



GRANT REQUEST FORM (GRF)

A) New Agreement # PIR-19-018 (to be completed by CGL office)

B) Division	Agreement Manager:	MS-	Phone
ERDD	Yahui Yang		916-327-2224

C) Recipient's Legal Name	Federal ID Number
Institute of Gas Technology dba Gas Technology Institute	36-2170137

D) Title of Project
3D Visualization Software for Mapping Underground Pipelines and Improving Pipeline Asset Management

E) Term and Amount

Start Date	End Date	Amount
6/30/2020	6/30/2023	\$ 1,738,436

F) Business Meeting Information

ARFVTP agreements \$75K and under delegated to Executive Director

Proposed Business Meeting Date 6/10/2020 Consent Discussion

Business Meeting Presenter Yahui Yang Time Needed: 5 minutes

Please select one list serve. Research (Energy RDD / PIER program)

Agenda Item Subject and Description:

Institute of Gas Technology dba Gas Technology Institute

Proposed resolution approving agreement PIR-19-018 with Institute of Gas Technology dba Gas Technology Institute for a \$1,738,436.00 grant to develop and demonstrate a software platform for mapping underground pipelines with better accuracy and improving pipeline assets management by integrating multiple data sources from several proven locating technologies, aggregating pipeline assets information into the Geographic Information Systems, and visualizing underground natural gas pipelines in real-time. (PIER NG funding) Contact: Yahui Yang. (PIER NG funding) Contact: Yahui Yang.

G) 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: Cal. Code Regs., tit 14, § 15301 ; Cal. Code Regs., tit 14, § 15306

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



GRANT REQUEST FORM (GRF)

Explain reason why Agreement is exempt under the above section: Categorical exemption section 15301 exempts projects consisting of the operation, repair, maintenance, permitting, leasing, licensing, or minor alteration of existing structures, facilities, mechanical equipment, or topographical features involving negligible or no expansion of existing or former use. This project is exempt under 15301: Existing Facilities, because it will demonstrate a mapping software tool at existing pipeline facilities. Project activities involve operation of existing pipeline facilities with no expansion of existing or former use. This project is also exempt under categorical exemption section 15306: Information collection, as the project will collect data of natural gas pipelines in real-time. This project will not result in a serious or major disturbance to an environmental resource.

- b) Agreement **IS NOT** exempt. (consult with the legal office to determine next steps)

Check all that apply

- Initial Study
- Negative Declaration
- Mitigated Negative Declaration
- Environmental Impact Report
- Statement of Overriding Considerations

H) List all subcontractors (major and minor) and equipment vendors: (attach additional sheets as necessary)

Legal Company Name:	Budget
Trident Environmental & Engineering, Inc.	\$ 95,015
	\$

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

Legal Company Name:

J) Budget Information

Funding Source	Funding Year of Appropriation	Budget List Number	Amount
NG Subaccount, PIERDD	18-19	501.001M	\$1,577,114
NG Subaccount, PIERDD	20-21	501.001O	\$161,322

R&D Program Area: ESRO: ETSI

TOTAL: \$ 1,738,436

Explanation for "Other" selection

Reimbursement Contract #: Federal Agreement #:



K) Recipient's Contact Information

1. Recipient's Administrator/Officer

Name: Kate Jauridez
Address: 1700 S Mount Prospect Rd
City, State, Zip: Des Plaines, IL 60018-1804
Phone: 847-768-0905
E-Mail: Kate.Jauridez@gastechnology.org

2. Recipient's Project Manager

Name: Shannon Katcher
Address: 1700 S Mount Prospect Rd
City, State, Zip: Des Plaines, IL 60018-1804
Phone: 847-544-3492
E-Mail: skatcher@gti.energy

L) Selection Process Used

- Competitive Solicitation Solicitation #: GFO-19-502p2
- First Come First Served Solicitation Solicitation #:

