Pacific Gas and Electric Company
300 Lakeside Drive
Oakland, CA 94612

March 28, 2023

Nika Kjensli
Program Manager
California Public Utilities Commission
Electric Safety and Reliability Branch
Safety and Enforcement Division
505 Van Ness Avenue
San Francisco, CA 94102

Re: Statement of Conditions for Experimental Installation of Ground Level Distribution System Pursuant to General Order 128, Rule 15.2

Dear Mr. Daye:

Pursuant to General Order 128 (GO 128), Rule 15.2, this correspondence sets forth the statement of conditions for Pacific Gas and Electric Company's (PG&E) experimental installation of a Ground Level Distribution System (GLDS) for its electric distribution system. The GLDS would place an already-approved cable in conduit (CIC) (encased in a geopolymer composite fill) inside a fire-rated (UL94-V0) cable tray assembly on the ground. The GLDS will be at ground level, and it can also be shallow trenched (no more than 10 inches underground) in areas where it is in conflict with vehicle or pedestrian travel, such as across driveways. Thus, the GLDS will differ from traditional underground systems.

We anticipate that the GLDS will offer public safety advantages similar to that of traditional undergrounding, but with less time and cost.

GO 128 – Rule 15.2

To further advancements in technology or changes in art, GO 128, Rule 15.2, Experimental Installations, permits California public utilities such as PG&E to engage in experimental installations that deviate GO 128's rules. To engage in experimental installations under GO 128, Rule 15.2, utilities must take precautions to ensure safety and submit a statement of conditions to the Commission at least 15 days prior to experimental modification or construction. Rule 15.2 reads in its entirety:

> *It is the intent of this rule to assist in advancements or changes in the art without mitigation of safety. For this purpose, experimental installations which deviate from one or more of these rules may be made, provided: Precautions are taken to secure safety to property and to persons engaged in the construction, maintenance, and operation of*

underground systems, and to the public in general; and

A full statement of the conditions involved in such experimental installation is filed with the Commission not less than 15 days prior to experimental modification of facilities or construction of any experimental facilities. Where such experimental construction would result in the installation of direct buried cable, duct, grounds, handholes, manholes or services with clearances, depths or protection other than provided by these rules, a copy of such statement shall concurrently be mailed to all utilities, local agencies or persons likely to be affected by such installation.

Our Experimental GLDS

Undergrounding our electric facilities has proven to be an effective tool in our toolbox for mitigating wildfire risks caused by equipment failure. However, traditional undergrounding takes a relatively long time to implement and is costly. In addition, wildfires pose an ongoing risk to California because of consistently low rainfall, elevated tree mortality, and record-setting high temperatures among other reasons. Therefore, we are evaluating new methods and technology to allow us to install underground conductors safely, quickly, and efficiently. To add to our undergrounding toolbox, we intend to pilot the GLDS.

Product Description

Our experimental GLDS will place CIC (operating at 21kV and below) encapsuled in fire-proof geopolymer composite into a fully enclosed fire-retardant (UL94-V0) cable tray assembly.[1] The cable tray system is the outermost layer of the GLDS. The shell of that layer consists of thermoplastic polyolefins (TPO), which are characterized as fire retardant, high impact resistant, low density, and chemical resistant; TPO is also recyclable. The exterior of the cable rail system is marked with high voltage signs every three feet and with reflective material. The inner portion of the cable rail system consists of at least two inches of high-density, fire-resistant, geopolymer composite. CIC is housed inside the geopolymer composite. CIC is a high-density polyethylene (HDPE) conduit that contains fully insulated jacketed cable.

Details of the GLDS can be found in Figure 1 below. These details may change as the technology is developed. Further product information can be found in Attachment 3.

[1] The "cable tray assembly" is also referred to as the "cable rail system."

