be approved through a formal amendment to the Agreement and may trigger an additional CPR.

Products:

- A letter regarding match funds or stating that no match funds are provided
- Copy(ies) of each match fund commitment letter(s) (if applicable)
- Letter(s) for new match funds (if applicable)
- Letter that match funds were reduced (if applicable)

Task 1.7 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. Although the Energy Commission budget for this task will be zero dollars, the Recipient shall budget match funds for any expected expenditures associated with obtaining permits. Permits must be identified in writing and obtained before the Recipient can make expenditures for which a permit is required.

The Recipient shall:

- Prepare a letter documenting the permits required to conduct this Agreement and submit it to the Commission Project Manager at least 2 working days prior to the kick-off meeting. If there are no permits required at the start of this Agreement, then state such in the letter. 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
  - The schedule the Recipient will follow in applying for and obtaining these permits.

- Discuss the list of permits and the schedule for obtaining them at the kick-off meeting and develop a timetable for submitting the updated list, schedule and the copies of the permits. 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, provide the appropriate information on each permit and an updated schedule to the Commission Project Manager.
- As permits are obtained, send a copy of each approved permit to the Commission Project Manager.
- If during the course of the Agreement permits are not obtained on time or are denied, notify the Commission Project Manager within 5 working days. Either of these events may trigger an additional CPR.

Products:

- Letter documenting the permits or stating that no permits are required
- A copy of each approved permit (if applicable)
- Updated list of permits as they change during the term of the Agreement (if applicable)
- Updated schedule for acquiring permits as changes occur during the term of the Agreement (if applicable)

Task 1.8 Obtain and Execute Subcontracts

The goals of this task are for Recipients to identify any subcontracts required to carry out the tasks under this Agreement, and to procure them consistent with the terms and conditions of this Agreement and the Recipient's own procurement policies and procedures. It will also provide the Energy Commission an opportunity to review the subcontracts to ensure that the tasks are consistent with this Agreement, that the budgeted expenditures are reasonable and consistent with applicable cost principles.

The Recipient shall:

- Prepare a letter documenting the subcontracts required to conduct this Agreement, and submit it to the Commission Project Manager at least 2 working days prior to the kick-off meeting. If there are no subcontracts required at the start of this Agreement, then state such in the letter. If it is known at the beginning of the Agreement that subcontracts will be required during the course of the Agreement, provide in the letter:
  - A list of the subcontracts that describes the anticipated maximum budget and general scope of work for each,
  - A description of the procurement process to be used, and
  - The schedule the Recipient will follow in applying for and obtaining these subcontracts

- Submit a draft of the subcontract that will include a budget with the information required in the budget details to the Commission Project Manager for review and approval, and incorporate any changes recommended by the Commission Project Manager.
- Submit a final copy of the executed subcontract.

Products:

- Letter describing the subcontracts needed, or stating that no subcontracts are required
- Draft subcontracts
- Final subcontracts

TECHNICAL TASKS

Task 2 - Resource Assessment/Verification and Procurement Plan

The goal of this task is to perform a refined and site-specific feedstock resource assessment (gross, technical and economic potentials) and feedstock procurement plan that will help ascertain sustainable feedstock supply requirements for co-digestion possibilities in Sacramento (American River Packaging (ARP)). The feedstock resources shall include (but are not limited to), food waste, fruits and vegetables wastes, pre-consumer food processing wastes, dairy manures and other organic wastes suitable for anaerobic digestions. In order to address local questions about the potential and cost-effectiveness of options for post-consumer organic waste diversion, this task shall include an assessment of the economic feasibility and a preliminary life-cycle cost analysis of local land-filling, source-separated post-consumer food-waste collection for anaerobic digestion (AD).

The Recipient Shall:

- Prepare and conduct RFP for this Task.
- Review bids, select subcontractor and award contract for this Task.
- Review existing database and other literatures of feedstock availability.
- Perform site visits or survey for waste stream information.
- Identify economic distance of feedstock to be collected.
- Prepare feedstock source inventory within economic radius of the host facility.
- Identify gross, technical and economic potentials of feedstocks.
- Create target list of most likely feedstock candidates for procurement plan.
- Create a set of evaluation criteria for most likely candidates of feedstocks.
- Recommend waste shed or feedstock enterprise zones.
- Review specific collection sources using Geographic Information System (potentials, clusters, mapping, and routing options).
- Profile and assess local collection options for pre- and post-consumer organic waste including land-filling, source-separated pre-consumer food-waste collection post-consumer food-waste collection for AD. Estimate the biogas generation potential for AD processing pathway.