M) The following items should be attached to this GRF

- | | | |
|---|-------------------------------------|----------|
| 1. Exhibit A, Scope of Work | <input checked="" type="checkbox"/> | Attached |
| 2. Exhibit B, Budget Detail | <input checked="" type="checkbox"/> | Attached |
| 3. CEC 105, Questionnaire for Identifying Conflicts | <input checked="" type="checkbox"/> | Attached |
| 4. Recipient Resolution | <input checked="" type="checkbox"/> | N/A |
| 5. CEQA Documentation | <input type="checkbox"/> | N/A |
| | <input checked="" type="checkbox"/> | Attached |

Agreement Manager

Date

Office Manager

Date

Deputy Director

Date

Exhibit A Scope of Work Gas Technology Institute

I. TASK ACRONYM/TERM LISTS

A. Task List

Task #	CPR ¹	Task Name
1		General Project Tasks
2		Analysis and Evaluation of Participating Locate Data Sources
3	X	Software System Requirements and Design
4		Cloud-Based and Field-Based Software System Development
5	X	Software System Testing
6	X	Pilot Demonstration and Analysis
7		Evaluation of Project Benefits
8		Technology/Knowledge Transfer Activities
9		Production Readiness Plan

B. Acronym/Term List

Acronym/Term	Meaning
3D	Three-dimensional
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CPR	Critical Project Review
GIS	Geographic Information Systems
GNSS	Global Navigation Satellite Systems
KPI	Key Performance Indicators
TAC	Technical Advisory Committee

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

A. Purpose of Agreement

The purpose of this Agreement is to develop and demonstrate a software platform for mapping underground pipelines with better accuracy and improving pipeline assets management by integrating multiple data sources from several proven locating technologies, aggregating pipeline assets information into the Geographic Information Systems (GIS) database, and visualizing underground natural gas pipelines in real-time.

B. Problem/Solution Statement

Problem

The safety and integrity of underground natural gas pipelines rely on the availability and accuracy of pipeline location information. According to the Common Ground Alliance (CGA), improperly

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.

Exhibit A

Scope of Work

Gas Technology Institute

located or undetected subsurface utilities has resulted in 1,906 injuries, 421 fatalities, and \$1.7 billion in damages during the last 20 years². Additionally, CPUC annual reports show that inaccurate and insufficient locating practices led to 21% of excavation damages to natural gas distribution pipelines in California. These incidents resulted in an estimated annual loss of \$1.5 million due to property damage and gas emission, excluding other losses caused by system shut off, fatalities and injuries.

A contributing factor to these incidents is inaccurate or missing data within the data records maintained by pipeline installers, owners, and operators. Also, current methods and tools for locating pipeline assets once they are buried underground are highly dependent on pipe diameter, depth of cover depth, and other environmental factors. Another issue with current pipe locating methods and tools is their inability to provide accurate vertical information that can be used to determine how far beneath the surface the pipeline assets lay. The lack of accuracy and completeness of data records and lack of reliable locating methods and tools make buried pipeline assets susceptible to safety issues and integrity threats such as damages by excavators. For example, safe excavation practices rely in part on clear, complete, and accurate knowledge of subsurface hazards, such as pipeline assets, which may be present prior to excavation.

Solution

To reduce the likelihood that buried pipe assets will be damaged due to excavations resulting from missing or inaccurate data, this agreement will deliver an improved software system. The software system will help increase the accuracy and completeness of the pipeline data records by providing a mechanism for field personnel, who locate subsurface utilities in response to 811 call before you dig or other requests, to record the geospatial location and depth of pipeline assets detected during the locating process. The information recorded in the field by the locating personnel will be synchronized to a centralized cloud database, such as a GIS database. The software system will help field personnel increase the reliability of buried pipeline locating instrumentation by making pipeline record information available in the field. The methodology applied by locating instrumentation operators significantly impacts the quality of results. These field operators can better select the appropriate methodology for the given instrument and the given site condition by referencing the pipeline records information supplied by the software system.

This agreement will deliver a field- and office-based software system to integrate multiple data sources in one tool and deliver data visualizations and insights in near real-time. The system will also take advantage of existing high-accuracy Global Navigation Satellite Systems (GNSS) data to add considerable efficiency in locating practices. The recipient's solution is the aggregation of several existing and proven technologies assembled into one Locate Technology Platform, which supports the implementation and adoption of new business processes designed to achieve operational performance improvements. The solution will provide a software platform to achieve the following:

- A GIS/GNSS enabled repository for infrastructure location data and associated metadata.
- Operator assistance in operating locating tools.

