CSI
CITYSERVICES,INC

CITYSERVICES, INC
P.O. Box 3217
538 Powell Dr.
Thomasville, GA 31799

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Email cityservicesinc@gmail.com

May 6, 2021

Mr. Ken Tutt
Project Representative
Nutrien Ltd.
SRC Dry Area Plant
15843 SE 78th Street
White Springs, Florida 32096-2703

RE: SRC DRY AREA PLANT
CATHODIC PROTECTION SURVEY
2021 RECOMMENDATIONS

Dear Mr. Tutt;

Please review the general recommendations concerning the results of the Nutrien Ltd. – SRC Dry Area Plant cathodic protection survey, performed beginning May 4, 2021. The following recommendations were cited during this inspection:

- Cathodic Protection measurements indicate approximately 100% of the steel gas system currently meet or exceed the minimum Federal and State CP requirements, with no further action required at this time.

I trust the information to be in sufficient detail, however, should you require additional information or would like to discuss these recommendations, please contact me.

Sincerely,

W. L. Hays

W. L. Hays
CITY SERVICES, INC.

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CSI
CITYSERVICES,INC

NUTRIEN LTD.

SRC Dry Area Plant

CATHODIC PROTECTION SURVEY

MAY 2021

www.csi-thomasville.com

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May 2021

Nutrien Ltd.
SRC Dry Area Plant
15843 SE 78th Street
White Springs, Florida 32096-2703
ATTN: Mr. Ken Tutt
Project Representative

SRC Dry Area Plant
Effectiveness of Cathodic Protection
Survey Underground Natural Gas System

INTRODUCTION

A cathodic protection survey was conducted for Nutrien Ltd. - SRC Dry Area Plant beginning May 4, 2021. During this survey, the SRC Dry Area Plant natural gas system was inspected for the effectiveness of cathodic protection, as applied. The cathodic protection system for Nutrien Ltd. - SRC Dry Area Plant consists essentially of Galvomag Magnesium anodes placed in various locations throughout the natural gas distribution system.

RESULTS AND ANALYSIS

A total of Fifteen [15] cathodic protection voltage readings, Three [3] Galvomag anode / CTP readings, Four [4] gas casing pipe readings and Eight [8] gas pipeline readings were taken during this survey. As can be seen by the structure-to-soil potential measurements and the enclosed data sheet, 100% of the gas pipeline readings obtained are indicative of cathodic protection. A structure-to-soil potential of 850 millivolts [-0.850] or more negative direct current is the basis used in this report to confirm cathodic protection.

SRC Dry Area Plant
May 2021

IR DROP CONSIDERATION

Aging pipes and changing conditions can cause significant problems, such as an increase in applied CP levels and enlarged holidays in coating. In addition, increased environmental concerns also emphasize the need to minimize leaks as much as possible.

The effectiveness of any cathodic protection system can be determined by taking potential measurements between the structure and a reference electrode. These potential measurements have traditionally been recorded with "average reading" digital voltmeters while the protective current is flowing or applied. These potential measurements contain the error produced by the voltage drop in the soil (electrolyte resistance) and the voltage drop (current) in the structure being protected. This error is referred to as *IR* drop. Interpretation of a current applied measurement requires consideration of the significance of voltage drops in the earth and metallic paths.

An *IR* drop is a voltage across a resistance, in accordance with Ohm's law *(V=IR)*. Although there are several *IR* drops in a structure-to-electrolyte potential circuit, the *IR* drop of most concern is that which occurs between the reference electrode (half-cell) and the structure-to-electrolyte (pipe) boundary. This *IR* drop is due to a CP current in the resistance of the electrolyte and is an error in the measurement.

One way to reduce the *IR* drop is to bring the reference electrode close to the structure (pipe) to reduce the resistance of the electrolyte (soil). Another way to reduce the *IR* drop is to bring the current to zero by interrupting all sources of current (anodes) influencing that reference point at the same precise time.

An instant off-potential measurement is the reading taken instantaneously after the protective current reaches zero. Off-potential measurements eliminate the *IR* drop error, allowing the true *IR* drop free polarized potential of a cathodically protected structure to be determined in the field. *IR* drop error is eliminated since there is no current flowing when the measurement is taken (i.e. $I = 0$ A, then $IR = 0$ V).

