Minutes of EFC WP 15
Corrosion in the Refinery and Petrochemical Industry

Berlin during Eurocorr 2022 and Virtual

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1 WELCOME

Francois Ropital opened the hybrid face to face and virtual meeting. The meeting took place in Berlin during the Eurocorr 2022 congress.

44 persons (25 face to face + 19 remote) attended the meeting. The list of participants is enclosed in Appendix 1.

2 EFC WP 15 ACTIVITIES

2.1 EFC WP 15 activities And Minutes of Meetings

Information on the activities of EFC WP 15, was presented by Francois Ropital. This information can also be found on the EFC web site where the minutes of previous WP15 meetings can be consulted and downloaded. More information is enclosed in Appendix 2.
https://efcweb.org/WP15.html

EFC hub platform:
EFC launches a web platform to share information and collaborative works. The web link is https://efc.solved.fi/activities/wp/list. The WP15 members are welcome to join the platform and all the information to do that has been emailed.
In this platform news on the activities of WP15 and collaborative works (such as publication of EFC green books) will be shared.

2.2 Publications from WP15

Advancement on a new guideline on corrosion in sea water cooling systems:

> This new EFC guideline takes place in the frame of a joint WP9 (marine corrosion) WP15 and in collaboration with French Cefracor “corrosion of heat exchangers” group. Two chapters have to be finalized and the final reviewed version is expected by the end of 2022 to be sent to the publisher (Valérie Bour-Beucler, Francois Ropital).

Continuation of the activities on Corrosion Under Insulation (CUI):

> To update and exchange information on CUI for the next 2025 revision of EFC guideline 55, a project has been created on the new EFC hub platform. https://efc.solved.fi/activities/wp/list.
> Persons who would like to contribute to the new revision should contact Gino de Landtsheer. (gino.delandtsheer@borealisgroup.com)

2.3 EUROCORR 2022

This annual working party meeting was held during the Eurocorr 2028 conference.

The session dealing with refinery and petrochemistry corrosion took place on 31th August.

Attendance of this session was around 40 persons, figure that reflects the attendance of the Eurocorr 2022 face to face conference with about 820 participants and 500 oral presentations.

2.4 EUROCORR 2023

Eurocorr 2023 “Closing the gap between industry and academia in corrosion science and prediction” will take place in Brussels, Belgium from 27 to 31 August.
A session dealing on corrosion in the refinery and petrochemistry will take place.
A joint session on “corrosion in biorefineries” is planned with the Task Force “Corrosion in low carbon and green energy technologies”.
Proposal has been put on the table by Gino De Landtsheer to invite via the Belgium Federation of chemical industries all Benelux players to the Eurocorr 2023 event, and specifically to the WP15 meeting.
The call of abstract will be issued in October with a probable **deadline to submit an abstract by the end of 2023**.
More information is available via the web link:
https://www.eurocorr2023.org/

2.5 Next 2023 WP15 spring meeting

During the meeting, different types of meetings have been discussed: one full day (face to face or hybrid or fully remote), two half days remote meetings.
A full day hybrid mode face to face with possibility to join virtually the meeting made consensus. Proposals from companies or laboratories to host this meeting are welcome. Then a Doodle enquiry will be sent to all the WP15 members in order to fix a date in March or April and to avoid overlap with the AMPP Corrosion Congress that will take place in Denver from 19 to 23 March 2023.

3 CORROSION IN BIOREFINERIES

CRA Upgrades of process vessels by high velocity thermal spray (HVTS) cladding – Asset conversion for renewable fuel processing
Vitaly Geraskin presented the HVTS cladding technology and its application for implementation in biorefinery process (new and upgrade ones) to mitigate the damage mechanisms associated with the new corrosive feeds. Rigorous performance qualification is required in connection with engineering standards and qualifications procedures. Advanced refinery feed-specific corrosion assessments have been conducted and further work to look at the impact of FAME and other specific compounds will be conducted. More information can be found in Appendix 3.

