



Ref: W18628/J930

7th November 2019

TOTAL Pacifique
Depot Pétrolier De L'Aéroport
Noumea – La Tontouta

Attention: Mr. Marc Chamonard
Email: tta.chefdepotcarb@canl.nc

Ms Vanessa Bocquet
Email: vanessa.bocquet@total.com

Dear Marc,

**RE: TONTOUTA AIRPORT, NEW CALEDONIA
HYDRANT NETWORK PIPELINES
CATHODIC PROTECTION SYSTEM INSPECTION**

Please find attached, our report following an inspection of the above cathodic protection system.

We trust you find our field testing and report satisfactory. Should you have any queries please do not hesitate to contact our office.

Yours faithfully,
Corrosion Control Engineering (NSW) Pty. Ltd.



Jim Galanos
Engineering Manager



TOTAL PACIFIQUE

TONTOUTA AIRPORT, NEW CALEDONIA

HYDRANT NETWORK PIPELINES

CATHODIC PROTECTION SYSTEM

INSPECTION REPORT

November 2019

Our Ref.	Date	Prepare By	Approved By	Comment	Rev. No.
W18268/J930	7/11/2019	B. Krizman	J. Galanos	First Issue	0

CONTENTS

SUMMARY

- 1.0 INTRODUCTION**
- 2.0 PIPELINE DESCRIPTION**
- 3.0 CATHODIC PROTECTION SYSTEM**
- 4.0 CORROSION MITIGATION**
- 5.0 PROTECTION CRITERIA**
- 6.0 DISCUSSION OF RESULTS**
- 7.0 CONCLUSION**
- 8.0 RECOMMENDATIONS**

APPENDIX I: CATHODIC PROTECTION SYSTEM – INSPECTION TEST RESULTS

APPENDIX II: MONTHLY TEST SHEET

SUMMARY

The Hydrant Network Pipelines at Tontouta Airport are protected against external corrosion, below ground, to the criteria stated.

All components of the Impressed Current Cathodic Protection (ICCP) system are operating satisfactorily.

1.0 INTRODUCTION

As requested, on Tuesday 5th November 2019, Corrosion Control Engineering (NSW) Pty. Ltd. conducted an inspection of the cathodic protection system operating on the Hydrant Network Pipelines at Tontouta Airport, New Caledonia.

2.0 PIPELINE DESCRIPTION

The hydrant network supplies Jet A1 Fuel from the Total Depot to Tontouta Airport Hydrant points.

The pipeline is approximately 1.2 km in length and is 200 mm NB pipe from the depot to the tarmac, with 150 mm NB and 200 mm NB branch lines to the hydrant pits and drain points.

3.0 CATHODIC PROTECTION SYSTEM

The hydrant pipelines have an ICCP system, providing external corrosion protection to the buried sections.

A 5 Amp/50 Volt TR unit is installed inside the depot office building. The anode groundbed is installed inside the depot and parallel to the southern boundary fence line, consisting of a 15 metre long x 1.5 mm diameter mixed metal oxide wire anode buried to the depth of the water table.

An insulating flange is installed on the pipe riser inside the depot. The system cable connection to the pipeline is at this location.

Testing for satisfactory operation of the system is carried out at the TR unit (which has a reference metering circuit), the hydrant pits and the drain/low/high points.

4.0 CORROSION MITIGATION

Cathodic Protection is the most effective method for mitigating corrosion on the buried or immersed surfaces of a structure.

If the cathodic protection system maintains the structure potentials within the limits set by the standards, then the structure will be corrosion free. Routine monitoring to ensure the potentials are maintained within this range can extend the life of a structure indefinitely and significantly reduce maintenance/replacement costs in the future. This can only be achieved if the monitoring/inspection of the cathodic protection system is undertaken on a regular basis and in accordance with the relevant Australian Standard.

