PACIFIC GAS AND ELECTRIC COMPANY
Wildfire Mitigation Plans Discovery 2023
Data Response

PG&E Data Request No.:	OEIS_010-Q001		
PG&E File Name:	WMP-Discovery2023_DR_OEIS_010-Q001		
Request Date:	July 20, 2023	Requester DR No.:	P-WMP_2023-PG&E-010
Date Sent:	August 3, 2023	Requesting Party:	Office of Energy Infrastructure Safety
DRU Index #:		Requester:	Dakota Smith

SUBJECT: REGARDING UNDERGROUND EQUIPMENT FAILURES

QUESTION 001

a. Provide a spreadsheet with the following information for all underground equipment/facility failures or damages from 2015 to 2023:
   i. Equipment type involved in the incident
   ii. Whether the equipment is subsurface or not
   iii. Year of incident
   iv. Whether a fire or ignition occurred
   v. Whether the location of the incident was urban, rural, or highly rural
   vi. Whether the location of the incident was WUI or not
   vii. Whether the location of the incident was non-HFTD, Tier 2, or Tier 3
   viii. Whether a root cause analysis or other form of cause analysis was performed
b. For any fires or ignitions that occurred from underground equipment, provide any trend data or lessons learned that PG&E has applied, which could include (but not limited to):
   i. Changes in type/manufacturer of equipment used
   ii. Changes in configurations (such as number of access points)
   iii. Changes in installation procedures
   iv. Changes in inspection procedures
   v. Changes in maintenance procedures
c. How does PG&E track and maintain any underground equipment that poses potential ignition risk, particularly within the HFTD?
d. How is PG&E working to minimize ignitions and fires from underground equipment/facility failures or damages for its wildfire risk undergrounding mitigation work?

ANSWER 001

a. Please see "WMP-Discovery2023_DR_OEIS_010-Q001Atch01CONF.xlsx" for the requested spreadsheet that spans from 2015 – 2023. Please note that specifying which pieces of equipment are subsurface would require a manual review of over 26,000 records for this large dataset and would be unduly burdensome. Therefore, information responsive to subpart ii has not been provided in response to this request. If additional information is needed regarding any specific incident, we are happy to discuss.

b. See the table below for changes made to equipment used or operating procedures due to incidents or trends from underground failures.

Equipment	Issue	Change

Load Break Oil Rotary (LBOR) Switches	Catastrophic failure of LBOR switch(es)	• Restricted operation of LBOR switches:
		  ○ Operation of an LBOR without a sight glass is not allowed unless by use of the remote operator or when de-energized.
		  ○ When operating an LBOR without a sight glass, perform a "before" and "after" infrared camera reading to determine temperature change after operating the switch, which may indicate low level arcing in the tank.
		• Proactive replacement of LBOR switches manufactured prior to 1975 as they lack oil inspection sight glasses.

Subsurface Oil Switches	Proactive safety measure and response to catastrophic failures of subsurface oil-filled equipment	• Approved solid dielectric vacuum switches and interrupters as an alternative to fluid-filled subsurface switches • Transitioned to solid dielectric vacuum switches and interrupters as the standard switch installation where not restricted by space limitations
Pad Mounted Switches	Arc flash incident involving a live-front padmounted switch (PMH).	• Implemented use of remote operating tool for PMH switches. • Introduced padmounted interrupter (PMI) as a dead-front alternative to the PMH switch.
Ground Terminal Lugs	Trend of broken lugs that resulted in injury or grass fires.	• Implemented new vise-type design of ground terminal lug.
Kuhlman Subsurface Transformers	Trend of catastrophic failures and other incidents	• Revised operating procedures: ○ Resetting of the secondary breaker on a Kuhlman

		subsurface transformer is not allowed unless by use of a remote operating pulling. o If a remote operating pulling device cannot be used to rig for remote operation, the transformer must be de-energized prior to resetting the secondary breaker. o In 2024, PG&E will revise operating procedures to prohibit any resetting of the secondary breaker if there is no known visible or apparent cause as to the reason the breaker tripped.
Explosion Restraint Manhole Covers	Proactive safety measure and response to manhole fire and explosion	• As a proactive safety measure, PG&E implemented replacement of our standard solid manhole covers in key areas of San Francisco with explosion restraint manhole covers • As a result of a manhole explosion that resulted in injury and property damage, the manhole cover replacement program was expanded to high-pedestrian areas in urban environments • In early 2022, explosion restraint manhole covers were implemented as PG&E's standard cover to be installed in new or rebuilt manholes where older covers are being replaced.

c. PG&E relies on our inspection and maintenance program to identify any problems and hazards that may adversely impact safety or reliability. As part of this program, detailed underground inspections are performed on a 3-year cycle. Additionally, patrols are performed every 2 years in rural areas and annually in urban areas. These patrol and inspection schedules apply to both HFTD and non-HFTD areas.

d. As mentioned above, PG&E relies on our inspection and maintenance program to identify any problems and hazards that may adversely impact safety or reliability. As part of this program, detailed underground inspections are performed on a 3-year cycle, with patrols performed every 2 years in rural areas and annually in urban areas. In addition, PG&E is currently piloting a Thermal Alert Device (TAD) that is intended for installation on underground oil-filled equipment and designed to alert PG&E if the equipment is operating above normal operating temperatures. This device will allow PG&E to take proactive action to prevent a catastrophic failure of underground oil-filled equipment. PG&E will continue to consider and evaluate emerging tools and technologies, such as the TAD, that would help to minimize or proactively address potential underground failures and fires.