





California Energy Commission May 8, 2024 Business Meeting Backup Materials for Capture6 Monarch LLC

The following backup materials for the above-referenced agenda item are available in this PDF packet as listed below:

- 1. Proposed Resolution
- 2. Grant Amendment Request Form
- 3. Scope of Work

RESOLUTION NO: 24-0508-03a

STATE OF CALIFORNIA

STATE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION: Capture 6 Monarch LLC

RESOLVED, that the State Energy Resources Conservation and Development Commission (CEC) adopts the staff CEQA findings contained in the Agreement or Amendment Request Form (as applicable); and

RESOLVED, that the CEC approves a novation amendment for agreement EPC-23-014 totaling \$8,153,623 to change the recipient from Capture6 Corp to its subsidiary, Capture6 Monarch LLC, and adopting staff's determination that this action will not alter the California Environmental Quality Act (CEQA) exemption findings in the original grant agreement; and

FURTHER BE IT RESOLVED, that the Executive Director or their designee shall execute the same on behalf of the CEC.

CERTIFICATION

The undersigned Secretariat to the CEC 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 CEC held on May 8, 2024.

AYE: NAY: ABSENT: ABSTAIN:		
	Dated:	
	Kristine Banaag Secretariat	



Original Agreement # EPC-23-014 Amendment # 1

Division			MS-	Phone
ERDD	Patricia De	La Torre		
- · · · · · · · · · · · · · · · · · · ·				
Recipient's Legal Name			Federa	
Capture6 Monarch LLC			93-3628	3244
		1		
Revisions: (check all that apply)		Additional Requ	irement	s
☐ Term Extension New End Date:		Include revised so items A, B, C, & F		and complete
☐ Budget Augmentation Amendment Amou	unt: \$ 0	Include revised be items A, B, C, D,	-	-
☐ Budget Reallocation		Include revised be items A, B, C, & F	_	d complete
Scope of Work Revision		Include revised so complete items A	•	
☐ Change in Project Location or Demonstr	ation Site	Include revised so complete items A		
Novation/Name Change of Prime Recipi Novation	ent	Include novation complete items A		
☐ Terms and Conditions Modification		Include applicable bold/underline/ st items A, B, C, & F	rikeout a	
A) Business Meeting Information Business Meeting approval is not requ Minor amendments delegated to Exercise		.	_	
Proposed Business Meeting Date: May 8		·		
Business Meeting Presenter N/A Time Needed: 0 minutes				
J			,	
Please select one list serve. EPIC (Elec	tric Program	i investment Char	ge)	
Agenda Item Subject and Description:	:			

B) Capture6 Monarch LLC. Proposed resolution approving a novation amendment for agreement Proposed resolution approving a novation amendment for agreement EPC-23-014 totaling \$8,153,623 to change the recipient from Capture6 Corp to its subsidiary, Capture6 Monarch LLC, and adopting staff's determination that this action will not alter the CEQA exemption findings in the original grant agreement.

CALIFORNIA ENERGY COMMISSION

Contact: Patricia DeLaTorreList all subcontractors (major and minor) and equipment vendors: (attach additional sheets as necessary)

Legal Company Name:	Budget
Stantec Consulting Services Inc.	\$ 1,108,746
DOE- Lawrence Berkeley National Laboratory	\$ 1,500,000
Physicians, Scientists, and Engineers for Sustainable and Healthy Energy, Inc.	\$ 758,133
Kleinfelder, Inc.	\$ 130,000
MWA Architects, Inc.	\$ 90,000
Katz & Associates	\$ 15,000
Veolia Water Technologies Treatment Solutions USA Inc.	\$ 1,875,000
TBD - Construction Contractor	\$ 1,670,000
TBD - O&M	\$ 325,000
TBD- Design Build Contractors	\$ 20,000
TBD - Consultant	\$ 70,000
TBD – Permit Contractor	\$0 (match only)
TBD – Insurance	\$0 (match only)
TBD – Environmental	\$0 (match only)
TBD – Contracts Consultant	\$0 (match only)

C) List all key partners: (attach additional sheets as necessary)

Legal Company Name:		

D) Budget Information (only include amendment amount information)

Funding Sou	rra	nding Year of ppropriation	Budget List Number	Amount
				\$

R&D Program Area: ICMB: IAW TOTAL: \$ 0

Explanation for "Other" selection

Federal Agreement #: N/A

E) California Environmental Quality Act (CEQA) Compliance

1.	Is Agreement considered a "Project" under CEQA?
	Yes (skip to question 2)
	☐ No (complete the following (PRC 21065 and 14 CCR 15378)):
	Explain why Agreement is not considered a "Project":
2.	If Agreement is considered a "Project" under CEQA:
	a) 🛛 Agreement IS exempt.
	☐ Statutory Exemption. List PRC and/or CCR section number:
	□ Categorical Exemption. List CCR section number:
	☐ Common Sense Exemption. 14 CCR 15061 (b) (3)

Explain reason why Agreement is exempt under the above section:

The California Energy Commission previously approved this grant. The original grant was approved and the CEQA exemption justification was adopted at the 9/13/23 Energy Commission Business Meeting. This amendment is for a Novation to a subsidiary of the original firm, and this amendment does not alter the project scope of work or change the adopted CEQA exemption analysis, as presented in the Grant Agreement Request Form in the 9/13/2023 Business Meeting backup material posted on the CEC's web site.