² Common Ground Alliance, Damage Incident Reporting Tool Report 2015, https://commongroundalliance.com/sites/default/files/publications/DIRT_Analysis_and_Recommendations_2015_Report_Final.pdf

Exhibit A Scope of Work Gas Technology Institute

- Connections between multiple data sources/services to allow access to existing data.
- Visualizations of the repository data to end-users, both in the field and the office.

An update to existing business processes and integration of these major components into a locating technology software system will allow for better geospatial accuracy from existing market tools. Existing traditional locating tools can supply better accuracy by encouraging best practices for operating procedures based on the influencing factors found at a given pipeline segment. Re-mapping existing pipeline assets at a higher accuracy using GNSS receivers and mapping locating tools will improve the GIS database and provide better supporting data for future locates. And finally, pipelines that have already been mapped to centimeter-level can best be marked out again by using a high-accuracy GNSS receiver to stake-out their locations.

C. Goals and Objectives of the Agreement

Agreement Goals

The goals of this Agreement are to:

- Maintain and improve the safety of the pipeline system;
- Improve the horizontal and vertical pipe locating capabilities by supporting operations with new data;
- Reduce damage risk by providing access to location information for underground infrastructure;
- Enable field-based collection data describing the geospatial location and depth of buried pipeline assets and provide field-based access to data in near real-time; and
- Provide a more efficient means to maintaining accurate spatial data of underground infrastructure as compared to excavation and remeasurement.

Ratepayer Benefits: This Agreement will result in the ratepayer benefits of lower costs and increased safety by increasing operational efficiency and providing more detailed information about utility infrastructure data. This system will provide visualizations in near-real-time. Additional analytics built into the office-side platform can help provide insight into maintaining a more reliable, safer gas system.

Technological Advancement and Breakthroughs: 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 introducing and enhancing three-dimensional (3D) spatial data capabilities and making field-based data more accessible in real-time.

Agreement Objectives

The objectives of this Agreement are to:

- Create a software system comprised of the major sub-components listed below.
 - An Influencing Factors GIS Database contains the data structures necessary to retain the various factors which may influence the accuracy performance of a locating tool.
 - A Field-based Locate Software can communicate with traditional locating tools, mapping locating tools, and high-accuracy GNSS receivers. The software will capture in near real-time the horizontal and vertical position of the located asset as determined by the field operator's assessment of the locating data. The

Exhibit A Scope of Work Gas Technology Institute

software will also provide background information, such as maps, that assists the field operator with inferring the pipe location based on the locating tool signals.

- A Cloud-based Locate Software, including GIS and other databases, communicates with the field-based software to send out relevant data and receives and records the geospatial position of the located pipeline. The cloud software will also provide visualization of the locating data alongside GIS data layers such as the pipeline layer.
 - Traditional Locate Tools such as state-of-the-art and state-of-the-practice tools are key elements of the platform. These tools represent the locating tools commonly deployed for 811 calls to locate pipelines. These tools and the data they produce will be integrated with either the field-based or cloud-based software as appropriate.
 - Mapping Locate Tools are devices capable of accurately locating underground gas pipelines, but due to operational workflows or required data analysis may not be suitable for the traditional 811 call locating process. Such tools could be used to complete or improve the GIS database, which, in turn, could make future 811 locating more reliable. These tools and the data they produce will be integrated with either the field-based or cloud-based software as appropriate.
 - High-Accuracy GNSS Devices will be used to produce centimeter-level accurate horizontal and vertical positions in support of the various field-based workflows.
- Build, test, and deploy for field demonstration the software system described here that reduces the likelihood that buried pipe assets will be damaged due to excavations resulting from missing or inaccurate data;
 - Take advantage of existing GIS/GNSS data to enhance performance;
 - Visualize high-accuracy 3D location data in near-real-time on maps with depth information, and make the location information available to field workers on GPS-enabled devices; and
 - Conduct a field pilot demonstration of the software system at California utilities.

