UST-7A

NORTH CAROLINA CATHODIC PROTECTION SYSTEM EVALUATION FOR GALVANIC (SACRIFICIAL ANODE) SYSTEMS

- This form must be utilized to evaluate underground storage tank (UST) cathodic protection systems in the State of North Carolina.
- A copy of this completed form must be submitted by the owner/operator to the NCDEQ UST Section, at the address listed below, within 30 days of testing.
- 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

Name:			
Address:			
City:	State: WY		

II. UST FACILITY

Name:	Facility ID:
Address:	
City:	County: Yancey

III. REASON SURVEY WAS CONDUCTED (mark only one)

☐ Routine – 3 year

☐ Routine – within 6 months of installation

☐ Re-survey as soon as the cathodic protection system reaches steady-state polarization design standards after repair/modification (complete Section IX)

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

☐ **PASS**	All protected structures at this facility pass the cathodic protection and continuity survey (indicate all criteria applicable by completion of Section VI).
☐ **FAIL**	One or more protected structures at this facility fail the cathodic protection and/or continuity survey (complete Section VII).
☐ **INCONCLUSIVE**	If the remote and the local do not both indicate the same test result on all protected structures (both pass or both fail), inconclusive is indicated and/or if the continuity survey indicates inconclusive or continuous results the survey must be evaluated and/or conducted by a corrosion expert (Section V must be completed by a Corrosion Expert).

Tester Name:	Name of Certifying Organization (e.g., NACE):
Company Name:	Certification Type (e.g., CP Tester, CP Technician):
Address:	Certification Number:

City:	State: WY	Zip:	Phone:

CP Tester's Signature:	Date Signed:	Date CP Survey Performed:

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

The survey must be conducted and/or evaluated by a corrosion expert when: a) an inconclusive is indicated for any protected structure since both the local and the remote structure-to-soil potentials do not result in the same outcome; b) repairs to steel piping protected by galvanic systems are conducted; c) supplemental anodes are added to the tanks and/or piping without following an accepted industry code; or d) when required by NCDEQ.

☐ **PASS**	All protected structures at this facility are judged to have adequate cathodic protection and therefore pass the cathodic protection and continuity survey (indicate all criteria applicable by completion of Section VI).
☐ **FAIL**	One or more protected structures at this facility fail or do not pass the cathodic protection and/or continuity survey and it is judged that adequate cathodic protection is not currently being provided to the UST system (indicate what action is necessary by completion of Section VII).

Corrosion Expert's Name:	NACE International Certification Type or Professional Engineer (PE) Specialty:
Company Name:	NACE International Certification Number or PE Number / State:

Address:	City:	State: WY	Zip:	Phone:

Corrosion Expert's Signature:	Date:	Email:

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

☐ **850 mV ON**	Structure-to-soil potential more negative than –850 mV with respect to a $Cu/CuSO_4$ reference electrode with the protective current applied (This criterion is applicable to any galvanically protected structure).
☐ **850 mV Instant OFF**	Structure-to-soil potential more negative than –850 mV with respect to a $Cu/CuSO_4$ reference electrode with protective current temporarily interrupted (This criterion is applicable only to those galvanic systems where the anodes can be disconnected).
☐ **100 mV Polarization**	Structure tested exhibits at least 100 mV of cathodic polarization (This criterion is applicable to galvanic systems where the anodes can be temporarily disconnected).

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.
☐ **REPAIR & RETEST**	Cathodic protection is not adequate. Immediately repair and/or modify cathodic protection system so that adequate cathodic protection is provided and then have the system re-tested as soon as the cathodic protection system reaches steady-state polarization design standards.

