

November 08, 2021

Mr. Terence Eng  
 Gas Safety and Reliability Branch  
 Safety and Enforcement Division  
 California Public Utilities Commission  
 505 Van Ness Avenue  
 San Francisco, CA 94102

Re: General Order (GO) 112-F Gas Inspection of PG&E’s Northern Area [GI-2021-07-PGE-73-01ABC]

Dear Mr. Eng:

Pacific Gas and Electric Company (PG&E) submits this response to the Safety and Enforcement Division’s (SED) Post-Inspection Written Preliminary Findings (Summary), dated October 08, 2021, stemming from the five week Northern Area gas transmission inspection conducted from July 26 through August 13, and August 23 through September 03, 2021. For clarity, each Summary item identified will be repeated followed by PG&E’s response.

## Unsatisfactory Results

### Unsat #1:

Question Text	<b>Maintenance and Operations: Gas Pipeline Operations (MO.GO)</b> <u>Question 10.</u> Are construction records, maps, and operating history available to appropriate operating personnel?
References	§192.605(a) [192.605(b)(3)]
Assets Covered	PG&E Northern Transmission [86284(73)]
Issue Summary	<b>Title 49 CFR §192.603 – General provisions</b>  Title 49 CFR §192.603 (b) states, “Each operator shall keep records necessary to administer the procedures established under 49 CFR 192.605.” Also, Title 49 CFR §192.605 (b) (3) states, “Making construction records, maps, and operating history available to appropriate operating personnel.”  During the record review in Sacramento Division, SED identified several instances, which are shown below, where PG&E's records, such as maps, equipment datasheet, maintenance records in regulator station binders are inaccurate. Therefore, PG&E is in violation of Title 49 CFR §192.603(b).  a) GT TS-09 regulator station: Set pressure of working regulator and standby were all set at 350 psi in the datasheet, but from the maintenance record it should be 350 psi for the working regulator and 340 psi for standby. PG&E corrected the information on the datasheet after SED pointed the mistake out. b) GT A-66 regulator station: Gas flow arrow is not correct for 6-DREG-9205 where it showed 100 psi in but should be 100 psi out. PG&E submitted a Corrective Action Program (CAP) after SED pointed the mistake out.

- c) GT A-40 regulator station: The regulator and monitor ID numbers on the map did not match the ones on the datasheet. The regulator and monitor for one run were R-1 and R-3 (R-2 and R-4 for the other run) on the datasheet but were marked as 10 and 30 (20 and 40 for the other run) on the map. PG&E changed the regulator and monitor ID numbers on the datasheet so that they matched the map after SED pointed it out.
- d) GT WI-02 Mariani regulator station: The most current regulator station map did not show all valves that were identified in the datasheet. On the map, valves 5, 7, 8, 10, 11, 13, 14, and 15 were missing. The monitor for one of the runs were marked as 16, but the datasheet showed it was R-1. PG&E informed SED that the station is going to be retired.

**Response to Unsat #1:**

PG&E recognizes this finding and has taken the following actions:

- GT TS-09 regulator station: PG&E has corrected the information on the datasheet. Please see attachment "TS-09.pdf"
- GT A-66 McClellan Primary regulator station: A mapping correction request was submitted under CAP# 121976618.
- GT A-40 regulator station: PG&E has corrected the information on the datasheet. Please see attachment "A-40.pdf"
- GT WI-02 Mariani Reg: Mariani Reg Station (WI-02) has been retired on order 31461119 and no longer feeds any assets. CAP # 121818678 was created to track abandonment. A PM has not yet been created for this abandonment.

**Unsat #2:**

Question Text	<b>Time-Dependent Threats: External Corrosion - CP Monitoring (TD.CPMONITOR)</b> <u>Question 4</u> . Do records document that the CP monitoring criteria used was acceptable?
References	§192.491(c) [192.463(a)]
Assets Covered	PG&E Northern Transmission [86284(73)]
Issue Summary	<b>Title 49 CFR §192.491 – Corrosion Control Records</b>

Section 192.491(c) states in part, "Each operator shall maintain a record of each test, survey, or inspection required by this subpart in sufficient detail to demonstrate the adequacy of corrosion control measures...."

