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BY ENERGY SAFETY E-FILING

Caroline Thomas Jacobs, Director
Office of Energy Infrastructure Safety
California Natural Resources Agency
715 P Street, 20th Floor
Sacramento, CA 95814

Re: **Cover Letter Providing Detail on Q1 2022 QDR and GIS Data Submissions**
Docket: 2022-QDR

Dear Director Thomas Jacobs:

Please find enclosed Pacific Gas and Electric Company's cover letter on the providing detail on our first quarter (Q1) 2022 Quarterly Data Report (QDR) and Geographic Information System (GIS) data submissions. If you have any questions, please do not hesitate to contact me.

Very truly yours,

/s/ Jay Leyno

Jay Leyno

Introduction

In their 2019 and 2020 WMPs, electrical corporations were requested to provide Geographic Information System (GIS) data which required significant interpretation and effort to address. Pacific Gas and Electric Company (PG&E) appreciates the Office of Energy Infrastructure Safety's (Energy Safety) effort to refine its guidance and provide standardization through the Draft GIS Data Reporting Requirements and Schema (GIS Data Standard) released on August 5, 2020, and updated on February 4, 2021 (V2), September 17, 2021 (V2.1), and most recently December 17, 2021 (V2.2). Below we provide updates on our Q1 2022 GIS data submission, regulatory developments relating to our GIS data submission, and general challenges and technical limitations relating to this submission.

Similarly, we are also providing a narrative outlining the general challenges and technical limitations relating to our Q1 2022 non-spatial data submission that is included in our Quarterly Data Report (QDR).

General Challenges & Technical Limitations Relating to Non-Spatial Data Submission (QDR)

PG&E's Q1 2022 non-spatial data submission is subject to certain internal and external limitations, which are outlined below.

As an initial matter, it should be noted that starting with the Q1 2022 submission, PG&E began using 2020 census data and this more recent data has impacted the Urban, Rural, and Highly Rural layers, and may cause discrepancies when comparing this data to previous years. Previously, these layers were based on 2010 census data.

Additionally, it is important to remember that, given the real-time dynamic nature of PG&E's GIS system, the data provided in the QDR is only a view of a specific moment in time and will continue to change as our system evolves in the coming months and years.

The data in the QDR are also subject to specific limitations which have been noted at the appropriate locations in each table. These limitations, when present, are explained in the column entitled "Comments," as well as in a narrative at the bottom of each table.

Please also note that the version of Table 12 that is included with this submission is slightly different from the version that was included in our 2022 WMP, pursuant to the instructions from Energy Safety.

Q1 2022 Spatial Data Submission Updates

In Q1 2022, PG&E progressed its alignment of data included within the GIS Data Standard (Spatial QDR) and the Quarterly Initiative Update (QIU). PG&E reviewed and

assessed the quantitative targets highlighted in our QIU and compared it against our GIS Data Standard submission. Post-assessment, PG&E initiated a variety of working sessions with business and technical data stewards to understand the technical feasibility and requirements for collection, curation, transformation, and QC of select data highlighted in our QIU into the prescribed data schema required for the GIS Data Standard.

For the Q1 2022 submission, PG&E is providing 10 net new datasets that are highlighted through the QIU, including:

- System Hardening Transmission – WMP Section 7.3.3.17.2;
- Fuse Saver (Single Phase Reclosers) Installations – WMP Section 7.3.3.9.2;
- Defensible Space Inspections on Distribution Substation – WMP Section 7.3.5.17.1;
- Defensible Space Inspections on Transmission Substation – WMP Section 7.3.5.17.2;
- Defensible Space Inspections on Hydroelectric Substations and Powerhouses – WMP Section 7.3.5.17.3;
- Utility Defensible Space – WMP Section 7.3.5.20;
- High-Definition Camera Installations – WMP Section 7.3.2.1.4;
- Weather Station Installations and Optimizations – WMP Section 7.3.2.1.3;
- LiDAR Routine Vegetation Transmission Inspections – WMP Section 7.3.5.8; and
- Distribution Fault Anticipators (DFA) Installations – WMP Section 7.3.2.2.3.

