

GRANTS/CONTINGENT AWARD REQUEST



To: Grants and Loans Office

Date: 3/12/2012

Project Manager: Anish Gautam

Phone Number: 916-327-2382

Office: Energy Efficiency Research Office

Division: Energy Research and Development

MS- 51

Project Title: Novel Hydrodynamic Separation Technology for Wastewater Treatment

Type of Request: (check one)

Form for New Agreement with fields for Agreement Number, Program, Solicitation Name, Recipient Name, Address, Project Officer, and Dates.

Form for Amendment with checkboxes for Term Extension, Work Statement Revision, Budget Revision, Change of Scope, and Other.

ITEMS TO ATTACH WITH REQUEST:

- List of items to attach: A. Work Statement, B. Budget, C. Recipient Resolution, D. Special Conditions, E. CEQA Compliance Form, F. Other Documents.

California Environmental Quality Act (CEQA)

Form for CEQA compliance with checkboxes for CEC findings and CEQA finding description.

Funding Information:

Table with 3 columns: Source #, 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:

Form for Business Meeting Approval with fields for Date, Participant, and Consent/Discussion options.

Agenda Notice Statement: (state purpose in layperson terms) This agenda item should be sent to the Research List Serve (Energy RD&D/PIER program)

Possible approval of a Grant / Contingent Award to...

Possible approval of Agreement PIR-11-006 for a grant of \$1,001,899.00 with Palo Alto Research Center, Incorporated to demonstrate its Hydrodynamic Separation (HDS) technology.

Exhibit A WORK STATEMENT

TECHNICAL TASK LIST

Task #	CPR	Task Name
1	N/A	Administration
2		Project Initiation
3	X	Molding, Assembly, and Final Build of a Hydrodynamic Separation Pilot System
4		Test Plan Preparation for the HDS Demonstration
5	X	Pilot Demonstration in a Wastewater Plant
6		Transfer Hydrodynamic Separation Technology to a Wastewater Technology Vendor

KEY NAME LIST *NONE*

GLOSSARY

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

Term/ Acronym	Definition
BOD	Biological Oxygen Demand
COD	Chemical Oxygen Demand
CPR	Critical Project Review
HDS	Hydrodynamic Separation
IOU	Investor Owned Utility
LPM	Liter Per Minute
M&V	Measurement and Verification
PAC	Project Advisory Committee
PARC	Palo Alto Research Center
PIER	Public Interest Energy Research
POU	Publicly Owned Utility
RD&D	Research, Development and Demonstration
TSS	Total Suspended Solids
WWTP	Wastewater Treatment Plant

Problem Statement:

Conventional wastewater treatment plants (WWTPs) in California and emerging urban areas around the world face significant challenges due to population growth and urbanization. Limitations in primary clarifier performance and process control leave many plants vulnerable to process upsets when flow rates change rapidly. Recovery of clarifier performance can take hours to days, depending on the degree of the problem. Overflow of solids to the biological process during these events results in higher

aeration demands and energy consumption. Aging and deteriorated infrastructure is driving the need to replace existing facilities. Leaky collection systems and combined sewer and storm drain in older systems result in inflow and infiltration rates that can exceed plant capacity many times during the wet season, causing pollution, permit violations, and costly cleanup and restoration. Primary clarification, being a slow gravity-driven process, can neither adequately remove fine suspended particles nor handle the extra flow during wet days. No technology on the market today can efficiently remove the near neutrally buoyant solids in wastewater without a physical barrier.

Leveraging years of research and expertise in physics and fluid dynamics for the manipulation of Xerox toner in printing research, researchers at Palo Alto Research Center (PARC) invented and developed Hydrodynamic Separation (HDS) technology. HDS technology exploits fluidic flow through curved channels by clever channel geometry design to balance multiple physical forces and thereby achieve particle separation. It separates particles independent of their specific density and has no physical barrier or moving parts. The technology is modular, scalable, and yet compact and mass producible. The technology has been successfully demonstrated in separation of particles from multiple sources (including wastewater, produced water, algae, and sea waters) in lab experiments. In this project, the HDS technology will be used in a WWTP to serve as a solids removal modality for primary clarifier effluent in normal days and as a storm surge rescue modality to treat excess combined sewer water during wet days. From laboratory results obtained to date, the HDS works well for these purposes, as laboratory HDS prototypes have been used to successfully remove 70% of the un-settled solids from two local WWTPs primary clarifier effluents.

Goals of the Agreement:

The goals of this Agreement are to demonstrate the ability of HDS technology to significantly reduce WWTP energy footprint and to protect the environment from sewer pollution during storm surges. The first goal can be realized by harvesting more solids from primary clarification effluent to reduce aeration energy use in secondary clarification, and by using the extra solids for biogas generation. The second goal can be accomplished by using HDS as a storm surge rescue to remove significant Biological Oxygen Demand (BOD) from discharge to the environment.