Appendix D to Part 192 – Criteria for Cathodic Protection and Determination of Measurements, Section I. Criteria for cathodic protection, part (3) states, “A minimum negative (cathodic) polarization voltage shift of 100 millivolts. This polarization voltage shift must be determined in accordance with sections III and IV of this appendix.”

Section III. Determination of polarization voltage shift states in part, “The polarization voltage of shift must be determined by interrupting the protective current and measuring the polarization decay. When the current is initially interrupted, an immediate voltage shift occurs. The voltage reading after the immediate must be used as the base reading from which to measure polarization decay...”

PG&E provided records regards to the casing reads of L-400 at MP 25.65 in year of 2013, 2017 through 2020. However, those records failed to demonstrate the application of 100 mV polarization voltage shift criteria for cathodic protection, as there was no recording of

interrupting the protective current (rectifier) or measuring the polarization decay (instant on, instant off voltage reads and polarization decay). On 8/3/2021, SED talked with PG&E corrosion team who recognized that there was no recording during application of 100 mV polarization, thus can't prove 100 mV polarization voltage shift criteria was utilized to demonstrate the adequacy of PG&E's corrosion control measures. Therefore, PG&E is in violation of Title 49 CFR §192.491(c).

**Response to Unsat #2:**

PG&E recognizes that the 100 mV polarization shift criteria used to confirm adequate cathodic protection was not clearly documented at this casing location. After the out of tolerance pipe-to-soil read (-628 mV) associated with the adjacent casing (Eq#41481745) electrical isolation test on 05/24/2018, a corrective troubleshoot (TS) was generated (SAP Notif# 11649022). This corrective notification, and those subsequently generated during annual monitoring, were cancelled by Corrosion stating "Casing is a known contact. Alternate reads/ means used. The casing is proven to be protected from a cathodic protection standpoint."

CAP #121884854 was submitted as a self-report on 08/11/2021 as a result of previous handling of TS notifications found during an audit of SAP CP records, and was self-reported to SED as part of PG&E's quarterly non-compliance submissions on 10/29/2021. This self-report addressed the unclear documentation, and these instances will be caught in the low P/S read report going forward. SAP Change Request #118599098 is in process to allow various approved CP criteria to be leveraged and documented in SAP by SAP equipment number. This Change Request has a January 1st, 2022 tentative release date for transmission CP monitoring points.

**Unsat #3:**

Question Text	<b>Time-Dependent Threats: External Corrosion - CP Monitoring (TD.CPMONITOR)</b> <u>Question 13.</u> Do records adequately document actions taken to correct any identified deficiencies in corrosion control?
References	§192.491(c) [192.465(d)]
Assets Covered	PG&E Northern Transmission [86284(73)]
Issue Summary	<b>Title 49 CFR §192.465(a) &amp; (d) – External Corrosion Control: Monitoring</b>  Section 192.465(a) states in part, "Each pipeline that is under cathodic protection must be tested at least once each calendar year, but with intervals not exceeding 15 months, to determine whether the cathodic protection meets the requirements of §192.463...."  Section 192.465(d) states, "Each operator shall take prompt remedial action to correct any deficiencies indicated by the [external corrosion control] monitoring."  The May 19, 1989, Federal Pipeline and Hazardous Materials Safety Administration's (PHMSA) Inspection Guideline and Interpretation #PI-89-006 for 192.465(d) states that, as a rule of thumb, PHMSA interprets "prompt" as having the "correction completed by the time of the next scheduled monitoring".  SED found Cathodic Protection Area (CPA) L-400 at MP 25.65, with Equipment # 41481745 to be deficient for intervals exceeding PG&E's routine monitoring frequency defined in TD-4181S, and as required in 49 CFR §192.465(d). SED identified the CPA has been deficient for more than 3 years (see PG&E records below). PG&E's delays in restoring CP deficiencies are violations of Title 49 CFR §192.465(d).  CPA L-400 at MP 25.56 (Eq#41481745):

<i>Date</i>	<i>Pipe to soil (mV)</i>	<i>Casing to soil (mV)</i>	<i>Instant off (mV)</i>
12/21/2017	-429		
04/11/2018	-628	-628	
04/11/2019	-687	-687	-635
04/14/2020	-753	-743	
07/28/2020	-743	-743	

**Response to Unsat #3:**

Please see response to Unsat #2 regarding the same PG&E asset and location.