PG&E also incorporated net new fields and enhanced existing ones:

- Net new fields include:
 - Substation Rating – 3.1.6 Substation Feature Class; and
 - Conductor Overall Diameter and Conductor Ampacity – 3.2.3 Secondary Distribution Line Feature Class.
- Enhanced fields include:
 - Exempt Status – 3.1.10 Transformer Detail Table; and
 - Exempt Status (for distribution splices) – 3.1.2 Connection Device Feature Class.

PG&E continues to leverage our enterprise data platform, Palantir Foundry (Foundry), to transform data into Energy Safety's schema and improve data quality. In this Q1 submission, PG&E incorporated camera installation and weather station installation or optimization¹ data into Foundry. This development marks the first '3.5.5 Other Initiative' reporting and progresses alignment between the Quarterly Initiative Update and GIS Data Standard reporting as both reports now include this initiative data. Previously, this data was not included in the GIS Data Standard submission.

¹ See PG&E 2022 Wildfire Mitigation Plan Update at p. 376 ("A unit is deemed "optimized" when a weather station is moved from an existing location to a new location for the purposes of improving our understanding of the weather conditions in the area.").

PG&E also enhanced data quality via Foundry through improvements applied to the 'exempt status' field for the 3.1.10 Transformer Detail table. Previously, PG&E was reporting 'Unknown' for all transformer records because exempt status data is not directly captured as a data point in any of PG&E's source systems. PG&E was able to create a lookup table in Foundry that now allows for reporting known exempt transformers as 'Yes' in select cases, enhancing the data quality associated with this field.

Additionally, PG&E expanded on the information included in our metadata. For example, definitions and methodology used to identify and report on substation facilities were added to the metadata for Feature Class '3.1.6: Substation.' Defining and identifying substation facilities for reporting required interpretation as these facilities contain numerous asset types and can serve various functions. Substation equipment includes but is not limited to transformers, voltage regulators, circuit breakers, switches, and bus work. The function of a substation facility can vary between distribution, transmission, and power generation – depending on voltage levels and/or power transformation requirements. In some cases, a single substation site contains multiple facilities, each of which serve distinct purposes. To address these complexities, PG&E held workshops with subject matter experts to define a reporting methodology for this Feature Class, which is documented through our metadata to help ensure a common understanding of our approach and reasoning.

Q1 2022 Regulatory Developments Relating to Spatial Data Submission

On February 15, 2022, Energy Safety hosted a technical workshop with the electrical corporations to align on key issues, document feedback, and provide guidance where applicable. Energy Safety highlighted the importance of further aligning the IOUs' GIS Data Standard (geospatial) data with their QIU tabular data where possible. Energy Safety also provided information on methods in which the submission data are being used, including tracking of progress against WMP objectives and to informing Energy Safety's inspections of utility equipment and initiative work.

PG&E reviewed 9 key points of feedback regarding technical or schema limitations, business processes and impacts on data available for submission, lack of operational value for certain data requested, and procedural feedback. PG&E followed up the workshop with a detailed matrix further describing the topics presented for Energy Safety. PG&E appreciates the progression of a common understanding of certain themes presented on by the utilities and Energy Safety's consideration of these items. We look forward to continuing to participate in upcoming quarterly Technical Workshops to help shape modifications and drive consistent implementation of the GIS Data Standard.

General Challenges & Technical Limitations Relating to Spatial Data Submission

PG&E's submissions of the requested Status Report and Data Submission (collectively referred to as "GIS Data Standard Submission") are not fully complete as we do not have all the requested data or have all the data in the format requested. Energy Safety anticipated that this process would take time to accomplish, and that all data would not be immediately available as noted in Section 1 of the Draft GIS Data Standard (V2.2):

Energy Safety understands that electrical corporations are at different stages of their data journeys and employ differing business practices, which may impact certain electrical corporations' abilities to fully comply with the requirements in this document. Energy Safety expects to routinely review and refine its GIS data requirements, in executing its mission of reducing risk of catastrophic wildfire ignitions from electrical facilities and equipment through a data-driven approach. As such, Energy Safety's GIS data standard is best viewed as a living document and will continue to evolve as data quality and capabilities grow.

