

# **Minutes of EFC WP 15**

## **Corrosion in the Refinery Industry**

**Trondheim (Norway)**

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### **Prepared by**

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### **Acknowledgement**

The EFC WP 15 Refinery Corrosion Group would like to express thanks to Statoil for hosting this meeting in their Trondheim research centre with special thanks to Hennie de Bruyn for the organisation of the meeting.

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## **1 Welcome**

The meeting was opened by Dr .R. Ødegård (Director for Oil & Gas Processing at the Statoil Research Centre), who welcomed the participants. Dr Ødegård presented the activities of Statoil.

Statoil is the 3<sup>rd</sup> largest crude seller in the world and operates in 28 countries. The company produces more than 1 million barrels of oil per day through 20 oil and gas fields (48% of Norwegian oil production and 84% of Norwegian gas production).

Statoil operates 2 refineries (Mongstad in Norway and Kalundborg in Denmark) and has minority shareholding in the Pernis refinery.

Regarding petrochemicals, Statoil owns 50% of the Borealis group. Statoil is also a major methanol producer (25% of the European capacity).

Statoil's technology strategy is based on 6 central challenges,

- finding hydrocarbons,
- new assets - developing and exploiting new resources
- subsea improved oil recovery,
- tail production (prolonging the economic lifetime of major fields),
- oil and gas processing (developing new technologies),
- new business options by realising long term technology and sustainable development.

15 persons attended the meeting and shortly introduced themselves. Apologies were received from 35 persons. The lists of the participants and the excused persons are 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 were presented by Francois Ropital. This information can also be found on the EFC web-site ([http://www.efcweb.org/WP\\_on\\_Corrosion\\_in\\_the\\_Refinery\\_Industry.html](http://www.efcweb.org/WP_on_Corrosion_in_the_Refinery_Industry.html)) where the minutes of previous WP15 meetings minutes can be consulted and downloaded. More information is enclosed in Appendix 2.

### **2.2 Publications**

The following publication is available at Maney Editor:

- EFC Guideline no. 40: Prevention of Corrosion by Cooling Waters.  
<http://www.maney.co.uk/search?fwaction=show&fwid=623>

Two EFC WP 15 publications are in preparation at the editor:

- EFC Guideline no. 42: A Collection of Selected Papers (ed. John Harston).
- The "Amine Unit Corrosion Survey" managed by John Harston.

Publications in preparation:

- Corrosion under insulation issues in modern refinery and petrochemical plants. This new guideline has been discussed during the meeting on CUI. The discussions on this guideline are presented in section 6 of these minutes.
- Collection of selected papers of the joined WP3/WP15 workshop. "*Corrosion by hot gases and combustion products with emphasis on high temperature corrosion in the chemical and petrochemical industries,*" that has been held with WP3 during Eurocorr 2004, will be published by Prof. Schutze (chairman of WP3 "High Temperature Corrosion).

### **2.3 EUROCORR 2005**

Eurocorr 2005 (EFC event n° 273) "Corrosion control for sustainable development" will take place in Lisbon, Portugal from 4-8 September 2005. Its web site is <http://www.eurocorr2005.org>

Two sessions dealing with refinery corrosion will be hold:

Workshop 7 " Corrosion and remedies to fight naphtenic acid corrosion (organised with WP1 "inhibitor")

Session N: "Refinery corrosion and failure cases"

As 2005 will the 50<sup>th</sup> Anniversary of the European Federation of Corrosion, a key note lecture will de given on "50 years of corrosion work in the refinery industry".

### **2.4 EUROCORR 2006**

Eurocorr 2006 "Reliability management of technical systems" will take place in Maastricht, Netherlands from 25-28 September 2006.

Its web site is <http://www.corrosiecentrum.nl/eurocorr2006/>

It has been decided that a session will deal with "Corrosion Under Insulation".

### **3 Proposal of further exchange topic on FCCU**

After discussion on potential subjects of future exchanges, the topic on FCCU materials and corrosion has been proposed by Nicholas Dowling. The goal of this forum will be to exchange experiences from European refineries. A specific letter will be addressed to the WP15 members in order to have their agreement for collaboration on this topic. More information is provided in Appendix 3.