- Conduct an economic feasibility study and preliminary life-cycle cost analysis of local collection options, given factors such as weather patterns and population/development densities, to help determine appropriate targets.
- Select food wastes and other organic wastes to be considered for co-digestions at ARP.
- Develop strategic feedstock procurement plan and identify issues and potential solutions.
- Identify most likely participants for planning and implementation of organic waste collection program and perform focus group meetings.
- Develop marketing communication and outreach plan, including each economically feasible disposal option in the scope of the plan.
- Evaluate and select haulers and best available site for central collection and pre-processing, based on volunteered, pre-permitted sites and commitment of required space, access and equipment.
- Secure feedstock supply agreement.
- Prepare and submit a report on resource availability of sludge, manure and biomass supply available in California, and include a procurement plan and feedstock supply agreement for biomass materials for anaerobic digestion for CWP's AD project at ARP to produce biomethane.

[Before this task begins all relevant subcontracts must be executed. See Task 1.8 for details.]

Products:
- Draft Task 2 Report
- Final Task 2 Report

Task 3 – Bench and Pilot Digester Tests for Additive Optimization

[Before this task begins all relevant subcontracts must be executed. See Task 1.8 for details.]

[CPR WILL OCCUR DURING THIS TASK. See Task 1.2 for details]

Task 3.1 Prepare Bench Digester for Testing at Argonne and ARP
The goals of this task are to optimize the process at Argonne National Laboratories (Argonne), and to examine the performance in a matrix at Argonne that will include feedstock ratios, rock composition, rock crush size, culture source, and wetness.

The Recipient Shall:
- Build out 12-cell reactor to accommodate approximately 50 simultaneous reactions where volume and composition can be measured.
- Optimize ratio of sludge additives: serpentinite and olivine.
- Evaluate and Compare the feedstock composition at the Chicago WWTP and ARP with the anaerobic bacteria needs.

- Promote growth of methanogens over acidogens by adding Nickel, Cobalt, and Iron, to accelerate methane production rates.
- Monitor fate of the serpentinite and olivine in the digester.
- Compare sludge sources and cultures from different facilities.
- Optimize rock crush size (grinding size) on digester performance.
- Validate increase in gas production rates through Argonne process.
- Validate how close to pipeline quality the gas composition is.
- Determine rate of solids buildup in the digester.
- Select process parameters for the most promising conditions for scale up.
- Prepare and submit Argonne Test Report summarizing the results of these tasks.

Products:
- Draft Argonne Test Report
- Final Argonne Test Report

Task 3.2 Testing and Pilot Scale Operation at the Chicago WWTP and ARP
The goal of this task is to optimize the process at Argonne for the Chicago WWTP and ARP at a pilot scale.

The Recipient Shall:
- Test optimized formulation at the Chicago WWTP and ARP.
- Scale up to pilot system experiments (10 L to 100 L or larger digester) and operate for 6 months at the Chicago WWTP using wastewater from Chicago WWTP and food wastes from ARP.
- Determine replenishment rate of serpintinite and olivine.
- Monitor struvite ($MgNH_4PO_46H_2O$) formation in the digester.
- Investigate impact of by-products on reaction chemistry and digester microbial populations.
- Determine methane yield.
- Consider variety of factors that affect the rate of digestion and biogas production.
- Monitor the accumulation of silica and other impurities in the digester environment.
- Prepare and submit a report on testing and optimized formulation, and pilot system experiments.

Products:
- Draft Report on Task 3.2 Activities
- Final Report on Task 3.2 Activities

Task 4 - Field Demonstration of the Use of Additive at ARP

[Before this task begins all relevant subcontracts must be executed. See Task 1.8 for details.]

[CPR WILL OCCUR DURING THIS TASK. See Task 1.2 for details]

Task 4.1 Design Demonstration Equipment for ARP
The goal of this task is to design a pilot scale facility at ARP using information from Task 3.

The Recipient Shall:

- Design demonstration equipment based on results of pilot scale testing under-Task 3.2. The process additions will be based on the most promising results and conditions of the optimization testing.
- Prepare and submit a report on the equipment design for ARP.

