PUBLIC UTILITIES COMMISSION
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October 23, 2017

GI-2017-04-PGE29-09

Mr. Sumeet Singh, Vice President
Pacific Gas and Electric Company
Portfolio Management & Engineering
6111 Bollinger Canyon Road, Room 4590-D
San Ramon, CA 94583

SUBJECT: SED's closure letter for the General Order 112 Gas Inspection of PG&E's Distribution Integrity Management Program (DIMP)

Dear Mr. Singh:

The Safety and Enforcement Division (SED) of the California Public Utilities Commission reviewed Pacific Gas and Electric Company's (PG&E) response letter dated August 4, 2017 for the findings identified during the General Order (GO) 112 Inspection of PG&E's Distribution Integrity Management Program (DIMP) conducted from April 17-21 and May 23-25, 2017[1].

A summary of the audit findings documented by the SED, PG&E's response to our findings, and SED's evaluation of PG&E's response taken for each identified Violation and Area of Concern and Recommendation is attached.

This letter serves as the official closure of the 2017 GO 112 Inspection of PG&E's Distribution Integrity Management Program (DIMP) and any matters that are being recommended for enforcement will be processed through the Commission's Citation Program or a formal proceeding.

If you have any questions, please contact Sikandar Khatri at (415) 703-2565 or by email at Sikandar.Khatri@cpuc.ca.gov.

Sincerely,

Dennis Lee

Dennis Lee, P.E.
Program and Project Supervisor
Safety and Enforcement Division

Enclosure: Summary of Inspection Findings

cc: Kenneth Bruno, SED
Mike Bradley, PG&E Compliance Gas Operations
Susie Richmond, PG&E Gas Operations Regulatory Compliance and Risk Analysis
Kelly Dolcini, SED
Ronda Shupert, PG&E Gas Compliance

[1] General Order 112-F was adopted by the Commission on June 25, 2015 via Decision 15-06-044.

SUMMARY OF INSPECTION FINDINGS

I. Probable Violations

Based on the records reviewed, SED did not find any violation of the Code of Federal Regulations – part 192 and General Order 112-F.

II. Areas of Concern/ Observations/Recommendations:

SED made the following observations during the audit. PG&E have created Corrective Action Program (CAP) notifications to address these, and draft language for the same was provided. Please provide final language for these CAP notifications together with status update.

1. PG&E has made changes to the definition of 'transmission' and 'distribution' assets (reference: TD- 4125P-10, effective date 01/01/2018). However, DIMP team mentioned that they have already started implementing some changes and Transmission Integrity Management Program (TIMP) will be evaluating some of assets that were previously considered under DIMP program.
   In addition, the current DIMP documents, for example, TD-4850P-01, page 28, has the definitions for "distribution > 60 psig" and 'Distribution pipe'.

   DIMP program should make the necessary changes in relevant documents to reflect the new definition and implement the same.

   PG&E through CAP notification, CAPN 112780109, Task 1 informed that it agrees to update the TD-4850P-01 to make the "distribution" definition consistent with TD-4125P-10 at the time the new definition takes effect. The transition of integrity management responsibility associated with the change in asset definition will be coordinated between TIMP and DIMP to ensure all assets are accounted for between the two programs. Please provide final language of CAP notification with status update, if any.

   PG&E's Response:

   PG&E agrees to update the TD-4850P-01 to make the "distribution" definition consistent with TD-4125P-10 at the time the new definition takes effect. The transition of integrity management responsibility associated with the change in asset definition will be coordinated between TIMP and DIMP to ensure all assets are accounted for between the two programs.

   SED's Conclusion:

   SED has reviewed the response.