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b) Agreement IS NOT exempt. steps)	(consult with the	e legal office to determine next
Check all that apply		
☐ Initial Study		
☐ Negative Declaration		
☐ Mitigated Negative Declarati	ion	
☐ Environmental Impact Repo	rt	
Statement of Overriding Cor	nsiderations	
F) The following items should be attached to	this GARF (as	applicable)
 Exhibit A, Scope of Work/Schedule 	☐ N/A	
2. Exhibit B, Budget Detail	☐ N/A	
CEQA Documentation	⊠ N/A	Attached
4. Novation Documentation	☐ N/A	
5. CEC 105, Questionnaire for Identifying	Conflicts	
Patricia De La Torre	3/15/	<u>24 </u>
Agreement Manager	Date	
Cody Taylor	<u>3/18/2</u>	4
Branch Manager	Date	
(delegated to Manager)	3/18	<u>3/24</u>
Deputy Director	Date	_

I. TASK ACRONYM/TERM LISTS

A. Task List

Task #	CPR ¹	Task Name
1		General Project Tasks
2	X	Build Direct Air Capture facility build and initiate product storage work
3	Χ	Execution of Monitoring, Reporting and Verification and Life Cycle Analysis
4		Stakeholder Engagement
5		Evaluation of Project Benefits
6		Technology/Knowledge Transfer Activities

B. Acronym/Term List

Acronym/Term	Meaning
APEEP	Air Pollution Emission Experiments and Policy analysis
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CDR	Carbon Dioxide Removal
CEC	California Energy Commission
CO ₂	Carbon Dioxide
CPR	Critical Project Review
DAC	Direct Air Capture
EASIUR	Estimating Air pollution Social Impact Using Regression model
GHG	Greenhouse Gas
GWP	Global Warming Potential
InMAP	Intervention Model for Air Pollution
LBNL	Lawrence Berkeley National Lab
LCA	Life Cycle Analysis
MRV	Monitoring, Reporting and Verification
PM	Particulate Matter
PWD	Palmdale Water District
PWAV	Pure Water Antelope Valley
TAC	Technical Advisory Committee
VOC	Volatile Organic Compounds

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¹ Please see subtask 1.3 in Part III of the Scope of Work (General Project Tasks) for a description of Critical Project Review (CPR) Meetings.

II. PURPOSE OF AGREEMENT, PROBLEM/SOLUTION STATEMENT, AND GOALS AND OBJECTIVES

A. Purpose of Agreement

The purpose of this Agreement is to design and build a direct air capture (DAC) demonstration facility for the capture of atmospheric carbon dioxide, via use of a separation technology to process the effluent brine from Palmdale Water District's Pure Water Antelope Valley (PWAV) water treatment facility. The recipient's novel DAC process uses salt water (brine) to produce a basic solvent (sodium hydroxide, or NaOH) and hydrochloric acid (HCI). When NaOH is exposed to ambient air it reacts with carbon dioxide (CO₂) to form sodium carbonate (Na₂CO₃). This Na₂CO₃ and HCI can contribute to decarbonization of the water treatment industry by being reused within water treatment facilities. The Agreement also includes comprehensive monitoring, reporting and verification, life-cycle analysis, and community engagement.

B. Problem/ Solution Statement

Problem

The climate crisis requires that we remove gigatons of carbon dioxide from the atmosphere. This is currently energy intensive, expensive, and an emergent industry which needs to be scaled rapidly. The water treatment industry is also being required to scale in response to increased water scarcity. This will result in significantly increased effluent brine production which will require safe disposal.

Solution

The Recipient has developed a novel process for integrating DAC technology with the water treatment industry. This integration provides an alternative for brine disposal, and a more economically favorable and rapidly scalable direct air capture process. Demonstration of this process will provide benefits for local communities such as removing land-use and environmental hazards associated with brine disposal, and increased fresh water availability.

C. Goals and Objectives of the Agreement

Agreement Goals

The goals of this Agreement are to:

- Demonstrate technical success of the Recipient's direct air capture process, integrated with a water treatment facility
- Document the economic and environmental impacts associated with the integration of water treatment and carbon removal processes using the Recipient's technology
- Share knowledge with local communities across California regarding DAC technology, climate technology solutions, and innovative approaches to desalination for the environment and communities

<u>Ratepayer Benefits</u>:² This Agreement will result in the ratepayer benefits of greater electricity reliability, greenhouse gas emissions reductions, air emissions reductions, and water savings and cost reduction.

The Recipient's technology exhibits significant operational flexibility which provides California IOU ratepayers with energy infrastructure resilience and reliability benefits. Further, this project provides a cost-effective, competitive DAC technology that can enable water treatment facilities to scale and provide increased clean water to communities. This technology can increase the percentage of fresh water produced by using brine which would otherwise be disposed. Further, this solution provides removal of land-use and air pollution by eliminating evaporation ponds, reducing capital and operational expenditures of water treatment facilities and building evaporation ponds which would enable cost reductions for ratepayers, and direct greenhouse gas emissions reductions. This project will also study the impact of DAC technology on air pollutant levels, and initiate research into permanent CO₂ storage, which at scale will further help abate the accelerating climate crisis.

Finally, this project can demonstrate to renewable energy developers that DAC technologies are viable and can serve as long-term offtakers. This could result in the development of new renewable energy facilities in the area and a surplus of renewable energy that could be used to power a full-scale DAC facility, reducing greenhouse gas emissions from the electricity sector.

Technological Advancement and Breakthroughs:³ This Agreement will lead to technological advancement and breakthroughs to overcome barriers to the achievement of the State of California's statutory energy goals by demonstrating the end-to-end feasibility of integrating the emerging industry of direct air capture with the established water treatment industry. The DAC technology in this project will produce green hydrochloric acid and sodium carbonate, both of which are used in the water treatment process. The all-electric process, with no thermal energy required provides these decarbonized solutions for otherwise carbon-intensive inputs, contributing to Senate Bill 32's goals of reducing greenhouse gas emissions by 2030, and to SB100's goals of ensuring reduction of GHG emissions in California's transition to a zero-carbon electric system. Further, demonstrating DAC technology as a long-term electricity offtaker can contribute to integrated facilities being drivers for development of new renewable energy facilities, supporting Senate Bill 32's 100 percent carbon-free electricity target.

Agreement Objectives

The objectives of this Agreement are to:

- Execute verifiable capture of atmospheric carbon dioxide via use of brine effluent from Pure Water Antelope Valley (PWAV)
- Provide metrics for the impact of the Recipient's process on water and air pollutants
- Provide public communications of produced data.

² California Public Resources Code, Section 25711.5(a) requires projects funded by the Electric Program Investment Charge (EPIC) to result in ratepayer benefits. The California Public Utilities Commission, which established the EPIC in 2011, defines ratepayer benefits as greater reliability, lower costs, and increased safety (See CPUC "Phase 2" Decision 12-05-037 at page 19, May 24, 2012, http://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/167664.PDF).