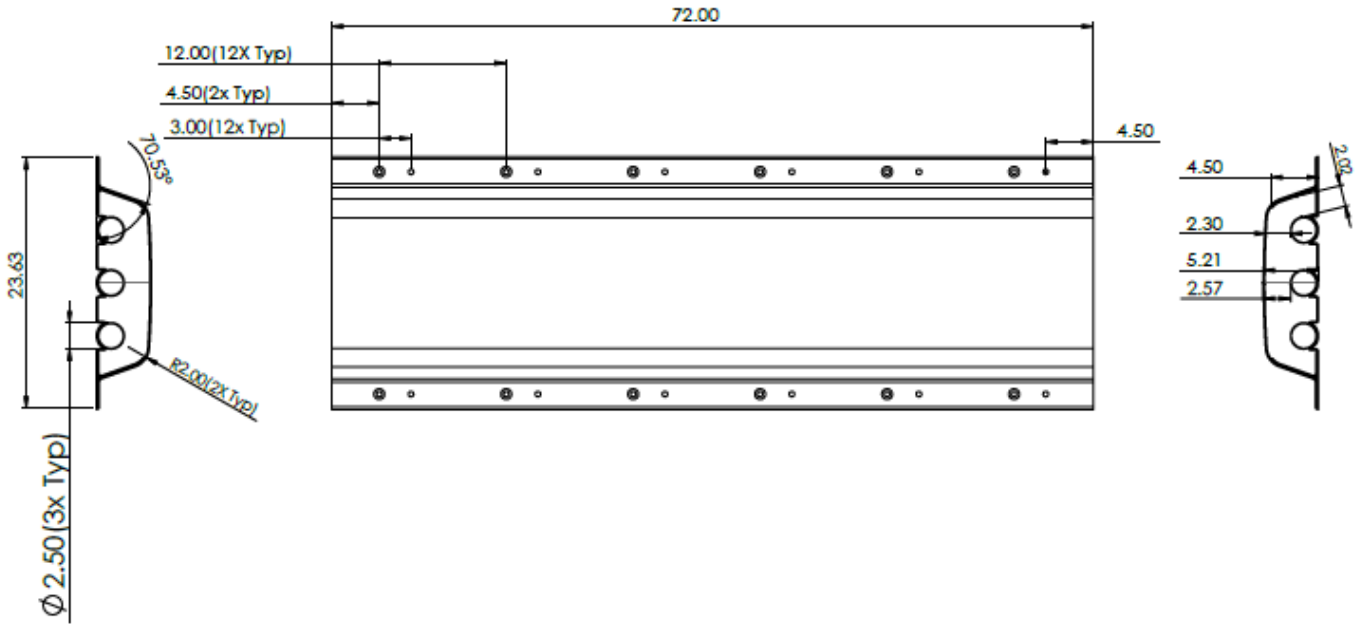

Figure 1: Current Design of the GLDS

Application of the GLDS

The GLDS will sit at grade and be secured to the ground via earth anchors. In terms of profile, the GLDS is approximately 6 inches in height (aboveground) and is less than 24 inches in width. Similar to underground conduit, the GLDS will come in sections with bends and flexing couplings to compensate for uneven terrain and immovable objects. The GLDS will interact with pad-mounted and subsurface equipment, such as transformers and subsurface junctions, over a variety of paved and unpaved surfaces. In areas with incidental vehicle traffic (such as driveways) the GLDS will be shallow trenched; in areas with full vehicle traffic (such as roadways) the GLDS will transition to traditional CIC with GO 128 compliant cover.

The GLDS's geopolymer fill and cable tray assembly are meant to provide an adequate level of protection for the system. The combination of the geopolymer fill and the cable tray system provides a level of mechanical protection such that a vehicle driving over the GLDS will not damage it. Similar to traditional underground facilities, wind and snow loads will have little to no effect on the GLDS.