Furthermore, a full quality validation of all data in the submission was not possible in the allotted time and, as a result, it is possible there may be some data in the submission that is inaccurate. Additionally, some of the inputs in the submission report necessarily reflect preliminary estimates and may not reflect final results. For example, 'Planned Initiative' data reflects forecasts that are subject to change based on operational developments. In addition, Ignition data may include data from Electric Incident Reports (EIRs) that are still under investigation.² For data not provided in the current submission, the Status Report inputs for "Estimated Delivery Timeframe" represent approximations that have significant dependencies, including, but not limited to, resourcing, procedural and technological developments, which could impact timeframes for delivery.

For data not currently collected or architected per Energy Safety's required schema, PG&E is exploring the feasibility and resource requirements to collect, transform, and ultimately submit these data. These assessments are accomplished through workshops with cross-functional teams (Asset Owners, Subject Matter Experts, Technical/System Experts), and will assess the feasibility and prioritization of future potential improvements.

² PG&E may include EIR ignitions still under investigation and ignitions where it is unknown whether the reportability threshold was met, but have been confirmed to be attributable to PG&E. The cadence of quarterly submissions makes it difficult to gather all the relevant data and form a timely conclusion on the reportability threshold. As an example, PG&E relies on external agency fire reports to make determinations for some ignition events and, depending on the agency and event, these fire reports could take several months for PG&E to receive. Additionally, PG&E may also exclude ignition events in these quarterly reports that were originally determined to be not PG&E attributable or meeting reporting criteria but are later determined to have met reporting criteria.

PG&E's existing data and system architecture were independently developed over decades to address specific operational uses and, as a result, often lack integration capability and a cohesive data schema. This presents significant challenges to accessing and aligning data to meet Energy Safety's GIS Data Standard. The various data requested exist across disparate systems and in the current state require significant time and resources to manually align data sets to the GIS Data Standard schemas and extract and format the data. Many of the resources who curate the data are simultaneously involved in core operations work, including emergency response and Public Safety Power Shutoff (PSPS) readiness. Provided the vast quantity of data submitted and compressed timelines, there was insufficient time and resource availability to perform a comprehensive quality check of data and the associated Status Report included in this submission.^{3 4}

Though PG&E significantly progressed its alignments of the GIS Data Standard and Quarterly Initiative Update as formerly described, technical limitations challenge our ability to fully align in select cases. Data included in the GIS Data Standard submission must meet specific technical criteria for inclusion, including the ability to transform data into Energy Safety's schema and represent geospatially. Tabular reports such as the QIU are not subject to these requirements which can result in differentials across reports. In addition, each report contains (i) differentials in technical and schematic requirements; (ii) differentials in timing of data readiness; and (iii) differentials in data types reported on. This is further described through our Comment on Draft GIS Data Standard V2.2.⁵

PG&E understands Energy Safety is using data included in the GIS Data Standard submission to inform efforts related to their Compliance Division field inspections. While many use limitations, assumptions, and definitions for data submitted are described via our metadata, additional complexities occur when combining distinct datasets for analyses or operations. These complexities can lead to misinterpretations and/or conflicting results when assessing data submitted against field inspection findings. In addition, timing differentials between collection of initiative data and the population of said data into a geospatial format/database (GIS) due to the processes needed to document data, verify work performance, and update (map) geospatial records. Until a project is completed and mapped, detailed information remains in the design systems and paper job packages. Once data is mapped in PG&E's GIS systems, it can be formatted to meet the requirements of Energy Safety's File Geodatabase schema and included in our GIS Data Standard submissions. Thus, a job may be visible in the field, but will not be present in our submission until these processes are

³ Reference for scale of submission: PG&E's Q4 2021 Submission included approximately 14.8M records.

⁴ Select data in this submission was requested through March 31, 2022 and due by May 1, 2022, providing less than five weeks to collect, curate, transform, perform antivirus scanning, and submit the data in a file-geodatabase (FGDB) format.

⁵ See PG&E Comment on Draft GIS Data Reporting Standard Version 2.2 (Dec. 27, 2021).

completed. PG&E's GIS Data Standard submission represents the best available data that can feasibly be aligned with Energy Safety reporting requirements; this data can provide general insights but is subject to limitations related to data quality and completeness. PG&E welcomes additional working sessions with Energy Safety to better understand its intended use of data included in our GIS Data Standard submission and provide feedback regarding various applications and/or potential limitations.