- Produce 0.4 0.7 tons freshwater per ton of brine treated
- Demonstrate electricity consumption below 1,200 kWh per ton of CO2 captured
- Demonstrate reduction of operational expenditures by eliminating brine disposal from PWAV by \$1-1.5 million per year
- Execute independent third-party Measurement and Verification to establish a baseline against which to measure and quantify project benefits and performance 6 months post-deployment.

III. TASK 1 GENERAL PROJECT TASKS

PRODUCTS

Subtask 1.1 Products

The goal of this subtask is to establish the requirements for submitting project products (e.g., reports, summaries, plans, and presentation materials). Unless otherwise specified by the Commission Agreement Manager (CAM), the Recipient must deliver products as required below by the dates listed in the **Project Schedule (Part V)**. All products submitted which will be viewed by the public, must comply with the accessibility requirements of Section 508 of the federal Rehabilitation Act of 1973, as amended (29 U.S.C. Sec. 794d), and regulations implementing that act as set forth in Part 1194 of Title 36 of the Federal Code of Regulations. All technical tasks should include product(s). Products that require a draft version are indicated by marking "(draft and final)" after the product name in the "Products" section of the task/subtask. If "(draft and final)" does not appear after the product name, only a final version of the product is required. With respect to due dates within this Scope of Work, "days" means working days.

The Recipient shall:

For products that require a draft version, including the Final Report Outline and Final Report

- Submit all draft products to the CAM for review and comment in accordance with the Project Schedule (Part V). The CAM will provide written comments to the Recipient on the draft product within 15 days of receipt, unless otherwise specified in the task/subtask for which the product is required.
- Consider incorporating all CAM comments into the final product. If the Recipient disagrees with any comment, provide a written response explaining why the comment was not incorporated into the final product.
- Submit the revised product and responses to comments within 10 days of notice by the CAM, unless the CAM specifies a longer time period, or approves a request for additional time.

For products that require a final version only

 Submit the product to the CAM for acceptance. The CAM may request minor revisions or explanations prior to acceptance.

For all products

Submit all data and documents required as products in accordance with the following:

Instructions for Submitting Electronic Files and Developing Software:

Electronic File Format

Submit all data and documents required as products under this Agreement in an electronic file format that is fully editable and compatible with the California Energy Commission's (CEC) software and Microsoft (MS)operating computing platforms, or with any other format approved by the CAM. Deliver an electronic copy of the full text of any Agreement data and documents in a format specified by the CAM, such as memory stick.

The following describes the accepted formats for electronic data and documents provided to the CEC as products under this Agreement, and establishes the software versions that will be required to review and approve all software products:

- Data sets will be in MS Access or MS Excel file format (version 2007 or later), or any other format approved by the CAM.
- Text documents will be in MS Word file format, version 2007 or later.
- Project management documents will be in Microsoft Project file format, version 2007 or later.

Software Application Development

Use the following standard Application Architecture components in compatible versions for any software application development required by this Agreement (e.g., databases, models, modeling tools), unless the CAM approves other software applications such as open source programs:

- Microsoft ASP.NET framework (version 3.5 and up). Recommend 4.0.
- Microsoft Internet Information Services (IIS), (version 6 and up) Recommend 7.5.
- Visual Studio.NET (version 2008 and up). Recommend 2010.
- C# Programming Language with Presentation (UI), Business Object and Data Layers.
- SQL (Structured Query Language).
- Microsoft SQL Server 2008, Stored Procedures. Recommend 2008 R2.
- Microsoft SQL Reporting Services. Recommend 2008 R2.
- XML (external interfaces).

Any exceptions to the Electronic File Format requirements above must be approved in writing by the CAM. The CAM will consult with the CEC's Information Technology Services Branch to determine whether the exceptions are allowable.

MEETINGS

Subtask 1.2 Kick-off Meeting

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

The Recipient shall:

 Attend a "Kick-off" meeting with the CAM, the Commission Agreement Officer (CAO), and any other CEC staff relevant to the Agreement. The Recipient will bring its Project Manager and any other individuals designated by the CAM to this meeting. The administrative and technical aspects of the Agreement will be discussed at the meeting.

Prior to the meeting, the CAM will provide an agenda to all potential meeting participants. The meeting may take place in person or by electronic conferencing (e.g., WebEx), with approval of the CAM.

The <u>administrative portion</u> of the meeting will include discussion of the following:

- o Terms and conditions of the Agreement;
- Invoicing and auditing procedures;
- Administrative products (subtask 1.1);
- CPR meetings (subtask 1.3);
- Match fund documentation (subtask 1.7);
- Permit documentation (subtask 1.8);
- Subcontracts (subtask 1.9); and
- Any other relevant topics.

The <u>technical portion</u> of the meeting will include discussion of the following:

- The CAM's expectations for accomplishing tasks described in the Scope of Work;
- An updated Project Schedule;
- Technical products (subtask 1.1);
- Progress reports (subtask 1.5);
- Final Report (subtask 1.6);
- o Technical Advisory Committee meetings (subtasks 1.10 and 1.11); and
- Any other relevant topics.
- Provide Kick-off Meeting Presentation to include but not limited to:
 - Project overview (i.e. project description, goals and objectives, technical tasks, expected benefits, etc.)
 - Project schedule that identifies milestones
 - List of potential risk factors and hurdles, and mitigation strategy
- Provide an *Updated Project Schedule, Match Funds Status Letter*, and *Permit Status Letter*, as needed to reflect any changes in the documents.

The CAM shall:

- Designate the date and location of the meeting.
- Send the Recipient a Kick-off Meeting Agenda.

Recipient Products:

- Kick-off Meeting Presentation
- Updated Project Schedule (if applicable)
- Match Funds Status Letter (subtask 1.7) (if applicable)
- Permit Status Letter (subtask 1.8) (if applicable)

CAM Product:

Kick-off Meeting Agenda

Subtask 1.3 Critical Project Review (CPR) Meetings

The goal of this subtask is to determine if the project should continue to receive CEC funding, and if so whether any modifications must be made to the tasks, products, schedule, or budget. CPR meetings provide the opportunity for frank discussions between the CEC and the

Recipient. As determined by the CAM, discussions may include project status, challenges, successes, advisory group findings and recommendations, final report preparation, and progress on technical transfer and production readiness activities (if applicable). Participants will include the CAM and the Recipient and may include the CAO and any other individuals selected by the CAM to provide support to the CEC.