Exhibit A

Scope of Work

Gas Technology Institute

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)**. 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 Energy Commission’s 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 or CD-ROM.
- The following describes the accepted formats for electronic data and documents provided to the Energy Commission 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.

Exhibit A Scope of Work Gas Technology Institute

- Documents intended for public distribution will be in PDF file format.
- The Recipient must also provide the native Microsoft file format.
- 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 Energy Commission'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 Energy Commission 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 administrative portion of the meeting will include discussion of the following:

- Terms and conditions of the Agreement;
- 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 technical portion of the meeting will include discussion of the following:

Exhibit A Scope of Work Gas Technology Institute

- The CAM's expectations for accomplishing tasks described in the Scope of Work;
 - An updated Project Schedule;
 - Technical products (subtask 1.1);
 - Progress reports and invoices (subtask 1.5);
 - Final Report (subtask 1.6);
 - Technical Advisory Committee meetings (subtasks 1.10 and 1.11); and
 - Any other relevant topics.
- Provide an *Updated Project Schedule*, *List of Match Funds*, and *List of Permits*, 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:

- Updated Project Schedule (*if applicable*)
- Updated List of Match Funds (*if applicable*)
- Updated List of Permits (*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 Energy Commission 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 Energy Commission 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 Energy Commission.

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 Energy Commission, 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 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.
- Submit the CPR Report along with any other *Task Products* that correspond to the technical task for which the CPR meeting is required (i.e., if a CPR meeting is required for Task 2, submit the Task 2 products along with the CPR Report).

Exhibit A Scope of Work Gas Technology Institute

- 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* and 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)
- Task Products (draft and/or final as specified in the task)

CAM Products:

- CPR Agenda
- List of Expected CPR Participants
- Schedule for Providing a Progress Determination
- 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 Energy Commission 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 state-owned equipment.
 - Need to file a Uniform Commercial Code Financing Statement (Form UCC-1) regarding the Energy Commission's interest in patented technology.

Exhibit A Scope of Work Gas Technology Institute

- The Energy Commission'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 *All Draft and Final Written Products* on a CD-ROM or USB memory stick, organized by the tasks in the Agreement.

Products:

- Final Meeting Agreement Summary (*if applicable*)
- Schedule for Completing Agreement Closeout Activities
- All Draft and Final Written 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.

The Recipient shall:

- 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 Fund 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. The CAM will review the Final Report, which will be due at least **five months** before the Agreement

Exhibit A Scope of Work Gas Technology Institute

end date. When creating the Final Report Outline and the Final Report, the Recipient must use the Style Manual provided by the CAM.

D. Subtask 1.6.1 Final Report Outline

The Recipient shall:

- Prepare a *Final Report Outline* in accordance with the *Style Manual* provided by the CAM. (See Task 1.1 for requirements for draft and final products.)

Recipient Products:

- Final Report Outline (draft and final)

CAM Product:

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

E. Subtask 1.6.2 Final Report

The Recipient shall:

- Prepare a *Final Report* for this Agreement in accordance with the approved Final Report Outline, Style Manual, and Final Report Template provided by the CAM with the following considerations:
 - 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)
 - Ensure that the document is written in the third person.
 - Ensure that the Executive Summary is understandable to the lay public.
 - Briefly summarize the completed work. Succinctly describe the project results and whether or not the project goals were accomplished.
 - Identify which specific ratepayers can benefit from the project results and how they can achieve the benefits.
 - If it's necessary to use a technical term in the Executive Summary, provide a brief definition or explanation when the technical term is first used.

Exhibit A Scope of Work Gas Technology Institute

- Follow the Style Guide format requirements for headings, figures/tables, citations, and acronyms/abbreviations.
- Ensure that the document omits subjective comments and opinions. However, recommendations in the conclusion of the report are allowed.
- Include a brief description of the project results in the Abstract.
- 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
 - Consider incorporating all CAM comments into the Final Report. 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 Final Report 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.
- Submit one bound copy of the Final Report to the CAM along with Written Responses to Comments on the Draft Final Report.