Objectives of the Agreement:

The objectives of this Agreement are to demonstrate that an HDS pilot system can: (1) continuously perform in a real wastewater plant for at least two weeks for all the tasks described without significant degradation of HDS separators, (2) achieve at least 70% removal of solids on a weekly average basis, and (3) enable a net energy savings through both reduced energy usage in wastewater treatment and increased biogas production in digesters. Another objective is to establish documented production processes for the molding and assembly of HDS stacks that facilitates technology transfer to a manufacturing partner.

Product Guidelines:

For complete product guidelines, refer to Section 5 in the Terms and Conditions.

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, the following:

- Discussion of the terms and conditions of the Agreement
- Discussion of Critical Project Review (Task 1.2)
- Match fund documentation (Task 1.6)
- Permit documentation (Task 1.7)

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

- The Commission Project Manager’s expectations for accomplishing tasks described in the Scope of Work
- An updated Schedule of Products
- Discussion of Progress Reports (Task 1.4)
- Discussion of Technical Products (Product Guidelines located in Section 5 of the Terms and Conditions)
- Discussion of the Final Report (Task 1.5)

The Commission Project Manager shall:

- Designate the date and location of this meeting.

Recipient Products:

- Updated Schedule of Products (no draft)
- Updated List of Match Funds (no draft)
- Updated List of Permits (no draft)

Commission Project Manager Product:

- Kick-Off Meeting Agenda (no draft)

Task 1.2 Critical Project Review (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 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 Energy Commission Project Manager and as shown in the Technical Task List above. However, the Energy Commission Project Manager may schedule additional CPRs as necessary, and any additional costs will be borne by the Recipient.

Participants include the Energy Commission Project Manager and the Recipient and may include the Energy Commission Grants Officer, the Public Interest Energy Research (PIER) Program Team Lead, other Energy Commission staff and Management as well as other individuals selected by the Energy 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).
- 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 Energy Commission Project Manager and any other designated reviewers at least 15 working days in advance of each CPR

- 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 (no draft)
- Schedule for written determination (no draft)
- Written determination (no draft)

Recipient Product:

- CPR Report(s) (no draft)

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 Energy Commission Grants Office Officer, and the Energy 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 Energy 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 Energy Commission Project Manager will determine the appropriate meeting participants.

The administrative portion of the meeting shall be a discussion with the Energy 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, such as repayment provisions and confidential Products
- Final invoicing and release of retention
- Prepare a schedule for completing the closeout activities for this

Agreement

Products:

- Written documentation of meeting agreements (no draft)
- Schedule for completing closeout activities (no draft)

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 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 Exhibit A, Attachment A-2.

Product:

- Monthly Progress Reports (no draft)

Task 1.5 Final Report

The goal of the Final Report is 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 RD&D projects and improvements to the PIER 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 Recipient shall:

- Prepare an Outline of the Final Report.
- Prepare a Final Report following the approved outline and the latest version of the PIER Final Report guidelines published on the Energy Commission's website at <http://www.energy.ca.gov/contracts/pier/contractors/index.html> at the time the Recipient begins performing this task, unless otherwise instructed in writing by the Energy Commission Project Manager. Instead of the timeframe listed in the Product Guidelines located in Section 5 of the Terms and Conditions, the Energy Commission Project Manager shall provide written comments on the Draft Final Report within fifteen (15) working days of receipt. The Final Report must be completed on or before the end of the Agreement Term.
- 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 PIER 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 PIER 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 Energy 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.
- 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 Energy Commission Project Manager if during the course of the Agreement additional match funds are received.
- Notify the Energy 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 (no draft)
- Copy(ies) of each match fund commitment letter(s) (if applicable) (no draft)
- Letter(s) for new match funds (if applicable) (no draft)
- Letter that match funds were reduced (if applicable) (no draft)

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 PIER 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 any expenditure 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 Energy 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 Energy Commission Project Manager.
- As permits are obtained, send a copy of each approved permit to the Energy Commission Project Manager.
- If during the course of the Agreement permits are not obtained on time or are denied, notify the Energy Commission Project Manager within 10 days. Either of these events may trigger an additional CPR.

Products:

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

TECHNICAL TASKS

Deliverables not requiring a draft version are indicated by marking “(no draft)” after the deliverable name.

TASK 2 PROJECT INITIATION

Task 2.1 Confirm and Contract with Demonstration Site

The goal of this task is to ensure that the pilot demonstration site is available prior to

and during the HDS unit demonstration period.