Products:

- Draft Equipment Design Report
- Final Equipment Design Report

Task 4.2 ARP Operations Using Argonne Process
The goal of this task is to use food waste and other organic wastes from ARP at a scale to be determined by the team, for six months. Field demonstration can be done on a split stream between a baseline AD and the test AD which allows side-by-side comparison of test results with the data obtained in Task 3.

The Recipient Shall:

- Transfer optimized operational conditions to the ARP site and set up digester for testing utilizing food waste feed system.
- Run facility under conditions similar to the pilot-scale facility.
- Investigate process upsets and stability of the cultures.
- Measure and report biomethane quality.
- Prepare and submit a report on the transfer to the ARP, test results, biomethane quality, and any recommended improvements.

Products:

- Task 4.2 Draft Report on ARP Operations
- Task 4.2 Final Report on ARP Operations

Task 5 - Biomethane Testing & Clean Up to Fuel Quality Methane
The goal of this task is to design and install a gas cleaning system for transportation grade CNG or liquefied natural gas (LNG), using data measured in Tasks 3 and 4 on biomethane gas quality, BTU value, CO2 content, and tramp gases.

The Recipient Shall:

- Review data of biomethane as gas is generated during pilot testing period.
- Using data, design gas cleaning system.
- Install gas cleaning system.
- Operate cleaning system during 6 month testing program.
- Prepare and submit a gas cleaning system report on the gas quality being delivered for transportation fuel.

[Before this task begins all relevant subcontracts must be executed. See Task 1.8 for details.]

[CPR WILL OCCUR DURING THIS TASK. See Task 1.2 for details]

Products:
- Draft Report on Gas Cleaning System
- Final Report on Gas Cleaning System

Task 6 - Distribution as Transportation Fuel
The goal of this task is to have biomethane taken from the digester system and stored as CNG at the site.

The Recipient Shall:
- Collect cleaned biomethane in storage tank from test digester system.
- Transfer biomethane to CNG compressor station on-site and transfer to truck going to CNG distribution center.
- Prepare and submit a report on the results of biomethane used as transportation fuel.

[Before this task ends all relevant subcontracts must be executed. See Task 1.8 for details.]

Products:
- Draft Report on Transportation Fuel From Biomethane
- Final Report on Transportation Fuel From Biomethane

Task 7 - Commercialization Plan
The goals of this task are to determine the commercial viability of the Argonne process for production of biomethane and to develop approaches to commercialize the Argonne process and get systems into operation at anaerobic digesters.

The Recipient Shall:
- Develop an economic model for Argonne process for production of biomethane.
- Develop Commercialization Plan on the commercial viability of the Argonne process and recommended approaches to commercialization.

[Before this task ends all relevant subcontracts must be executed. See Task 1.8 for details.]

Products:
- Draft Commercialization Plan
- Final Commercialization Plan

Task 8 - Data Collection and Analysis
The goal of this task is to perform the final analysis of all project data and to prepare final reports for the California Energy Commission.

The task will estimate the benefits and local impacts of the project and include that information in the Final Report.

The Recipient Shall:

- Use the results of Task 4.2- ARP Operations Using Argonne Process and Task 7-Commercialization Plan to estimate the following:
  - Gasoline and /or petroleum-based diesel fuel that could be displaced annually.
  - How the project will reduce criteria air pollutants and air toxics and reduce or avoid multimedia environmental impact, and lead to a decrease, on a life-cycle basis, in emissions of water pollutants or any other substances known to damage human health or the environment project incorporated and achieved the sustainability goals. (The Energy Commission will provide data forms to the Recipient to aid with this task.)
  - A quantified estimate of the project's carbon intensity values for life-cycle scale greenhouse gas emissions.
  - Water efficiency and water use reduction measures used in the project including, but not limited to, the use of recycled or reclaimed water and the reduction or elimination of point and nonpoint source wastewater discharge.
  - Potential use of renewable energy or cogeneration in the project that would exceed Title 24 standards in Part 6 of the California Code of Regulations.
  - Data on expected job creation, economic development, and increased state revenue.
- Compare any project performance and expectations provided in the proposal to Energy Commission with actual project performance and accomplishments.
- Provide additional data that may be requested by the Energy Commission during the term of this Agreement, as is reasonably available.
- Provide the information and analysis specified above in the Final Report.

