



Corrosion Management, Inc.

System Designs • Resurveys • Troubleshooting • Repairs

May 26, 2017

Bill Collins
Citizens Bank & Trust Company
126 S. Main St.
Blackstone, VA 23824

Location: Burkeville Market
404 N. 2nd St.
Burkeville, VA
Job #RS-3492

On May 16, 2017, we were at the subject location to recommission/resurvey the Impressed Current Cathodic Protection System on 2 Steel Tanks and Steel Product Lines. We also tested the Sacrificial Anode Systems on 3 STI-P3 Tanks.

Upon arrival at the site, the ICCP System rectifier for the 2 Diesel Tanks and Steel Product Lines was found turned off. We took and recorded depolarized local potential readings. This was done to meet the NACE 100mv polarization criteria if needed. The rectifier was then turned on and a period of polarization was allowed to occur. After the period of polarization, a full resurvey was done.

As of May 26, 2006, Virginia requires that all Cathodic Protection testing be completed according to their document titled "Guidelines for Underground Storage Tank Cathodic Protection Evaluation". The resurvey test data must be recorded on the states forms and include a site drawing. These documents are attached to this letter.

The 2 Diesel Steel Tanks and Diesel Steel Product Lines passed the Impressed Current System resurvey for corrosion protection according to the requirements in the VADEQ document referenced above. The 3 Gasoline STI-P3 Tanks also passed Sacrificial Anode System resurveys according to the VADEQ requirements.

We greatly appreciate your business. If you have any questions or need more information, do not hesitate to call me at (888) 822-2431.

Sincerely,

Rick Rogers
NACE Cathodic Protection Specialist #4394

VIRGINIA
DEQ

7531-CP (03/05)

- > This form should be utilized to evaluate underground storage tank (UST) cathodic protection systems in the Commonwealth of Virginia.
- > Access to the soil directly over the cathodically protected structure that is being evaluated must be provided.
- > A site drawing depicting the UST cathodic protection system and all reference electrode placements must be completed.

I. UST OWNER

II. UST FACILITY

NAME **NAME:** *Burkeville Market* **ID #**

ADDRESS: **ADDRESS:** *404 North 2nd Street*

CITY: **PHONE:** **CITY:** *Burkeville* **COUNTY:**

STATE: VA **ZIP:** **STATE:** VA **ZIP:** **PHONE:**

III. REASON SURVEY WAS CONDUCTED (mark only one)

Routine - 3 year Routine - within 6 months of installation 90-day re-survey after fall Re-survey after repair/modification

Date next cathodic protection survey must be conducted _____ (required within 6 months of installation/repair & every 3 years thereafter).

IV. CATHODIC PROTECTION TESTER'S EVALUATION (mark only one)

PASS All protected structures at this facility pass the cathodic protection survey and it is judged that adequate cathodic protection has been provided to the UST system (indicate all criteria applicable by completion of Section VI).

FAIL One or more protected structures at this facility fail the cathodic protection survey and it is judged that adequate cathodic protection has not been provided to the UST system(s) (complete Section VII).

TESTER'S NAME: Gary Burchard **SOURCE OF CERTIFICATION:** STI

COMPANY NAME: Precision Line Test, LLC **TYPE OF CERTIFICATION:** CP-Tester

ADDRESS: P.O. Box 63 **CERTIFICATION NUMBER:** R02-14

CITY: Powhatan **STATE:** VA **ZIP:** 23138 **PHONE:** 804-664-3178

CP TESTER'S SIGNATURE: *Gary Burchard* **DATE SIGNED:** *5/16/17* **DATE CP SURVEY PERFORMED:** *5/16/17*

V. CORROSION EXPERT'S EVALUATION (mark only one)

The survey must be conducted and/or evaluated by a corrosion expert when: a) supplemental anodes or other changes in the construction of the cathodic protection system are made; b) stray current may be affecting buried metallic structures or c) an inconclusive result was written in Section VI. (except for under STI-R972— "Recommended Practice for the Addition of Supplemental Anodes to sif-P₂ UST's")

PASS All protected structures at this facility pass the cathodic protection survey and it is judged that adequate cathodic protection has been provided to the UST system (indicate all criteria applicable by completion of Section VI).

FAIL One or more protected structures at this facility fail the cathodic protection survey and it is judged that adequate cathodic protection has not been provided to the UST system (indicate what action is necessary by completion of Section VII).