2. SED reviewed the "Gas Service Record" (GSR) form and recommends that PG&E should capture other additional data from field activities either in GSR or other platforms that might be relevant/critical for DIMP program either for current or future use. One

most important data is the information on welder/joiner for each joint they make for traceability purposes.
SED understands the steps PG&E is taking steps, for example digitizing the records which is currently focused on capturing plastic pipe information and may later evolve on capturing welder/joiner information for the joints they make. Also the current method of identifying employees who worked on a project through time sheets and logs is insufficient as it does not lead to find employee who made a particular joint.
Therefore, SED strongly recommends that until digitizing projects are fully implemented, PG&E should capture information of welders and joiners for each joint they make for traceability purposes.
PG&E has created CAPN 112780109, task 2 for this purpose, but it does not address actions to take to start capturing this information from now. Please provide updated language of the CAP notification and status update.

PG&E's Response:

PG&E has given additional consideration to this recommendation. We have checked with other gas utilities to understand their practices in this regard. Most of these utilities are not currently tracking the joiner information. Most of these utilities have plans to implement joiner tracking; however, they intend to implement this functionality in conjunction with information system deployment. Given the significant changes this would require including additional manual controls on existing processes for documentation on Gas Service Records and As-built Job Files, PG&E cannot implement this recommendation at this time. As discussed during the audit, PG&E agrees with the objective of having the ability for joiner tracking and traceability. PG&E has been conducting a pilot program for electronic as-built records. PG&E believes that the successful implementation of pipe joiner tracking will require a technology solution on a mobile platform that allows capture of this data in near real time.

SED's Conclusion:
SED has reviewed the response, and would like to emphasize the importance of this matter, and recommend starting capturing this information as soon as possible.

3. PG&E procedure TD-4850P-01 on page 29 defines "potential threat" as 'A threat to a system component or system process that has not yet resulted in a leak'.

   PHMSA FAQ's C4.b.9 on DIMP requires operator to consider reasonably available information to identify existing and potential threats (include threats that are known potential threats that the operator has not experienced yet as well as threats that have not resulted in a leak (e.g., near misses; GO112-F Section 105 Definitions).

   PG&E should review its procedure to address definition of potential threats as per above reference guideline so as not to limit potential threats to leaks only, and also implement the same.

   (Reference: CAPN 112780109, Task 3)

   PG&E's Response:
   PG&E will review the PHMSA FAQ on potential threats and will update its procedure to include potential threats as appropriate.

SED's Conclusions:
SED has reviewed the response.

4. California Public Utilities Commission's General Order 112-F, Section 105 provides definition for the 'Near-miss events'. PG&E's DIMP Program does not define "Near-miss" events and neither implements the same. Therefore, DIMP documents should address it.
(Reference: CAPN 112780109, Task 4)

PG&E's Response:
PG&E will review the definition of near misses in GO112-F and will update its procedure to include near misses and potential threats as appropriate.

SED's Conclusion:
SED has reviewed the response.

5. Title 49 Code of Federal Regulations, Section §192.1007(b) identifies 'patrolling' as one source of data gathering. During audit, PG&E indicated that the DIMP team has used patrolling records in the past as a data resource; however, it is not being used anymore. SED highly recommends that PG&E should continue to use the available patrolling records to identify existing and potential threats; such as new landslide areas, missing supports for span and others.
(Reference: CAPN 112780109, Task 5)

PG&E's Response:
PG&E agrees with this recommendation and will continue to use the available patrol records to identify existing and potential threats as available.

SED's Conclusion:
SED has reviewed the response.

6. To ensure continuous improvement of PG&E DIMP Program, SED recommends that PG&E review the Gas Piping Technology Committee (GPTC) guidance and other industry resources to ensure integrity management program maturity. For example, PG&E can perform an exercise on suggested threat sub-categories in GPTC and make a determination that how these can be applied into PG&E and record the reasons for their inclusion or otherwise.
(Reference: CAPN 112780109, Task 6)

PG&E Response:

PG&E will review the GPTC guidance with respect to sub-divisional risk results to determine if any change to our methodology is needed. PG&E will also review ASME B31.8S-2016 for threat and subthreat categories.

SED's Conclusion:

SED has reviewed the response.

