# **Public Quarterly Report**

Date of Report: 2nd Quarterly Report, March 29, 2023 Contract Number: 693JK32210002POTA Prepared for: Government Agency: DOT and Co-funders Project Title: Monitoring the Long-Term Compatibility of Vapor Corrosion Inhibitor and Cathodic Protection Associated Components Prepared by: Pipeline Research Council International, Inc. Contact Information: Laurie Perry, email: <u>lperry@prci.org</u> phone: 571-600-2002 For quarterly period ending: March 31, 2023

# 1: Items Completed During this Quarterly Period:

Item	Task	Activity/Deliverable	Title	Federal Cost	Cost Shares
1	1	Research literature and summarize literature search findings	Results to be included in quarterly report	\$7,094	\$7,094
3	2	Planning and procurement for field testing	To be summarized in quarterly report	\$12,117	\$12,117
4	4	Planning and procurement for large-scale and laboratory experiments	To be summarized in quarterly report	\$12,117	\$12,117
8	2	Identification of the VCI-treated tanks for field testing, collection of the VCI treatment and dosages information	To be summarized in quarterly report	\$6,515	\$6,515
9	5	Quarterly status report & project management	Submit 2nd quarterly report	\$5,133	\$5,133

### 2: Items Not Completed During this Quarterly Period:

Item	Task	Activity/Deliverable	Title	Federal	Cost
#	#			Cost	Share
6	2	<i>Obtain VCI dosage information for tank pad chemical compositions and tank bottom characteristics</i>	Summarize the dosages for a range of conditions to be include in quarterly report	\$4,508	\$4,508
7	1	Collect and start analyzing environmental well water samples	To be summarized in quarterly report	\$3,258	\$3,258

# 3: Project Financial Tracking During this Quarterly Period:

Note that this chart reflects Federal share only.





### 4: Project Technical Status –

The following activities were undertaken:

Item 1, Task 1 — Research literature and summarize literature search findings, Results to be included in quarterly report: The literature search related to vapor corrosion inhibitor (VCI) and cathodic protection (CP) interaction was completed. Following is a summary of the literature search.

- Pynn and Abed (Reference a) conducted laboratory scale experiments to evaluate VCI and CP interactions. The authors reported synergistic effect between the particular inhibitor tested and CP, where the inhibitor enhances cathodic polarization to reduce cathodic protection current requirement, and cathodic protection reduction reaction appears to have enhanced the absorption & effectiveness of the inhibitor at the cathodic metal surface.
- PRCI Phase 1 (Reference b) also reported synergistic interaction between VCIs and CP and reported that one VCI reduced the current requirement to achieve -850 mV vs. Cu/CuSO<sub>4</sub> instant off potential. In addition, the authors reported that VCIs presence do not inhibit anodes' ability to deliver the CP current.
- PRCI Phase 2 (Reference c) documented VCI and CP interaction using the field data which indicated that the ground bed resistance did not change significantly after VCIs addition. In addition, the CP rectifier current outputs also did not change after VCIs addition. Overall, VCI addition did not seem have any detrimental effect on CP system components.

References:

- a) C.R. Pynn and K. Abed, "Compatibility & Interactions between Cathodic Protection and a Vapor Phase Corrosion Inhibitor." In Proceedings of CORROSION 2017, Paper No. 9232 (Houston, TX, NACE, 2017).
- b) P. Shukla, X. He, O. Pensado, A. Nordquist, "Vapor Corrosion Inhibitors Effectiveness for Tank Bottom Plate Corrosion Control," Report Catalog Number PR-015-153602-R01, Chantilly, VA: PRCI, Inc. 2018.
- c) P. Shukla, A. Nordquist, R. Fuentes, B. Wiersma, "Vapor Corrosion Inhibitors Effectiveness for Tank Bottom Plate Corrosion Control – Ph2," Report Catalog Number PR644-183611-R01, PRCI, Chantilly, Virginia, 2022.

This item has been completed, and it satisfies item 1 in Attachment 2 Project Deliverables. The above links to item 3 as listed in Attachment 1 Project Team Activities.

