

## Rami Izhiman

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**From:** Khalil- CORTEC ME <kabed@cortec-me.com>  
**Sent:** Sunday, August 4, 2013 11:37 AM  
**To:** Kirita, Katsuo X.; Hapuarachchi, Gamini C.  
**Cc:** 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

Kirita, Katsuo X.  
Hapuarachchi, Gamini C.  
lyad Alami

#### Read

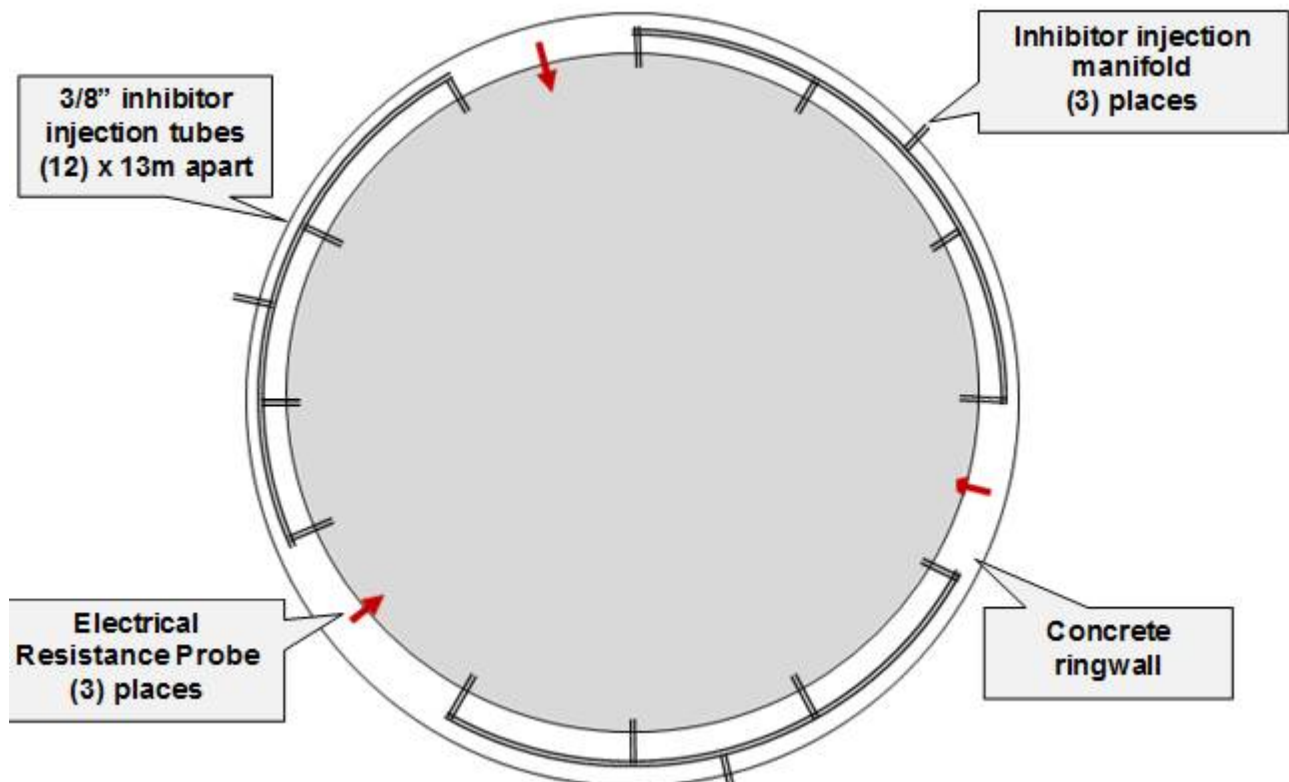
Read: 8/4/2013 12:49 PM

Dear Mr. Kirita and Gamini,

Please note that I have been in direct contact with Dr. Ismaeel last week addressing and clarifying the following issues:

#### 1. How to apply Cortec Corrologic technology for in service tanks:

For in-service tanks, the inhibitor needs to be applied through manifolded tubes inserted a few inches under the annular chime plate as has shown in the sketch below.



#### 2. How the inhibitor will reach to center of the tank:

**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.

**3. How the inhibitor will diffuse in case we have very tight clearance between the bottom plates and the asphalt layer:**

**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.

**4. Will the inhibitor provide protection in the presence of ground water:**

**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.

When can we arrange for a meeting at Petro Rabigh and move into the implementation phase?

Regards,  
Khalil

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**From:** Kirita, Katsuo X. [mailto:KATSUO.KIRITA@PETRORABIGH.COM]

**Sent:** Monday, July 22, 2013 4:11 PM

**To:** Khalil- CORTEC ME

**Cc:** Hapuarachchi, Gamini C.; Yano, Masaya X.; 'Iyad Alami Outside'; ujacir@cortec-me.com

**Subject:** RE: Protection of Tank No. F50-T35 floor using Cortec Corrologic Technology

Khalil San,

The tanks has already replaced the base plate and in service.

Why do you need MFL result?

No problem, I will send you tomorrow.

Bahaddad San,

Please send us MFL results on the tanks which already returned back to service without any counter measurement such as CP installation. Instead of CP, Cortec anti-corrosion chemical is a candidate of improvement.

We are investigation with vendor.

Kirita

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**From:** Khalil- CORTEC ME [<mailto:kabed@cortec-me.com>]  
**Sent:** Monday, July 22, 2013 2:00 PM  
**To:** Kirita, Katsuo X.  
**Cc:** Hapuarachchi, Gamini C.; Yano, Masaya X.; 'Iyad Alami Outside'; [ujacir@cortec-me.com](mailto:ujacir@cortec-me.com)  
**Subject:** RE: Protection of Tank No. F50-T35 floor using Cortec Corrologic Technology

Dear Mr. Kirita,

Thank you for the below email.

In order to be able to provide you with a solution for in-service tank, please provide us with MFL / UT reports for those tanks that were put back in service.

Regards,

Khalil

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**From:** Kirita, Katsuo X. [<mailto:KATSUO.KIRITA@PETRORABIGH.COM>]  
**Sent:** Monday, July 22, 2013 2:29 PM  
**To:** Khalil- CORTEC ME  
**Cc:** Hapuarachchi, Gamini C.; Yano, Masaya X.  
**Subject:** RE: Protection of Tank No. F50-T35 floor using Cortec Corrologic Technology

Khalil San,

Please inform us how to apply Cortec system on existing tank which has asphalt foundation with no CP.  
Your proposal is only for opening tank. We have a few tanks just returned back to service after replacement of base plate.  
We have a plan to install CP system on the tank, but the plan was stopped. We will plan to apply Cortec system as well if possible.

Please give as vendors list and historical application data which shows how effectiveness of the system.  
And also Saudi Aramco technical evaluation document on this system etc.

Kirita

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**From:** Khalil- CORTEC ME [<mailto:kabed@cortec-me.com>]  
**Sent:** Monday, July 22, 2013 9:48 AM  
**To:** Kirita, Katsuo X.  
**Cc:** Hapuarachchi, Gamini C.; Yano, Masaya X.  
**Subject:** RE: Protection of Tank No. F50-T35 floor using Cortec Corrologic Technology

Dear Mr. Kirita,

I am working on the below points and will keep you updated.

Regards,  
Khalil

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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](mailto: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

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**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

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**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](mailto: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 2<sup>nd</sup>, followed by a presentation on Cortec 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

KSA, Levant and North Africa

**CORTEC Middle East**

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