7. SED reviewed results of DIMP risk ranking carried out for 2016. It was found that the "Other" ranked high on the list. An example is that 'others' category had "no dope/deteriorated dope' which can be accommodated under material failure or equipment.
   SED recommends that PG&E's DIMP team should review existing field forms and determine whether these need to be updated or field personnel be trained to ensure incoming data are accurate to reduce the threats going to 'other' category.
   (Reference: CAPN 112780109, Task 7)

   PG&E's Response:
   PG&E will review the threat categories and reassign leaks to the appropriate category. PG&E will review what remains in the "Other" category and will assess whether or not any training or form changes are required. PG&E will update the scrub process in Attachment J accordingly.

   SED's Conclusion:

   SED has reviewed the response.

8. PG&E defines interactive threats in TD-4850P-01, section 5.2(3). However, during the audit PG&E did not demonstrate whether they are considering any interactive threats for calculating the risk.
   One examples of Interactive Threats (interaction of multiple threats) can be a potential threat (rock impingement for plastic) to prioritize replacement. PG&E should look to its leak and incident history and operations and maintenance history to identify interactive threats specific to its system. Examples are:
   • Slow crack growth in older plastics where pipeline was pinched during operational event or where over-squeeze occurred due to improper tools or procedure
   • Slow crack growth in older plastics where non-modern construction practices were used
   • Water main leakage areas or areas of soil subsidence with cast iron mains
   • Installation of mechanical fittings without restraint in soils or conditions (excavation damage) that cause pipe to pull out of fitting

   (Reference: CAPN 112780109, Task 8)

   PG&E's Response:
   PG&E accounts for interactive threats in risk assessment through Likelihood of Failure factors. For example, the interaction of pipe squeezing and slow crack growth is taken into account through the Squeeze Point factor for Material Failure Plastic Crack sub-threat (See Attachment N - Rev 1 Appendix A, SME Adjustment and CoF, row 20). PG&E will perform a review of its existing processes for modeling interactive threats to see if there are opportunities to improve.

   SED's Conclusion:
   SED has reviewed the response.

9. SED reviewed PG&E's Attachment N –Risk Algorithm and understands that PG&E considers the following factors affecting consequence: severity, population density, migration and pressure.

- 2.2.2.1 Severity factor –Table 1: Severity factor values. Highest value is 1. Unknown is assigned a value of 0.5 in this category.

  PG&E should consider that “unknown” should carry a weighting factor value of the worst case scenario which is 1 in this case

- 2.2.2.2 Population Density Factor includes:

  * Public Assembly locations
  * Large customer meters (customer type = residential or commercial complexes, or large industrial or commercial)
  * Inside meter sets
  * Overbuilds

  Where assets are within 100 feet of one of these locations, the Population Density factor is assigned a value of 1.0. For Above Ground Facility features, this factor only uses statuses for large customer meters and inside meter from the feature being scored.

  What factors will PG&E assign if there are multiple situations at a location? For example, public assembly location in high population density area etc.

- 2.2.2.3 Migration factor, Table 3-Migration factor values

  For the case of “other” the assigned value is 0.5. PG&E did not define “other” in its Mitigation Factor.

- 2.2.2.4 Pressure factor-The Pressure factor uses the pressure classification of the asset to gauge the release rate of gas in the event of a failure. A higher pressure class results in a higher release rate and potentially affects a larger area. When pressure is not available, the Pressure Class is assumed to be HP and the factor defaults to 0.1.

  PG&E should consider appropriate value for the case when pressure is not available.

In addition, SED recommends PG&E should consider including:

- Interactive threat of an adjacent facility on its pipelines.

- The railroad facilities located in proximity to its pipelines when calculating the consequence of failure for evaluating the risk.

- Applicable operating and environmental factors affecting consequence (e.g., paved area, hard to evacuate etc.). These are considered to be operating environment factors and must be considered as additional factors relating to consequence of failure when evaluating risk.