**Unsat #4:**

Question Text	<b>Time-Dependent Threats: External Corrosion - Cathodic Protection (TD.CP)</b> <u>Question 13.</u> Do records adequately document electrical isolation of each buried or submerged pipeline from other metallic structures unless they electrically interconnect and cathodically protect the pipeline and the other structures as a single unit?
References	§192.491(c) [192.467(a), 192.467(b), 192.467(c), 192.467(d), 192.467(e)]
Assets Covered	PG&E Northern Transmission [86284(73)]
Issue Summary	<b>Title 49 CFR §192.467 – External Corrosion Control: Electrical Isolation</b>  Section 192.467(c) states, "Except for unprotected copper inserted in ferrous pipe, each pipeline must be electrically isolated from metallic casings that are a part of the underground system. However, if isolation is not achieved because it is impractical, other measures must be taken to minimize corrosion of the pipeline inside the casing."  Section 192.467(d) states, "Inspection and electrical tests must be made to assure that electrical isolation is adequate."  The §192.467 requirements apply to pipelines that must be electrically isolated from other underground metallic structures (in this case, casing) and, therefore, each pipeline must be electrically isolated from metallic casings that are a part of the underground system. SED found several casings, which are listed below, are potentially in contact with carrier pipe since 2018. Therefore, PG&E is in violation of Title 49 CFR §192.467(d).  a) SAP 44320649 ETS casing, L-401, MP 213.05 pipe to soil (P/S) -1069 mV, casing to soil (C/S) -1063 mV, interrupting rectifier casing reads still -1060 mV on 8/11/2021. Casing contact can be traced back since 6/18/2018, with (P/S) -1176 mV and (C/S) -1176 mV. b) SAP 41428643 ETS casing, L172A, MP 59.49, (P/S) -1235 mV, (C/S) -1172 mV on 9/2/2021. Casing contact can be traced back since 2/8/2018, with (P/S) -1188 mV and (C/S) -1147 mV.

**Response to Unsat #4:**

- a) Casing (Eq#44320649) – PG&E respectfully disagrees with this finding, as US DOT guidance for pipeline operators has allowed for the management of contacted casings from the mid-1980s to present, as follows:

Regulation Enforcement Guidelines, 192.467 External Corrosion Control – Electrical Isolation, August 11, 1987 revision

*To comply with the requirements of Sections 192.467(c), 192.453, and 192.605, the operator's O&M Plan must incorporate procedures to be used for correcting or negating the adverse effects of shorted casings.*

*After the cathodic protection survey has been completed and a shorted casing has been identified, the operator should have determined a course of action intended to correct or negate the adverse effects of shorted casings.*

Part 192 Corrosion Enforcement Guidance, December 7, 2015 revision

*To avoid loss of current from the carrier pipeline, casings are electrically isolated from the pipeline. However, sometimes this isolation cannot be maintained.*

*Examples of a Probable Violation or Inadequate Procedures*

*c. Metallic short is discovered between the pipeline and casing and the operator did not take any remedial action.*

In addition, the 2015 PHMSA Corrosion Enforcement Guidance includes a 2007 Final Order issued to Tennessee Gas Pipeline ([CPF No. 2-2007-1011](#)) that further defines PHMSA's guidance on contacted casings.

*Under circumstances where it is impractical to achieve isolation, operators are required to take other measures to minimize corrosion of the pipe inside the casing. These measures can range from removing electrolyte between the casing and the carrier pipe and replacing the end seals, to replacing or recoating the carrier pipe. However, the measure appropriate for correcting most shorted casings is to fill the casing annulus with dielectric material (i.e. material that will not conduct current) and to conduct ongoing monitoring.<sup>2</sup>*

<sup>2</sup> National Association of Corrosion Engineers, Standard Recommended Practice RP0200-200, Appendix A

*In circumstances where eliminating the metallic contact or filling the casing with dielectric material is impracticable, still other measures can potentially satisfy the requirement to minimize corrosion. For example, an operator may analyze a given shorted casing or casings and determine that a targeted program or regular internal inspections or frequent monitoring would be sufficient to protect against corrosion.<sup>3</sup>*

<sup>3</sup> Such an analysis would have to be conducted at the time the decision not to take other measures was made and would have to be well documented and technically sound.