Products:

- None. Data from this task will be included in the Final Report.

Award Number: ARV-10-003 Date: 02 / 13 / 2013

Note: The Energy Commission Project Managers Manual includes detailed instructions on how to complete this section, with examples of grants that are "Projects" and are not "Projects". When the Project Manager is completing this section, if questions arise as to the appropriate answers to the questions below, please consult with the Energy Commission attorney assigned to review grants or loans for your division.

1. Is grant/loan considered a "Project" under CEQA? ☒ Yes *(skip to question #2)* ☐ No *(continue with question #1)*

   Please complete the following: *[Public Resources Code (PRC) 21065 and 14 California Code of Regulations (CCR) 15378]:*

   Explain why the grant/loan is ***not*** considered a "Project"? The grant/loan will not cause a direct physical change in the environment or a reasonably foreseeable indirect physical change in the environment because grant/loan involves:

2. If grant/loan is considered a "Project" under CEQA: *(choose either **IS** or **IS NOT**)*

   ☒ Grant/loan **IS** exempt:

   ☐ Statutory Exemption: *(List PRC and/or CCR section numbers)*

   ☒ Categorical Exemption: *(List CCR section number)* 15301(existing facility); 15306 (data collection)

   ☐ Common Sense Exemption. *(14 CCR 15061(b)(3))*

   Explain reason why the grant/loan is exempt under the above section:

   The project will fund bench and field demonstrations of a patented additive process to optimize the production of biomethane from anaerobic digestion at the American River Packaging Organic Waste Recycling facility. Data will be collected to verify and document the increased generation of biomethane and reduction of CO2 and other greenhouse gases. The project includes operation of an existing anaerobic digestion facility involving negligible or no expansion of current use as well as basic data collection, research, and resource evaluation activities which do not result in a serious or major disturbance to any environmental resource. Therefore, the project will not have any significant impact on the environment.

Please attach draft Notice of Exemption (NOE). Consult with the Energy Commission attorney assigned to your division for instructions on how to complete the NOE.

☐ Grant/loan **IS NOT** exempt. The Project Manager needs to consult with the Energy Commission attorney assigned to your division and the Siting Office regarding a possible initial study.

February 13, 2013
Energy Commission Business Meeting

Amendment to Grant Agreement ARV-10-003 to Replace Recipient Eurisko Scientific with Sacramento Municipal Utility District

Summary
In June 2011, the Energy Commission entered into a grant agreement with Eurisko Development LLC (doing business as Eurisko Scientific LLC) to demonstrate a patented additive process to optimize the production of biomethane from anaerobic digestion. In late December 2011, Eurisko Scientific, LLC informed the CEC that it had ceased work on this project and that it was dissolving the company.

Energy Commission Staff is recommending that the Commission novate Agreement ARV-10-003 to the Sacramento Municipal Utility District (SMUD) so that the remaining $1,819,166.00 grant award can be used to complete the project. SMUD was a participant in the original project and has a good working relationship with Argonne National Laboratory, a major subcontractor. The Schedule of Products and Due Dates, Scope of Work, and Budget documents will be revised to reflect their new project management responsibilities.

Benefits
The benefits of this amendment include no increase of the initial $1,830,132.00 grant award, no significant change to the scope of the project, and the Match funding amount will actually be increased by 5%. The revised project will also increase the amount of bench and pilot scale testing performed in California using the Clean World Partners facility at the American River Packaging Organic Waste Recycling Facility.

Implementation Schedule
This project is scheduled to be completed by March 31, 2015.

Participants
Sacramento Municipal Utility District will manage the grant agreement, and provide resource assessment and project support.

Argonne National Laboratory will conduct bench and pilot scale evaluation of anaerobic digestion using their patented additive process in Sacramento at the American River

Packaging Organic Waste Recycling Facility and in Chicago at the Stickney Water Reclamation Plant.

Assembly District: 10
Senate District: 6

- Phil Cazel, can be reached at 653-1590.