- Pipe diameter as additional factor relating to consequence of failure when evaluating risk–larger diameters will create situations where there may be greater consequence in the event any threat manifests a failure. Thus the larger diameters have higher consequence factors.

  (Reference: CAPN 112780109, Task 9)

PG&E's Response:

Regarding 2.2.2.1: PG&E will update its algorithm and procedure to conservatively assign factors for "unknown" categories. Regarding 2.2.2.2: As described in Attachment N, Section 2.2.2.2, the maximum value for the population density factor is 1. This maximum value is applied when there is a high consequence location in order to treat high consequence locations as areas of high population density, regardless of actual population density. No action is required in response to this recommendation.

Regarding 2.2.2.3: PG&E will assign the "Other" value for Surface Over Pipe Calc. a factor value of 1. PG&E will clarify "all other values" as the value applied when no applicable leak data is available for the feature; PG&E will also change this value to be 1 (worst case). Regarding 2.2.2.4: PG&E will update the factor value for HP to be 1.

Regarding adjacent facilities: DIMP does assess the risk of threats related to adjacent facilities, namely cross-bore and joint trench (failure of a gas asset related to co-location of other underground facilities).See Attachment H, page 4. No action is required in response to this recommendation.

Regarding railroad facilities: DIMP will consider railroad facilities located in proximity to a pipeline as a consequence factor in its risk assessment.

Regarding environmental factors: As described in Attachment N, pages 9 and 10, DIMP considers operating and environmental factors, including surface over pipe (i.e., paved areas), wall-to-wall paving, and public assembly locations. No action is required in response to this recommendation.

Regarding Pipe Diameter: DIMP will review historical distribution system events to consider whether or how diameter should be accounted for as a consequence factor.

Att N, rev 2 and the Uptime models have been updated as follows: For CoF Severity, the value has been changed for "Unknown" from 0.5 to 1.0. For CoF Migration, the value for Surface Over PipeCalc when it is "Other" is now 1.0.

For CoF Population Density, Rail facilities have been incorporated into the Special impact locations factor.

These changes are currently drafted and awaiting review and approval from the DIMP SC.

In addition to the above note, in the CoF Pressure factor, the value of pressure class of HP is now 1.0.

SED's Conclusion:

SED has reviewed the response.

10. PG&E has information on Steering Committee (SC) in attachment E of the procedure TD-4850P-01. SED would like to emphasize that if SC members are required to provide an expert opinion on a technical matter for decision making, then they should meet the definition of “subject matter expert” as outlined in PHMSA DIMP FAQ C.4.a.3. "Subject matter experts are simply people who have specific knowledge of topics and/or facilities under consideration. This includes the operator's operations and maintenance personnel - the people who construct, inspect, maintain and oversee it distribution facilities day-to-day …"
(Reference: CAPN 112780109, Task 10)

PG&E Response:
PG&E agrees with this recommendation and will update attachment E to include the information from the PHMSA FAQ.

SED’s Response:
SED has reviewed the response.

11. PG&E procedure TD-4850P-01, section 6.8 talks about validation including comparison to previous years and adjustment to risk logarithm, if needed. PG&E should continue to perform validation against the expectations based on knowledge of the system and mitigation activities and other resources, as available.
(Reference: CAPN 112780109, Task 11)

PG&E’s Response:
PG&E will continue to validate risk results with its subject matter experts during the DIMP Steering Committee review as well as during the field review process.

SED’s Conclusion:
SED has reviewed the response.

12. Attachment A–Mitigation activities, 4.0 Attachment A-mitigation Activities for DIMP cycle 2012 showed that Permasert and Kerotest curb valves leaks were considered under incorrect operation threat. In 2015 the same valves were classified under incorrect operation, equipment failure, material or welds. SED requests that PG&E provide additional information regarding these valves to verify if the cause of the leak is related to incorrect operation, equipment failure, material or welds?
(Reference: CAPN 112780109, Task 12)

PG&E’s Response:
See attached cause analysis report (RCA Report No. 2012-04, Table 1) for details on the rationale for categorizing these leaks.