CPR meetings generally take place at key, predetermined points in the Agreement, as determined by the CAM and as shown in the Task List on page 1 of this Exhibit. However, the CAM may schedule additional CPR meetings as necessary. The budget will be reallocated to cover the additional costs borne by the Recipient, but the overall Agreement amount will not increase. CPR meetings generally take place at the CEC, but they may take place at another location, or may be conducted via electronic conferencing (e.g., WebEx) as determined by the CAM.

The Recipient shall:

- Prepare and submit a *CPR Report* for each CPR meeting that: (1) discusses the progress of the Agreement toward achieving its goals and objectives; and (2) includes recommendations and conclusions regarding continued work on the project.
- Attend the CPR meeting.
- Present the CPR Report and any other required information at each CPR meeting.

The CAM shall:

- Determine the location, date, and time of each CPR meeting with the Recipient's input.
- Send the Recipient a CPR Agenda with a list of expected CPR participants in advance of the CPR meeting. If applicable, the agenda will include a discussion of match funding and permits.
- Conduct and make a record of each CPR meeting. Provide the Recipient with a schedule for providing a Progress Determination on continuation of the project.
- Determine whether to continue the project, and if so whether modifications are needed
 to the tasks, schedule, products, or budget for the remainder of the Agreement. If the
 CAM concludes that satisfactory progress is not being made, this conclusion will be
 referred to the Deputy Director of the Energy Research and Development Division.
- Provide the Recipient with a *Progress Determination* on continuation of the project, in accordance with the schedule. The Progress Determination may include a requirement that the Recipient revise one or more products.

Recipient Products:

CPR Report(s)

CAM Products:

- CPR Agenda(s)
- Progress Determination

Subtask 1.4 Final Meeting

The goal of this subtask is to complete the closeout of this Agreement.

The Recipient shall:

 Meet with CEC staff 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 the Recipient and CAM, at a minimum. The meeting may occur in person or by electronic conferencing (e.g., WebEx), with approval of the CAM.

The technical and administrative aspects of Agreement closeout will be discussed at the meeting, which may be divided into two separate meetings at the CAM's discretion.

- The technical portion of the meeting will involve the presentation of findings, conclusions, and recommended next steps (if any) for the Agreement. The CAM will determine the appropriate meeting participants.
- The administrative portion of the meeting will involve a discussion with the CAM and the CAO of the following Agreement closeout items:
 - Disposition of any procured equipment.
 - The CEC's request for specific "generated" data (not already provided in Agreement products).
 - Need to document the 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 *Final Meeting Agreement Summary* that documents any agreement made between the Recipient and Commission staff during the meeting.
- Prepare a Schedule for Completing Agreement Closeout Activities.
- Provide copies of *All Final Products* on a USB memory stick, organized by the tasks in the Agreement.

Products:

- Final Meeting Agreement Summary (if applicable)
- Schedule for Completing Agreement Closeout Activities
- All Final Products

REPORTS AND INVOICES

Subtask 1.5 Progress Reports and Invoices

The goals of this subtask are to: (1) periodically verify that satisfactory and continued progress is made towards achieving the project objectives of this Agreement; and (2) ensure that invoices contain all required information and are submitted in the appropriate format.

- Submit a monthly *Progress Report* to the CAM. Each progress report must:
 - Summarize progress made on all Agreement activities as specified in the scope
 of work for the preceding month, including accomplishments, problems,
 milestones, products, schedule, fiscal status, and an assessment of the ability to
 complete the Agreement within the current budget and any anticipated cost
 overruns. See the Progress Report Format Attachment for the recommended
 specifications.
- Submit a monthly or quarterly *Invoice* that follows the instructions in the "Payment of Funds" section of the terms and conditions, including a financial report on Match Funds and in-state expenditures.

Products:

- Progress Reports
- Invoices

Subtask 1.6 Final Report

The goal of this subtask is to prepare a comprehensive Final Report that describes the original purpose, approach, results, and conclusions of the work performed under this Agreement. When creating the Final Report Outline and the Final Report, the Recipient must use the CEC Style Manual provided by the CAM.

Subtask 1.6.1 Final Report Outline

The Recipient shall:

• Prepare a *Final Report Outline* in accordance with the *Energy Commission Style Manual* provided by the CAM.

Recipient Products:

Final Report Outline (draft and final)

CAM Product:

- Energy Commission Style Manual
- Comments on Draft Final Report Outline
- Acceptance of Final Report Outline

Subtask 1.6.2 Final Report

- Prepare a *Final Report* for this Agreement in accordance with the approved Final Report Outline, Energy Commission Style Manual, and Final Report Template provided by the CAM with the following considerations:
 - o Ensure that the report includes the following items, in the following order:
 - Cover page (required)
 - Credits page on the reverse side of cover with legal disclaimer (required)
 - Acknowledgements page (optional)
 - Preface (required)
 - Abstract, keywords, and citation page (required)
 - Table of Contents (required, followed by List of Figures and List of Tables, if needed)
 - Executive summary (required)
 - Body of the report (required)
 - References (if applicable)
 - Glossary/Acronyms (If more than 10 acronyms or abbreviations are used, it is required.)
 - Bibliography (if applicable)
 - Appendices (if applicable) (Create a separate volume if very large.)
 - Attachments (if applicable)
- Submit a draft of the Executive Summary to the TAC for review and comment.

- Develop and submit a Summary of TAC Comments on Draft Final Report received on the Executive Summary. For each comment received, the recipient will identify in the summary the following:
 - Comments the recipient proposes to incorporate.
 - o Comments the recipient does propose to incorporate and an explanation for why.
- Submit a draft of the report to the CAM for review and comment. The CAM will provide written comments to the Recipient on the draft product within 15 days of receipt.
- Incorporate all CAM comments into the *Final Report*. If the Recipient disagrees with any comment, provide a *Written Responses to Comments* explaining why the comments were not incorporated into the final product.
- Submit the revised Final Report electronically with any Written Responses to Comments
 within 10 days of receipt of CAM's Written Comments on the Draft Final Report, unless the
 CAM specifies a longer time period or approves a request for additional time.