Conclusion

PG&E continues to achieve improvements in data quantity and/or quality on a quarterly basis. Additional enhancement opportunities will largely require more involved operational and technological changes, and a significant investment of resources and time to collect, curate, and organize the submissions on a recurring basis. Given the estimated level of effort required to meet the standard, regular collaboration with Energy Safety is needed to align on expectations, prioritization of data and information, technical feasibility issues, and help shape modifications to the schema. PG&E appreciates the February 15, 2022, Technical Workshop with Energy Safety and the Electrical Corporations. PG&E looks forward to the upcoming Quarterly Technical Workshops to help drive priorities, shape schema modifications, and facilitate future data submissions.

APPENDIX:
**HISTORICAL SUBMISSION UPDATES AND REGULATORY
DEVELOPMENTS**

Q4 2021 Submission Updates

- Adopted Energy Safety's updated schema (V2.2), incorporating two notable changes – provide scientific name for tree species and match units used for initiative targets with geometry of feature. To adopt these changes PG&E built a lookup table to include the new vegetation genus, species, and common name data.
- Net new data for Conductor Overall Diameter and Ampacity Rating fields added to 3.2.1 Transmission Line and 3.2.2 Primary Distribution Line.
- Included net new data reflecting developments in PG&E's Non-Exempt Surge Arrester Replacement Program (WMP Section 7.3.3.17.3) as part of the 3.5.4.2 Grid Hardening Log and 3.5.4.3 Grid Hardening Point Feature Classes.
- Leveraged Palantir Foundry to include new primary and foreign key identifiers that relate PSPS Event tables to the PSPS Damages tables. For PSPS Event tables we are using multiple data types to create primary key inputs, including Date, Circuit ID, and Isolation Device ID which can be correlated with Primary key inputs for PSPS Damage Event ID tables which include Date and CircuitID.
- Improved the organization and quality of information provided in the metadata for majority of the feature classes and related tables provided in our Q4 2021 submission. Specific improvements included: (i) shifting Summary section inputs to the Description section to align with V2.2's reporting requirements 5; (ii) inclusion of Energy Safety's outlined subsections within each primary section; and (iii) populating the methodology subsection with file and table names for feature classes and related tables provided in the Q4 submission.

Q4 2021 Regulatory Developments:

- On December 17, 2021, Energy Safety released V2.2 of the GIS Data Standard. Version 2.2 was the fourth version of the GIS Data Standard used throughout 2021.
- PG&E filed comments on this latest version of the data standard on December 27, 2021.⁶ Through these comments, PG&E highlighted (i) the need for technical workgroups for collaboration and consistent implementation of the GIS Data Standard; (ii) request for additional time to assess changes applied to version changes and for release of all files simultaneously (including the need for alignment across guidance materials); (iii) request for clarification regarding geometry requirements; (iv) technical limitations regarding alignment with tabular reports and confidentiality labels.

⁶ See PG&E Comment on Draft GIS Data Reporting Standard Version 2.2 (Dec. 27, 2021).

Q3 2021 Submission Updates

- Adopted Energy Safety’s updated schema (V2.1), accomplished through a series of working sessions with technical and business resources to apply revisions to existing data automation logic used to transform PG&E internal source system data into Energy Safety’s updated data schema.
- Developed a Domain Quality Checker Tool via our Foundry Data Management Platform to help ensure that domain values in PG&E’s FGDB aligned with Energy Safety’s prescribed schema. This tool automates the comparison of PG&E’s data outputs (FGDB domain structures) with the domain structures prescribed by Energy Safety.
- Added Expulsion Non-Exempt Fuse Replacements, Transmission Switches, and MSO Switch Replacements in Feature Class 3.5.4.2 & 3.5.4.3 (Grid Hardening Log and Point).

