

May 16, 2024

Mr. Robert Burrough
Director, Eastern Region
Pipeline and Hazardous Materials Safety Administration
U.S. Department of Transportation
840 Bear Tavern Road, Suite 300
West Trenton, NJ 08628

Re: Notice of Amendment (NOA) CPF 1-2024-030-NOA - Pacific Gas and Electric Company (PG&E)
Response and Closure Request

Dear Mr. Burrough:

Pacific Gas and Electric Company (PG&E) submits this response to the Pipeline and Hazardous Materials Safety Administration's (PHMSA) NOA dated April 23, 2024, stemming from the June 05 to June 09, 2023, underground natural gas storage (UNGS) inspection, and respectfully requests PHMSA's review in support of closure.

Please note that guidance within PG&E's Gas Storage Asset Management manual (i.e., TD-4870M) containing UNGS standards and procedures reviewed during the 2023 inspection has undergone further refinement through the formation of a Well Design standard (i.e., TD-4873S). Each of the four (4) items outlined within the NOA are related to well design, and therefore involved revisions to PG&E current standard, TD-4873S ([Attachment-02](#)).

For clarity, each of the four (4) items identified in the NOA will be repeated followed by PG&E's response. Each response will include both the legacy standard referenced within the NOA, along with key guidance document section(s) from TD-4873S.

Item #1:

49 CFR §192.12 Underground natural gas storage facilities.

- (a)
- (b) Depleted hydrocarbon and aquifer reservoir UNGSFs
 - 1)
 - 2) Each UNGSF that uses a depleted hydrocarbon reservoir or an aquifer reservoir for natural gas storage and was constructed after July 18, 2017, must meet all provisions of API RP 1171 (incorporated by reference, see § 192.7), sections 8, 9, 10, and 11, and paragraph (c) of this section, by January 18, 2018, and must meet all provision of paragraph (d) of this section by March 13, 2021.

PG&E's written procedures for underground natural gas storage were inadequate to assure safe operation of a pipeline facility. Specifically, PG&E's construction procedures required by American Petroleum Institute Recommended Practice 1171 (2015) (API RP 1171), Section 11.2.1, failed to adequately address API RP 1171, Section 6.2.3.

Section 11.2.1 of API RP 1171 states, in part, "The operator shall develop and follow procedures for the construction, operation, and maintenance of natural gas storage wells and reservoirs to establish and maintain functional integrity."

Section 6.2.3 of API RP 1171 states, in part, "Wellhead equipment shall have operating pressure ratings sufficient to exceed the maximum anticipated operating pressure."

During the inspection, PHMSA reviewed PG&E's *Wellhead Equipment Design Standard UGS-E1A-S*. The process stated "Wellhead equipment operating pressure ratings shall exceed maximum anticipated operating pressure [MAOP]" but did not detail the MAOPs and pressure ratings for their assets or refer to the document that contained the information. PG&E also presented *q05 multi-bowl_wellhead_design_whitepaper* that included both the field MAOPs and field specific minimum pressure ratings for wellhead components but was not referred to by the procedure.

Therefore, PG&E's construction procedures required by § 192.12(b)(2) and API RP 1171, Section 11.2.1 were inadequate regarding the requirements of API RP 1171, Section 6.2.3. PG&E must revise its procedures to address the deficiency outlined above.

Response to Item #1:

As previously addressed in our December 06, 2023, response to the NOA stemming from our 2022 PHMSA UNGS inspection (i.e., CPF 1-2023-057-NOA), this item has been resolved and closure acknowledged by the PHMSA closure letter dated December 12, 2023 ([Attachment-01](#)). For convenience, the response has been repeated below:

PG&E has updated its guidance on wellhead equipment design by adding a table that includes the maximum anticipated operating pressure and the minimum component rating for wellheads at each gas storage field PG&E operates. Please see specifics outlined in the table below.

API 1171, section 6.2.3 requirement	Reference – Guidance Document(s)	
	Legacy	Current
Wellhead equipment shall have operating pressure ratings sufficient to exceed the maximum anticipated operating pressure....	TD-4870M, UGS-E1A-S	TD-4873S, section 2.2(4)(a)

Technical document TD-4873S providing guidance on well design and construction has been provided as [Attachment-02](#).

Item #2:

49 CFR §192.12 Underground natural gas storage facilities.

(a) ...

(b) Depleted hydrocarbon and aquifer reservoir UNGSFs

1) ...