4 COOLING WATER SYSTEMS

Problems with contamination from sweetening units
Vlad Gogulancea shared the analysis of leak trouble in the Tail-Gas unit on a process water cooler. Erosion-corrosion appeared at the joint between tubes and tube-sheet. Chloride contamination could be the main cause but after remediation, the corrosion trouble was still there even with a low free chlorine level. After further investigations, the source of the contamination came from a process water recirculation pump. The pump sealing was previously cooled with another source of water, but for some

reason the source of water was changed. The trouble was an operating management problem.

How an integrated solution for heat exchangers and water systems can manage critical assets and anticipate performance to optimize productivity
Valerie Bour-Beucler presented OMNI^{TM} that is a digital evolution of water treatment programs, focusing on customer's outcomes, maximizing reliability and profitability.
OMNI™ HX brings the cooling water program to a new level: a control based on customer core KPI on heat exchanger performance**.** The main advantages are to avoid downtime, to maximize the heat, to avoid cleaning costs and to optimize turnaround plans. More information can be found in Appendix 4.

5 CO_2 REMOVAL

Utilization of High Velocity Thermal Spray (HVTS) to prevent corrosion in amine systems designed for CO_2 removal
Vitaly Geraskin gave some information and feedback on the benefits of HVTS claddings. Examples of applications to avoid pitting in amine absorbers have been shared: after 10 years of run no damage has been detected. In amine stripper columns, HVTS cladding replaced weld overlays and avoided post weld heat treatments. More information can be found in Appendix 5.

6 FAILURE ANALYSIS

The most probable failure mechanisms in superheater tubes of the steam generation boilers in the gas refineries and the prevention strategy
Askar Soltani presented the investigations on a leakage failure in steam generation boilers. The Na/PO_4 molar ratio was not in the safe zone of the operating window and a caustic gouging was active. EDX analysis inside the pits revealed the presence of mineral elements like Na and Ca. The presence of high amounts of Na and P could be an indication of a boiled feed water carry-over or the presence of a condensed steam after boiler stop and cooled-down process. More information can be found in Appendix 6.

7 CORROSION UNDER INSULATION

Revision of the third edition of EFC CUI n°55 guideline
Pre-work has been done about the following items:
- Google doc's corporation platform set-up
- Upload of latest versions of manuscripts of each of the chapters/appendixes separately
- Next publication date of revision 4 of publication n°55 will be 2025 (agreed with Elsevier publishing company)
- At this moment 11 people already assigned for reviewer
- In the next days/weeks the platform will be opened for the reviewers individually

Evolution of CUI technology and CUI standards

Chris Magel presented the base concept of CUI heat resistant coatings. A new PPG multipolymeric 1027 HD single coat that can be applied on zinc silicate primers, had been developed. This coating can withstand high heat conditions up to 650°C with a good thermal cycling resistance. More information can be found in Appendix 7.

A coating-integrated, impressed current cathodic protection (ICCP) and real time digital asset integrity monitoring system for preventing corrosion under insulation

Copsys Intelligent Digital Skin (CIDS) has been developed to detect CUI hotspots before any corrosion damage can occur. It replaces manual inspection processes with persistent a digital presence by the implement of a coating with an integrated impressed cathodic current protection (ICCP) to prevent corrosion even after the failure of the barrier system.
Michael Maguire is looking for partners for pilot application of CIDS system to existing or planned facilities. More information can be found in Appendix 8.

Gas Dryer: Reducing CUI risk and extending inspection intervals

William Noordink presented the Control Radar™ CUI risk monitoring system with moisture and corrosion sensing devices to monitor a gas dryer. Some values of return on investments for small tanks have been shared. More information can be found in Appendix 9.

8 NEXT MEETINGS

2023 Spring WP15 Meeting
A full day hybrid mode (face to face with possibility to join virtually the meeting) made consensus. Proposals from companies or laboratories to host this meeting are welcome. Then a Doodle enquiry will be sent to all the WP15 members in order to fix a date.

2023 Autumn Full WP 15 Meeting:
This meeting should take in Brussels, Belgium from 27 to 31 August during the Eurocorr congress.