PG&E has specific procedures to address the mitigation of casing contacts (TD-4181P-602) and testing of electrical isolation (TD-4181P-601). These two standards meet or exceed federal code requirements as there are no remediation timelines stipulated in 49 CFR Part 192, nor in the enforcement guidelines. As noted in 49 CFR Part 192.467(c), it may be impractical to remediate every contact so PG&E has provisions in TD-4181P-602 Section 3 detailing the actions that should be taken on a casing with a contact that is not cleared.

As reported to SED during the audit, PG&E has been aware of this contact and in 2012, both ends of the casing were excavated; all electrolyte (groundwater) was drained; both end seals were replaced; and a dielectric filler was introduced to minimize the potential for corrosion of the pipe inside the casing should the casing become contacted again in the future. Data indicated the casing was free of contact from 2012-2018 and PG&E continued to monitor for electrical isolation and added it to a quarterly leak survey once a potential contact was found. Based on the 2018 readings indicating a potential contact, PG&E planned for a pipe replacement to eliminate the contact as the original remediation did not remove the casing and potential for future contacts. This project (PM#74022749) will install new pipe to retire the pipe and casing in place and is targeting completion in Q1 2022.

As such, PG&E believes that no violation occurred at this location and respectfully requests that this potential violation be withdrawn.

- b) Casing (Eq# 41428643) – PG&E respectfully disagrees with this finding, as US DOT guidance for pipeline operators has allowed for the management of contacted casings from the mid-1980s to present. Please reference DOT guidance language provided in response to Unsat #4(a).

PG&E has specific procedures to address the mitigation of casing contacts (TD-4181P-602) and testing of electrical isolation (TD-4181P-601). These two standards meet or exceed federal code requirements as there are no remediation timelines stipulated in 49 CFR Part 192, nor in the enforcement guidelines. As noted in 49 CFR Part 192.467(c), it may be impractical to remediate every contact so PG&E has provisions in TD-4181P-602 Section 3 detailing the actions that should be taken on a casing with a contact that is not cleared.

As reported to SED during the audit, an external corrosion direct assessment (ECDA) for this casing was conducted in 2014. Both ends of the casing were excavated; all electrolyte (groundwater) was drained; both end seals were replaced; and a dielectric filler was introduced to minimize the potential for corrosion of the pipe inside the casing.

This creates a low corrosive environment inside the casing to attempt to mitigate future corrosion in a contacted casing. PG&E continues to monitor the casing annually and has added it to a quarterly leak survey plan per the requirements of TD-4181P-602, as well as monitor integrity threats through in-line inspection (ILI) which was last performed in 2019 with no actionable results. The results of the ILI indicate if a non-corrosive environment is occurring in the annulus, as little to no corrosion found in the ILI would indicate that the wax fill is effectively mitigating corrosion.

As such, PG&E believes that no violation occurred at this location and respectfully requests that this potential violation be withdrawn.

## Concerns

### Concern #1:

Question Text	<b>Design and Construction: Design of Pipe Components (DC.DPC)</b> <u>Question 8.</u> Do flanges and flange accessories meet the requirements of 192.147?
References	§192.147 [192.147(a), 192.147(b), 192.147(c), 192.607]
Issue Summary	SED team conducted field inspection at Lincoln Junction Primary Regulator Station and found three stud bolts are too short at two blind flanges, and the nuts are not completely on the bolts. According to the §192.147 Flanges and flange accessories-2.1 Bolting (g), it states: "For all flange joints, the bolts or stud bolts used should extend completely through the nuts." Also, ASME B31.8 Transmission and Distribution Piping System - 831.22 Bolting (a) also has the same statement as §192.147. Please provide an update on any corrective action(s) taken by PG&E.

**Response to Concern #1:**

PG&E recognizes this concern and has taken the following actions:

These bolts were all replaced under PM# 44955980 and completed on 9/17/2021. Please see attached files "Lincoln Jct\_Bolts.pdf", "Lincoln Jct\_Left\_flange.pdf, and "Lincoln Jct\_Right\_flange.pdf".

