PACIFIC GAS AND ELECTRIC COMPANY
PG&E Ref. DRU14128-Case-Electric Undergrounding Expediting Program-Senate Bill (SB) 884
Data Request OEIS
Requester Event Ref. No.
Requester DR No. Energy Safety-DR-EUP-24-08

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Request Date: August 08, 2024
Response Date: August 13, 2024

Question No. 001:

When we visited the PG&E undergrounding scoping site in Placerville, the process for scoping a project was described as listed below. Can you confirm that this is the general process, or provide any corrections?

1. The Circuit Protection Zones or CPZs are traced out annually with a GIS software's radial graph tracing algorithm which defines the CPZs by their terminal equipment.
   - The names of the CPZs are determined by the substation name, the circuit number, and either "CB" for "Circuit Breaker" or a serial number for a piece of terminal equipment.
   - Because these circuit numbers can be reassigned, or the same equipment with the same serial numbers can be reused in a different place, these CPZ names are often reused, so at different times, the same name may be used to refer to different physical alignments which may serve different customers.
2. The CPZs are thus separated into a Polyline feature class with these affiliated names.
3. A Polygon object is drawn around each CPZ (more detailed questions below) in such a way as to incorporate all equipment, conductor lines, and other PG&E assets affiliated with this CPZ.
4. By joining the Polygon to all PG&E equipment asset layers, the set of assets affiliated with this CPZ is identified with the CPZ name.
5. PG&E applies their risk modeling procedure to each of these sets of affiliated assets, assigning Ignition Risk Scores, PSPS Risk Scores, and a Combined Utility Risk Score to each CPZ by its CPZ name.
   - This involves some GIS processing of equipment overlaps with pixelated consequence scores, likelihood scores, and other scores over the service territory.
6. Using these risk scores, PG&E identifies CPZs which are worth undergrounding or applying other mitigations to. A CPZ is selected for applying mitigations.
   - This CPZ remains "frozen" in place, meaning even if the CPZ is changed in the next radial graph tracing after another year, this set of affiliated assets remains under consideration as one object.
7. This CPZ begins the "scoping" process, using the "frozen" set of assets and lines. This is broken down into individual "jobs" which are small parts of the CPZ which will be mitigated as a single unit, which go through further scoping, permitting, alignment, and construction.

Response to Question No. 001 Response No. 001:

1. For details related to the CPZ names, please see section 1.1.2 in attachment *"DRU14128_Q01_Atch01_WDRM SH CS Methodologies.docx"*, which is the WDRM System Hardening Circuit Segment Methodologies.

   For details related to circuit numbers and the date of timestamping changes to circuit segments, please see section 1.1.4 in attachment *"DRU14128_Q01_Atch01_WDRM SH CS Methodologies.docx"*.

2 – 4. Please see section 1.1.2 in the attachment *"DRU14128_Q01_Atch01_WDRM SH CS Methodologies.docx"*.

5. PG&E's current process for risk modeling uses Ignition Risk scores only. PG&E is developing a process to incorporate PSPS risk scores and a combined utility risk score for the purposes of the EUP. For details of the Ignition Risk assignment, see section 1.2.2 of attachment *"DRU14128_Q01_Atch01_WDRM SH CS Methodologies.docx"*.

6. For the purposes of the EUP, PG&E will use a combination of the risk scores, Cost-Benefit Ratio and Scoping decision tree to determine which mitigations should apply to a CPZ. If we install a new device and the risk model remains the same, then the CPZ remains the same. Once a project has passed screen 3 of the project acceptance framework in the EUP, the CPZ parameters will not change.

7. Once a CPZ has passed Screen 3, there will be no changes to the CPZ. A new polygon will be drawn to capture the entire project and any changes to the CPZ proposed through Scoping, this will capture any adjacent assets and the associated risk.

   CPZs that pass Screen 3 will be broken down into individual jobs or "subprojects", which will be mitigated as a single unit, which go through further scoping, permitting, alignment, and construction.

