

Rami Izhiman

From: Khalil- CORTEC ME <kabed@cortec-me.com>
Sent: Sunday, July 28, 2013 3:59 PM
To: Andijani, Ismaeel N.
Cc: Kirita, Katsuo X.; lyad Alami
Subject: RE: Protection of Tank No. F50-T35 floor using Cortec Corrologic Technology
Attachments: VpCI diffusion distance .pdf; METHODOLOGY OF VCI'S FOR WATER TREATMENT.PDF; MP-Water Treatment.pdf; Evaluation of Corrosion Protection Provided by VpCI-609 in Sand saturate....pdf; SCC and Crevice corrosion inhibition of Steam Turbine.pdf; 2242 Mitigating Soil-Side Corrosion on Crude Oil Tank Bottoms Using Vol....pdf

Tracking:

Recipient

Read

Andijani, Ismaeel N.

Kirita, Katsuo X.

lyad Alami

Read: 7/28/2013 4:02 PM

Dear Dr. Ismaeel,

Further to the telephone conversation we had about the use of Cortec Corrologic VpCI technology in protecting aboveground storage tank bottoms, please find below supporting documents for the points we discussed :

1. **Diffusion distance:** Technical report on the diffusion distance of a Vapor phase corrosion inhibitor. The test shows that the corrosion inhibitor molecules were able to diffuse without any external force a distance of 30 meters.
2. **Multi-phase protection:** Vapor phase corrosion inhibitors provide protection for multi metals in three phase; liquid, vapor and liquid/vapor interface and therefore can provide protection to the aboveground storage tank bottoms even in the presence of water. Please find attached the following:
 - a. NACE Technical paper "METHODOLOGY OF VCI'S FOR WATER TREATMENT". This paper clearly shows that VpCI technology can provide protection in liquid, vapor and interface liquid/vapor phase.
 - b. NACE technical article that shows how VpCI can provide three phase protection in water treatment applications.
 - c. Technical report on the evaluating the corrosion protection of a vapor phase corrosion inhibitor in sand saturated with seawater.
3. **Crevice between bottom plates and asphalt layer:** Cortec VpCI technology has proven its potency in providing protection against corrosion in very difficult and hard to reach areas with very minimal clearance. Simply, our Vapor phase corrosion inhibitors will flow wherever the air, oxygen and corrosive elements can flow. For example, the technology has been used to provide protection against crevice corrosion in steam turbines (attached technical paper). In case of the aboveground storage tanks, our technology will definitely diffuse through all the clearances between the asphalt layer and the bottom plates no matter how small the gap is. It is also worth mentioning that the Aramco NACE paper (attached) shows that the VpCI was able to diffuse not only through the small gaps between the bottom plates and the sand layer but also through grout and bituminous sand. This can give you a feel how our VpCI technology can diffuse.

Should you have questions or require further clarification, please don't hesitate to contact me.

Regards,
Khalil Abed
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From: Kirita, Katsuo X. [mailto:KATSUO.KIRITA@PETRORABIGH.COM]
Sent: Wednesday, July 24, 2013 5:21 PM
To: Khalil- CORTEC ME
Cc: Andijani, Ismaeel N.
Subject: RE: Protection of Tank No. F50-T35 floor using Cortec Corrologic Technology

Khalil San,

Please teach us how to persuade top management from your experiences.

And also teach us what are discussion points to introduce VpCI technology.

Our Mr. Ismaeel has started the investigation. Please inform him much data.

Kirita

From: Khalil- CORTEC ME [mailto:kabed@cortec-me.com]
Sent: Wednesday, July 24, 2013 3:23 PM
To: Kirita, Katsuo X.
Cc: Hapuarachchi, Gamini C.; Yano, Masaya X.; Andijani, Ismaeel N.; 'Iyad Alami Outside'; ujacir@cortec-me.com
Subject: RE: Protection of Tank No. F50-T35 floor using Cortec Corrologic Technology

Dear Mr. Kirita,

It is worth mentioning that Amine carboxylate-based VpCI technology is established and well proven for over 30 years and by more than 300 tanks protected with this technology. Cortec Corrologic solutions for soil side corrosion mitigation are utilized by many major corporations in most regions of the world such as Conoco, Motiva, Holly Frontier, Valero, NuStar and TransMontaigne from the U.S, Aramco in KSA and ORPIC in Oman. The technology is getting wide acceptance in other countries like UAE and Qatar.