2) Each UNGSF that uses a depleted hydrocarbon reservoir or an aquifer reservoir for natural gas storage and was constructed after July 18, 2017, must meet all provisions of API RP 1171 (incorporated by reference, see § 192.7), sections 8, 9, 10, and 11, and paragraph (c) of this section, by January 18, 2018, and must meet all provision of paragraph (d) of this section by March 13, 2021.

PG&E's written procedures for underground natural gas storage were inadequate to assure safe operation of a pipeline facility. Specifically, PG&E's construction procedures required by American Petroleum Institute Recommended Practice 1171 (2015) (API RP 1171), Section 11.2.1, failed to adequately address API RP 1171, Section 6.7.3.

Section 11.2.1 of API RP 1171 states, in part, "The operator shall develop and follow procedures for the construction, operation, and maintenance of natural gas storage wells and reservoirs to establish and maintain functional integrity."

Section 6.7.3 of API RP 1171 states, in part, "The operator shall repair a failed plug; the operator shall repair a well with any leak indication that may suggest a lack of isolation of the storage reservoir."

During the inspection, PHMSA reviewed PG&E's *UGS-E1D-S_Well Abandonment Standard* and

UGS-AG-S_Well Work Requirements_20220201. The procedure paraphrased API RP 1171, Section 6.7.3 but did not provide any detail of the plug repair or well repair process and did not refer to the document that included the detailed process.

Therefore, PG&E's construction procedures required by§ 192.12(b)(2) and API RP 1171, Section 11.2.1 were inadequate regarding the requirements of API RP 1171, Section 6.7.3. PG&E must revise its procedures to address the deficiency outlined above.

Response to Item #2:

In response to a preliminary concern shared during the 2024 PHMSA UNGS Inspection (April 15 to April 26, 2024), PG&E recently updated its guidance on Abandoned Well Maintenance (e.g., section 5.3(2) of TD-TD-4873S) to better align with language in section 6.7.3 of API 1171 assuring the repair of a failed abandonment plug. Please see specifics outlined in the table below.

API 1171, section 6.7.3 requirement	Reference – Guidance Document(s)	
	Legacy	Current
The operator shall repair a failed plug; the operator shall repair a well with any leak indication that may suggest a lack of isolation of the storage reservoir. ...	TD-4870M, UGS-E1D-S & UGS-AG-S	TD-4873S, section 5.3(2)

Technical document TD-4873S providing guidance on well design and construction has been provided as [Attachment-02](#) and the referenced Additional Investigations outlined in TD-4875P-02 has been provided as [Attachment-03](#).

Item #3:

49 CFR §192.12 Underground natural gas storage facilities.

- (a)
- (b) Depleted hydrocarbon and aquifer reservoir UNGSFs
 - 1)
 - 2) Each UNGSF that uses a depleted hydrocarbon reservoir or an aquifer reservoir for natural gas storage and was constructed after July 18, 2017, must meet all provisions of API RP 1171 (incorporated by reference, see§ 192.7), sections 8, 9, 10, and 11, and paragraph (c) of this section, by January 18, 2018, and must meet all provision of paragraph (d) of this section by March 13, 2021.

PG&E's written procedures for underground natural gas storage were inadequate to assure safe operation of a pipeline facility. Specifically, PG&E's construction procedures required by American Petroleum Institute Recommended Practice 1171 (2015) (API RP 1171), Section 11.2.1, failed to adequately address API RP 1171, Section 6.7.2.

Section 11.2.1 of API RP 1171 states, in part, "The operator shall develop and follow procedures for the construction, operation, and maintenance of natural gas storage wells and reservoirs to establish and maintain functional integrity."

Section 6.7.2 of API RP 1171 states, in part, "The operator shall verify the presence and location of a cement plug after the plug is set and has reached a sufficient compressive strength; the operator shall correct deviations which may threaten isolation objectives of the plug."

During the inspection, PHMSA reviewed PG&E's *UGS-E1D-S_Well Abandonment Standard* section 3.5. The procedure paraphrases API RP 1171, Section 6.7.2 but did not include the process of how the location of the cement plug and how the sufficient compressive strength of the cement plug would be verified nor included a reference to a document that included the process.

Therefore, PG&E's construction procedures required by § 192.12(b)(2) and API RP 1171, Section 11.2.1 were inadequate regarding the requirements of API RP 1171, Section 6.7.2. PG&E must revise its procedures to address the deficiency outlined above.