SRC Dry Area Plant
May 2021

SURVEY TEST INSTRUMENTATION

The Cathodic Protection Analyzer, developed by Universal Rectifiers, Inc, (Hereinafter referred to as CPA), is a handheld instrument used with a reference electrode to measure the uninterrupted characteristics of the signal generated from a CP source. It can be used to evaluate the coating of a pipeline to ensure that the pipe is fully protected from corrosion. The CPA is designed for use with any pipeline system or structure at risk to corrosion factors. Aging pipes and changing conditions can cause significant problems, such as an increase in applied CP levels and enlarged holidays in coating. In addition, increased environmental concerns also emphasize the need to minimize leaks as much as possible.

The CPA has computer capabilities of filtering interfering signals. The instrument is also capable of measuring several facets of the protection waveform. The software-driven instrument reads the minimum, average, and maximum voltage levels emanating from the pipe, thereby allowing an overview of the entire CPv signature. Digital signal processing makes the accuracy and precision of the CPA possible. It utilizes software to provide the extra speed and flexibility that is becoming increasingly important in the field.

The CPA is operated in conjunction with a Copper – Copper Sulfate [$Cu/CuSO_4$] shielded reference electrode known by its model number SPI, which allows the measurement of the cathodic protection voltage without interrupting the potential source.

RECOMMENDATIONS

Nutrien Ltd. – SRC Dry Area Plant
Underground Natural Gas System
May 2021

The sacrificial galvanic anode arrangement designed to protect the coated and wrapped steel natural gas system indicates adequate current to afford cathodic protection to the steel distribution system. Structure-to-soil readings obtained from Cathodic Test Points and gas risers on the steel distribution system indicate CP readings above State and Federal minimum standards of -0.850 volts direct current. Each Railroad casing was inspected and indicates a sacrificial anode installed on the casing pipe.

The coated and wrapped main lines show a minimum *IR* drop free structure-to-soil potential of –1.100 vdc and a maximum *IR* drop free structure-to-soil potential of –1.251 vdc at various Cathodic Test Points in the SRC Dry Area Plant distribution system. Continuity over the entire main line system is good to excellent. The six-inch [6"] coated and wrapped steel gas pipe from the metering station to the limestone unloading area indicates adequate cathodic protection at this time. Structure-to-soil readings at the limestone unloading area indicate adequate cathodic protection levels and no remedial action is required to maintain compliance with State and Federal minimum guidelines for applied cathodic protection.

At this time, the Natural Gas Distribution System for Nutrien Ltd. - SRC Dry Area Plant complex indicates acceptable cathodic protection levels that meet or exceed regulatory minimum levels. I trust the above information to be satisfactory and in sufficient detail, however, should you require additional information, please contact me.

Sincerely,

Mitchell L. Whitfield
C.P. Tester

CATHODIC TEST POINTS

CATHODIC TEST POINTS

Nutrien Ltd. – SRC Dry Area Plant
Underground Natural Gas System
May 2021

Cathodic Test Point - #1

Red Anode Connection	-1.399 Vdc
Black Gas Pipeline Connection	-1.141 Vdc
Anode / Gas Line Connections Combined	-1.299 Vdc

Cathodic Test Point - #2

Red Anode Connection	-1.648 Vdc
Black [Tape] Casing Pipeline Connection	-0.745 Vdc
Black Gas Pipeline Connection	-1.237 Vdc
Anode / Gas Line Connections Combined	-1.417 Vdc

Cathodic Test Point - #3

Red Anode Connection	-1.243 Vdc
White Casing Pipeline Connection	-0.713 Vdc
Black Gas Pipeline Connection	-1.100 Vdc
Anode / Gas Line Connections Combined	-1.214 Vdc

STRUCTURE-TO-SOIL POTENTIALS
GAS PIPE CASINGS

STRUCTURE-TO-SOIL POTENTIAL
GAS PIPE CASINGS

Nutrien Ltd. – SRC Dry Area Plant
Underground Natural Gas System
May 2021

Test Location	Energized Potentials Volts
*Railroad Casing @ CTP #3	-0.813
*Scale House Drive Casing @ CTP #2	-0.796

*Casing Anode Installed

STRUCTURE - TO - SOIL POTENTIAL DATA

STRUCTURE – TO – SOIL POTENTIAL DATA

Nutrien Ltd. – SRC Dry Area Plant
Underground Natural Gas System
May 2021

Test Location	Energized Potentials Volts
Metering Station [6" Steel Line Outlet]	-1.143
Limestone Loading [6" Riser Inlet]	-1.251