CORROSION EXPERT'S NAME: *Richard Rogers* **SOURCE OF CERTIFICATION:** *NACE*

COMPANY NAME: *UST Corrosion Mgmt., Inc.* **TYPE OF CERTIFICATION:** *CP Specialist*

ADDRESS: *2764 Pleasant Rd. #10714* **CERTIFICATION NUMBER:** *4394*

CITY: *Fort Mill* **STATE:** *SC* **ZIP:** *29708* **PHONE:** *(803) 802-0562*

CORROSION EXPERT'S SIGNATURE: *Richard Rogers* **DATE:** *5-26-17*

VI. CRITERIA APPLICABLE TO EVALUATION (mark all that apply)

-850mV ON (Instant) OFF Structure-to-soil potential more negative than -850 mV with respect to a Cu/CuSO₄ reference electrode with protective current ON (galvanic) or temporarily interrupted (Instant-OFF (impressed)). Inconclusive?

100 mV POLARIZATION Structure(s) exhibit at least 100 mV of cathodic polarization. Inconclusive?

VII. ACTION REQUIRED AS A RESULT OF THIS EVALUATION (mark only one)

NONE Cathodic protection is adequate. No further action is necessary at this time. Test again by no later than (see Section V).

RETEST Cathodic protection may not be adequate. Retest during the next 90 days to determine if passing results can be achieved.

REPAIR & RETEST Cathodic protection is not adequate. Repair/modification is necessary as soon as practical but within the next 90 days.

VIII. DESCRIPTION OF UST SYSTEM

TANK	PRODUCT	CAPACITY	TANK MATERIAL	PIPING MATERIAL	FLEX CONNECTORS
1	Plus		STIP ³	Non METALIC	YES TOTAL CONT
2	Reg-U		STIP ³	" "	" " "
3	Reg-U		STIP ³	" "	" " "
4	DIESEL		STEEL	STEEL	NA
5	DIESEL		STEEL	NA	NA
6					
7					
8					
9					
10					

IX. IMPRESSED CURRENT RECTIFIER DATA (complete all applicable)

In order to conduct an effective evaluation of the cathodic protection system, a complete evaluation of rectifier operation is necessary.

RECTIFIER MANUFACTURER: <p style="text-align: center; font-size: 1.2em;">UNIVERSAL</p>	RATED DC OUTPUT: <p style="text-align: center;">40 VOLTS 5 AMPS</p>
RECTIFIER MODEL: <u>ES2</u>	RECTIFIER SERIAL NUMBER: <u>060611</u>
RECTIFIER OUTPUT AS INITIALLY DESIGNED OR LASTLY RECOMMENDED (if available): _____ VOLTS _____ AMPS	

EVENT	DATE	TAP SETTINGS		DC OUTPUT		HOUR METER	COMMENTS
		COARSE	FINE	VOLTS	AMPS		
"AS FOUND"	5/16/17	1	3	5	2.4	NA	
"AS LEFT"	5/16/17	1	3	5	2.4	NA	

X. IMPRESSED CURRENT POSITIVE & NEGATIVE CIRCUIT MEASUREMENTS (output amperage)

Complete if the system is designed to allow such measurements (i.e. individual lead wires for each anode are installed and measurement shunts are present).

CIRCUIT	1	2	3	4	6	8	7	8	9	10	TOTAL AMPS
ANODE (+)	7.1	2.8	3	3.2							
TANK (-)											

XI. DESCRIPTION OF CATHODIC PROTECTION SYSTEM REPAIRS AND/OR MODIFICATION

Complete if any repairs or modifications to the cathodic protection system are made OR are necessary. Certain repairs/modifications as explained in the text of the VADEQ cathodic protection guidance document are required to be designed and/or evaluated by a corrosion expert (completion of Section V required).

- Additional anodes for an impressed current system (attach corrosion expert's design).
- Supplemental anodes for a STI-P3® tank or metallic pipe (attach corrosion expert's design or documentation industry standard was followed).
- Repairs or replacement of rectifier (explain in "Remarks/Other" below).
- Anode header cables repaired and/or replaced (explain in "Remarks/Other" below).
- Impressed current protected tanks/piping not electrically continuous (explain in "Remarks/Other" below).
- Galvanically protected tanks/piping NOT electrically isolated (explain in "Remarks/Other" below).