SED’s Conclusion:
SED has reviewed the response, and understands the process used.

13. SED recommends that when a change in weighting factors, algorithm etc. is made for risk model, the modified model should be re-run on previous data. For validation purposes, the model results with new parameters should be compared with previous model results and also with the observations made through mitigation measures/field observations to ensure that the changes are driving the model in right direction.
(Reference: CAPN 112780109, Task 13)

PG&E's Response:
PG&E understands the recommendation and agrees on developing a method to evaluate the model changes to confirm the results are reasonable and as expected.

SED's Conclusion:
SED has reviewed the response.

14. SED discussed with DIMP team the Discovery Bay incident that occurred in December, 2015. Due to this incident, wet gas entered into the system. SED would like to know that if any other PG&E team studied the risk of moisture intrusion into the distribution system. If it was studied, please let us know the details of steps/measures taken and what the conclusion was. During the audit, the DIMP team further stated that the pipeline system in Discovery Bay area is plastic and therefore there is no concern about the internal corrosion. Please confirm the same.
(Reference: CAPN 112780109, Task 14)

PG&E's Response:
The Discovery Bay distribution system has approximately 65 miles of mains with 10 miles of steel and the remaining 55 miles made of plastic (see attached map for reference). The Discovery Bay Root Cause Analysis concluded that "There is no evidence that free liquids in two phase flow regime passed through the regulators. Considering this, it is most likely that the formation of hydrates began with moisture condensation in the top portion of the regulator and pressure pilot." To further validate the findings of the root cause analysis, PG&E will consider working with its Gas Quality Department to sample moisture vapor content at points along the steel pipelines to ensure the vapor content is below the maximum allowable limit.

SED's Response:
SED has reviewed the response, and may request to review the moisture content values in next audit. If there are unusual observations, please provide the same.

15. Title 49 Code of Federal Regulations, §192.1007(g) Report results requires operator on an annual basis to report the four measures listed in paragraphs (e)(1)(i) through (e)(1)(iv).
SED recommends that in addition to reporting these measures, PG&E should monitor the trends on these performance measures and perform a root cause analysis triggered by the determination of high risk, if applicable.
(Reference: CAPN 112780109, Task 15)

PG&E's Response:
Although not required by regulation, PG&E will evaluate whether trending at this high level provides insights in addition to what is currently identified for monitoring performance in the DIMP.

SED's Conclusion:
SED has reviewed the response.

SED also made following observations during the second week of the audit. Please provide final language of CAP items and status update on the same:

16. PG&E explained that currently it uses Riskfinder model for the assets which operate at ≤ 60psig. For assets greater than 60 psig, PG&E uses previous leak based model. We understand that PG&E's document "2016 Known Threats Risk Assessment Results" has information on this, but PG&E procedures do not specify that which methods will be used for two types of assets. Therefore, PG&E should make this clear in their relevant procedures.

    PG&E's Procedure:
    PG&E agrees with this recommendation and will update the documents to identify the risk models being used for above and below 60 psig.

    SED's Conclusion:
    SED has reviewed the response.

17. Attachment N, table 1 has severity factor values. It has severity factor values for Other – Pipe Dope. SED discussed with PG&E and it has been agreed that these issues identified as Pipe Dope – others should be re-classified under Material Failure or as PG&E determine to be appropriate. SED reviewed PG&E Cause Analysis Report for pipe dope, "CA 2016-03 Pipe Dope", which states on page 5, "The reason behind this type of leak could be associated with lack of riser thread quality and the quality of the pipe dope itself".
    Therefore, SED recommends that the severity factor value for Pipe Dope should be moved to another appropriate Primary Threat Category.

    PG&E's Response:
    PG&E agrees with this recommendation and will move Pipe Dope Severity factors from "Other" to "Material and Weld" primary threat category.
    PG&E will update Attachment N accordingly.
    The sub-threat Pipe Dope has been moved from primary threat category of "Other" to "Material and Weld" in Attachment N, H, and in the Uptime risk models. Attachments are currently in draft status and need to be reviewed for approval.