Question No. 002:

When we visited the PG&E undergrounding scoping site in Placerville, the process for scoping a project made use of a distinction made between "main" and "tap" lines for prioritization of service and planning work. <u>Can you confirm that this is a major distinction, or provide any corrections?</u>

   a. How does PG&E distinguish between "main" and "tap" lines, procedurally?
   b. Is this distinction defined in any PUC proceedings or other government documents, or is it strictly internal to PG&E?
   c. If we were to use this distinction in data collection for the EUP, how would PG&E recommend we define it to most closely align with its existing usage?

Response to Question No. 002 Response No. 001:

   a. PG&E uses the following definitions to distinguish the main line and local or tap lines.
   - Main Line:
     o Overhead is a three-phase line that is not fused.

- o Underground is a three-phase line constructed with cable larger than 1/0 with 600-Amp terminations, splices, and equipment.

- Local Line - there are two types of local lines called 'taps' and 'loops', these are defined as:

  - o Overhead is single-phase or three-phase line that taps and extends from the main line.

  - o Underground is single-phase or three-phase line with 200-Amp terminations.

b. These definitions are a common descriptor for all distribution circuits used in engineering schools and across other utilities. We are not aware that these definitions have been defined by the CPUC and other government documents.

c. PG&E does not currently distinguish between main lines and local lines when reporting projects in GIS or through other systems.

Question No. 003:

If the polygons are an important part of the process. what is the procedure for creating these polygons?

a. Are these polygons created automatically using a Minimum Bounding Box algorithm, a Buffer algorithm, or something else similar?
b. Are these polygons ever manually edited, i.e. an SME adjusts the vertices? What are they adjusting them to accomplish?
c. Are these drawn in order to prevent, or minimize, inclusion of equipment from other, nearby CPZs?
d. Are the polygons drawn such that all the pre-mitigation assets which will be removed or mitigated are located inside this polygon?
e. Are the polygons drawn such that all the post-mitigation assets which will be installed are located inside this polygon?
f. What happens when or if there is an asset or a line segment that might be in multiple CPZ polygons?
    - Is it used for risk evaluation in both?
    - What kinds of circumstances can cause this?
    - How frequently does this happen?
g. Does PG&E consider these polygons confidential?

Response to Question No. 003 Response No. 001:

For the purposes of this question, PG&E has assumed that the polygons are project polygons developed through scoping (Screen 3).

a. No, scoping project polygons developed through the scoping phase are created manually.

b. Yes, scoping project polygons are manually edited. Scoping polygons are edited from the entire CPZ to enable phasing and segmentation. The scoping project polygons are used to create subprojects from the CPZs.

c. Polygons are drawn to minimize inclusion of equipment from other nearby CPZs.

d. All primary and secondary assets mapped in EDGIS are included in the area of the polygon. However, non-mapped assets and assets not impacted by the work may also be included.

e. Polygons at the scoping phase can be drawn to represent the location of future assets. However, this may not align with all assets when constructed and mapped.

f. If an asset is included in multiple CPZ polygons, the risk of the asset would be apportioned between the CPZs. A project on a pole line with more than one CPZ would address risk for both CPZs. Risk reduction for the portion of the adjacent CPZ that is hardened would be included. This is an infrequent occurrence.

g. The polygons on their own, which is just a shape over the area on a map where we are planning work, are *not* confidential. If specific confidential information is paired with the polygons, such as customer data or asset descriptors, the polygons will then be confidential. It is possible to exclude this confidential information from the polygons.

Question No. 004:

If the polygons are NOT an important part of the process how is the set of assets assigned to each CPZ identified?

a. Do assets from other, nearby CPZs ever mistakenly get assigned to the wrong one, or to multiple CPZs?
   - Does this get corrected during or before the risk modeling procedure takes place?
b. Do assets ever need to be manually added or removed from the set?

Response to Question No. 004 Response No. 001:

PG&E has assumed for the purposes of this question that the polygons are risk polygons developed for the purposes of the Ignition Risk Model. This is an important part of the process.

