

From

Damien Féron, Chairman of the EFC WP4 CEA/Saclay DEN/DANS/DPC/SCCME Bâtiment 458 91191 GIF SUR YVETTE Cedex (France)

Monday, June 27th, 2005

O/Ref. EFC/CEA/05-004/DF/MBe

Dear Colleagues,

Minutes of the Anvers meeting (15/04/2005) Re

> Please, find hereafter the minutes of the WP4 meeting held in Anvers on April 15th, 2005. Sincerely,

Damien Féron Chairman of the EFC WP4

Mylène Belgome Secretary of the EFC WP4

Enc. Minutes Annexes

EFC WP4 "NUCLEAR CORROSION"

Chairman Damien Féron Secretary Mylène Belgome Scientific Secretary Yves Rouillon

CEA/Saclay CEA/Saclay EDF

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EUROPEAN FEDERATION OF CORROSION EUROPÄISCHE FÖDERATION KORROSION Fédération Européenne de la Corrosion

MINUTES OF THE WP4 SPRING MEETING HELD IN ANVERS ASTRID PARK PLAZA HOTEL APRIL 15TH, 2005



Attendance:

Mylène Belgome **Rik-Wouter Bosch** Anna Brozōvá Philippe Dillmann Miroslava Ernestová Damien Féron Lionel Fournier Dolores Gomez Briceño Anders Jenssen **Renate Kilian** Bruno Kursten Valérie L'Hostis Virginia Madina Francisco Javier Perosanz Antoine Pourbaix Stefan Ritter Bo Rosborg Armin Roth Peter Scott Hans-Peter Seifert Guy Turluer François Vaillant Steven Van Dyck

CEA/Saclay (France) SCK-CEN (Belgium) Nuclear Research Institute Rez, plc. (Czech Republic) CEA/Saclay (France) Nuclear Research Institute (Czech Republic) CEA/Saclay (France) CEA/Saclay (France) CIEMAT (Spain) Studsvik Nuclear AB (Sweden) FRAMATOME-ANP GmbH (Germany) SCK-CEN (Belgium) CEA/Saclay (France) INASMET (Spain) CIEMAT (Spain) CEBELCOR (Belgium) Paul Scherrer Institute (Switzerland) KTH (Sweden) FRAMATOME-ANP GmbH (Germany) FRAMATOME-ANP (France) Paul Scherrer Institute (Switzerland) Consultant (France) EDF (France) SCK-CEN (Belgium)

EFC WP4 "NUCLEAR CORROSION"

Chairman	Damien Féron	CEA/Saclay
Secretary	Mylène Belgome	CEA/Saclay
Scientific Secretary	Yves Rouillon	EDF

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Apologies for absence received from:

Iñaki Azkarate Peña	INASMET (Spain)
Walter Bogaerts	K.U. Leuven (Belgium)
Franck Druyts	SCK-CEN (Belgium)
Catherine Guerre	CEA/Saclay (France)
Torill Karlsen	Institutt For Energiteknikk (Norway)
Éric Mathet	Nuclear Energy Agency
Anders Molander	Studsvik Nuclear AB (Sweden)
Gabor Nagy	KFKI Atomic Energy Research Institute (Hungary)
Juha Piippo	CORMET Testing Systems (Belgium)
Filippo Sevini	European Commission
Bernhard Stellwag	FRAMATOME-ANP GmbH, Germany
David Tice	Serco Assurance (United Kingdom)
Peter Wood	United Kingdom Nirex Ltd, United Kingdom

Diffusion:

Present and apologized participants WP4 Members P. MacIntyre (EFC Scientific Secretary) J. Vogelsang (STAC Chairman) Ph. Berge (EFC Secretariat in France)

Summary:

1.	Opening and welcome - Approval of the agenda (Annex I)					
2.	Approval of the minutes of the Nice meeting					
3.	EFC Event n°279: Seminar on "High Temperature Electrochemistry in Light Water Reactors" and proceedings edition – by R.W. Bosch (Annex II)	4				
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EFC WP4 "NUCLEAR CORROSION"

Chairman	Damien Féron	CEA/Saclay	DEN/SAC/DPC/SCCME	Bâtiment 458	F-91191 GIF SUR YVETTE Cedex
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1. OPENING AND WELCOME - APPROVAL OF THE AGENDA (Annex I)

D. Féron opened the meeting and presented the agenda which is approved by the participants.

As nobody had been appointed to present the point 6 of the agenda by the official representative of the EEG on Corrosion of Internals in LWRs (F. Sevini, apologized), A. Roth, who attended the last "AMALIA Group" meeting, agreed to say a few words about it.

A. Roth also presented the apologies for absence of B. Stellwag (FRAMATOME-ANP GmbH, Germany).

M. Belgome presented to the participants the lists of attendance and asked them to check and/or correct the information mentionned or missing, before passing the lists on to the audience.