Products:

- Summary of TAC Comments on Draft Final Report
- Draft Final Report
- Written Responses to Comments (if applicable)
- Final Report

CAM Product:

Written Comments on the Draft Final Report

MATCH FUNDS, PERMITS, AND SUBCONTRACTS

Subtask 1.7 Match Funds

The goal of this subtask is to ensure that the Recipient obtains any match funds planned for this Agreement and applies them to the Agreement during the Agreement term.

While the costs to obtain and document match funds are not reimbursable under this Agreement, the Recipient may spend match funds for this task. The Recipient may only spend match funds during the Agreement term, either concurrently or prior to the use of CEC funds. Match funds must be identified in writing, and the Recipient must obtain any associated commitments before incurring any costs for which the Recipient will request reimbursement.

The Recipient shall:

 Prepare a Match Funds Status Letter that documents the match funds committed to this Agreement. If no match funds were part of the proposal that led to the CEC awarding this Agreement and none have been identified at the time this Agreement starts, then state this in the letter.

If match funds were a part of the proposal that led to the CEC awarding this Agreement, then provide in the letter:

- A list of the match funds that identifies:
 - The amount of cash match funds, their source(s) (including a contact name, address, and telephone number), and the task(s) to which the match funds will be applied.
 - The amount of each in-kind contribution, a description of the contribution type (e.g., property, services), the documented market or book value, the 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 must identify its owner and provide a contact name, address, telephone number, and the address where the property is located.

- If different from the solicitation application, provide a letter of commitment from an authorized representative of each source of match funding that the funds or contributions have been secured.
- At the Kick-off meeting, discuss match funds and the impact on the project if they are significantly reduced or not obtained as committed. 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 Supplemental Match Funds Notification Letter to the CAM of receipt of additional match funds.
- Provide a Match Funds Reduction Notification Letter to the CAM if existing match funds are reduced during the course of the Agreement. Reduction of match funds may trigger a CPR meeting.

Products:

- Match Funds Status Letter
- Supplemental Match Funds Notification Letter (if applicable)
- Match Funds Reduction Notification Letter (if applicable)

Subtask 1.8 Permits

The goal of this subtask 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, with the exception of costs incurred by University of California recipients. Permits must be identified and obtained before the Recipient may incur any costs related to the use of the permit(s) for which the Recipient will request reimbursement.

The Recipient shall:

- Prepare a Permit Status Letter that documents the permits required to conduct this
 Agreement. If no permits are required at the start of this Agreement, then state this in the
 letter. If permits will be required during the course of the Agreement, provide in the letter:
 - A list of the permits that identifies: (1) the type of permit; and (2) the name,
 address, and telephone number of the permitting jurisdictions or lead agencies.
 - The schedule the Recipient will follow in applying for and obtaining the permits.

The list of permits and the schedule for obtaining them will be discussed at the Kick-off meeting (subtask 1.2), and a timetable for submitting the updated list, schedule, and copies of the permits will be developed. The impact on the project 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 progress reports and will be a topic at CPR meetings.

- If during the course of the Agreement additional permits become necessary, then provide the CAM with an *Updated List of Permits* (including the appropriate information on each permit) and an *Updated Schedule for Acquiring Permits*.
- Send the CAM a Copy of Each Approved Permit.
- If during the course of the Agreement permits are not obtained on time or are denied, notify the CAM within 5 days. Either of these events may trigger a CPR meeting.

Products:

- Permit Status Letter
- Updated List of Permits (if applicable)
- Updated Schedule for Acquiring Permits (if applicable)
- Copy of Each Approved Permit (if applicable)

Subtask 1.9 Subcontracts

The goals of this subtask are to: (1) procure subcontracts required to carry out the tasks under this Agreement; and (2) ensure that the subcontracts are consistent with the terms and conditions of this Agreement.

The Recipient shall:

- Manage and coordinate subcontractor activities in accordance with the requirements of this Agreement.
- Incorporate this Agreement by reference into each subcontract.
- Include any required Energy Commission flow-down provisions in each subcontract, in addition to a statement that the terms of this Agreement will prevail if they conflict with the subcontract terms.
- If required by the CAM, submit a draft of each *Subcontract* required to conduct the work under this Agreement.
- Submit a final copy of each executed subcontract.
- Notify and receive written approval from the CAM prior to adding any new subcontractors (see the discussion of subcontractor additions in the terms and conditions).

Products:

• Subcontracts (draft if required by the CAM)

TECHNICAL ADVISORY COMMITTEE

Subtask 1.10 Technical Advisory Committee (TAC)

The goal of this subtask is to create an advisory committee for this Agreement. The TAC should be composed of diverse professionals. The composition will vary depending on interest, availability, and need. TAC members will serve at the CAM's discretion. The purpose of the TAC is to:

- Provide guidance in project direction. The guidance may include scope and methodologies, timing, and coordination with other projects. The guidance may be based on:
 - Technical area expertise;
 - Knowledge of market applications; or
 - Linkages between the agreement work and other past, present, or future projects
 (both public and private sectors) that TAC members are aware of in a particular area.
- Review products and provide recommendations for needed product adjustments, refinements, or enhancements.
- Evaluate the tangible benefits of the project to the state of California, and provide recommendations as needed to enhance the benefits.
- Provide recommendations regarding information dissemination, market pathways, or commercialization strategies relevant to the project products.
- Help set the project team's goals and contribute to the development and evaluation of its statement of proposed objectives as the project evolves.

- Provide a credible and objective sounding board on the wide range of technical and financial barriers and opportunities.
- Help identify key areas where the project has a competitive advantage, value proposition, or strength upon which to build.
- Advocate, to the extent the TAC members feel is appropriate, on behalf of the project in its effort to build partnerships, governmental support, and relationships with a national spectrum of influential leaders.
- Ask probing questions that insure a long-term perspective on decision-making and progress toward the project's strategic goals.

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

- Researchers knowledgeable about the project subject matter;
- Members of trades that 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 the project;
- U.S. Department of Energy research managers, or experts from other federal or state agencies relevant to the project;
- Public interest environmental groups;
- Utility representatives;
- Air district staff; and
- Members of relevant technical society committees.