Location of Experimental Installation

Pilot project details are subject to change over the course of the installation. At the time of

writing, we intend to substitute roughly three-quarters of a mile of overhead conductor[2] in the Township of Woodside, California, with the GLDS. (See Attachment 1 for the intended layout of the GLDS within Woodside). The location was chosen in large part because it stands to benefit from this style of construction. Woodside is in a Tier 3 High Fire Threat District and is currently served via overhead electric distribution (See Attachment 1). Thus, we expect the GLDS may immediately mitigate wildfire risk upon installation in Woodside. Additionally, Woodside was selected as the location of experimental installation because we anticipate that the small, rural community[3] will have minimal interference and interaction with the GLDS during its pilot stage. This will help us to measure the success of the systems with minimum interference from external variables that could potentially affect performance.

Furthermore, we anticipate that the performance of the GLDS in Woodside may act as a bellwether for the system's performance in locations where the systems would ultimately be installed. Woodside is similar in character to other locations where we contemplate early installation of the GLDS—in rural, High Fire Threat Districts. The goal of the pilot in Woodside is to use the GLDS in a real-life scenario to further develop the technology. We anticipate obtaining real life information regarding construction, tie-in, and operation of the GLDS. Should the technology prove viable in Woodside, we will use it to further our goal of maximum wildfire risk reduction in other locations.

The specific areas of installation within Woodside are also intended to minimize interference with the GLDS. The areas of installation do not have sidewalks, and although the GLDS will pass through several driveways and is rated for vehicle loads, all driveway crossings will occur below grade to minimize pedestrian and vehicle interaction with the GLDS. Furthermore, for street crossings, the GLDS will transition to CIC only with the required GO 128 cover.

Attachment 2 to this document contains an addition description of the pilot program scope. Construction is expected to start in Q4 of 2023 (end of October).

GO 128 Deviations How the project deviates from the current GO 128

GO 128 generally governs the installation of underground electric facilities. The GLDS deviates

[2] We do not intend to place the GLDS directly above existing underground utilities or structures.
[3] Pursuant to the 2020 United States Census, there were less than 6,000 people living in Woodside and the population per square mile was 463. Woodside would thus appear to qualify as a "rural" location under General Order 165, Section III.A.2.

from GO 128 in a few respects.

GO 128, Rule 31.4-D sets forth cover requirements for ducts carrying supply cable and conductors. The cover requirements can be reduced if adequate mechanical protection is provided. However, to qualify for a reduction in cover, GO 128, Rule 33.4-D(1) requires either (1) steel conduit or plastic pipe made of rigid unplasticized polyvinyl chloride having the properties and dimensions specified in Type II, High Impact, Normal Chemical Resistance in United States Commercial Standard No. CS 207-60 with a minimum wall thickness of 0.15 inches; (2) a layer of concrete at least 3 inches in thickness above the cable or duct; or (3) cable armor of #12 BWG steel wire closely wound or two layers of steel tape each 0.020 inch thick.

The GLDS does not satisfy these cover requirements or qualify for the exceptions. Although we believe the GLDS provides adequate mechanical protection, the cover will be effectively nonexistent. Moreover, although the GLDS will be encapsulated in TPO and at least two inches of fire-proof geopolymer composite—which will provide significant mechanical protection—this protection is not one of the enumerated exceptions set forth in Rule 33.4-D(1).[4] Nonetheless, due to the durability, resistance, and strength of the TPO, the geopolymer composite, and the CIC referenced above and in Attachment 3, we believe the cable tray assembly provides adequate mechanical protection.[5]

In addition, we believe the GLDS will provide a higher level of safety and functionality than other aboveground electrical facilities (such as risers), and a similar level of safety and functionality as traditional undergrounding. We believe the GLDS poses less wildfire risk than overhead electrical facilities because failing branches, trees, and other objects will not be able to cause the sparking or arcing that can occur with overhead electrical facilities. And unlike overhead electrical facilities, wind and snow loads should have little to no effect on the GLDS, and we expect fewer unplanned outages and less property damage caused by such weather events.