City Services, Inc. (CSI)
User Task Status Report

Run by: Bobby Boyd
Run on: 1/12/2021

Whitfield, Mitch

0001 - Measure Structure-To-Electrolyte Potential Qualified

Qualification Type	Evaluations	Evaluation Date	Expiration Date	Verified
ENERGY worldnet, Inc. - Performance	EWN-PE-Perform AC Structure-to-Electrolyte Potential Readings at Test Points - 2374	3/9/2020	3/9/2023	EV
ENERGY worldnet, Inc. - Performance	EWN-PE-Measure Structure-to-Soil Potentials (1.1, 0021, 0001) - 2649	3/9/2020	3/9/2023	EV
ENERGY worldnet, Inc. - Written	EWN-CBT-AOC Failure to Follow Procedures - 2207	3/11/2020	3/11/2023	EV
ENERGY worldnet, Inc. - Written	EWN-CBT-AOC Insufficient Cathodic Protection - 2212	3/11/2020	3/11/2023	EV
ENERGY worldnet, Inc. - Written	EWN-CBT-Corrosion Control Fundamentals (5.3, 9.2, 1021, 0031, 0091) - 2355	3/12/2020	3/12/2023	EV

0031 - Inspect And Monitor Galvanic Ground Beds/Anodes Qualified

Qualification Type	Evaluations	Evaluation Date	Expiration Date	Verified
ENERGY worldnet, Inc. - Performance	EWN-PE-Install Galvanic Anode (9.2, 0031) - 2584	3/9/2020	3/9/2023	EV
ENERGY worldnet, Inc. - Written	EWN-CBT-AOC Failure to Follow Procedures - 2207	3/11/2020	3/11/2023	EV
ENERGY worldnet, Inc. - Written	EWN-CBT-AOC Insufficient Cathodic Protection - 2212	3/11/2020	3/11/2023	EV

ENERGY worldnet, Inc. - Written	EWN-CBT-Corrosion Control Fundamentals (5.3, 9.2, 1021, 0031, 0091) - 2355	3/12/2020	3/12/2023	EV

0061 - Inspect or Test Cathodic Protection Bonds Qualified

Qualification Type	Evaluations	Evaluation Date	Expiration Date	Verified
ENERGY worldnet, Inc. - Performance	EWN-PE-Inspect and Perform Electrical Test of Bonds and Isolation Devices (1.4, 0061) - 2652	3/9/2020	3/9/2023	EV
ENERGY worldnet, Inc. - Written	EWN-CBT-AOC Failure to Follow Procedures - 2207	3/11/2020	3/11/2023	EV
ENERGY worldnet, Inc. - Written	EWN-CBT-AOC Insufficient Cathodic Protection - 2212	3/11/2020	3/11/2023	EV
ENERGY worldnet, Inc. - Written	EWN-CBT-Corrosion Control Fundamentals (5.3, 9.2, 1021, 0031, 0091) - 2355	3/12/2020	3/12/2023	EV

0071 - Inspect or Test Cathodic Protection Electrical Isolation Devices Qualified

Qualification Type	Evaluations	Evaluation Date	Expiration Date	Verified
ENERGY worldnet, Inc. - Performance	EWN-PE-Inspect and test isolation devices (1.5, 0071, 0081) - 2653	3/9/2020	3/9/2023	EV
ENERGY worldnet, Inc. - Written	EWN-CBT-AOC Failure to Follow Procedures - 2207	3/11/2020	3/11/2023	EV
ENERGY worldnet, Inc. - Written	EWN-CBT-AOC Insufficient Cathodic Protection - 2212	3/11/2020	3/11/2023	EV
ENERGY worldnet, Inc. - Written	EWN-CBT-Corrosion Control Fundamentals (5.3, 9.2, 1021, 0031, 0091) - 2355	3/12/2020	3/12/2023	EV

0081 - Install Cathodic Protection Electrical Isolation Devices Qualified

Qualification Type	Evaluations	Evaluation Date	Expiration Date	Verified

ENERGY worldnet, Inc. - Performance	EWN-PE-Inspect and test isolation devices (1.5, 0071, 0081) - 2653	3/9/2020	3/9/2023	EV
ENERGY worldnet, Inc. - Written	EWN-CBT-AOC Failure to Follow Procedures - 2207	3/11/2020	3/11/2023	EV
ENERGY worldnet, Inc. - Written	EWN-CBT-AOC Insufficient Cathodic Protection - 2212	3/11/2020	3/11/2023	EV
ENERGY worldnet, Inc. - Written	EWN-CBT-Corrosion Control Fundamentals (5.3, 9.2, 1021, 0031, 0091) - 2355	3/12/2020	3/12/2023	EV