Remarks/Other: DEPOLARIZED READINGS ON 2 DIESEL TANKS BEFORE STARTING RECTIFIER: DIESEL
Fill-850, Middle-910, END-850, DIESEL Fill-1199, Middle-1123, END-1082

XIV. CATHODIC PROTECTION SYSTEM SURVEY

This section may be utilized to conduct a survey of the cathodic protection system by obtaining structure-to-soil potential measurements.

- | | |
|---|--|
| <ul style="list-style-type: none"> > For impressed current systems: the reference electrode must be placed (minimum of three locations) in the soil directly above the structure that is being tested and as far away from any active anode as practical to obtain a valid structure-to-soil potential (refer to the VADEQ cathodic protection evaluation guidance document for detailed discussion of electrode placement). > Both "on" and "instant off" potentials must be measured for each structure that is intended to be under cathodic protection. > The "instant off" potential must be -850 mV or more negative or the 100 mV polarization criterion must be satisfied in order to pass. | <ul style="list-style-type: none"> > For Galvanic systems: the reference electrode must be placed (minimum of three locations) in the soil directly over the tested structure (local) or one local plus one remote 25-100 feet away from the structure. > Both the local and any remote voltage must be -850 mV or more negative, in order for the structure to pass. > Inconclusive is indicated when both the local and any remote structure-to-soil potentials do not result in the same outcome (both must "pass" or both "fail"). > As a place to record the "galvanic CP system voltage", use the "instant |
|---|--|

FACILITY NAME: BURKEVILLE MARKET

NOTE: This survey is not complete unless all applicable parts of sections I - XIV are also completed.

LOCATION ¹ CO ID	STRUCTURE ²	CONTACT POINT ³	REFERENCE CELL PLACEMENT ⁴	ON ⁵ VOLTAGE	INSTANT ⁶ OFF VOLTAGE	100 mV polarization		PASS ⁸ FAIL
						ENDING ⁷ VOLTAGE	VOLTAGE CHANGE	
R1-GV	PLUS STE ^{P3}	TANK BOTTOM	@ Fill	-1084				PASS
R2-GV	" "	" "	@ MIDDLE	-1041	-890			PASS
R3-GV	" "	" "	@ STP	-1129				PASS
R1-GV	REG STE ^{P3}	TANK BOTTOM	@ Fill	-1018				PASS
R2-GV	" "	" "	@ MIDDLE	-990	-887			PASS
R3-GV	" "	" "	@ STP	-1000				PASS
R1-GV	REG STE ^{P3}	TANK BOTTOM	@ Fill	-1076				PASS
R2-GV	" "	" "	@ MIDDLE	-1001	-915			PASS
R3-GV	" "	" "	@ STP	-1030				PASS

COMMENTS: GAS LINES ARE TOTAL CONTAINMENT STP + DISP. GAS LINES ARE NON METALLIC

1. Designate numerically or by code on the site drawing each local reference electrode placement (e.g. 1,2,3... T-1, T-2, P-1, P-2...etc.).
2. Describe the structure that is being tested (e.g. plus tank; diesel piping; flex connector, etc.).
3. Describe where the structure being tested is contacted by the test lead (e.g. plus tank bottom; diesel piping @ dispenser 7A; etc.).
4. Describe the exact location where the reference electrode is placed for each measurement (e.g. soil @ regular tank STP manway; soil @ dispenser 2, etc.).
5. (Applies to all tests) Record the structure-to-soil potential (voltage) observed with the current applied (e.g. -1070 mV).
6. (Applies to all tests) Record the structure to soil potential (voltage) observed when the current is interrupted (e.g. 890 mV).
7. (Applies to 100 mV polarization test only) Record the voltage observed at the end of the test period (e.g. 873 mV).
8. (Applies to 100 mV polarization test only) Subtract the final voltage from the instant off voltage (e.g. 890 mV - 873 mV = 108 mV).
9. Indicate if the tested structure passed or failed one of the two acceptable criteria (850 instant off or 100 mV polarization) based on your interpretation of data.

XIV. CATHODIC PROTECTION SYSTEM SURVEY

This section may be utilized to conduct a survey of the cathodic protection system by obtaining structure-to-soil potential measurements.