Products:

- Final Report (draft and final)
- Written Responses to Comments on the Draft Final Report

CAM Product:

- Written Comments on the Draft Final Report

F. 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 Energy Commission 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 Energy Commission 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 Energy Commission 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

Exhibit A Scope of Work Gas Technology Institute

- 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.

Exhibit A

Scope of Work

Gas Technology Institute

- 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 the 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.

Exhibit A Scope of Work Gas Technology Institute

- 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.

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.

Exhibit A

Scope of Work

Gas Technology Institute

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.

Products:

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

Exhibit A

Scope of Work

Gas Technology Institute

IV. TECHNICAL TASKS

TASK 2: ANALYSIS AND EVALUATION OF PARTICIPATING LOCATE DATA SOURCES

In order to present to the field operator data records describing the buried pipeline assets within the field-based locating software and in order to record the geospatial location and depth of buried pipe assets as detected by the locating instrumentation, it is necessary to solve data integration challenges. Data integration is an information technology discipline comprised of various techniques for combining various data sources into a single technology platform.

The goals of this task are to evaluate a variety of data sources to determine accessibility to the data. Data accessibility challenges may present in the form of administrative limitations preventing data sharing among organizations or may present in the form of technical barriers preventing data sharing among technology platforms created by different manufacturers. This task will determine how to integrate the select data sources from various organizations into the field-based software and how to transmit real-time GNSS location data from the locating instrumentation to the field-based software.

The Recipient shall:

- Acquire select buried pipeline locating tools that can establish a connection with the field-based locating software and transmit geospatial location and depth data. Data sources may include select field locating tools enabled with Bluetooth or other data transfer protocols, GIS data, GNSS receiver data, or others as defined.
- Communicate with organization that currently maintain relevant data records describing buried pipeline assets which may be compatible with the goals of the software system.
- Evaluate all data sources identifying issues or challenges related to quality, completeness, relevance, data accessibility, and technical interoperability.
- Compile a *Data Source Evaluation Document* that defines which sources were evaluated and advantages or limitations of incorporating that data in the software system.

Products:

- Data Source Evaluation Document (draft and final)

TASK 3: SOFTWARE SYSTEM REQUIREMENTS AND DESIGN

The goal of this task is to develop the requirements of the project expectations and software for the system and use this documentation for auditing and testing. Standard industry best practices will be enforced.

The Recipient shall:

- Create a *General System Business Requirements Document* that records high-level business workflows. The high-level business workflows record the process steps that impact or are related to the pipe locating process, but are not directly involved in the pipe locating process. Documenting these workflows is an important step because it established the general business landscape the software system will operate within.
- Create a *GIS Re-Mapping Pipe Locating Business Requirements Document* that records specific workflows. These workflows address the specific steps and business rules that the software system must support or directly interact with. This document will specifically

Exhibit A Scope of Work Gas Technology Institute

address the requirements related to updating existing pipeline data record's geographic position and/or depth information recorded from locating instrumentation during the course of standard buried pipeline locating activities.

- Create a *GIS Stake-Out Locating Business Requirements Document* that record specific workflows. These workflows address the specific steps and business rules which would apply to buried pipeline locating activities where the geospatial position and/or depth had already been mapped using high-accuracy methodologies during construction before the pipe was originally buried. High-accuracy methodologies can produce geospatial accuracies in the centimeter range.
- Create a *Hardware/Software Interface Requirements Document* that records the essential communications between the software and the Pilot Demonstration locating tools, if applicable. This is the research analysis that will discover the methods and techniques which allow the locate instrumentation hardware to communicate in real-time with the field-based locating software, and the methods for the field-based locating software to send data in near real-time.
- Create a *Software and System Requirements Document* that records the essential features and functions of the Field GIS and Visualization Software, the Office GIS and Visualization Software, and the Web, Cloud, and GIS Database architecture.
- Create a *Field/Office Side Interface Design Document* that models the structures of the input communications for Pilot Demonstration.
- Participate in a CPR meeting and prepare *CPR Report #1* as described in subtask 1.3.