0091 - Troubleshoot in-Service Cathodic Protection System Qualified

Qualification Type	Evaluations	Evaluation Date	Expiration Date	Verified
ENERGY worldnet, Inc. - Performance	EWN-PE-Cathodic Protection Remediation (0091) - 2361	3/9/2020	3/9/2023	EV
ENERGY worldnet, Inc. - Performance	EWN-PE-Test to Detect Interference (1.3) - 2651	3/12/2020	3/12/2023	EV
ENERGY worldnet, Inc. - Written	EWN-CBT-AOC Failure to Follow Procedures - 2207	3/11/2020	3/11/2023	EV
ENERGY worldnet, Inc. - Written	EWN-CBT-AOC Insufficient Cathodic Protection - 2212	3/11/2020	3/11/2023	EV
ENERGY worldnet, Inc. - Written	EWN-CBT-Corrosion Control Fundamentals (5.3, 9.2, 1021, 0031, 0091) - 2355	3/12/2020	3/12/2023	EV
ENERGY worldnet, Inc. - Written	EWN-WE-Test to Detect Interference (1.3) - 2594	3/12/2020	3/12/2023	EV

0101 - Inspect Rectifier And Obtain Readings Qualified

Qualification Type	Evaluations	Evaluation Date	Expiration Date	Verified
ENERGY worldnet, Inc. - Performance	EWN-PE-Obtain a voltage output reading from a rectifier (3.1, 0101) - 2697	3/9/2020	3/9/2023	EV

ENERGY worldnet, Inc. - Performance	EWN-PE-Check for Proper Operation of a Rectifier (3.2) - 2698	3/12/2020	3/12/2023	EV
ENERGY worldnet, Inc. - Written	EWN-CBT-AOC Failure to Follow Procedures - 2207	3/11/2020	3/11/2023	EV
ENERGY worldnet, Inc. - Written	EWN-CBT-AOC Insufficient Cathodic Protection - 2212	3/11/2020	3/11/2023	EV
ENERGY worldnet, Inc. - Written	EWN-CBT-Corrosion Control Fundamentals (5.3, 9.2, 1021, 0031, 0091) - 2355	3/12/2020	3/12/2023	EV

0111 - Maintain Rectifier Qualified

Qualification Type	Evaluations	Evaluation Date	Expiration Date	Verified
ENERGY worldnet, Inc. - Performance	EWN-PE-Repair or Replace Defective Rectifier Components (4.2, 0111) - 2573	3/12/2020	3/12/2023	EV
ENERGY worldnet, Inc. - Written	EWN-CBT-AOC Failure to Follow Procedures - 2207	3/11/2020	3/11/2023	EV
ENERGY worldnet, Inc. - Written	EWN-CBT-AOC Insufficient Cathodic Protection - 2212	3/11/2020	3/11/2023	EV
ENERGY worldnet, Inc. - Written	EWN-CBT-Rectifiers(3.1, 3.2, 4.1, 4.2, 4.3, 9.3, 0101, 0111) - 2319	3/12/2020	3/12/2023	EV

CITY SERVICES, INC.
2020 Drug Test Statistical Summary

City Services, Inc.
Post Office Box 3217
Thomasville, Georgia 31799

Contact Person: Jerry Allen
Title: Office Manager
Telephone: (229) 226-6569

Total Number of Employees in Organization: 7

Number of Employees in Test Pool:

Full Time:	6
Temporary:	0
Part Time:	0
Others:	0

Summarized is the number of test, number of employees tested, and positive results for each category listed.

Type of Test	Draws	Tested	Positive Results	Positive For:
Pre-Employment:	0	0	0	N/A
Random:	4	3	0	N/A
Reasonable Cause:	0	0	0	N/A
Post-Accident	0	0	0	N/A
Post-Rehab	0	0	0	N/A

DOT drug tests are conducted only using urine specimens. The urine specimens are analyzed for the following drugs/metabolites:

- Marijuana metabolites/THC
- Cocaine metabolites
- Amphetamines
- Phencyclidine (PCP)
- Opioid Metabolites (i.e., codeine, 6-AM (heroin), morphine)
- Also, four Semi-Synthetic Opioids (i.e., oxycodone, oxymorphone, hydrocodone, hydromorphone)

Indicate positive results by number as follows:

Marijuana-1, Cocaine-2, Amphetamines-3, Phencyclidine-4, Opioid Metabolites-5, Semi-Synthetic Opioids - 6

Indicate test by number as follows:

Random-1, Post Accident-2, Reasonable Cause-3, Post-Rehab-4, Pre-employment-5

Age	Sex	Test	Substance Found
___	___	___	_____
___	___	___	_____
___	___	___	_____

Report Prepared By: Jerry Allen
Period Covered: 1/1/2020 – 12/31/2020

Date Submitted: 5/5/2021
Distributed To: Nutrien – White Springs, Florida