Item 3, Task 2 — Planning and procurement for field testing, To be summarized in quarterly report: A total of 23 tanks have been identified where field testing will be conducted. All tanks have been treated with VCIs. Following is a summary:

- Nine tanks already have UT-based mass loss coupons; the UT coupons were placed at targeted locations. The floor scan data will be used to select to select two UT coupons for extraction, along with obtaining CP-ON and instant OFF potentials; extracting UT probe and imaging probe sensing coupon, wipe it clean, image clean surface; obtaining under tank sand sampling; positioning mass-loss coupons along-side the UT probe and installation.
- Three tanks already have several ER and UT probes. The scan drawing will be used to remove existing two ER and UT coupons, and ER probes will be replaced with mass-loss coupons.
- Nine tanks already have several ER probes. The scan drawing will be used to remove existing two ER probes, two mass-loss coupons will be installed with alongside the existing ER probes.
- Two tanks have VCI treatment but no monitoring. ER probes and mass-loss coupons will be installed at eight locations for each of the two tanks.

The procurement of the mass-loss coupons is underway. Procurement of the material for the laboratoryscale and the large-scale testing is also underway. This item has been completed, and it satisfies item 3 in Attachment 2 Project Deliverables. The above links to item 4 as listed in Attachment 1 Project Team Activities.

Item 4, Task 4 — Planning and procurement for large-scale and laboratory experiments, To be summarized in quarterly report: A detailed plan for the large-scale testing has been developed, including design and essential details such as sand box size, number and placement of coupons, size and characteristics of the ER probes, and CP related details. Various supplies and materials needed for the large-scale experiments are being procured. Similarly, planning for laboratory scale experiment has been completed, and supplies and materials are being procured. This item has been completed, and it satisfies item 3 in Attachment 2 Project Deliverables. The above links to item 4 as listed in Attachment 1 Project Team Activities.

Item 8, Task 2 — Identification of the VCI-treated tanks for field testing, collection of the VCI treatment and dosages information, To be summarized in quarterly report: Twenty three VCI-treated tanks have been identified, details of the tanks are provided under Item 3, Task 2. This item has been completed, and it satisfies item 3 in Attachment 2 Project Deliverables. The above links to item 4 as listed in Attachment 1 Project Team Activities.

Item 6, Task 2 — Obtain VCI dosage information for tank pad chemical compositions and tank bottom characteristics, Summarize the dosages for a range of conditions to be include in quarterly report: The VCI dosage information has been partially collected, and still being collected variety of other conditions. This item has not been completed yet. The above links to item 3 as listed in Attachment 1 Project Team Activities.

Item 7, Task 1 — Collect and start analyzing environmental well water samples, To be summarized in quarterly report: Plans have been made to collect the environmental well water samples, the collection activity will be conducted during the third week of April 2023. This item has not been completed yet. The above links to item 5 as listed in Attachment 1 Project Team Activities.

Item 9, Task 5 — Quarterly status report & project management, Submit 1st quarterly report: This item has been completed. This item has been completed, and it partly satisfies item 13 in Attachment 2 Project Deliverables. The above links to item 13 as listed in Attachment 1 Project Team Activities.

#### **5: Project Schedule:**

The following items were not completed in the second quarter due to contracting delay between PRCI/BSRA.

Item 6, Task 2 — Obtain VCI dosage information for tank pad chemical compositions and tank bottom characteristics, Summarize the dosages for a range of conditions to be include in quarterly report: The VCI dosage information has been partially collected, and still being collected variety of other tank pad conditions.

Item 7, Task 1 — Collect and start analyzing environmental well water samples, To be summarized in quarterly report: Plans have been made to collect the environmental well water samples, the collection activity will be conducted during the third week of April 2023.

The two activities, mentioned above, are undergoing will be completed in the next quarter. The project team plans to accelerate work in the next quarter and catch up so that the entire project is back on schedule by the end of the next quarter.

*The project has caught up considerably but is still behind schedule.*