The Recipient shall:

- Prepare a List of Potential TAC Members that includes the names, companies, physical
 and electronic addresses, and phone numbers of potential members. The list will be
 discussed at the Kick-off meeting, and a schedule for recruiting members and holding
 the first TAC meeting will be developed.
- Recruit TAC members. Ensure that each individual understands member obligations and the TAC meeting schedule developed in subtask 1.11.
- Prepare a *List of TAC Members* once all TAC members have committed to serving on the TAC.
- Submit *Documentation of TAC Member Commitment* (such as Letters of Acceptance) from each TAC member.

Products:

- List of Potential TAC Members
- List of TAC Members
- Documentation of TAC Member Commitment

Subtask 1.11 TAC Meetings

The goal of this subtask is for the TAC to provide strategic guidance for the project by participating in regular meetings, which may be held via teleconference.

The Recipient shall:

- Discuss the TAC meeting schedule with the CAM at the Kick-off meeting. Determine the number and location of meetings (in-person and via teleconference) in consultation with the CAM.
- Prepare a TAC Meeting Schedule that will be presented to the TAC members during recruiting. Revise the schedule after the first TAC meeting to incorporate meeting comments.
- Prepare a TAC Meeting Agenda and TAC Meeting Back-up Materials for each TAC meeting.
- Organize and lead TAC meetings in accordance with the TAC Meeting Schedule.
 Changes to the schedule must be pre-approved in writing by the CAM.
- Prepare TAC Meeting Summaries that include any recommended resolutions of major TAC issues.

The TAC shall:

- Help set the project team's goals and contribute to the development and evaluation of its statement of proposed objectives as the project evolves.
- Provide a credible and objective sounding board on the wide range of technical and financial barriers and opportunities.
- Help identify key areas where the project has a competitive advantage, value proposition, or strength upon which to build.
- Advocate on behalf of the project in its effort to build partnerships, governmental support and relationships with a national spectrum of influential leaders.
- Ask probing questions that insure a long-term perspective on decision-making and progress toward the project's strategic goals.
- Review and provide comments to proposed project performance metrics.
- Review and provide comments to proposed project Draft Technology Transfer Plan.

Products:

- TAC Meeting Schedule (draft and final)
- TAC Meeting Agendas (draft and final)
- TAC Meeting Back-up Materials
- TAC Meeting Summaries

Subtask 1.12 Project Performance Metrics

The goal of this subtask is to finalize key performance targets for the project based on feedback from the TAC and report on final results in achieving those targets. The performance targets should be a combination of scientific, engineering, techno-economic, and/or programmatic metrics that provide the most significant indicator of the research or technology's potential success.

- Complete and submit the project performance metrics section of the *Initial Project Benefits Questionnaire*, developed in the Evaluation of Project Benefits task, to the CAM.
- Present the draft project performance metrics at the first TAC meeting to solicit input and comments from the TAC members.

- Develop and submit a *TAC Performance Metrics Summary* that summarizes comments received from the TAC members on the proposed project performance metrics. The *TAC Performance Metrics Summary* will identify:
 - TAC comments the Recipient proposes to incorporate into the *Initial Project Benefits Questionnaire*, developed in the Evaluation of Project Benefits task.
 - TAC comments the Recipient does not propose to incorporate with and explanation why.
- Develop and submit a *Project Performance Metrics Results* document describing the extent to which the Recipient met each of the performance metrics in the *Final Project Benefits Questionnaire*, developed in the Evaluation of Project Benefits task.
- Discuss the *Project Performance Metrics Results* at the Final Meeting.

Products:

- TAC Performance Metrics Summary
- Project Performance Metrics Results

IV. TECHNICAL TASKS

Products that require a draft version are indicated by marking "(draft and final)" after the product name in the "Products" section of the task/subtask. If "(draft and final)" does not appear after the product name, only a final version of the product is required. Subtask 1.1 (Products) describes the procedure for submitting products to the CAM.

TASK 2: BUILD DIRECT AIR CAPTURE FACILITY AND INITIATE PRODUCT STORAGE WORK

SUBTASK 2.1 PROJECT BIDDING AND CONTRACTING

The goal of this task is to secure procurement, construction, and all other relevant contracts related to facility construction and nominal operation.

The Recipient shall:

- Engage in contract negotiations which include, but are not limited to:
 - Equipment procurement contracts
 - Facility construction contracts
- Produce a Finalized Contracts Summary which includes, but is not limited to:
 - A finalized list of subcontractors/vendors
 - Updated budgets for major subcontractors
 - A summary of tasks for each subcontractor/vendor
 - o Status of securing any environmental permits

Products:

Finalized Contracts Summary

SUBTASK 2.2 PRE-CONSTRUCTION PREPARATION AND PLANNING

The goal of this task is to oversee pre-construction site preparation activities.

The Recipient shall:

- Oversee site preparation by building contractor which includes, but is not limited to:
 - Construction site leveling/geologic stabilization
 - Utility infrastructure installation/development
 - Road access installation/development
 - Construction material and heavy equipment staging
- Prepare a *CPR Report #1* in accordance with subtask 1.3 (CPR Meetings) and including the status of activities completed in Subtasks 2.1 and 2.2, challenges and how they were overcome.
- Participate in a CPR meeting.

Products:

• CPR Report #1

SUBTASK 2.3 FACILITY CONSTRUCTION

The goal of this task is to oversee construction of the proposed facility.

- Oversee facility construction
- Interface with equipment vendors to ensure timely delivery of purchased equipment

- Address any emergent issues related to facility construction
- Prepare a Facility Construction Report which includes, but is not limited to:
 - A summary of procedures for installation of the Recipient's technology
 - Photographs of the Recipient's technology installed at the demonstration site
 - A summary of issues that occurred during the facility construction and installation and how they were overcome
 - A discussion of lessons learned and potential solutions for future adopters of the recipient's technology

Products:

Facility Construction Report

SUBTASK 2.4 FACILITY STARTUP AND OPERATION

The goal of this task is to oversee facility startup and operations, making adjustments to operating procedures as necessary.