5.0 PROTECTION CRITERIA

Australian Standard AS2832.1, Cathodic Protection of Metals, Part 1: Pipes and Cables and EN12954 Cathodic Protection of Buried or Immersed Metallic structures, states that the accepted practice for the corrosion protection of a buried ferrous structure is to maintain a potential equal to, or more negative than, -0.85 Volts (free of voltage gradient error) with respect to a Cu/CuSO₄ reference electrode.

Additionally, to ensure overprotection does not cause accelerated disbondment of a coating or other deleterious effects, this potential (free of voltage gradient error) should not be more negative than -1.20 Volts with respect to a Cu/CuSO₄ reference electrode.

6.0 DISCUSSION OF RESULTS

The TR unit was found operating satisfactorily, at an output of 0.33Amps. As the TR unit does not have auto potentials mode, site personnel need to adjust the output to maintain satisfactory protection levels when the anode bed or general ground conditions change. That is, reduce the driving voltage when the ground is wet and increase when dry.

The test results (see Appendix I) indicate that protected potentials were recorded at the TR unit and all test locations along the tarmac. The CP (Instant Off) potentials were more negative than required and were approaching the maximum recommended limit at some test locations. As a result, the TR output was decreased to 0.30 Amps.

Testing found the insulating flange on the pipe riser, inside the TOTAL Depot, satisfactorily provided electrical isolation from foreign structures.

A review of the monthly test sheets conducted by TOTAL Pacifique personnel indicates protected potentials were maintained throughout the year.

During our onsite inspection, we calibrated the onsite reference electrode.

Traduction:

L'unité de protection cathodique s'est avérée fonctionner de manière satisfaisante, à une sortie de 0,33 ampères. Comme l'unité n'a pas de mode potentiels automatiques, le personnel du site doit ajuster la sortie pour maintenir des niveaux de protection satisfaisant lorsque le lit anodique ou les conditions générales du sol changent. C'est à dire réduire la tension d'entraînement lorsque le sol est humide et l'augmenter quand il est sec.

Les résultats des tests (voir annexe I) indiquent que des potentiels protégés ont été enregistrés à l'unité et à tous les emplacements de test le long du tarmac. Les potentiels CP (instant off) étaient plus négatifs que requis et approchaient la limite maximale recommandée à certains emplacements de tes. En conséquence, la sortie TR a été réduite à 0,30 ampères.

Les tests ont révélé que la bride isolante sur la colonne montante, à l'intérieur du dépôt TOTAL offrait une isolation électrique suffisante des structures étrangères.

Une revue des fiches de tests mensuels réalisées par le personnel TITAL indique que les potentiels protégés ont été maintenus tout au long de l'année.

Lors de notre inspection sur site, nous avons calibré l'électrode de référence du site.

7.0 CONCLUSION

The Hydrant Network Pipelines at Tontouta Airport were found protected against external corrosion, below ground, to the criteria stated and provided no cathodic shielding exists.

The TR unit output was slightly reduced as the pipelines were found well protected.

The TR unit, anode groundbed and associated cabling were found in good condition and operating satisfactorily.

Traduction:

Les canalisations du réseau d'hydrant à l'aéroport de la Tontouta ont été trouvées protégées contre la corrosion externe, sous terre, conformément aux critères énoncés et à condition qu'aucun blindage cathodique n'existe.

La sortie de l'unité de protection cathodique a été légèrement réduite dans la mesure où les tuyauteries se sont avérées bien protégées.

L'unité, l'anode et le câblage associé ont été trouvés en bon état et fonctionnent de manière satisfaisante.

8.0 RECOMMENDATIONS

In order to maintain satisfactory operation of the cathodic protection system, we recommend the following:

- a) TOTAL Pacifique personnel to conduct monthly testing at the TR unit and a selection of four hydrant pits, emailing the results to Corrosion Control Engineering: contact@cceng.com.au

Based on the test results, some TR output adjustments may be required.