Products:

- General System Business Requirements Document
- GIS Re-Mapping Pipe Locating Business Requirements Document
- GIS Stake-Out Locating Business Requirements Document
- Hardware/Software Interface Requirements Document
- Software and System Requirements Document
- Field/Office Side Interface Design Document
- CPR Report #1 (draft and final)

TASK 4: CLOUD-BASED AND FIELD-BASED SOFTWARE SYSTEM DEVELOPMENT

The goal of this task is to develop the cloud-based locate software and field-based locate software that integrates the various data sources into one system. The system will connect data sources in the field to a cloud repository to capture new data. It will also provide users (both in the field and office) with visualizations of the infrastructure location and metadata.

The field-based locate software can communicate with traditional locate tools, mapping locate tools, and high-accuracy GNSS receivers. The software will capture in near real-time the horizontal and vertical position of the located asset as determined by the field operator's assessment of the locate data. The software will also provide the field user with visualizations of background information, such as maps, that assists the field operator with inferring the pipe location based on the locate tool signals.

The cloud-based locate software, including GIS and other databases, communicates with the field-based locating software to send out relevant data and receives and records the geospatial position of the located pipeline. The cloud software will provide visualization of the located data alongside

Exhibit A Scope of Work Gas Technology Institute

GIS data layers such as the pipeline layer. The map and data visualizations are supplied to in-office viewers via web applications embedded in the cloud-based locate software. The various data records comprising the map and 3D visualizations will be configured within the cloud-based system deployment. The data records could include compatible 3D and GIS data layers such as those containing information about the pipeline assets, integrity information, maintenance information, and leak survey records.

The Recipient shall:

- Set up development Cloud architecture, Web services, and Field GIS Software environments.
- Develop the hardware/software interface between the selected pilot demonstration locate tools and the field-based locating software system. This includes resolving compatibility issues between the field computer hardware which runs the field-based locating software and the locating instrumentation hardware.
- Develop the field-based locating software and cloud-based locating software.
- Deploy the development version of the software system and all of its sub-components to an integrated development environment.
- Create an *Integration Testing Plan* that documents specific test cases which exercise the specific requirement and design element documented during Task 3.
- Execute the integration test case to identify defects in the system. A defect is any error or unexpected result that causes the software system to fail to meet a documented requirement or design element.
- Repair any defects to the software system identified during integration testing.
- Create a *Development Phase Bug Resolution Document* that documents the problems solved during integration testing and rework.
- Compile a Development Phase Software Code Repository that captures the state of the various software code at the conclusion of the development phase.
- Create a *Demonstration Site Key Performance Indicators (KPI) Evaluation Plan* that documents the data that will be measured and recorded in the field.
- Develop a *Field-based Testing Workflow and Data Collection Form* to capture KPIs.

Products:

- Integration Testing Plan
- Development Phase Bug Resolution Document
- Demonstration Site Key Performance Indicators (KPI) Evaluation Plan
- Field-based Testing Workflow and Data Collection Form

TASK 5: SOFTWARE SYSTEM TESTING

The goal of this task is to perform standard system testing, rework, and analysis. System testing will be conducted on sample buried pipe located on the recipient's campus.

The Recipient shall:

- Set up and Deploy Full Test Environment.
- Create *System Testing Scripts Document* that ensure the essential features contained in the Business Workflow, Requirements and Design Documentation have been satisfied and that the system operates correctly.

Exhibit A Scope of Work Gas Technology Institute

- Organize a field test environment on the recipient's campus with sample buried pipe sufficient to support the execution for the system testing scripts.
- Execute System Testing scripts.
- Rework for System Testing defects.
- Create a *System Testing Phase Bug Resolution Document* that documents the problems solved during integration testing and rework.
- Compile a System Testing Phase Software Code Repository that captures the state of all software code at the conclusion of the system testing phase.
- Participate in a CPR meeting and prepare *CPR Report #2* as described in subtask 1.3.