The Recipient shall:

- Confirm with the demonstration site manager(s) that the site and support staff (including staff that will perform equipment installation and removal) are available for the project. If the site and/or staff are not available, the Recipient will obtain a new suitable demonstration site subject to the Commission Project Manager's approval.
- Determine liability insurance requirements at the demonstration site.
- Enter into a *contract with the demonstration site representative* to secure use of the site and support staff for the project. The contract will also address issues such as permits, insurance, and indemnification.
- Ensure that permitting requirements are met for the Task 5 HDS pilot demonstration.

Products:

- Contract with the demonstration site representative (hardcopy and softcopy)

Task 2.2 CONTRACTS WITH AN ENGINEERING FIRM AND A MEASUREMENT AND VERIFICATION CONSULTANT

The goal of this task is to enter into contracts with an engineering consulting firm and with a measurement and verification (M&V) consultant.

The Recipient shall:

- Enter into a *contract with an engineering consulting firm* that will require the firm to:
 - Help select an M&V consultant. The consultant will perform the following activities: (1) perform on-site measurements and subsequent verification of engineering calculations and analysis; (2) help prepare an analytical report that verifies energy consumption and engineering calculations for energy generation and overall savings; and (3) Ensure investor owned utility (IOU) satisfaction with M&V activities by engaging IOU representatives during the agreement (e.g., by holding conference calls and providing a draft copy of the Task 5 M&V Report for review and comment).
 - Work with the selected M&V consultant to engage investor owned utility (IOU) representatives and staff during the agreement to ensure IOU satisfaction with M&V activities.
 - Select and supervise another engineering firm that will build the pilot system and install HDS units (full and half-turn) under Task 3.
 - Provide input on the Test Plan developed under Task 4.
- Develop a detailed *List of Measurements and Analyses* that the M&V consultant must perform.
- Enter into a *contract with the M&V consultant* to perform the activities listed above. The contract's scope of work will incorporate the *List of*

Measurements and Analyses.

Products:

- Contract with the selected engineering firm
- List of Measurements and Analyses
- Contract with the M&V consultant

TASK 3 MOLDING, ASSEMBLY, AND FINAL BUILD OF A HYDRODYNAMIC SEPARATION PILOT SYSTEM

The goals of this task are to: (1) select the best molding method for HDS separator layers and the best assembly method for robustness of assembled HDS units; and (2) produce enough layers for two variations of the pilot system at a wastewater site to be demonstrated in Task 5.

The Recipient shall:

- Engage a molding vendor, iterate through various designs, and choose the best molding method for mass production based on cost and reliability.
- Contract with a molding vendor to mold enough layers for both full-turn and half-turn HDS units needed for this task.
- Investigate HDS layer assembly methods and select the best one based on robustness, manufacturability, ease of assembly, and cost.
- Consult with the selected engineering firm (from Task 2.2) to select and supervise another engineering firm to build the pilot system and install HDS units (full and half-turn).
- Conduct in-house leak tests prior to transferring the system to the demonstration site.
- Properly assemble full and half-turn HDS stacks for solids removal and concentration that are rated at 10 liters per minute (LPM) input, pressure-tested for no leaks, and ready for easy mounting to the pilot system skid.
- Properly assemble full and half-turn HDS stacks for storm water surge rescue operation that are rated at 30 LPM, pressure tested for no leaks, and ready for easy mounting to the pilot system skid.
- Develop a skid-mounted pilot system capable of receiving two versions (half and full-turn) of HDS stacks that are: (1) complete with all plumbing needs, sensing, and controls; (2) tested in-house for proper functioning; and (3) ready for site demonstration.
- Ensure the skid mounted system is fully functional, tested, and ready for transport to the selected demonstration site.
- Prepare a *Pilot System Report* that includes but is not limited to the following:
 - A discussion of the selected molding method, including an explanation of why it is the best method for the project
 - A discussion of the HDS stack assembly method, including an explanation of why it is the best method for the project
 - A discussion of the types of tests performed in-house and the results of the tests

- A description of the pilot HDS unit design, parts procurement, and build of 10 LPM (solids removal) input and 30 LPM (storm surge rescue) input models
- A discussion of problems encountered and how they were resolved
- Prepare a *CPR Report* and participate in a CPR Meeting per Task 1.2.

Products:

- Pilot System Report
- CPR Report (no draft)

TASK 4 TEST PLAN PREPARATION FOR THE HDS DEMONSTRATION

The goal of this task is to prepare a Test Plan for the HDS demonstration activities under Task 5.

The Recipient shall:

- Solicit input on a Pilot Test Plan by conducting meetings with: the Recipient's personnel, the engineering firm and M&V consultant selected in Task 2.2, a demonstration site representative, and project stakeholders (including wastewater consultants, engineering firms, investor and publicly-owned utility staff, government agencies, and national laboratories).
- Prepare a *Pilot Test Plan* that includes but is not limited to:
 - A detailed schedule that identifies tasks, personnel involved, and personnel responsibilities.
 - The List of Measurements and Analyses from Task 2.2 (update this list as required from stakeholder input).
 - A section that discusses what will be measured, why it needs to be measured, what equipment will be needed, what data will be collected, and how data will be collected.
 - Data analysis to be performed and anticipated results.