- | | |
|--|---|
| <ul style="list-style-type: none"> > For Impressed Current systems: the reference electrode must be placed (minimum of three locations) in the soil directly above the structure that is being tested and as far away from any active anode as practical to obtain a valid structure-to-soil potential (refer to the VADEQ cathodic protection evaluation guidance document for detailed discussion of electrode placement). > Both "on" and "instant off" potentials must be measured for each structure that is intended to be under cathodic protection. > The "instant off" potential must be -850 mV or more negative or the 100 mV polarization criterion must be satisfied in order to pass. | <ul style="list-style-type: none"> > For Galvanic systems: the reference electrode must be placed (minimum of three locations) in the soil directly over the tested structure (local) or one local plus one remote 25-100 feet away from the structure. > Both the local and any remote voltage must be -850 mV or more negative, in order for the structure to pass. > Inconclusive is indicated when both the local and any remote structure-to-soil potentials do not result in the same outcome (both must "pass" or both "fail"). > As a place to record the "galvanic CP system voltage", use the "Instant |
|--|---|

FACILITY NAME: BURKEVILLE MARKET

NOTE: This survey is not complete unless all applicable parts of sections I - XIV are also completed.

LOCATION ¹ CO DE	STRUCTURE ²	CONTACT POINT ³	REFERENCE CELL PLACEMENT ⁴	ON ⁵ VOLTAGE	DISTANT ⁶ OFF VOLTAGE	100 mV polarization		PASS ⁸ FAIL
						ENDING ⁷ VOLTAGE	VOLTAGE CHANGE ⁸	
R1-IC	Diesel TANK [Ⓢ]	TANK BOTTOM	Ⓢ FILL RISER	- 1755	1016			PASS
R2-IC	" "	" "	Ⓢ MIDDLE	- 1770	1066			PASS
R3-IC	" "	" "	Ⓢ END	- 1843	1002			PASS
R1-IC	Diesel TANK [Ⓢ]	TANK BOTTOM	Ⓢ FILL RISER	- 1475	992			PASS
R2-IC	" "	" "	Ⓢ MIDDLE	- 1559	1007			PASS
R3-IC	" "	" "	Ⓢ END	- 1707	1091			PASS
R1-IC	Diesel LINE	TANK BOTTOM	Ⓢ Diesel DISP Riser	- 1336	914			PASS
R2-IC	" "	" "	Ⓢ Diesel LINE 50'	- 1382	882			PASS
R3-IC								

COMMENTS: IMPRESSED CURRENT SIDE THE RECTIFIER GROUND WAS USED ON THE CONTINUITY SURVEY
DIESEL SUPPLY LINE WAS TESTED MIDWAY. DISP REMOVED

1. Designate numerically or by code on the site drawing each local reference electrode placement (e.g. 1,2,3... T-1, T-2, R-1, R-2...etc.).
2. Describe the structure that is being tested (e.g. plus tank; diesel piping; flex connector, etc.).
3. Describe where the structure being tested is contacted by the test lead (e.g. plus tank bottom; diesel piping @ dispenser 7/B; etc.).
4. Describe the exact location where the reference electrode is placed for each measurement (e.g. soil @ regular tank STP manway; soil @ dispenser 2, etc.)
5. (Applies to all tests) Record the structure-to-soil potential (voltage) observed with the current applied (e.g. -1070 mV).
6. (Applies to all tests) Record the structure to soil potential (voltage) observed when the current is interrupted (e.g. 680 mV).
7. (Applies to 100 mV polarization test only) Record the voltage observed at the end of the test period (e.g. 878 mV).
8. (Applies to 100 mV polarization test only) Subtract the final voltage from the instant off voltage (e.g. 680 mV - 878 mV = 198 mV).
9. Indicate if the tested structure passed or failed one of the two acceptable criteria (850 instant off or 100 mV polarization) based on your interpretation of data.

XII. UST FACILITY SITE DRAWING

Attach detailed drawing of the UST and cathodic protection systems. Sufficient detail must be given in order to clearly indicate where the reference electrode was placed for each structure-to-soil potential that is recorded on the survey forms. Any pertinent data must also be included. At a minimum indicate the following: all tanks, piping and dispensers; all buildings and streets; all anodes and wires; location of CP test stations; and, each reference electrode placement must be indicated by a code (1, 2, 3; R-1, R-2, R-3...etc.) corresponding with the appropriate line number in Section XIV of this form. (Note, CP test stations (PP4) may be questionable for use as described in Section 6.1.2)

AN EVALUATION OF THE CATHODIC PROTECTION SYSTEM IS NOT COMPLETE WITHOUT AN ACCEPTABLE SITE DRAWING.