Products:

- System Testing Scripts Document
- System Testing Phase Bug Resolution Document
- CPR Report #2 (draft and final)

TASK 6: PILOT DEMONSTRATION AND ANALYSIS

The goal of this task is to conduct a minimum of a 6-month pilot demonstration at sites volunteered by California utilities to demonstrate, analyze, and optimize the software system, including proving the concept of the improved mapping capabilities.

The Recipient shall:

- Create a *Demonstration Plan* to document the coordination of human and material resources necessary to prepare and execute the demonstration.
- Set up and deploy full pilot demonstration environment.
- Train the field locating personnel participating in the Pilot Demonstration on the software system.
- Kick-off the Pilot Demonstration.
- Conduct an in-field pilot demonstration, support, and data collection.
- Analyze KPI data for improvement and enhancement goals.
- Create a *Pilot Demonstration and Analysis Document* that records the results of the KPI analysis and background information on the setup, kick-off, training, and operation of the field demonstration.
- Participate in a CPR meeting and prepare *CPR Report #3*.

Products:

- Demonstration Plan
- Pilot Demonstration and Analysis Document
- CPR Report #3 (draft and final)

TASK 7: EVALUATION OF PROJECT BENEFITS

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

Exhibit A

Scope of Work

Gas Technology Institute

The Recipient shall:

- Complete three Project Benefits Questionnaires that correspond to three main intervals in the Agreement: (1) *Kick-off Meeting Benefits Questionnaire*; (2) *Mid-term Benefits Questionnaire*; and (3) *Final Meeting Benefits Questionnaire*.
- Provide all key assumptions used to estimate projected benefits, including targeted market sector (e.g., population and geographic location), projected market penetration, baseline and projected energy use and cost, operating conditions, and emission reduction calculations. Examples of information that may be requested in the questionnaires include:
 - For Product Development Projects and Project Demonstrations:
 - Published documents, including date, title, and periodical name.
 - Estimated or actual energy and cost savings, and estimated statewide energy savings once market potential has been realized. Identify all assumptions used in the estimates.
 - Greenhouse gas and criteria emissions reductions.
 - Other non-energy benefits such as reliability, public safety, lower operational cost, environmental improvement, indoor environmental quality, and societal benefits.
 - Data on potential job creation, market potential, economic development, and increased state revenue as a result of the project.
 - A discussion of project product downloads from websites, and publications in technical journals.
 - A comparison of project expectations and performance. Discuss whether the goals and objectives of the Agreement have been met and what improvements are needed, if any.
 - Additional Information for Product Development Projects:
 - Outcome of product development efforts, such copyrights and license agreements.
 - Units sold or projected to be sold in California and outside of California.
 - Total annual sales or projected annual sales (in dollars) of products developed under the Agreement.
 - Investment dollars/follow-on private funding as a result of Energy Commission funding.
 - Patent numbers and applications, along with dates and brief descriptions.
 - Additional Information for Product Demonstrations:
 - Outcome of demonstrations and status of technology.
 - Number of similar installations.
 - Jobs created/retained as a result of the Agreement.
 - For Information/Tools and Other Research Studies:
 - Outcome of project.
 - Published documents, including date, title, and periodical name.
 - A discussion of policy development. State if the project has been cited in government policy publications or technical journals, or has been used to inform regulatory bodies.
 - The number of website downloads.
 - An estimate of how the project information has affected energy use and cost, or have resulted in other non-energy benefits.
 - An estimate of energy and non-energy benefits.

Exhibit A Scope of Work Gas Technology Institute

- Data on potential job creation, market potential, economic development, and increased state revenue as a result of project.
- A discussion of project product downloads from websites, and publications in technical journals.
- A comparison of project expectations and performance. Discuss whether the goals and objectives of the Agreement have been met and what improvements are needed, if any.
- Respond to CAM questions regarding responses to the questionnaires.

The Energy Commission may send the Recipient similar questionnaires after the Agreement term ends. Responses to these questionnaires will be voluntary.

Products:

- Kick-off Meeting Benefits Questionnaire
- Mid-term Benefits Questionnaire
- Final Meeting Benefits Questionnaire

TASK 8: TECHNOLOGY/KNOWLEDGE TRANSFER ACTIVITIES

The goal of this task is to develop a plan to make the knowledge gained, experimental results, and lessons learned available to the public and key decision makers.