Products:

- Pilot Test Plan

TASK 5 PILOT DEMONSTRATION IN A WASTEWATER PLANT

The goal of this task is to conduct test runs of the HDS pilot system at a local municipal wastewater treatment facility, evaluate the performance, and collect data for use in subsequent technology transfer phases.

The Recipient shall:

- Transport the skid-mount pilot system to the municipal wastewater plant demonstration site selected in Task 2.1 for testing as an enhanced primary treatment option for solids removal from primary clarifier effluent (overflow).
- Verify that the selected site from Task 2.1 is available. If the site is not

- available, select a new demonstration site with similar or more favorable characteristics (subject to the Commission Project Manager's approval).
- Install and commission an HDS unit in a location at the demonstration site that allows access to the site's primary clarifier and storm surge waters. This will ensure that the HDS can operate and serve as a solids removal modality for primary clarifier effluent in normal days and as a storm surge rescue modality to treat excess combined sewer water during wet days.
 - Calibrate and verify performance of all M&V hardware and software.
 - Install any required M&V equipment identified in the Pilot Test Plan developed in Task 4.
 - Prepare an *Installation Report* that documents: installation, commissioning of the HDS pilot unit, and calibration/verification of the performance of all M&V hardware and software.
 - Conduct analyses of HDS effluent quality of the wastewater samples treated with the cascaded HDS pilot system and compare the results to samples not treated with HDS. The parameters will include but not be limited to: Total Suspended Solids (TSS), Chemical Oxygen Demand (COD), and BOD.
 - Capture and divert storm waters to the pilot system outfitted with parallel HDS units for solids removal. Compare the effluent quality data to that of untreated and primary-treated samples to understand the performance of HDS as a storm surge rescue solution.
 - Work with the M&V consultant to make energy consumption measurements for HDS operation and to verify the accuracy of analytical data and engineering calculations.
 - Collect sufficient data from the M&V phase to ensure that results are accurate and meaningful.
 - Write a *Pilot Demonstration Report* covering the performance of HDS in areas including but not limited to:
 - Performance data in continuous operation over a period of two weeks for each demonstrated activity and each activity repeat.
 - Risks of failure in long-term operation due to fouling, leakage, and disruption caused by comprised material, sensors, or mechanical parts.
 - Treatment efficiency by comparing the quality of HDS-treated samples with primary clarifier effluent and including data on relevant parameters such as TSS, COD, and BOD.
 - Net energy savings calculation taking into account HDS operation cost, aeration energy (electricity) savings, and natural gas or electricity generation by biogas in digestion from the additional solids harvested by HDS.
 - HDS operation in storm surge rescue mode: compare influent suspended solids removal efficiency under various operational conditions, such as flow rate fluctuations during wet days to untreated and primary-treated samples.
 - Overall energy savings, reliability, and economics (such as payback,

operational and maintenance cost, and estimated unit cost) for all operational modes.

- A *Measurement and Verification Report* from the M&V consultant that summarizes on-site measurements and verifies the engineering calculations for net energy savings, economics (such as payback, operational and maintenance cost, and estimated unit cost), system performance, and reliability. To the extent possible, the M&V consultant should work with IOU staff to ensure that the M&V Report will meet IOU requirements if HDS technology is considered for incentives and rebates.
- Conduct meetings at the site, via teleconference, and via the web with all project stakeholders (including IOU staff, POU staff, the Recipient's representatives, and the Energy Commission) at the beginning of and during the report writing period. Meeting agendas, notes, and action items will be included in the Monthly Progress Report per Task 1.4.
- Prepare a *CPR Report* and participate in a CPR Meeting per Task 1.2.

Products:

- Installation Report (no draft)
- Pilot Demonstration Report
- Measurement and Verification Report
- CPR Report (no draft)

TASK 6 TRANSFER HYDRODYNAMIC SEPARATION TECHNOLOGY TO A WASTEWATER TECHNOLOGY VENDOR

The goal of this task is to develop a plan to make the knowledge gained, experimental results, and lessons learned available to key decision-makers in the industry who may introduce this technology to the marketplace.

The Recipient shall:

- Identify and describe critical production processes (i.e., molding of HDS layers and the assembly of these layers into modules that, when plumbed together, become systems that are capable of large throughput).
- Engage third-party water equipment and technology partners (i.e., Infilco Degremont and Veolia Water) to prepare a *Technology Transfer Plan* under the direction of the Recipient's Business Development Director.
- Conduct activities in accordance with the Technology Transfer Plan and report activities in the Monthly Progress Reports.

Products:

- Technology Transfer Plan