

**Minutes of EFC WP 15
Corrosion in the Refinery Industry**

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1 WELCOME

Francois Ropital opened the meeting.

32 persons attended the meeting and briefly introduced themselves. 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; Corrosion in the Refinery Industry, 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.

<http://www.efcweb.org/Working+Parties-p-104085/WP+15-p-104111.html>

2.2 Publications from WP15

The following publications from this working party are available:

- EFC Guideline n°46: "Amine Unit Corrosion Survey"
<http://www.woodheadpublishing.com/en/book.aspx?bookID=1299>
- EFC Guideline n°55: "Corrosion under insulation CUI guidelines"
<http://www.woodheadpublishing.com/en/book.aspx?bookID=1486>

More information on the availability of these EFC guidelines and how to order these can be obtained with the following web link:

<http://www.efcweb.org/Publications/List+of+EFC+Publications.html>

Discussion on proposals for revision of these publications:

- EFC Guideline n°55: "Corrosion under insulation (CUI) guidelines".

An update is planned (see section 3 of this document)

Discussion on proposals for future publications:

- A best practice guideline to avoid and characterize high temperature stress relaxation cracking of austenitic materials.

2.3 Downloading Previous Eurocorr Conference Papers

Papers from the previous Eurocorr conferences (from Eurocorr 2004 to 2011) can be downloaded via the member's pages of each of the national member societies of EFC. The list of EFC member societies is available on the web page:

<http://www.efcweb.org/Who+we+are/Member+Societies.html>

Please contact your member society for more information on access to these papers.

2.4 EUROCORR 2012

This annual working party meeting was held in Istanbul during the Eurocorr 2012 conference "Safer world through better corrosion control".

The session dealing with refinery corrosion has been held on 11 September.

Attendance of the working party sessions was between 55 and 65 persons, a significant figure similar to the 2011 refinery sessions in Stockholm. This point reflects the good attendance of the 2012 conference: more than 800 participants.

2.5 EUROCORR 2013

Eurocorr 2013 "Corrosion control for a blue sky" will take place in Estoril, Portugal from 1-5 September 2013. Its web site is:

<http://www.eurocorr2013.org/>

During this meeting, the proposal of a joint session co-organized with WP 19 (Corrosion of polymer materials) on the behaviour of plastic materials in refineries petrochemical and chemical plants has been discussed with Jürgen Heinemann vice chairman of WP19. It has been decided to contact manufacturers and end-users. Francois Ropital will also contact NACE chairpersons of STG10 "Non Metallic Materials" (Todd A. Thomas) and TEG191X Managing corrosion with polymer based and composite materials (Christine Osborne).

Abstracts are welcomed and the deadline for submission is 12 January 2013.

2.6 EUROCORR 2014

Eurocorr 2014 "Improving materials durability: from cultural heritage to industrial applications" will take place in Pisa, Italy from 8-14 September 2014.

During this meeting, it has been proposed that a joint session could be organized with WP 3 (Corrosion at high temperature) on the high temperature corrosion in refineries and petrochemical plants.

2.7 Collaboration with NACE

Exchange of information between WP15 and the NACE groups dedicated to the same topics are encouraged. Rob Scanlan and John Wodarczyk are the EFC WP15 representatives for the NACE meetings during the annual NACE Conferences and Technical week to inform on the WP15 activities. The minutes of the EFC WP15 and NACE STG 34 meetings are exchanged between Linda Goldberg and Francois Ropital. As mentioned in other paragraphs of these minutes, CUI, plastic materials and the corrosion failure atlas are potential topics of collaboration with NACE.

Information received after the meeting from EFC President Philippe Marcus: During the NACE – EFC presidents meeting that took place in Istanbul during Eurocorr 2012, the proposal of a NACE – EFC dedicated one day symposium on

Corrosion Under Insulation (CUI) has been submitted. This symposium could take place in Estoril (Portugal) the day before or after the Eurocorr 2013 conference (1-5 September). As this proposal has still to be discussed within NACE and EFC officials, Francois Ropital will send more information when available.

2.8 Next 2013 WP15 spring meeting

The participants agreed to continue to have 2 working party meetings per year: one in spring and one during the annual Eurocorr conference.

Martin Richez from Total proposed to host the next spring meeting in **Paris La Défense (France)** between the 9 and 19 April 2013: due to the meeting room availability the date of the meeting has been fixed on **Tuesday 9 April 2013**.

3 CORROSION UNDER INSULATION – REVISION OF EFC GUIDELINE

3.1 Update of the EFC n°55 guideline on CUI

A revision of the guideline appears useful, especially for old equipment that will not be covered by the future ISO standard. WP15 had previous meetings for this revision on 7 September 2011 (in Stockholm) and 25 April 2012 (in Amsterdam). The main parts of the revision have been discussed and volunteers (xxx in the table below) are now requested in order to submit written proposals of revisions.