- b) TOTAL Pacifique personnel to contact Corrosion Control Engineering for advice, should any works be planned which could either damage the system and/or pipeline electrical isolation.
- c) The cathodic protection system continues to be inspected annually, by suitably experienced corrosion personnel, as per AS2832.1 and EN12954

Traduction:

Afin de maintenir un fonctionnement satisfaisant du système de protection cathodique, nous recommandons ce qui suit :

a) Le personnel TOTAL effectuera des tests mensuels à l'unité TR et à une sélection de quatre pits (fosses), en envoyant les résultats par courrier électronique à Corrosion Control Engineering : contact@cceng.com.au
Sur la base des résultats des tests, certains ajustements de sortie TR peuvent être nécessaires.

b) Le personnel de TOTAL devra contacter Corrosion Control Engineering pour obtenir des conseils, si des travaux prévus pourraient endommager le système et/ou l'isolation électrique du système.

c) le système de protection cathodique continue d'être inspecté annuellement, par du personnel suffisamment qualifié en matière de protection anti-corrosion, conformément aux normes AS2832.1 et EN12954.



APPENDIX I

CATHODIC PROTECTION SYSTEM

TEST RESULTS

APPENDIX I

TOTAL PACIFIQUE TONTOUTA, NEW CALEDONIA AIRPORT HYDRANT NETWORK PIPELINES CATHODIC PROTECTION SYSTEM

TEST RESULTS

Date Tested: 5th November 2019

Tested By: B. Krizman

A. TR Unit Output

As Found: 0.33 Amps at 8.4 Volts

As Left: 0.30 Amps at 8.0 Volts

B. Pipeline Potentials (Volts) vs. Cu/CuSO₄ Reference Electrode

Test Location	Pipeline Potential (Volts)	
	CP (On)	CP (Instant Off)
TR Unit	-1.25	-1.07
Insulating Flange Inside Total Depot		
Unprotected side	-0.30	-0.30
Protected side	-1.28	-1.11
Hydrant Pit 1	-1.23	-1.15
Hydrant Pit 2	-1.16	-1.07
Hydrant Pit 3	-1.19	-1.13
High Point Pit	-1.15	-1.04
Hydrant Pit 4	-1.16	-1.07
Hydrant Pit 5	-1.17	-1.07
Hydrant Pit 6	-1.19	-1.10
Low Point Pit (New)	-1.21	-1.10
Low Point Pit (Old)	-1.17	-1.06
Hydrant Pit 7	-1.22	-1.13
Hydrant Pit 8	-1.25	-1.14
Drain Point 1 (Old DP2)	-1.16	-1.08
Drain Point 2 (Old DP3)	-1.16	-1.08
Hydrant Pit 9	-1.15	-1.09
Hydrant Pit 10	-1.22	-1.16
Drain Point 3 (Old DP6)	-1.14	-1.08
Drain Point 4	-1.12	-1.03
Drain Point 5	-1.06	-1.02
Hydrant Pit 11	-1.23	-1.16
Hydrant Pit 12	-1.22	-1.15
Hydrant Pit 13	-1.22	-1.15
Hydrant Pit 14	-1.23	-1.15

APPENDIX II

MONTHLY TEST SHEET

APPENDIX II

TOTAL PACIFIQUE TONTOUTA AIRPORT, NEW CALEDONIA - HYDRANT NETWORK PIPELINES CATHODIC PROTECTION SYSTEM

MONTHLY TEST SHEET

Date Tested:

Tested By:

A. TR Unit

Output: _____ Amps at _____ Volts (As Found)

Pipeline Potentials (Volts) vs. Cu/CuSO₄ Reference Electrode
_____ CP (On) _____ CP (Instant Off)

Note: CP (Instant Off) Potentials in the range of -1.00 to -1.10 Volts to be maintained.

B. Hydrant Potentials (Volts) vs. Portable Cu/CuSO₄ Reference

Hydrant Pit	Potential CP (On)

Please send results to:

Corrosion Control Engineering (NSW) Pty. Ltd.
Email: contact@cceng.com.au