Response to Item #3:

In Q1-2024 PG&E updated its guidance on storage zone isolation to assure the location and presence of any cement plug is verified once sufficient compressive strength has been reached and any deviation that will endanger the efficacy of the isolation must be rectified. Please see specifics outlined in the table below.

API 1171, section 6.7.2 requirement	Reference – Guidance Document(s)	
	Legacy	Current
... The operator shall verify the presence and location of a cement plug after the plug is set and has reached a sufficient compressive strength; the operator shall correct deviations which may threaten isolation objectives of the plug.	TD-4870M, UGS-E1D-S	TD-4873S, section 5.2(6)

Technical document TD-4873S providing guidance on well design and construction has been provided as [Attachment-02](#).

Item #4:

49 CFR §192.12 Underground natural gas storage facilities.

(a)

(b) Depleted hydrocarbon and aquifer reservoir UNGSFs

1)

2) Each UNGSF that uses a depleted hydrocarbon reservoir or an aquifer reservoir for natural gas storage and was constructed after July 18, 2017, must meet all provisions of API RP 1171 (incorporated by reference, see § 192.7), sections 8, 9, 10, and 11, and paragraph (c) of this section, by January 18, 2018, and must meet all provision of paragraph (d) of this section by March 13, 2021.

PG&E's written procedures for underground natural gas storage were inadequate to assure safe operation of a pipeline facility. Specifically, PG&E's construction procedures required by American Petroleum Institute Recommended Practice 1171 (2015) (API RP 1171), Section 11.2.1, failed to adequately address API RP 1171, Section 6.7.2.

Section 11.2.1 of API RP 1171 states, in part, "The operator shall develop and follow procedures for the construction, operation, and maintenance of natural gas storage wells and reservoirs to establish and maintain functional integrity."

Section 6.7.2 of API RP 1171 states, in part, "The operator shall use cement plugs (see 6.4.3) and/or mechanical plugs to isolate the storage zone from fluid migration. The use of hydrostatic pressure as a sole means of isolation shall not be acceptable."

During the inspection, PHMSA reviewed PG&E's *UGS-E1D-S_Well Abandonment Standard*. The procedure paraphrases API RP 1171, Section 6.7.2 but does not include detailed information of cement or mechanical plugs to be used or refer to the document that included the specific of the plugs to be used.

Therefore, PG&E's construction procedures required by § 192.12(b)(2) and API RP 1171, Section 11.2.1 were inadequate regarding the requirements of API RP 1171, Section 6.7.2. PG&E must revise its procedures to address the deficiency outlined above.

Response to Item #4:

PG&E's guidance on storage zone isolation to assure cement and/or mechanical plugs are used to isolate the storage zones from fluid migration and direction that hydrostatic pressure alone is not acceptable for isolation is outlined in section 5.2 of TD-4873S. Please see specifics outlined in the table below.

API 1171, section 6.7.2 requirement	Reference – Guidance Document(s)	
	Legacy	Current
The operator shall use cement plugs (see 6.4.3) and/or mechanical plugs to isolate the storage zone from fluid migration. The use of hydrostatic pressure as a sole means of isolation shall not be acceptable. ...	TD-4870M, UGS-E1D-S	TD-4873S, section 5.2(2) and section 4.3

Technical document TD-4873S providing guidance on well design and construction has been provided as [Attachment-02](#)

PG&E believes the four items identified in the NOA have been satisfactorily addressed by the above updates to PG&E's well design and construction standard (i.e., TD-4873S). Upon completion of your review, PG&E requests notification of closure of this NOA.

The NOA requested (not mandated) that PG&E maintain documentation of the safety improvement costs associated with fulfilling this NOA and submit the total to PHMSA. Negligible costs were incurred as these items were all addressed in prior revisions.

Please contact Justin Leany at (415) 603–9552 or justin.leany@pge.com for any questions you may have regarding this response.

Sincerely,

/s/ Frances Yee
Senior Manager, Regulatory Compliance & Reporting

cc: Kristina Castrence, PG&E
Lucy Redmond, PG&E

Attachments:

Attachment-01_12023057NOA_Closure Letter_12122023_(22-235006).pdf
Attachment-02_TD-4873S (Rev-0c) Well Design.pdf
Attachment-03_TD-4875P-02 (Rev-0) Additional Investigations.pdf