	Update	Full	Partial	Volunteer(s)
Chapters				
Chapter 1- Introduction	y		y	S. Winnik + xxx
Chapter 2 – Economic Consideration	y	y		xxx
Chapter 3 – Ownership and Responsibility	Y	Y		xxx
Chapter 4 - RBI Methodology for CUI Unit Prioritisation	Y	Y		H. de Bruyn, J. Van Roij + xxx
Chapter 5 – Inspection Activities/ Strategy	Y			H. de Bruyn, J. Van Roij + xxx
Chapter 6 – NDE/NDT Screening Techniques for CUI	Y			A. Demma + xxx
Chapter 7 – Recommended Practice to Mitigate CUI	Y		Y	S. Winnik + M. MeLampy + xxx
Chapter 8 – Design for the Prevention of CUI	N			xxx
Appendices				
A NDE/NDT Techniques	Y	Y		A. Demma + xxx
B Cost-Economic Evaluation	Y		Y	S. Winnik + xxx
C Application of TSA	Y		Y	S. Winnik + xxx
D Use of Protective Guards	Y		Y	xxx
E Additional Guidelines of the Implementation of CUI Best Practice	?			
F Coatings	Y	Y		xxx
G Quality Assurance	?			
H Insulation Material Types and Forms	?			
I Cladding/ Jacketing Materials	?			
J Case Studies	Y		Y	xxx

A **restricted access web page** will be created on the WP15 EFC web site in order to facilitate the work of the task force for this revision. The documents useful to revise the guideline could be downloaded. More volunteers are welcome to join the task. If you are interested send an email to Francois Ropital (francois.ropital@ifpen.fr) and Stefan Winnik (stefan.winnik@exxonmobil.com) to have access to this restricted area and to inform what part(s) of the document you will work on. The dead line for submitting your proposals to Stefan Winnik and Francois Ropital is the **end of February 2013**. The revised documents will be discussed during the April 2013 EFC WP15 spring meeting.

4 CORROSION UNDER INSULATION: PROPOSALS OF JIP

4.1 Honeywell JIP proposal on CUI

B. Chambers presented a proposal of Joint Industrial Project (JIP) on the characterization and quantification of CUI for process plant applications. This JIP will provide a focus on the wet insulation problem by selection and rating evaluations of insulation materials. CUI and thermal performances will also be evaluated on full scale pipe tests. The objective of this JIP will be to develop a set of data to rank and select insulation materials and assess corrosion damage and thermal losses due to existing wet insulation.

More information is provided in Appendix 3.

4.2 SINTEF JIP proposal on CUI

The presentation of this JIP was performed by O. Knudsen from SINTEF. The aim of this JIP is to select and develop a test method that can be used for evaluation and pre-qualification of coatings for use under thermal insulation applications. Cyclic heating and wetting tests will be performed with a thermal gradient between 60 and 400°C.

More information is provided in Appendix 4.

5 CRUDE UNITS OVERHEAD SYSTEMS

A proposal of JIP on corrosion characterization in crude distillation unit overhead systems was presented by B. Chambers (Honeywell). Phase 1 of this project examines corrosion due to HCl, NH₃, H₂S, and H₂O in conditions relevant to the CDU overhead system. Then Phase II will be launched to assess the impact of amine neutralizers.

Six tasks are proposed: Development of NH₄Cl phase behaviour model, Development of baseline parametric data, Data development on the effect of H₂S, Thermodynamic / Ionic modelling for experimental tasks, Development of a prediction model, Development of a prediction software.

More information is provided in Appendix 5.

6 CORROSION FAILURE ATLAS

In order to facilitate exchange on corrosion failures and their remedies, a fully open dedicated web page is available within the WP15 page on the EFC website:

<http://www.efcweb.org/Working+Parties/WP+Corrosion+in+the+Refinery+Industry/WP+15+Refinery+Corrosion+Atlas.html>

At the present time 8 anonymous failure cases have been implemented. The number of corrosion and failure cases has to increase and new contributions (to be sent to Francois Ropital) are welcome. The data sheets information will continue to be validated by the task force and discussed during the next EFC WP15 meetings.

More information is provided in Appendix 6.

7 TOPICS FROM THE AUDIENCE

The following topics have been discussed:

- Monitoring of the naphthenic acid corrosion
- Corrosion of tank roofs
- Information on the start of the JIP conducted by TNO on stress relaxation cracking

8 NEXT MEETINGS

2013 Spring WP15 Meeting

This meeting will take place on 9 April 2013 in Paris La Défense – France (Total offices).

2013 Autumn Full WP 15 Meeting:

This meeting will take place in Estoril, Portugal during the Eurocorr 2013 conference from 1-5 September 2013.