EASTERN
GAS TRANSMISSION AND STORAGE
A BERKSHIRE HATHAWAY ENERGY COMPANY

Eastern Gas Transmission and Storage, Inc.
925 White Oaks Blvd
Bridgeport, WV 26330

March 16, 2022

Mr. Robert Burrough
Director, Eastern Region, Office of Pipeline Safety
Pipeline and Hazardous Materials Safety Administration
840 Bear Tavern Road, Suite 300
West Trenton, New Jersey 08628

Re: CPF 1-2022-011-WL

Dear Mr. Burrough:

Please find the Eastern Gas Transmission and Storage, Inc. (EGTS) response to Warning Letter CPF 1-2022-011-WL, dated February 8, 2022. Specifically, PHMSA noted the following probable violation:

1. § 192.461 External corrosion control: Protective coating.

(a) Each external protective coating, whether conductive or insulating, applied for the purpose of external corrosion control must -
(1) …
(2) Have sufficient adhesion to the metal surface to effectively resist underfilm migration of moisture.

EGTS failed to ensure the external coating on their PL-1x2 pipeline has sufficient adhesion to the metal surface to effectively resist under film migration of moisture in accordance with § 192.461(a)(2).

During the inspection, EGTS provided records that reflected that coating disbondments, in the form of osmotic blisters, are present on portions of their Fusion Bonded Epoxy (FBE) coated PL-1x2 pipeline. PL-1x2 is a 24" diameter pipeline, approximately 80 miles in length, and installed in 2008. The Maximum Allowable Operating Pressure varies between 1454 psig and 1250 psig. The PL-1x2 pipeline is located in classes 1 through 3, with portions in a HCA, and is non-odorized. The pipeline runs from Leidy Compressor Station in Clinton County, PA to the Centre Compressor Station in Centre County, PA. All 80 miles of PL-1x2 were under the same pipe specifications and procedures or the mill coating process.

The Association for Materials Protection and Performance (AMPP) (formerly NACE) website references a 2019 publication Blister Initiation Mechanism of FBE Coatings which states in part, "FBE coating blistering is a common failure mode" and "Osmotic pressure is from the residual soluble salts on steel surface".

EGTS stated that they have not conducted a root cause analysis for the osmotic blisters; however, they have reviewed industry documents on the subject and have revised their procedures to help prevent future FBE coating blisters from occurring. EGTS stated that they

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have made revisions to their Mill Applied External Fusion Bond Coating specifications and the Quality Control Inspection Task for Fusion Bonded Epoxy procedures.

Records reflected that EGTS has monitored the blistered pipeline and has replaced sections of the blistered pipe in an HCA area. However, with blisters present and possible future blisters developing on this pipe, timely and/or additional monitoring may be needed by EGTS to ensure conditions or corrosion are not present and appropriate mitigation is performed.

Based on the osmotic blisters appearing under the FBE on the PL-1x2 pipe, EGTS failed to ensure that coating applied to their PL-1x2 pipeline had sufficient adhesion to the metal surface to effectively resist under film migration of moisture in accordance with § 192.461(a)(2).

...

We have reviewed the circumstances and supporting documents involved in this case and have decided not to conduct additional enforcement action or penalty assessment proceedings at this time. We advise you to correct the item identified in this letter. Failure to do so will result in Eastern Gas Transmission and Storage, Inc. being subject to additional enforcement action.

EGTS Response:

As stated by EGTS during the inspection, and demonstrated via reference to relevant research, disbonded or blistered fusion bonded epoxy (FBE) coating does not shield cathodic protection (CP) and does not cause corrosion if adequate CP is applied to the pipeline. EGTS conducts close interval surveys (CIS) on its pipeline system to ensure that the entire length of the pipeline has adequate CP to minimize external corrosion on the pipeline system. The most recent CIS was completed on PL-1x2 in 2018 and the findings indicated that the CP system is functional and that PL-1x2 is receiving adequate CP. The most recent in-line inspection (ILI) was also completed on PL-1x2 in 2018. EGTS provided PHMSA with the ILI data as requested following the conclusion of the inspection. This ILI data was integrated with the CIS data to evaluate the pipeline for areas that may be more susceptible to external corrosion.

In the EGTS response (submitted on 1/7/2021) to the PHMSA data request (received on 11/9/2020), EGTS provided PHMSA with a description of how disbonded or blistered FBE is considered in its Integrity Management Program (IMP) and its associated risk ranking process. The EGTS response stated that the External Coating Damage or Disbondment data element within the external corrosion likelihood of failure sub-algorithm accounts for brittle, damaged, disbondment (blisters), and distortion related coating defects.

As described in the Warning Letter, *"EGTS stated that they have made revisions to their Mill Applied External Fusion Bond Coating specifications and the Quality Control Inspection Task for Fusion Bonded Epoxy procedures."* In the EGTS response (submitted on 1/7/2021) to the PHMSA data request (received on 11/9/2020), EGTS noted that it has utilized industry documents to evaluate and improve its FBE coating process to prevent reoccurrence of the noted blisters or

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disbonded coating and referenced the following industry papers that have been published concerning the subject of FBE coating blisters which are available to the public for review:

- NACE Paper No. 06044 Fusion Bonded Epoxy - A Field Proven Fail Safe Coating System (2006)
https://store.nace.org/06044-fusion-bonded-epoxy
- NACE Paper No. 7246 Fusion Bonded Epoxy Coatings (FBE) and Disbondment (2016)
https://store.nace.org/fusion-bonded-epoxy-coatings-fbe-and-disbondment
- PR-377-113602-R01 Long-term Field Performance and Review of Failure Modes and Effects of FBE Coatings (2020)
https://www.prci.org/Research/Corrosion/CORRProjects/EC-3-13/4009/181067.aspx

These industry papers, as well as other industry papers support that disbonded or blistered FBE coating does not cause external corrosion if adequate CP is applied to the pipeline.

EGTS reviewed the referenced Association for Materials Protection and Performance (AMPP, formerly NACE International), Paper No. 13508 (Blister Initiation Mechanism of FBE Coatings) and did not locate the statements referenced in Warning Letter CPF 1-2022-011. AMPP Paper No. 13508 is a follow up industry paper to a 2012 industry paper. These industry papers evaluate osmotic and non-osmotic blisters and focus on the integrity of the coating, not the integrity of the pipeline.

Based on the measures described in this letter, in addition to the measures described in the EGTS response (submitted on 1/7/2021) to the PHMSA data request (received on 11/9/2020), EGTS has and continues to take the appropriate actions to confirm that there are no negative integrity impacts on the PL-1x2 pipeline, or any pipeline with adequate CP, resulting from the blistered FBE coating.

If you have any questions, concerns, or should require additional information, please contact Dan Stahl at 681-842-3365 (office) or 304-266-6062 (mobile).

Respectively,

John M. Lamb
Vice President, Eastern Pipeline Operations
Eastern Gas Transmission and Storage, Inc.