For clarity, the process assigning assets to a CPZ for risk modeling is based on established relationships stored in SAP and through the trace tables as described in Question 001 above. This is an automated process. Assets are not assigned to multiple CPZs; however, some assets support more than one CPZ. In the case that the asset supports multiple CPZs, the risk of the asset is apportioned across relevant CPZs. Further detail on this approach is outlined in the appendix.

From a project polygon perspective, we do not collect all the asset information underneath the project polygon. These are meant for internal notification of where work will be completed.

Question No. 005:

If a new Project is scoped on a CPZ adjacent to or partially overlapping with an existing Project, how are potential overlaps or border issues handled?

a. Are the Projects defined as overlapping?

b. Is the risk modeled on the current, unmitigated CPZ, or does it incorporate the planned changes on the existing Project?

c. Are the Projects merged?

Response to Question No. 005 Response No. 001:

    a. Yes, it is identified and defined where the overlapping subprojects and projects exist in Screen 3.

    b. The unmitigated CPZ is used for risk modeling through scoping and execution.

    c. The projects are not merged.

Question No. 006:

What happens if the physical assets themselves have been swapped out or moved since the high-risk CPZ's set of affiliated equipment was identified, or in other words the current as-built no longer matches the "frozen" Project? How does this affect the selected Project?

    a. Does the set of affiliated equipment get regularly re-evaluated to ensure it includes all current equipment as-built near the Project? Or, does it stay "frozen" to maintain the original project scope?
- Alternatively, is non-emergency maintenance and construction postponed until the project is done to minimize changes to the Project?

    b. Is the risk re-evaluated on the "frozen" project, or on the current as-built?
    c. Is the scoping re-evaluated on the "frozen" project, or on the current as-built?
    d. Is the GIS alignment re-evaluated on the "frozen" project, or on the current as-built?

Response to Question No. 006 Response No. 001:

    a. Generally, PG&E does not re-evaluate CPZs through risk modeling and scoping once the job package is established; the only exception to this approach is if there was an emergency fire rebuild in the area.

    b. A subproject's risk is not re-evaluated once its job package is established.

    c. A subproject's scoping is not re-evaluated once its job package is established.

    d. A subproject's GIS alignment is not re-evaluated once its job package is established. Variances between the original job package and completed construction are documented in the subproject's post-construction as-built, which is signed-off by an inspector. Final GIS updates are based on the final drawing which is part of the as-built, not the initial job package.

Question No. 007:

Is the before-project "as-built" recorded on the level of the individual job?

Response to Question No. 007 Response No. 001:

No, we do not record as-builts prior to beginning construction. An as-built is our drawing of the work order/job following completion of field construction, and is required in order to process mapping updates and close out the order in our system of record.

PG&E does compile a high-level job package prior to construction, which includes detailed construction drawings. When construction is completed, the drawings are redlined to account for variances. Upon inspection and approval it is included in the post-construction as-built.

Question No. 008:

Is the after-project "as-built" recorded on the level of the individual job?

Response to Question No. 008 Response No. 001:

Yes. Every construction job in our portfolio has a completed and approved as-built following construction completion. That as-built is then used through the post-construction process to close out the subproject (order) within our system of record.

Question No. 009:

If Energy Safety, as part of the SB 884 Guidelines, were to ask PG&E to track Projects as a spatial GIS feature class of polygons encompassing an entire Circuit Segment's boundaries at the start of scoping that project in Screen 3:

a. What concerns would PG&E have about the feasibility of this addition? What would the timeline be on the ability to create this?
b. What features could and could not be tracked as attributes of this feature class? E.g. Project ID, risk modeling scores, lists of subprojects, etc.
c. What additional challenges would arise from requiring this feature class to only include assets from the circuit segment on which it was defined, e.g. by manually editing the boundaries to remove overlaps from other Circuit Segments?
d. Even if it is not possible to remove overlaps entirely, estimate the difficulty of creating polygons with, on average, less than 1% of the encompassed Line segments being from a different Circuit Segment, less than 20% of the encompassed Line segments being from a different Circuit Segment, and less than 40% of the encompassed Line segments being from a different Circuit Segment.
e. What challenges would arise if Subprojects were restricted to take place only on pre-mitigation assets falling within this Project polygon?
f. Currently, how commonly do subprojects extend outside the boundaries of the Circuit Segment on which they were qualified as high risk? By how far (as a percentage)? Would a Subproject ever take place entirely outside of the Circuit Segment on which it was qualified?

