MINNESOTA POLLUTION CONTROL AGENCY
520 Lafayette Road North
St. Paul, MN 55155-4194

UST cathodic protection system evaluation Impressed Current Type

Underground Storage Tanks (UST) Program

Doc Type: Compliance Certification

Instructions:

- All reports must be submitted regardless of results (pass, fail, or inconclusive) within 30 days
- Incomplete forms will not be accepted and will be returned.

Submittal: To submit this form, open the form using Internet Explorer Web browser or Adobe Acrobat Reader, save the form to your computer and send to the MPCA by using the submit button at the end of the form, or attach the form to an email message, using "Impressed Current form" as the subject line to undergroundtanks.pca@state.mn.us.

1. UST facility

MPCA Site ID #: _____

Name: _____

Address: _____

City: _____ Zip code: _____

County: _____ Phone: _____

Contact name (if different than above): _____

2. UST owner/operator

Name: _____

Address: _____

City: _____ State: _____

Zip code: _____ Phone: _____

Contact phone: _____

3. Cathodic protection (CP) tester information and qualifications

Tester name (print): _____ Company name: _____

Address: _____ City: _____

State: _____ Zip code: _____ Phone: _____ Email: _____

National Association of Corrosion Engineers (NACE) international certification #: _____

Steel Tank Institute (STI) certification #: _____

4. Reason survey was conducted (check only one)

☐ Routine - Annual ☐ Routine - within 6 months of install ☐ 30-day re-survey after fail ☐ Re-survey within 6 months of repair/modification

Date next CP survey must be conducted by (mm/dd/yyyy): _____ (Required within 6 months of install or repair, and annually thereafter.)

5. CP tester's evaluation (check only one)

☐ **Pass** All protected structures at this facility pass the CP survey and the continuity survey indicates all protected structures are continuous. It is judged that adequate CP has been provided to the UST system (Complete sections 7 and 8).

☐ **Fail** One or more protected structures at this facility fail the CP survey, and it is judged that adequate CP has not been provided to the UST system. (Complete sections 7 and 8).

☐ **Inconclusive** Stray current may be affecting one or more of the protected structures, or the tester cannot conclusively determine a pass or failing test result based on irregular test results. (Corrosion Expert to complete section 6).

Date CP survey performed (mm/dd/yyyy): _____

6. Corrosion expert's evaluation (if applicable)

The attached survey must be conducted and/or evaluated by a corrosion expert when: a) supplemental anodes or any repairs of the impressed current system are made; b) current output changes are made to the rectifier; c) the continuity survey indicates one or more of the protected structures are not continuous; d) stray current may be effecting protected structures; e) when required by MPCA (Corrosion Expert to complete sections 7 and 8).

☐ **Pass** All protected structures at this facility have been judged that the adequate CP is provided to the UST system.

☐ **Fail** One or more protected structures at this facility fail the CP survey and it is judged that adequate CP has not been provided to the UST system.

Corrosion expert's name (print): _____ Phone: _____

Company name: _____

NACE Int./PE certification: _____ NACE Int./PE certification #: _____

7. Criteria applicable to evaluation (check all that apply)

☐ **-850 Off** Structure-to-soil potential more negative than -850 mV with the protective current momentarily interrupted. ("Instant Off")

☐ **100 mV** Structure tested exhibits at least 100 mV of cathodic polarization. ("Instant Off " readings minus native /depol readings)

Facility name: _____ Date CP survey performed: _____

(Note: The facility name and date of survey will automatically populate from page one.)

8. Action required as a result of this evaluation (check only one)

☐ **None** CP is adequate. No further action is necessary at this time. Test again by no later than (see section 4).

☐ **Retest** CP may not be adequate. Retest within 30 days to determine if passing results can be achieved. (Retests may occur only if all intended protected structures are continuous with each other)

☐ **Repair & Retest** CP is not adequate. Repair/modification is necessary within the next 60 days, **or** permanently close the tank system.

9. Impressed Current rectifier data

Rectifier manufacturer: _____ Model: _____ Serial #: _____

Rated DC output: _____ volts _____ amps Rectifier output as designed or lastly recommended (if available): _____ volts _____ amps

Event	Date (mm/dd/yyyy)	Tap settings		DC output		Hour meter	Comments
		Course	Fine	Volts	Amps		
"As Found"							
"As Left"							

Note: *If rectifier output settings are modified, a corrosion expert must be consulted first and approve the modifications by signing section 6*

10. Impressed Current positive and negative circuit measurements (output amperage)

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

Circuit	1	2	3	4	5	6	7	8	9	10	Total amps
Anode (+)											
Tank/Pipe (-)											

11. CP system repairs and/or modification information

Date of "failing" test: _____ Date of repair: _____ Repair company: _____

Name of lead repair technician: _____ Phone # _____

Certification of repair technician (check all that apply): ☐ Steel Tank Institute ☐ NACE ☐ MPCA certified supervisor

Note: *submit failing test results with this report*

Description of repairs (check all that apply)

☐ 1. Anodes for an impressed current system were added or replaced

☐ 2. Repair or replacement of anode header cables were needed

☐ 3. Continuity was established between all protected structures

☐ 4. Rectifier was repaired or replaced

Repairs /modifications for 1-4 must be designed by a "corrosion expert". Attach corrosion experts design specifications.

Retests after repairs/modifications are made must be evaluated by the corrosion expert to assure the system is functioning properly (Section 6 must be signed by expert).

☐ 5. Rectifier output was modified (explain in "remarks/other" below; CP expert to approve modifications by signing section 6).