Q3 2021 Regulatory Updates

- On August 20, 2021, Energy Safety released an updated PDF document introducing a new release (V2.1) of the GIS Data Standard. On September 17th, 2021, Energy Safety reissued its GIS Data Standard (V2.1) that incorporated data fields and applied changes to the structure of the data schema with the expectation that electrical corporations adopt this schema for the Q3 2021 submission due November 1st, 2021.
- For its V2.1 assessment, PG&E found discrepancies and misalignments across Energy Safety’s requirements documentation, including the PDF document and FGDB, which introduced considerable complexity and resulted in rework to ensure accurate assessment findings.
- PG&E filed Comments on the GIS Data Standard V2.1 on August 27, 2021, highlighting the following: (i) elements of the data schema that are subject to technical limitations; (ii) field requirements that are subject to interpretation and require clarification or are out of alignment with Energy Safety’s PG&E 2021 WMP Action Items (iii) proposed methods to improve consistent implementation of the GIS Data Standard across electrical corporations, including the potential benefits of a formalized working group⁷. In addition, PG&E’s V2.1 Comment highlighted the technical limitations of labeling confidentiality designations at the record level and outlined our approach to help mitigate the risk of mislabeling confidential records.

Q2 2021 Submission Updates

- Provided data in accordance with the GIS Data Standard (V2).
- Added transmission splice data in Feature Class 3.1.2 – Connection Device and other utility-owned power line data in Feature Class 3.6.1. – Other Power Line Connection Location.

⁷ See PG&E Comment on Draft GIS Data Reporting Standard Version 2.2 (Aug. 27, 2021)

- Progressed data quality through consolidation of Distribution Outage data across multiple source systems and trackers in Palantir Foundry. In addition, leveraged this platform to create connectivity across source systems that contain data for Feature Class 3.4.3 – Ignitions, enabling association between Ignition events and near weather station.

Q2 2021 Regulatory Developments

- On June 23, 2021, Energy Safety held a joint meeting with the electrical corporations to communicate expectations around 2021 WMP data reporting, including desired alignments across spatial and non-spatial reports.
- PG&E performed an initial assessment of overlaps in data reported between the Quarterly Data Report (QDR, non-spatial) and Energy Safety GIS Data Standard (spatial) submissions.

Q1 2021 Submission Updates

- Adopted Energy Safety’s updated schema (V2) which introduced significant change. This was accomplished through re-development of existing queries, re-training of Data Stewards (SMEs), and changes in overall data collection, curation, and transformation techniques.
- Incorporated additional fields (e.g., PSPSDays and PSPSDaysDateBasis in the Critical Facilities feature class) and feature classes such as 3.6.5 Major Woody Stem.
- Developed a minimum viable product with our new data management platform to help manage data pipelines across source systems and automate reporting for select feature classes. This platform will continue to develop in future quarters.

Q1 2021 Regulatory Development

- On February 4, 2021, Energy Safety released an updated GIS Data Standard (V2) that incorporated new feature classes and data fields as well as changes to the structure of the data schema.

Q4 2020 Submission Updates

- Expanded mapping of Energy Safety GIS Schema to PG&E’s internal SAP schema for feature dataset 3.1 (Asset Point) and 3.2 (Asset Line).
- Enhanced the quality by addressing prioritized findings from Energy Safety Evaluation. For example, PG&E increased the specificity of the Status Report and enhanced its accuracy relative to the FGDB data submitted. Additionally, a baseline Metadata entry was delivered.
- On February 4, Energy Safety released GIS Data Standard Version 2 which incorporated new feature classes and data fields as well as changes to the data schema structure.

Q3 2020 Submission Updates

- Instituted multiple measures to improve the quantity and quality of its submission
- Increased number of Feature Classes and data attributes submitted while providing a more comprehensive Status Report.
- Implemented data collection processes to enable more efficient data collection, curation, and organization, and mapping ES GIS Schema to PG&E's internal GIS schema for 3.1 (Asset Point) and 3.2 (Asset Line).

Q3 2020 Regulatory Developments

- On January 8, 2021, the Wildfire Safety Division (for ease of reference, the Wildfire Safety Division will be referred to by its new name, Energy Safety, throughout this document) provided its Evaluation of Pacific Gas and Electric Company's First Quarterly Report (Energy Safety Evaluation) detailing findings on completeness and quality of GIS data submitted by PG&E on September 9, 2020.

Q2 2020 Submission Updates

- Included 15 of 38 feature classes and 4 of 15 related tables in the FGDB format.
- Data for another 4 feature classes and 2 related tables was submitted in tabular format as an appendix file.

Q2 2020 Regulatory Developments

- Energy Safety released its Draft GIS (Geographic Information System) Data Reporting Requirements and Schema (GIS Data Standard) on August 5, 2020.