1. **Warranty:** Our standard warranty for product and installation supervision applies for 2 years from installation date. Cortec' obligation under this warranty shall be limited to replacement of product that proves to be defective along with associated supervision costs.
2. **Assurance:** While we believe that the system will provide effective protection for 10 years, please note that the Corrologic real time monitoring of corrosion allows us to re-charge the system with corrosion inhibitors, if and when required. Periodic Corrologic survey will be conducted by our Field Engineer on a monthly basis and annual report will be submitted. This practical approach is ideal for the dynamic conditions that are also unique to each tank.
3. **CP & Cortec Corrologic technology comparison:**

- a. According to API 651, cathodic protection is not considered an effective way to combat corrosion in the presence of asphalt cushion, especially if deteriorated, as it may shield the cathodic protection current. Cortec technology provides protection irrespective of the pad material. When a VPCI output is released within an AST interstitial space, protective vapors disseminate and migrate to the metal and replace moisture and corrosive elements without the need to be in direct contact with tank bottom.
- b. From our experience in this field we are at similar initial cost as CP. Maintenance/ operating cost for Cortec Corrologic system is limited to data collection.

Should you have questions or require further clarification, please don't hesitate to contact me.

Regards,

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From: Kirita, Katsuo X. [<mailto:KATSUO.KIRITA@PETRORABIGH.COM>]
Sent: Sunday, July 21, 2013 2:07 PM
To: kabed@cortec-me.com
Cc: Hapuarachchi, Gamini C.; Yano, Masaya X.
Subject: FW: Protection of Tank No. F50-T35 floor using Cortec Corrologic Technology

Dear Sir,

Please explain below.

1. Warranty if failed
2. 10 years assurance for no corrosion without any additional actions.
3. Comparison of initial investment + maintenance cost between CP installation and Cortec system

Kirita

From: Kirita, Katsuo X.
Sent: Thursday, July 18, 2013 12:51 PM
To: 'kto.kirita@keh.biglobe.ne.jp'
Subject: FW: Protection of Tank No. F50-T35 floor using Cortec Corrologic Technology

From: Khalil- CORTEC ME [<mailto:kabed@cortec-me.com>]
Sent: Tuesday, July 16, 2013 4:19 PM
To: Kirita, Katsuo X.
Cc: yanom3@sc.sumitomo-chem.co.jp; Andijani, Ismaeel N.; Hapuarachchi, Gamini C.; Naji, Ahmed M.; 'Iyad Alami Outside'
Subject: Protection of Tank No. F50-T35 floor using Cortec Corrologic Technology

Dear Eng. Kirita,

It was a great pleasure to have a telephone conversation with you yesterday.

Further to the site visit to Tank No. F50-T35 on July 2nd, followed by a presentation on Cortect Corrologic technology and its proven effectiveness in mitigating soil side corrosion of tank bottoms, please find attached the following techno-commercial proposal for protecting and extending service life of Tank No. F50-T35 bottom:

1. Technical proposal with background, case discussion and retrofit strategy
2. VpCI 609S product data sheet
3. VpCI 609S Material Safety Data Sheet
4. NACE Article – June 2011
5. NACE Paper #2242 – Corrosion 2013 (Saudi Aramco)
6. Commercial offer

We strongly believe that with the use of our technology you will be able to achieve the following:

1. Extending service life of the storage tank
2. Rescheduling and managing dates of future T&I's
3. Minimize, if not eliminate, percentage of defective area in tank floor and the cost associated with replacing defective bottom plates
4. Real-time Corrosion Rate Monitoring for the corrosiveness of the under tank environment
5. Prevention of leakage and its negative impact on the environment
6. Overall savings during T&I in terms of labor, tank shutdown time, floor scanning and overheads.

I look forward to discussing the details of the proposal with you next Monday , I visit KSA twice a month.

Meanwhile, please don't hesitate to contact me at any time for further discussion and information.

Regards,

Khalil Abed

Business Development Manager

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