

December 06, 2023

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 1-2023-057-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 November 09, 2023, stemming from the June 27 to July 01, 2022 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 underground gas storage (UGS) standards and procedures reviewed during the 2022 inspection has undergone further refinement through the formation of a Well Design standard (i.e., TD-4873S). All three (3) items outlined within the NOA are related to well design, and therefore involved revisions to PG&E current standard, TD-4873S ([Attachment 1](#)).

For clarity, each of the three (3) 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 the revised section(s) of TD-4873S.

Item #1:

49 CFR §192.12 Underground natural gas storage facilities.

(a) ...

(b) Depleted hydrocarbon and aquifer reservoir UNGSFs

- 1) 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), and paragraphs (c) and (d) of this section, prior to commencing operations.

PGE's construction procedures required by § 192.12(b)(1) were inadequate. Specifically, PGE's Tubular Equipment Design Standard, Utility Standard: UGS-E1B-S, Rev 0 and its Cementing Standard, Utility Standard: UGS-E1C-S, Rev 0 failed to satisfy API RP 1171 Sections 11.2.1 (Section 11.2.1) and 6.3.5 (Section 6.3.5).

Section 11.2.1 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."

Correspondingly, as to those procedures governing the construction, operation, and maintenance of PGE's UNGSF, Section 6.3.5 states in part, "The production casing shall be free of open perforations or holes other than the planned completion interval(s). Perforations created for investigative or remedial work shall be sealed to establish hydraulic isolation."

During the inspection, CalGEM reviewed PGE's construction standards relative to Section 6.3.5, which included its Tubular Equipment Design Standard (UGS – E1B - S) and its Cementing Standard (UGS – E1C - S). These standards failed to mandate that its production casing be free of open perforations or holes other than the planned completion intervals. The standards also failed to mandate that perforations created for investigative or remedial work shall be sealed to establish hydraulic isolation (e.g., Section 3.6 of the Cementing Standard). The Cementing Standard used discretionary "should" statements instead of including the mandatory "shall" requirements under Section 6.3.5.

Therefore, PGE's written procedures required by § 192.12(b)(1) pursuant to meeting the provisions of Sections 11.2 1 and 6.3.5 were inadequate. PGE must revise its procedures to address the deficiency outlined above.

Response to Item #1:

PG&E has updated its guidance on production casing design to incorporate the mandatory requirements of section 6.3.5 of API 1171 as outlined in the table below.

API 1171, section 6.3.5 requirement	Reference – Guidance Document(s)	
	Legacy	Current
The production casing shall be free of open perforations or holes other than the planned completion interval(s).	TD-4870M, UGS-E1B-S	TD-4873S, section 3.2(4)(d)
Perforations created for investigative or remedial work shall be sealed to establish hydraulic isolation.	TD-4870M, UGS-E1C-S	TD-4873S, section 4.3(7)(b)

Technical document TD-4873S providing guidance on well design has been provided as [Attachment 1](#).

Item #2:

49 CFR §192.12 Underground natural gas storage facilities.

(a) ...

(b) Depleted hydrocarbon and aquifer reservoir UNGSFs

- 1) 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), and paragraphs (c) and (d) of this section, prior to commencing operations.

PGE's construction procedures required by §192.12(b)(1) were inadequate. Specifically, PGE's Wellhead Equipment Design Standard, Utility Standard: UGS-E1A-S, Section 2.3 (Wellhead Design Standard) failed to satisfy API RP 1171 Sections 11.2.1 (Section 11.2.1) and 6.2.3 (Section 6.2.3).

Section 11.2.1 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."

Correspondingly, as to those procedures governing the construction, operation, and maintenance of PGE's UNGSF, Section 6.2.3 states in part, "Wellhead equipment shall have operating pressure ratings sufficient to exceed the maximum anticipated operating pressure."

During the inspection, PGE's Wellhead Design Standard Section 2.3 was reviewed. The procedure did not specify the maximum anticipated operating pressure of each field nor what the required rating for each wellhead component must be to meet the standard of Section 6.2.3.

Therefore, PGE's written procedures required by § 192.12(b)(1) pursuant to meeting the provisions of Sections 11.2 and 6.2.3 were inadequate. PGE must revise its procedures to address the deficiency outlined above.

Response to Item #2:

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 has been provided as [Attachment 1](#).

Item #3:

49 CFR §192.12 Underground natural gas storage facilities.

(a) ...

(b) Depleted hydrocarbon and aquifer reservoir UNGSFs

- 1) 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), and paragraphs (c) and (d) of this section, prior to commencing operations.

PGE's construction procedures required by§ 192.12(b)(1) were inadequate. Specifically, PGE's Utility Standard UGS-E1D-S, Well Abandonment Standard, failed to satisfy API RP 1171 Sections 11.2.1 (Section 11.2.1) and 6.7.2 (Section 6.7.2).

Section 11.2.1 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."

Correspondingly, as to those procedures governing the construction, operation, and maintenance of PGE's UNGSF, Section 6.7.2 states in part "The operator shall determine the location of groundwater and hydrocarbon bearing zones (in addition to the storage zone) penetrated by the well to be abandoned, and the condition of the well's casing and cement across those zones, to prevent communication between any of those zones during and after plugging of the well."

During the inspection, Cal GEM reviewed PGE's Well Abandonment Standard (UGS-E1D-S). This standard, at section 3.2 of UGS-E1D-S), generally parallels the quoted language from Section 6.7.2 above, and fails to establish or refer to any process or procedure or evaluation regarding how the condition of a well's casing and cement across a zone shall be determined (or addressing evaluation/determination of the location of groundwater and hydrocarbon bearing zones to prevent communication during abandonment operations.

Therefore, PGE's written procedures required by § 192.12(b)(1) pursuant to meeting the provisions of Sections 11.2 and 6. 7 .2 were inadequate. PGE must revise its procedures to address the deficiency outlined above.

Response to Item #3:

PG&E has updated its guidance on storage zone isolation to assure the location of groundwater and hydrocarbon bearing zones penetrated by the well to be abandoned are properly considered through an engineering review of casing inspections and cement bonding logs. Please see specifics outlined in the table below.

API 1171, section 6.7.2 requirement	Reference – Guidance Document(s)	
	Legacy	Current
... The operator shall determine the location of groundwater and hydrocarbon bearing zones (in addition to the storage zone) penetrated by the well to be abandoned, and the condition of the well's casing and cement across those zones, to prevent communication between any of those zones during and after plugging of the well. ...	TD-4870M, UGS-E1D-S	TD-4873S, section 5.2(3) and section 5.2(4)

Technical document TD-4873S providing guidance on well design has been provided as [Attachment 1](#).

PG&E believes the three items identified in the NOA have been satisfactorily addressed by the above updates to PG&E's well design 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 only a minor revision to a single standard was involved.

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 1 - TD-4873S (Rev-0a) Well Design.pdf