Notice of Exemption

Form D

To: Office of Planning and Research
P.O. Box 3044, Room 212
Sacramento, CA 95812-3044

County Clerk
County of _____

_____

_____

From: (Public Agency) California Energy Commission
1516 Ninth Street
Sacramento, CA 95814
(Address)

Project Title: Grant Award # ARV-10-003 to Sacramento Municipal Utility District (Recipient)

Project Location - Specific:

American River Packaging Organic Waste Recycling Facility, 4225 Pell Drive, Sacramento 95838

Project Location – City: Sacramento Project Location – County: Sacramento

Description of Nature, Purpose and Beneficiaries of Project:

The project will fund bench and field demonstrations of a patented additive process to optimize the production of biomethane from anaerobic digestion at the American River Packaging Organic Waste Recycling facility. Data will be collected to verify and document the increased generation of biomethane and reduction of CO2 and other greenhouse gases.

Name of Public Agency Approving Project: California Energy Commission

Name of Person or Agency Carrying Out Project: Sacramento Municipal Utility District

Exempt Status: **(check one)**

- ☐ Ministerial (Sec. 21080(b)(1); 15268);
- ☐ Declared Emergency (Sec. 21080(b)(3); 15269(a));
- ☐ Emergency Project (Sec. 21080(b)(4); 15269(b)(c));
- ☒ Categorical Exemption. State type and section number: "Existing facility" (§15301);"Information collection" (§ 15306).
- ☐ Statutory Exemptions. State code number: _____

Reasons why project is exempt:

The project will operate at an existing anaerobic digestion facility involving negligible or no expansion of current use as well as basic data collection, research, and resource evaluation activities which do not result in a serious or major disturbance to any environmental resource. Therefore, the project will not have any significant impact on the environment.

Lead Agency Contact Person: Phil Cazel Area Code/Telephone/Extension: 916-653-1590

If filed by applicant:

1. Attach certified document of exemption finding.
2. Has a Notice of Exemption been filed by the public agency approving the project? ☐ Yes ☐ No

Signature: _____ Date: _____ Title: _____

☒ Signed by Lead Agency
☐ Signed by Applicant

Date received for filing at OPR: _____

Revised 2005

RESOLUTION NO: [XX-XXXX-XX]

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION REGARDING: NOVATION AND AMENDMENT
OF GRANT AWARD TO
SACRAMENTO MUNICIPAL UTILITY DISTRICT
UNDER PON-09-003

WHEREAS, on June 21, 2012 the State Energy Resources Conservation and Development Commission (hereinafter "Energy Commission") entered into grant agreement ARV-10-003 with Eurisko Development LLC (d.b.a. Eurisko Scientific, LLC) (hereinafter "Eurisko") to demonstrate a patented additive process to optimize the production of biomethane from anaerobic digestion and reduce the amount of CO_2 produced (hereinafter the "Project").

WHEREAS, on or about December 19, 2011 Eurisko informed the Energy Commission that it no longer desired the grant award and would not complete performance of grant agreement ARV-10-003.

WHEREAS, on or about July 30, 2012, a major subcontractor on the Project, the Sacramento Municipal Utility District (hereinafter "SMUD"), indicated an interest in continuing the Project by having SMUD take over the Project as the grantee.

WHEREAS, the Energy Commission is informed and believes that Eurisko filed a Certificate of Cancellation with the Secretary of the State of Delaware on or about December 15, 2012, which dissolved the company.

WHEREAS, the Energy Commission finds that the activities funded by this grant are a "project" under the California Environmental Quality Act (CEQA) and categorically exempt from further environmental review pursuant to the "existing facility" exemption under CEQA Guidelines, § 15301 and the "information collection" exemption under CEQA Guidelines, § 15306.

RESOLVED, that the State Energy Resources Conservation and Development Commission (Energy Commission) approves the Novation Agreement, dated December 03, 2012, substituting SMUD as the Grantee under Grant Award # ARV-10-003, and

approves the amendment of Grant Award # ARV-10-003, for $1,819,166.00, to complete the Project.

FURTHER BE IT RESOLVED, that this document authorizes the Executive Director or his/her designee to execute the same on behalf of the Energy Commission.

CERTIFICATION

The undersigned Secretariat to the Energy Commission does hereby certify that the foregoing is a full, true, and correct copy of a RESOLUTION duly and regularly adopted at a meeting of the California Energy Commission held on February 13, 2013:

AYE: [*List Commissioners*]
NAY: [*List Commissioners*]
ABSENT: [*List Commissioners*]
ABSTAIN: [*List Commissioners*]

_____
Harriet Kallemeyn,
Secretariat