**Concern #2:**

Question Text	<b>Time-Dependent Threats: Atmospheric Corrosion (TD.ATM)</b> <u>Question 5</u> . Is pipe that is exposed to atmospheric corrosion protected?
References	§192.481(b) [192.481(c), 192.479(a), 192.479(b), 192.479(c)]
Issue Summary	During field inspection in Sierra Division, SED found the span with equipment# 43188057 missing wraps, and heavy vegetation on pipe-to-soil interface of the pipeline. Please provide an update on any corrective action(s) taken by PG&E.

**Response to Concern #2:**

After additional investigation from a corrosion specialist and the Insulation & Coatings (I&C) group, it was determined that this span location, including air-to-soil transitions, is protected from atmospheric corrosion and meets Gas Design Standard E-30.4 (Coating Application On Air-To-Soil Transition Zones) which allows an epoxy basecoat with a UV overcoat. I&C determined this coating was PPG Amerlock 400 epoxy with a PSX-700 Siloxane Top Coat "sunscreen" Epoxy. PM 44992154 was also created to address the vegetation management.

**Concern #3:**

Question Text	<b>Time-Dependent Threats: External Corrosion - Cathodic Protection (TD.CP)</b> <u>Question 14</u> . Are measures performed to ensure electrical isolation of each buried or submerged pipeline from other metallic structures unless they electrically interconnect and cathodically protect the pipeline and the other structures as a single unit?
References	§ 192.467(a) [192.467(b), 192.467(c), 192.467(d), 192.467(e)]
Issue Summary	During field inspection, SED observed several potentially contacted casings due to pipe to soil (P/S) and casing to soil (C/S) potential reads shown below: a) SAP 43186516 ETS casing, L-128 MP 0.4104 -1027 mV (P/S), with (C/S)-1002 mV at East side; -1115 mV (P/S), with (C/S)-1104 mV at West side, instant off -1016 mV, b) SAP 44273507 ETS casing, L-401, MP 213.09 -1229 mV (P/S), -1209 mV (C/S), -864 coupon instant off read, -219 mV native read. Read was -1347 mV (P/S) with -1289 mV (C/S) on 1/29/2020, c) SAP 44320649 ETS casing, L-401, MP 213.05 -1069 mV (P/S), -1063 mV (C/S), -687 coupon instant off read, -179 mV native read. interrupting rectifier casing reads still -1060 mV, d) SAP 41399495 ETS casing, L1523-01, MP 1.75, 1247 mV (P/S), -1236 mV (C/S), e) SAP 41428643 ETS casing, L172A, MP 59.49, 1235 mV (P/S), -1172 mV (C/S), f) SAP 41419960 DREG-4093. MP 0.12 (C/S) -1142 mV on, -1095 mV off.

Please provide an update on any corrective action(s) taken by PG&E.

**Response to Concern #3:**

PG&E recognizes this concern and is providing the following updates:

- a) Casing (Eq#43186516) – This casing was dug up in 2011 and wax filled in 2012. PG&E considers this casing remediated as the wax creates a non-corrosive environment inside the casing.

- b) Casing (Eq#44273507) – This is the same physical casing as 44320649, just a duplicate SAP EQ.
- c) Casing (Eq#44320649) – Please see response to Unsat #4(a) regarding the same PG&E asset and location.
- d) Casing (Eq# 41399495) – This casing was flagged for review under the 09/22/2021 SAP analysis. PG&E will review the data and determine next steps for this casing.
- e) Casing (Eq# 41428643) – Please see response to Unsat #4(b) regarding the same PG&E asset and location.
- f) Casing (Eq# 41419960) – This casing was flagged for review under the 07/14/2021 SAP analysis. PG&E will review the data and determine next steps for this casing.

Please contact Mike Lang at (209) 601-9853 or Michael.Lang@pge.com for any questions you may have regarding this response.

Sincerely,

/s/ Jerrod Meier

Director, Risk, Compliance, & Oper. Qual.

cc: Dennis Lee, SED  
Mahmoud Intably, SED  
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Susie Richmond, PG&E