The Recipient shall:

- Oversee facility startup and address any issues that arise
- Oversee nominal facility operations
- Address any emergent issues related to nominal facility operations
- Conduct experimental tests and collect resultant data
- Establish a cross-functional committee formed of multiple internal and external team members to assess the viability of the Recipient technology for future integrated water treatment and carbon removal facilities
- Review test data and adjust operational procedures to optimize facility operations
- Execute a post-testing assessment conducted by an expert panel of reviewers under the auspices of the National Water Resources Institute
- Prepare a CPR Report #2 in accordance with subtask 1.3 (CPR Meetings).
- Participate in a CPR meeting.

Products:

• CPR Report #2

SUBTASK 2.5 CARBONATE STORAGE

The goal of this task is to plan end use (i.e. storage) of carbonate outputs produced by the demonstration facility operations in subtask 2.4.

- Develop plan for permanent, long-term, carbonate storage approaches which include, but is not limited to:
 - Identifying potential sites through GIS mapping and geologic data analysis and activities undertaken by the California Department of Conservation and other agencies related to Senate Bill 905
 - Work with offtakers to identify most advantageous potential site(s)
 - Assess storage site technical and economic feasibility
- Produce a Carbonate Storage Report which includes but is not limited to:
 - A list of potential carbonate storage sites in California
 - o A summary of advantages of listed sites and their potential for carbonate storage
 - A summary of the evaluation parameters used

- A discussion of recommendations for potential carbonate storage, including regulatory approvals needed and other challenges to overcome
- Confirm partnerships required for long-term, permanent management of carbonate byproducts.

Products:

Carbonate Storage Report

TASK 3: EXECUTION OF MONITORING, REPORTING AND VERIFICATION, AND LIFE CYCLE ANALYSIS

SUBTASK 3.1 MONITORING, REPORTING AND VERIFICATION

The goal of this task is to design and deploy a robust CO₂ emissions quantification and verification framework for the Palmdale DAC facility based on a tiered-observing system using in-flow, ground and aerial observations (subcontractor) and to execute air sampling for fixed gases, criteria air pollutants, and VOCs to establish an understanding of ambient baseline air quality and composition of facility emissions (subcontractor).

- Design MRV system based on the demonstration site DAC facility and CDR technology.
- Procure, build and deploy MRV instrumentation (CO₂ and additional air pollutants) at the DAC facility.
- Optimize MRV instrumentation based on preliminary observations
- Provide inputs for Life Cycle Analysis to help evaluate the effectiveness of the CO₂ capturing technologies and the overall CO₂ emissions from the DAC facility.
- Develop a general MRV Outline that could be used at a scaled Capture6 facility and a wide range of DAC facilities using different CDR technologies which includes, but is not limited to:
 - A summary of parameters that should be monitored.
 - A summary of MRV system to be implemented.
- Seek philanthropic support to draft manuscript for open access peer-reviewed journal publication submission (e.g., Environmental Science and Technology) and/or for preprint submission (e.g., EarthArXiv) focused on air quality measurements and emissions estimates.
- Prepare a Data Summary Report focused on air measurements and implications for air quality and human health, to inform community discussions in Task 4 which includes, but is not limited to:
 - A summary of collected data using discrete and continuous sampling approaches during multiple field visits at the demonstration site.
 - A list of measured pollutants including but not limited to fixed gases, criteria air pollutants, VOCs, and sulfur compounds.
 - A summary of quality control measures used, including but not limited to chain of custody, collection of blanks and duplicate samples, etc.
 - A summary of aggregated data comparing air concentration by sampling location, operational phase, etc.
 - A summary of health-relevant air concentration data for integration with LCA.
- Prepare a CPR Report #3 in accordance with subtask 1.3 (CPR Meetings) which includes, but is not limited to:

- A summary of analyzed observations during the operation of the DAC facility for estimation of CO₂ emissions.
- o An analysis of Capex and Opex for the installed Capture6 system, including current and at scale, and with carbonate storage options.
- Discussion and summary of the measurement and verification used to establish a baseline performance. Since the facility is new, baseline performance will be developed using industry-standard equipment that represent reasonable baseline conditions. The baseline will be used as a point of comparison for measurements taken 6 months post-deployment, to measure and quantify project benefits. Performance metrics will include the items in Section II.B of the goals and objectives of this document which include, but are not limited to:
 - Energy use per ton of CO₂ captured (post deployment)
 - CO₂ captured per volume of brine (post deployment)
 - Water produced per ton of brine treated (post deployment)
 - Volume of brine produced from PWAV and operational expenditures for transport and disposal (baseline), volume and operational expenses reduced with DAC technology-including any disposal of by-products of DAC technology, such as Na₂CO₃ (post deployment)
 - Air quality (e.g., criteria emissions) (post deployment)
- Participate in a CPR meeting.

Products:

- MRV Outline
- Data Summary Report
- CPR Report #3

SUBTASK 3.2 LIFE CYCLE ANALYSIS

The goal of this task is to conduct a full accounting of the direct and indirect greenhouse gas emissions sources and sinks, direct and indirect water consumption and freshwater production (subcontractor), and direct and indirect air pollution impacts of the facility (subcontractor).

- Prepare a Report on Life-Cycle GWP Impacts (draft & final) which includes, but is not limited to:
 - Mass and energy balances, including directly measured emissions and future sequestration for the facility.
 - One or more appropriate functional unit(s) on which to report the net GHG impact.
 - Group measured and modeled pollutants based on their impact (e.g., contributor to secondary PM, odor/nuisance, direct human health impacts).
 - Summary of developed hybrid process-based/input-output model that quantifies direct and indirect CO₂, CH₄, N₂O sources and sinks, direct and indirect water use and freshwater production, and direct and indirect air pollutant emissions and avoidance.
 - Summary of estimates on net life-cycle GWP, water consumption and freshwater production per functional unit for the facility, and net air pollutant emissions per functional unit for the facility, normalized where possible.

 Summary of estimates of net human health impacts using an integrated assessment model, such as EASIUR, APEEP, or InMAP, as approved by the CAM.

Products:

• Report on Life-Cycle GWP Impacts (draft & final)

TASK 4: STAKEHOLDER ENGAGEMENT

SUBTASK 4.1 BROAD OUTREACH

The goal of this subtask is to engage broad stakeholders across California to learn and respond to questions about direct air capture technology, climate technology solutions, and innovative approaches to desalination for the environment and communities.