Moreover, the benefits of the GLDS may exceed traditional undergrounding because the GLDS

[4] The GLDS is not protected by (a) steel conduit or plastic pipe made of rigid unplasticized polyvinyl chloride with the specifications required by Rule 33.4-D(1)(a); (b) a three-inch layer of concrete under Rule 33.4-D(1)(b); or (c) cable armor of #12 BWG steel wire closely wound or two layers of steel tape each 0.020 inch thick under Rule 33.4-D(1)(c).

[5] We have performed a reasonable and diligent evaluation of GO 128 and do not believe there to be any additional deviations, though it is possible that some minor exceptions could exist.

will be less affected by tree and root growth, the GLDS is clearly visible and should be less prone to dig-ins, and the GLDS may be an alternative where earthwork is sensitive in nature (such as work at cultural sites, animal habitats, hazardous sites, etc.). To the extent that the GLDS may be placed in shallow trenching to accommodate driveways and roadways and will not have the same cover as traditional undergrounding, the system will still be protected by the cable tray assembly. We believe the cable tray assembly will sufficiently protect the cable from dig-ins to the same degree as the mechanical protection specified in Rule 33.4-D(1). In addition, the installation time and expense for the GLDS is significantly less than traditional underground systems. Thus, we hope to be able to obtain the wildfire risk reduction of underground systems much more quickly and efficiently with GLDS.

Additional Safety Information

Construction, Maintenance, and Operation Safety

The type of safety risks during the construction process of the GLDS are anticipated to be similar to those present in traditional underground construction, operation, and maintenance. However, we anticipate that construction and operation of the GLDS may be even safer. With either no trenching or very shallow trenching, installation of the GLDS has the potential to result in:

- Fewer worker injuries from heavy equipment
- Reduced worker conflict with vehicle traffic due to less intrusive traffic control requirements
- Elimination of trench plate injuries
- Reduced construction and site-restoration time providing a general reduction to the risk of workplace injuries
- Reduced occurrence of repetitive strain injuries from entering and exiting trenches
- No risk of cross-bore during installation and reduced risk of cross-bore from future installations of other underground utilities that utilize boring

Public Safety

As noted above, the GLDS appears to offer significant public safety advantages. First, it should have a reduced wildfire risk similar to that of traditional undergrounding. In addition, we expect fewer unplanned outages caused by weather factors such as extreme wind and heavy snow. The durability of

Pacific Gas and Electric Company
300 Lakeside Drive
Oakland, CA 94612

TPO and the cable rail system, including the geopolymer composite fill, offer mechanical protection and fire-resistance. The CIC inside the cable rail system is fully insulated, mitigating the risk of electrocution. The durability of the TPO and cable-rail system also make tampering difficult.

Additionally, the location of the pilot program is in a rural setting to minimize public interaction with the facilities. We do not anticipate significant pedestrian or vehicle interactions with the GLDS. The GLDS can run parallel to roads with no crosswalks and can be transitioned to a shallow trench when crossing a residential driveway. In this fashion, we expect to minimize foot traffic near the GLDS, and homeowners in rural areas can avoid having to drive over the GLDS when exiting their homes.

As an additional safety measure, the GLDS is marked with high voltage signs every three feet and has reflective marking to increase visibility. This is designed to reduce the risk of third-party dig-ins into the GLDS and reduce any tripping risk to pedestrians. The GLDS can be shallow buried and should not present any risk to pedestrians beyond that of traditional underground construction because the GLDS can be installed below grade when needed. The system can be interconnected in such a way to optimize pedestrian safety. Where desirable or necessary, GLDS can transition to a shallow buried system in areas with high foot traffic (such as areas with crosswalks or crossing signs) and can be used to comply with any ADA requirements.

The pilot location will be closely monitored during and after construction for viability and safety. Should the pilot location prove successful, other pilot locations will be considered in the future.

Please contact the undersigned with any questions or concerns.

Sincerely,

JIM GILL
Pacific Gas and Electric Company
300 Lakeside Drive
Oakland, CA 94612
Telephone: (916) 936-6783
Email: Jim.Gill@pge.com

March 28, 2023

cc: Leslie Palmer, Director, Safety and Enforcement Division