    SED's Conclusion:
    SED has reviewed the response.

18. PG&E's A-from have information on 'leak cause' and 'leak source'. SED recommends that the listing under these two headings should be aligned with DIMP threat categories for capturing better information and thus reducing data being categorized under 'others'. In addition, as far as possible, the threat categories should be sub-categorized to finer level to capture detailed information for proper categorization.

    PG&E's Response:
    PG&E will review the A form Leak Cause and Leak Source categories and compare them with the threat categories and if appropriate, reassign them to the appropriate threat category.
    PG&E will assess whether or not it is possible for the current sub-threats to be categorized to a finer level.

SED's Conclusion:
SED has reviewed the response.

19. PG&E procedure TD-4150P-01, section 4.6. talks about the 'new construction data' collection. Currently, RiskFinder model treat this the same way as the existing pipeline assets, however, it should be recognized that some vintage data such as previous leaks data may not be applicable to it. Therefore, it is suggested that possibly these be assessed separately, however still considering all kinds of threats.

    PG&E's Response:
    PG&E will review the current risk model and historic leak data being used to assess the risk on new construction assets. If appropriate, PG&E will update the risk model to address new facilities with the appropriate data associated to those facilities.

    SED's Conclusion:
    SED has reviewed the response.

20. PG&E procedure TD-4850P-01 often refers to the term "DIMP manual". It was discussed that what is included in this? It appears that standard, procedure and all attachments are part of it. However, the language in the procedure sometime is confusing. One example is section 1.4 of TD-4850P-01 which states:
    "This utility procedure and the attachments to the DIMP Manual will be reviewed and updated as necessary to implement annual and periodic reviews."
    SED suggests that the language in new revision of DIMP documents should address this correctly.

    PG&E's Response:

    PG&E agrees with this suggestion. The DIMP Manual will be clarified in the next revision of TD-4850P-01

    SED's Conclusion:
    SED has reviewed the response.

21. PG&E's model RiskFinder is defined in Attachment N. In this document, the section 2.2.2.2 Population Density Factors has two items 'Inside Meter Sets' and 'overbuilds'. SED discussed and PG&E indicated that these will be moved to section 2.2.2.3 Migration Factor.

    PG&E's Response:
    PG&E will update Attachment N accordingly.
    Attachment N and Uptime risk models have been updated to use inside Meter Sets and Overbuilds information in Migration factor. Attachments are currently in draft status and awaiting review and approval.

    SED's Conclusion:
    SED has reviewed the response.

22. There is a lot of information captured by field personnel on A-form; this includes internal corrosion, external corrosion, soil type, pipe condition and others. SED suggests that this information can be used for validation purposes, when needed.

    PG&E's Response:
    PG&E agrees with this recommendation and currently uses this Information as part of the mitigation process. TD4850P-01, Attachment K Cause Analysis Process specifies that during the data analysis process that Mitigation engineers use the raw version of the normalized leak data set to gather data elements from the A-form that are useful for the evaluation. No action will be taken in response to this observation.

    SED's Conclusion:
    SED has reviewed the response.

23. PG&E provided Cause Analysis Report, "2016 DIMP Cycle, CA No. 2016-06 October 2016". One of the items in this report under Mitigation Activities is "2016-06-04: Submit CAP to identified gap in leak reporting process. Station leaks are not fully captured under the normal leak program."

    Please provide an update on this CAP item.

    PG&E' Response:
    Reference: CAPN 7031976, Task 4; Codes and Standards. PG&E's Codes and Standards will review appropriate leak survey procedures and regulator station maintenance standard to determine if there is a gap in leak reporting at regulator stations during compliance maintenance activities. PG&E scheduled this review in October, 2017. Please see CAP Notification 7031976, task 4 for follow-on deliverables.

    SED's Conclusion:
    SED has reviewed the response.