The Recipient shall:

- Raise visibility about the demo facility, by conducting broad stakeholder outreach in the region such as:
 - Regional water agencies like the Central Valley Regional Water Quality Control Board and the National Alliance for Water
 - Federal, state and local government agencies
 - California-based universities and national laboratories, such as Stanford University's Water and Energy Efficiency for the Environment Lab and the California Water Institute at California State University, Fresno
 - o Environmental organizations like OurWaterLA and WateReuse California
- Prepare a Summary of California-wide outreach that includes but is not limited to:
 - Executive summary discussing goals and outcomes of the above engagement
 - Key takeaways from all groups engaged

Products:

Summary of California-wide Outreach

SUBTASK 4.2 LOCAL OUTREACH

The goal of this subtask is to engage local stakeholders across Palmdale to learn about the demonstration facility, identify supporters for a commercial scale facility, and learn about potential community benefits that could be offered through a commercial scale facility.

- Conduct local stakeholder outreach to better understand community benefits such as jobs, revenue generation, and apprenticeship and job training programs that could be delivered through a large-scale Capture6 DAC facility by:
 - Having meetings with local Palmdale employers (such as Lockheed Martin, Boeing, and Edwards Air Force Base) to describe mutually beneficial activities and opportunities for job training programs and apprenticeships
- Provide learning opportunities for community members, environmental justice organizations and community based organizations, and others on carbon removal, direct air capture, desalination, and climate solutions including but not limited to:
 - Social media posts

- Generate a Social Media Strategic Plan
- A demonstration facility website that includes updates on construction, upcoming events, and relevant contact information
 - Present a Demonstration Facility Website
- Preparation of Supplementary Public-Facing Materials aimed at translating scientific methods and findings for a general audience (subcontractor)
- A community learning center at the demonstration facility and information sessions there
 - Execute a Presentation on the Community Learning Center at the Demonstration Facility
- Identify community coalitions that support a full-scale facility and begin work on delivering community benefits to them by activities including but not limited to:
 - Hosting roundtable discussions to better understand community interest and concerns surrounding a full-scale facility, as well as potential community benefits that could be provided through a full-scale facility
 - Publishing a public report on stakeholder engagement findings
 - Generate a Draft Public Report on Stakeholder Engagement Findings
 - Developing a Draft Community Benefit Agreement Outline for a Commercial Facility

Products:

- Social Media Strategic Plan
- Presentation on the Demonstration Facility Website
- Supplementary Public-Facing Materials (subcontractor)
- Presentation on the Community Learning Center at the Demonstration Facility
- Draft Public Report on Stakeholder Engagement Findings
- Draft Community Benefit Agreement Outline for a Commercial Facility

TASK 5: EVALUATION OF PROJECT BENEFITS

The goal of this task is to report the benefits resulting from this project.

- Complete the Initial Project Benefits Questionnaire. The Initial Project Benefits Questionnaire shall be initially completed by the Recipient with 'Kick-off' selected for the 'Relevant data collection period' and submitted to the CAM for review and approval.
- Complete the *Annual Survey* by January 31st of each year. The Annual Survey includes but is not limited to the following information:
 - Technology commercialization progress
 - New media and publications
 - Company growth
 - o Follow-on funding and awards received
- Complete the *Final Project Benefits Questionnaire*. The Final Project Benefits Questionnaire shall be completed by the Recipient with 'Final' selected for the 'Relevant data collection period' and submitted to the CAM for review and approval.
- Respond to CAM questions regarding the questionnaire drafts.
- Complete and update the project profile on the CEC's public online project and recipient directory on the Energize Innovation website (www.energizeinnovation.fund), and

- provide *Documentation of Project Profile on EnergizeInnovation.fund*, including the profile link.
- If the Prime Recipient is an Innovation Partner on the project, complete and update the
 organizational profile on the CEC's public online project and recipient directory on the
 Energize Innovation website (www.energizeinnovation.fund), and provide
 Documentation of Organization Profile on EnergizeInnovation.fund, including the profile
 link.

Products:

- Initial Project Benefits Questionnaire
- Annual Survey(s)
- Final Project Benefits Questionnaire
- Documentation of Project Profile on EnergizeInnovation.fund
- Documentation of Organization Profile on EnergizeInnovation.fund

TASK 6: TECHNOLOGY TRANSFER ACTIVITIES

The goal of this task is to ensure the technological learning that resulted from the demonstration(s) is captured and disseminated to the range of professions that will be responsible for future deployments of this technology or similar technologies.

- Develop and submit a *Project Case Study Plan* that outlines how the Recipient will document the planning, construction, commissioning, and operation of the technology or system being demonstrated. The Project Case Study Plan should include:
 - o An outline of the objectives, goals, and activities of the case study.
 - The organization that will be conducting the case study and the plan for conducting it.
 - A list of professions and practitioners involved in the technology's deployment.
 - Specific activities the recipient will take to ensure the learning that results from the project is disseminated to those professions and practitioners.
 - Presentations/webinars/training events to disseminate the results of the case study.
- Present the draft *Project Case Study Plan* to the TAC for review and comment.
- Develop and submit a *Summary of TAC Comments* that summarizes comments received from the TAC members on the draft *Project Case Study Plan*. This document will identify:
 - TAC comments the recipient proposes to incorporate into the final *Technology Transfer Plan*.
 - TAC comments the recipient does not propose to incorporate with and explanation why.
- Submit the final Project Case Study Plan to the CAM for approval.
- Execute the final Project Case Study Plan and develop and submit a Project Case Study.
- When directed by the CAM, develop presentation materials for a CEC sponsored conference/workshop(s) on the project.

- When directed by the CAM, participate in annual EPIC symposium(s) sponsored by the California CEC.
- Provide at least (6) six High Quality Digital Photographs (minimum resolution of 1300x500 pixels in landscape ratio) of pre and post technology installation at the project sites or related project photographs.

Products:

- Project Case Study Plan (draft and final)
- Summary of TAC Comments
- Project Case Study (draft and final)
- High Quality Digital Photographs

V. PROJECT SCHEDULE

Please see the attached Excel spreadsheet.