Response to Question No. 009 Response No. 001:

a. The development and inclusion of custom polygons in the EUP introduces new challenges. Further information would be required to understand what information would be needed as part of the polygon and how often this polygon would need to be updated as it progresses from scoping through to execution. This proposal for polygons differs from our current method and would require PG&E to develop additional processes and potentially new tools to create these polygons. At this time, we do not have an estimate of the timing to develop this approach. We would need to determine requirements and scope a solution to be able to provide an estimated timeframe.

b. Project level risk could be accounted for through a normalized risk adjustment for the proportional amount of the section of the CPZ being mitigated. Other than that, only basic project information would be potentially available as attributes (e.g., Portfolio ID, Project ID, Primary CPZ).

c. It is currently not possible to draw a polygon in the scoping phase that excludes all other CPZs other than the one for which it was defined.

d. The systems are designed to develop the most appropriate mitigation for customers. The percentage of overlap included is not a value that can be predetermined or restricted.

e. As a project polygon can include more than one CPZ post-scoping, the subproject would naturally fall within that polygon. This will be different than the polygon provided for the CPZ prior to scoping. If restricted to not include adjacent high-risk CPZs, PG&E's ability to design the most cost-effective solution for mitigating risk in the area would be limited.

f. For PG&E's 2023-2026 System Hardening workplan, less than 5% of the subprojects (i.e., jobs by order number) have more than one CPZ.

Yes, it is possible that a subproject could take place entirely outside of the Circuit Segment on which it was qualified. Figure 1 below visualizes an example for illustrative purposes. CPZ 1 (light blue line) was identified for mitigation due to having elevated risk for which the work is qualified. CPZ 2 (dark blue line) is a lower risk segment overall; however, the top portion of CPZ 2 shows the high-risk pixels that would be identified when scoping work on CPZ 1, thus included in the overall project for CPZ 1, and likely separated into its own subproject.
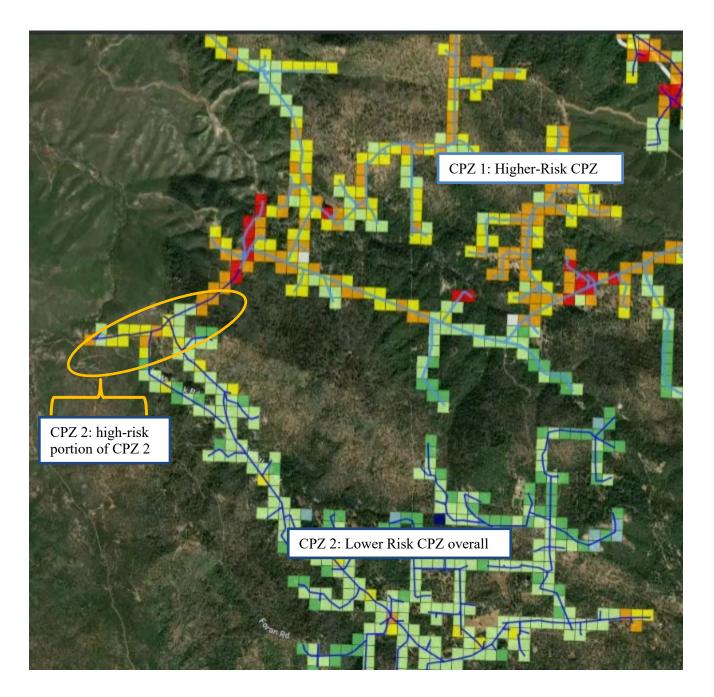
Figure 1. Illustrative example of two adjacent CPZs