2. APPROVAL OF THE MINUTES OF THE NICE MEETING

Following some comments made after the Nice meeting, D. Féron made a review of the minutes of the previous WP4 meeting held in Nice on September 15th, 2004 before asking for the attendance approval.

D. Féron reminded that two "mirror groups" were created in the WP4 for the ECG-COMON group and the AMALIA group that are, respectively, European Cooperative Group and European Expert Group gathering members around a consortium agreement, which is not acceptable for an EFC group, as decided during the STAC Meeting in Nice (agenda item 4).

As no comment was made on the minutes, they are approved.



3. EFC EVENT N°279: SEMINAR ON "HIGH TEMPERATURE ELECTROCHEMISTRY IN LIGHT WATER REACTORS" AND PROCEEDINGS EDITION - BY R.W. BOSCH (Annex II)

D. Féron introduced the presentation by thanking R.W. Bosch for the organization and the great interest of the Seminar.

R.W. Bosch recalled the motivation, scope and goal of the Seminar held in Campus Library Arenberg of the Katholieke Universiteit Leuven (Belgium), on November 30th, 2004. He showed some pictures of the location and attendance, and presented some key information:

- ✓ 1-day seminar with 9 lectures and 1 forum discussion (in presence of an EU Officer),
- ✓ 40 participants of 14 different nationalities.

R.W. Bosch presented the proceedings that are planned to be published as an EFC Series Green Book:

- ✓ 9 papers were expected:
 - * 4 papers received up to now,
 - *1 paper cancelled,
 - * 4 papers still awaited, despite the authors' agreement has already been received.
- ✓ Deadline for the missing papers: postponed to the end of April.
- ✓ In case of insufficient number of papers, R.W. Bosch proposed to merge the papers received with the Green Book "Corrosion issues in Light Water Reactors" that is under edition.

D. Féron informed that the coming Green Book "Corrosion issues in Light Water Reactors" already contents the maximum number of papers allowed for an EFC Series publication. He proposed the attendance to join the Green Book of R.W. Bosch that cannot only be a collection of the papers presented during the Leuven Seminar, but could be a more general publication about high temperature electrochemistry in LWRs.

A. Pourbaix informed that the EFC BoA (Bord of Administrators) is about to analyze the EFC publications to priorize the future Green Books publications. It is recommended that authors who consider submitting a publication as a Green Book take informations from the STAC or BoA of the EFC to learn about recommended priorities.

D. Féron informed that others solutions are possible for publications. For instance, he is in contact with the Journal of Nuclear Materials which is interested in publishing selected papers related to the usual content of this Journal. Of course, this kind of publications must be authorized by the EFC BoA.

D. Féron thanked again R.W. Bosch for the Leuven Seminar that was very appreciated by all the participants and by the EU Officer.

He underlined that this kind of seminar is very useful as an efficient and appreciated way to present european programmes, specially when they begin or come to their end.



4. EFC EVENT N°284: WORKSHOP "NUCPERF 2006" ON CORROSION AND LONG TERM PERFORMANCE OF CONCRETE IN NUCLEAR POWER PLANTS AND WASTE FACILITIES - BY V. L'HOSTIS (Annex III)

V. L'Hostis presented the NUCPERF 2006 Workshop that is organized by the CEA and EDF, with the support of the EFC, specially the WP4, and the OECD/NEA, and that will take place in Cadarache (France) on March 27-30th, 2006.

She presented:

- ✓ The origin of the workshop and its scope and aims.
- ✓ The topics that will be evoked.
- ✓ The members of the organizing and programmes committes (it is notified that WP11 Chairman is member of the programme committee).
- ✓ The proceedings that will be edited:
 - * on a CD-DOM including recommandations made by participants during discussions,
 - * in a Green Book after reviewing.
- ✓ The key dates and deadlines for registration and papers submission.
- ✓ The information about conference office and website (to be opened in June 2005).
- \checkmark The information about registration, accomodation and venue.

V. L'Hostis informed that not only corrosion of concrete will be discussed, but also corrosion in concrete reinforcement, problems of radiolysis in concrete and radiolysis linked to corrosion, etc.

D. Féron underlined the importance of the NEA co-sponsoring for this workshop as it is the first time, up to him, that an event is co-sponsored by both the EFC/WP4 and the OECD/NEA.



5. "EUROPEAN COOPERATIVE GROUP ON CORROSION MONITORING OF NUCLEAR MATERIALS" -BY ST. RITTER (Annex IV)

St. Ritter presented the up-date of the ECG-COMON current status, from the EUROCORR'2004 meeting (kick-off meeting of the group) up to now.

He recalled:

- ✓ The objectives of the ECG-COMON.
- ✓ Its fields of interest and action.
- \checkmark Its organization.
- ✓ Its current members.

He summarized the ECG-COMON kick-off meeting held in Nice during EUROCORR'2004 which was mainly dedicated to implement the Charter, to elect the Executive Committee and to select/elect the members of the group.