### **4 Failure case: fin fan tube failure**

Andrew Kettle (Pembroke Refinery Chevron Texaco) presented the failure of a fin fan tube from an air cooled exchanger. The failure had been caused by external corrosion that had been developed underneath the L fin type design. Inspection by IRIS (internal rotary inspection system) indicates that corrosion is located at the top row. More information is provided in Appendix 4. Andrew Kettle will appreciate to be informed on similar failure on fin fan tube: WP15 members shall contact him directly (email: Andrew.Kettle@ChevronTexaco.com).

### **5 Direct fired heater integrity review issues**

Nicholas Dowling (Shell Global Solutions) presented a full access integrity review on direct fired heaters. As heaters are an integral part of modern petrochemical plants, reliability and availability is critical to ensure plant productivity targets. Despite design differences, heater materials of construction and process fluids are often similar allowing integrity to be managed systematically and effectively. This approach can lead to heater optimization. More information is in Appendix 5.

### **6 Corrosion Under Insulation EFC Guideline**

The main part of the meeting was dedicated to the advancement of the Corrosion Under Insulation (CUI) guideline. The second draft version of the document was discussed in connection with the comments received from the UK forum on CUI (with as John Thirkettle as a co-ordinator). The current objectives are to produce a consensus European document from WP15 on corrosion under insulation.

#### **6.1 Consultation and update of the document**

To facilitate the transmission and consultations of files, a common internet zone has been created:

<http://project.ifp.fr/cui-efc-wp15>

The CUI guideline is incorporated in the "Discussion". Further information are enclosed in Appendix 6.

This facilitates easy sharing of the documents and provide access to the most updated versions.

Other documents concerning activities of the WP15 group are also enclosed in the "Library" section of the web site :

- CUI Reference documents
- Literature data base
- Previous working party meetings minutes.

For further information or access to this web site, Francois Ropital is to be contacted.

## **6.2 Reviewing and comments on version 2 of the CUI EFC Guideline**

A unique document has been built by Hennie de Bruyn that was the base document for the reviewing during this meeting.

The comments received from the UK forum on CUI were discussed by the authors of the sections and the participants of the meeting. The decisions are reported on the "comments.doc" file that is available at the following address:

[http://project.ifp.fr/QuickPlace/cui-efc-wp15/Main.nsf/h\\_Discussion/29B5E157688DC35780256FE90034C380/?OpenDocument](http://project.ifp.fr/QuickPlace/cui-efc-wp15/Main.nsf/h_Discussion/29B5E157688DC35780256FE90034C380/?OpenDocument)

In order to facilitate the update of the sections by their authors or the persons who are in charge of them, the unique document has been transformed after the meeting in a single file version "EFC WP15 CUI document (rev 3).doc" and in sub files for each of the sections "Section ii (rev 3). doc" or "Appendix XX (rev 3). doc".

## **6.3 Progress schedule for the guideline**

Each section's author or person in charge of it who will take responsibility to incorporate changes mentioned in the "comments.doc" file and then rename it as "Section ii (rev 4). doc" or "Appendix XX (rev 4). doc".

By at least 15 June 2005 the rev 4 files should be incorporate on the web site (<http://project.ifp.fr/cui-efc-wp15> Discussion zone) and send by email to Francois Ropital.

1 July 2005: Availability on the web common zone, of version 4 of the CUI Guideline - unique document - first contacts with the publisher to get a "common style" document (Paul McIntyre and Maney Publishing).

5-8 September 2005: one day WP15 autumn meeting in Lisbon (Portugal) during Eurocorr 2005 and further work on the guideline.

## **7 Next Meeting**

*The next autumn meeting will take place in Lisbon during the Eurocorr 2005 conference, 5-8 September.*

The date will be fixed in conjunction with the Eurocorr refinery session organisation. Our colleagues from Portugal and Spain are specially welcomed: please transmit the invitation to your corporate colleagues dealing with refinery corrosion in these countries.