The Recipient shall:

- Prepare an *Initial Fact Sheet* at start of the project that describes the project. Use the format provided by the CAM.
- Prepare a *Final Project Fact Sheet* at the project's conclusion that discusses results. Use the format provided by the CAM.
- Prepare a *Technology/Knowledge Transfer Plan* that includes:
 - An explanation of how the knowledge gained from the project will be made available to the public, including the targeted market sector and potential outreach to end users, utilities, regulatory agencies, and others.
 - A description of the intended use(s) for and users of the project results.
 - Published documents, including date, title, and periodical name.
 - Copies of documents, fact sheets, journal articles, press releases, and other documents prepared for public dissemination. These documents must include the Legal Notice required in the terms and conditions. Indicate where and when the documents were disseminated.
 - A discussion of policy development. State if project has been or will be cited in government policy publications, or used to inform regulatory bodies.
 - The number of website downloads or public requests for project results.
 - Additional areas as determined by the CAM.
- Conduct technology transfer activities in accordance with the Technology/Knowledge Transfer Plan. These activities will be reported in the Progress Reports.
- When directed by the CAM, develop *Presentation Materials* for an Energy Commission-sponsored conference/workshop(s) on the project.
- When directed by the CAM, participate in annual EPIC symposium(s) sponsored by the California Energy Commission.
- Provide at least (6) six *High Quality Digital Photographs* (minimum resolution of 1300x500

Exhibit A Scope of Work Gas Technology Institute

pixels in landscape ratio) of pre and post technology installation at the project sites or related project photographs.

- Prepare a *Technology/Knowledge Transfer Report* on technology transfer activities conducted during the project.

Products:

- Initial Fact Sheet (draft and final)
- Final Project Fact Sheet (draft and final)
- Presentation Materials (draft and final)
- High Quality Digital Photographs
- Technology/Knowledge Transfer Plan (draft and final)
- Technology/Knowledge Transfer Report (draft and final)

TASK 9: PRODUCTION READINESS PLAN

The goal of this task is to determine the steps that will lead to the manufacturing of technologies developed in this project or to the commercialization of the project's results.

The Recipient shall:

- Prepare a *Production Readiness Plan*. The degree of detail in the plan should be proportional to the complexity of producing or commercializing the proposed product, and to its state of development. As appropriate, the plan will discuss the following:
 - Critical production processes, equipment, facilities, personnel resources, and support systems needed to produce a commercially viable product.
 - Internal manufacturing facilities, supplier technologies, capacity constraints imposed by the design under consideration, design-critical elements, and the use of hazardous or non-recyclable materials. The product manufacturing effort may include "proof of production processes."
 - The estimated cost of production.
 - The expected investment threshold needed to launch the commercial product.
 - An implementation plan to ramp up to full production.
 - The outcome of product development efforts, such as copyrights and license agreements.
 - Patent numbers and applications, along with dates and brief descriptions.
 - Other areas as determined by the CAM.

Products:

- Production Readiness Plan (draft and final)

V. PROJECT SCHEDULE

Please see the attached Excel spreadsheet.

STATE OF CALIFORNIA

**STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION**

RESOLUTION - RE: INSTITUTE OF GAS TECHNOLOGY DBA GAS TECHNOLOGY INSTITUTE.

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 Agreement PIR-19-018 with Institute of Gas Technology dba Gas Technology Institute for a \$1,738,436 grant to develop and demonstrate a software platform for mapping underground pipelines with better accuracy and improving pipeline assets management by integrating multiple data sources from several proven locating technologies, aggregating pipeline assets information into the geographic information systems, and visualizing underground natural gas pipelines in real-time; and

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

CERTIFICATION

The undersigned Secretariat to the Commission does hereby certify that the foregoing is a full, true, and correct copy of a Resolution duly and regularly adopted at a meeting of the CEC held on June 10, 2020.

AYE:

NAY:

ABSENT:

ABSTAIN:

Cody Goldthrite
Secretariat