Remarks/Other *(Maximum 750 characters approximately)*:

12. Impressed Current structure to soil potential survey

- ***Half Cell Placement (testing) on frozen soil, concrete, asphalt, or other paving materials is not acceptable***
- The half cell must be placed locally in the soil directly over the structure being tested**. A minimum of three half cell locations per tank, and three half cell locations per piping run** are required. The three locations must be as evenly distributed over the protected structure, and as far away from any active anode as practical. (Refer to the MPCA cathodic protection evaluation guidance document for detailed discussion of electrode placement.)
- When testing flex connectors in contact with an electrolyte, **one tests point is required for each flex connector** with the half cell placed locally in the soil directly over the flex connector being tested.
- Both "ON" and "Instant Off" potential readings are required at each half cell placement. Each half cell location must meet the "Instant Off" potential of-850 mV or more negative, or the 100 mV polarization criterion must be satisfied in order to pass.
- Check polarity (+/-) when taking readings and be sure to record them properly

Facility name: ____ Date CP survey performed: ______________________
(Note: The facility name and date of survey will automatically populate from page one.)

Describe soil type(s) of local reference cell placements: ____

Half cell site map code	Structure tested	Structure contact point	Reference cell placement	On voltage (mV)	Instant off voltage (mV)	Native/ depol (mV)	mV polarized	Pass/ Fail/Inc
(example) 1	*(example)* *Tank 1 (premium)*	*(example)* *Tank bottom*	*(example)* *Soil @ Prem STP manway*	*(example)* *-1070 mV*	*(example)* *-875 mV*			*(example)* *Pass*
(example) 2	*(example)* *Pipe 2 (diesel)*	*(example)* *Dispenser 7/8*	*(example)* *Soil @ Diesel dispenser 7/8*	*(example)* *-810 mV*	*(example)* *-680 mV*	*(example)* *-575 mV*	*(example)* *105 mV*	*(example)* *Pass*

Comments *(Maximum 750 characters approximately)*:

If additional sheets are need, complete another form.

Facility name: _____ Date CP survey performed: _____

(Note: The facility name and date of survey will automatically populate from page one.)

13. Impressed Current continuity survey (Point-to-Point Method)

- Point-to-Point: When conducting this method, **the rectifier must be turned off**, and is recommended the negative cable should be disconnected from the rectifier. The leads of the volt meter are required to contact the two structures being examined to demonstrate isolation or continuity. A half cell is not used for this test method.
- To interpret continuity data, compare the difference in voltage of the structures evaluated and use t**h**e following guidelines:
  1 mV or less = continuous, 1-10 mV= inconclusive, greater than 10 mV = isolated.
- For impressed current systems, all metallic structures intended to be protected must be continuous with each other in order to "pass"
- If other approved continuity testing methods are used, alter this form or submit the data on a separate sheet.

Protected structure	Other structure[1]	Point-to-point voltage difference	Isolated/ continuous/ inconclusive
(example) *Tank #1 (premium) tank bottom*	*(example)* *Tank # 1 (premium) fill riser*	*(example) 8 mV*	*(example)* *Inconclusive*
(example) *Tank #1 (premium) tank bottom*	*(example)* *Pipe #1 (premium) @ STP*	*(example) 1 mV*	*(example)* *Continuous*

Comments *(Maximum 750 characters approximately)*:

1. Describe the "other" metallic structure that you are attempting to demonstrate is continuous or isolated.

If additional sheets are need, complete another form.

Facility name: _____ Date CP survey performed: _____

(Note: The facility name and date of survey will automatically populate from page one.)

14. Description of UST system

Tank/ Pipe #	Product	Capacity (Gallons)	Tank type[1]	Piping type [2]	Metal segments at Tank sump [3]	Metal segments at Dispenser[3]
1						
2						
3						
4						
5						
6						
Ex:	*Premium*	*10,000*	*SW* Bare Steel	*SW Fiberglass*	*Bonded to IC system*	*In Containment*

1. Indicate if tank is Double Wall (DW) or Single Wall (SW). Also indicated type (e.g., steel, fiberglass, sti-P_3®, composite etc.). Also indicate if tank is compartmental if applicable
2. Indicate if piping is Double Wall (DW) or Single Wall (SW). Also indicate type (e.g., coated steel, fiberglass, galvanized, flex, etc.).
3. Indicate how metal segments such as flex connectors or metal pipe segments are protected from corrosion (e.g., isolated, booted, bonded, in containment, etc.)

15. UST facility site diagram

Attach a detailed site diagram of the UST and CP systems to the email. At a minimum, you should indicate the following: All tanks, piping and dispensers; Location of anodes and wires if known; All buildings and streets; Location of CP test stations; Each reference cell placement must be indicated by a code (e.g., 1, 2, T-1,) corresponding with the appropriate test in Section 12 of this form. If supplemental anodes are added to the tank system, indicate number, size, location and depth of the new anodes. **An evaluation of the CP system is not complete without an acceptable site diagram.**

Certification

By typing my name below, I certify the above statements to be true and correct, to the best of my knowledge, and that this information can be used for the purpose of processing this form.

☐ I agree ***Note:*** *This needs to be checked before the form will submit.*

CP tester signature:

Name: _____
(This document has been electronically signed.)

Title: _____

Date (mm/dd/yyyy): _____

CP expert signature

Name: _____
(This document has been electronically signed.)

Title: _____

Date (mm/dd/yyyy): _____

Submit **Reset**