Date next cathodic protection survey must be conducted by _____ (required every 3 years)

VIII. DESCRIPTION OF UST SYSTEM

TANK #	PRODUCT STORED (PREMIUM, REGULAR, DIESEL, ETC.)	TANK CAPACITY (GAL)	CONSTRUCTION MATERIAL (TANKS)	CONSTRUCTION MATERIAL (PIPING)	FLEX CONNECTORS/ METAL FITTINGS PRESENT (Y/N)	FLEX CONNECTORS/METAL FITTINGS IN CONTACT WITH SOIL (Y/N)
1					No	No
2					Yes	Yes
3					Yes	Yes
4					Yes	Yes
5					Yes	Yes
6					Yes	Yes
7					Yes	Yes
8					Yes	Yes
9					Yes	Yes
10					Yes	Yes

IX. DESCRIPTION OF CATHODIC PROTECTION SYSTEM REPAIRS AND/OR MODIFICATIONS

Cathodic protection systems must be evaluated as soon as the cathodic protection system reaches steady-state polarization design standards following any repairs and/or modifications. Complete this section if any repairs or modifications were made to the cathodic protection system in response to a "failed" evaluation. Certain repairs/modifications as determined by NCDEQ are required to be designed and/or evaluated by a corrosion expert (completion of Section V required).

- ☐ Supplemental anodes for a sti-P_3® tank were added (attach corrosion expert's design or document industry standard used).
- ☐ Supplemental anodes for metallic pipe or flex-connectors were added (attach corrosion expert's design or document industry standard used).
- ☐ Galvanically protected tanks/piping not electrically isolated (explain repairs/modifications completed in "Remarks/Other" below).

Remarks/Other:

X. UST FACILITY SITE DRAWING

Attach detailed drawing or use the space provided to draw a sketch 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 you should indicate the following: All tanks, piping and dispensers; All buildings and streets; All anodes and wires; Location of CP test stations; Each reference electrode placement must be indicated by a code (e.g., 1,2,3… T-1, T-2, P-1, P-2… etc.) corresponding with the appropriate line number in Section XII of this form.

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

XI. GALVANIC (SACRIFICIAL ANODE) CATHODIC PROTECTION SYSTEM CONTINUITY SURVEY

- This section must be utilized to document measurements of continuity on underground storage tank systems that are protected by cathodic protection systems.
- When conducting a fixed cell - moving ground survey, the reference electrode must be placed in the soil at a remote location and left undisturbed.
- Conduct point-to-point test between any two structures for which the fixed cell-moving ground survey is inconclusive or indicates possible continuity.
- For galvanic systems, the structure that is to be protected must be isolated from any other metallic structure in order to pass the continuity survey.
- For Sti-P3 tanks only, continuity testing is not required if the tanks local and remote tank-to-soil potentials are -850 mV or more negative.

FACILITY NAME:

NOTE: The survey is not complete unless all applicable parts of Sections I-XII are also completed

DESCRIBE LOCATION OF "FIXED REMOTE" REFERENCE ELECTRODE PLACEMENT:

STRUCTURE "A" [1]	STRUCTURE "B" [2]	STRUCTURE "A" [3] FIXED REMOTE VOLTAGE (mV)	STRUCTURE "B" [4] FIXED REMOTE VOLTAGE (mV)	POINT-TO-POINT [5] VOLTAGE DIFFERENCE (mV)	ISOLATED/ [6] CONTINUOUS/ INCONCLUSIVE
(example) PREMIUM TANK BOTTOM	(example) PREMIUM TANK FILL RISER	(example) -921 mV	(example) -915 mV		(example) INCONCLUSIVE
(example) PREMIUM TANK BOTTOM	(example) PREMIUM TANK FILL RISER			(example) 17 mV	(example) ISOLATED
					INCONCLUSIVE
					INCONCLUSIVE
					INCONCLUSIVE
					INCONCLUSIVE
					INCONCLUSIVE
					INCONCLUSIVE
					INCONCLUSIVE
					INCONCLUSIVE
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					INCONCLUSIVE

COMMENTS:

1) Describe the cathodically protected structure that you are attempting to demonstrate is isolated from unprotected structures (e.g., premium tank).
2) Describe the unprotected structure that you are attempting to demonstrate is isolated from the protected structure (e.g., premium tank fill riser).
3) Record the measured structure-to-soil potential of the cathodically protected structure {"A"} in millivolts (e.g., -921 mV).
4) Record the measured structure-to-soil potential of the unprotected structure {"B"} in millivolts (e.g., -915 mV).
5) Record the voltage observed between the protected and the unprotected structures when conducting point-to-point testing (e.g., 17 mV).
6) Document whether the test (fixed cell and/or point to point) indicated the protected structure was isolated, continuous or inconclusive by using the following guidelines.

Fixed Cell – Moving Ground Method
Isolated = Structures exhibit potentials that vary by 10 mV or more
Continuous = Structures exhibit potentials that vary by 1 mV or less
Inconclusive = Structures exhibit potentials that vary by more than 1mV but less than 10 mV

Point-to-Point Method
Isolated = Voltage difference is 10 mV or greater
Continuous = Voltage difference is 1 mV or less
Inconclusive = Voltage difference is greater than 1 mV but less than 10 mV

XII. GALVANIC (SACRIFICIAL ANODE) CATHODIC PROTECTION SYSTEM SURVEY

- This section must be utilized to document a survey of a galvanic cathodic protection system by obtaining structure-to-soil potential measurements.
- The reference electrode must be placed in the soil in a minimum of **one** location directly over the tested structure (local) and **two** locations 25-100 feet away from the structure (remote). Remote readings (R1 and R2) **must** be within 10 mV of each other to show that remote earth has been found.
- Both the local and the remote voltage must be –850 mV or more negative, for the structure to pass.
- Inconclusive is indicated when both the local and the remote structure-to-soil potentials do not result in the same outcome (Both must "pass" or both must "fail").
- If the 100-mV polarization method is used to verify adequate cathodic protection, please use Section XIV of the UST-7B form

FACILITY NAME:	**NOTE: The survey is not complete unless all applicable parts of Sections I-XII are also completed**
LOCATION OF REMOTE REFERENCE ELECTRODE #1 (R1):	**LOCATION OF REMOTE REFERENCE ELECTRODE #2 (R2):**

LOCATION CODE[1]	STRUCTURE [2]	CONTACT POINT [3]	LOCAL REFERENCE CELL PLACEMENT [4]	LOCAL VOLTAGE[5] (mV)	REMOTE VOLTAGE (R1)[6] (mV)	REMOTE VOLTAGE (R2)[6] (mV)	PASS/FAIL/ [7] INCONCLUSIVE
(example) T-1	(example) PLUS TANK	(example) TANK BOTTOM	(example) SOIL @ PLUS TANK STP	(example) -928 mV	(example) -810 mV	(example) -811 mV	(example) INCONCLUSIVE
(example) P-1	(example) PLUS PIPING	(example) DISPENSER 5/6	(example) SOIL UNDER DISPENSER 5/6	(example) -890 mV	(example) -885 mV	(example) -884 mV	(example) PASS
							INCONCLUSIV
							INCONCLUSIV
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COMMENTS:

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; premium piping; diesel submersible pump flex connector; etc.).
3) Describe where contact with the structure that is being tested is made (e.g., plus tank @ test lead; diesel piping @ dispenser 5/6; tank test lead; pp4, etc).
4) Describe the exact location where reference electrode is placed for each "local" measurement (e.g., soil @ plus tank STP; soil @ dispenser 5/6; etc.)
5) Record the structure-to-soil potential measured with the reference electrode placed "local" in millivolts (e.g., -865 mV, -920 mV, etc.).
6) Record the structure-to-soil potential measured with the reference electrode placed "remote" (Two separate remote readings are required).
7) Indicate whether the tested structure passed or failed the -850 mV "on" criterion based on your interpretation of the test data.