St. Ritter concluded with the announcement of the 1st annual meeting of the ECG-COMON, that will take place on June 6-7th, 2005 in Ljubljana (Slovenia) at ZAG and that will be about:

- ✓ Presenting past, current and future researches / results concerning the topic of the ECG-COMON and discussions.
- ✓ Planning a 1st Round Robin test about measurement equipements of electrochemical noise.

It is reminded that non-members of the ECG-COMON are allowed to participate if they are interested in joining the group. The contact addresses for information/registration are recalled.

A. Pourbaix asked about the links between the ECG-COMON and the WP4.

St. Ritter explained that he is, as a member of the WP4, the representative of the ECG-COMON, to inform the WP4 about non-confidential discussions/actions carried out by the ECG-COMON and to further future collaboration(s) with the WP4.

D. Féron reminded that, after a large discussion with P. McIntyre about the possibility of closed groups inside the EFC or WPs, it has been decided to create "mirror-groups" inside the WP4 to keep the EFC and the WP informed about non-confidential matters discussed in closed groups (as the ECG-COMON) and even created collaborations between them.

EFC WP4 "NUCLEAR CORROSION"

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6. EUROPEAN EXPERT GROUP ON CORROSION OF INTERNALS IN LWRS

As F. Sevini apologized for his absence but did not appointed someone for this point of the agenda, a quick summary of the last AMALIA (closed group for which the "EEG on Corrosion of Internals in LWRs" has been created as a mirror group inside the WP4) meeting was made by A. Roth and R. Kilian who attended it.

A. Roth informed that the partners of the AMALIA group obviously did not show enough interest to initiate specific projects related to the topic of the group. The participants therefore decided to formally stick together as an expert group, however, to meet again only to answer future european programme(s) on nuclear corrosion.

R. Kilian added that, as several groups already exist on the subject, the future of the AMALIA group depends on the decisions of the other groups and partners, as the new SIERNet group.

As European programmes were evoked, R. Kilian asked if, as the K.U. Leuven Seminar showed the results of the LIRES European programme, there has been a meeting presenting the results of the European 5th FCP.

It is answered that the new FCP and a recall of the previous ones has been presented during the last FISA meeting but mainly on the managerial/political point of view, and also during the last EFC/WP4 Spring meeting held in Paris on April 16th, 2004 (see the minutes ref. CEA-040514-MLL).

D. Féron proposed to contact EURATOM to sponsor a meeting where the results of different European programmes could be presented, or to create a special session during EUROCORR to present the results of European funded programmes related to corrosion.

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7. "REVISED STABILITY DIAGRAMS" - BY A. POURBAIX (Annex V)

- A. Pourbaix developped several items related to the revision of stability diagrams:
 - \checkmark The aim of the work:
 - * the original thermodynamic stability diagrams date back to 1963 and new thermodynamic data are now available,
 - * there is a need of revised, validated, more complete E-pH stability diagrams, specially regarding more complex materials and higher temperatures,
 - * this huge work is needed to produce a tool of reference for every researcher interested in this field.
 - ✓ The materials to be studied: it has been decided to first focus on Fe, Cu and Ti, in selected environments and conditions.
 - The validation of data: data have to be collected, selected (with arguments of selection), validated and even produced when needed.
 - ✓ The point of collecting data:

some possible sources of data have already been found but the participants are asked for any other possible source:

* F. Vaillant mentionned H. Catalette (EDF, France) who may be interested in performing calculation,

* B. Rosborg mentionned that a considerable effort was performed at Studsvik during the 90's considering operating LWRs co-sponsored by the Swedish nuclear utilities.

✓ The presentation of the revised diagrams: they should first be edited as an hard copy, but a website, free (up to a certain point) and regularly updated, is the final goal of this work.

✓ The participants:

the partners and acting people have to be defined, as the WP4 is the center body and A. Pourbaix the coordinator of this work, but not the "working" people

✓ The financial support:

there is an EU fund that could allow to fund the first 12 months and 60% of the costs of the first year; a project to be submitted to the EU by mid-September 2005 is being prepared (see Annex Vb), but other contributors are needed and welcomed.

✓ The work programme:

a draft of the work programme and the actions to be carried out this year, that is to say finding contributors, financial support and the acting people, is presented

D. Féron mentionned that, there should not be problem to get data from waste management agencies (for instance: the J. Chivot's book on some E-pH diagrams is available free of charge on demand to the ANDRA, the French waste management agency), but that could be more difficult (and/or not free of charge) with industrial partners working on reactors.

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8. STATUS OF THE CO-ORDINATED ACTION "NUCLEAR CORROSION" - BY D. FÉRON (Annex I)

D. Féron recalled the actions carried out in 2004:

- ✓ EoI submitted to an EU Officer in June, 2004 and discussed during the K.U. Leuven Seminar in November, 2004 with another EU Officer who was very impressed by the nuclear corrosion community and actions.
- ✓ Cancellation of the EURATOM call for proposals in September, 2004, postponed to April, 2005.

D. Féron informed the participants that there will be no call for proposals about "Nuclear Corrosion" but this topic could be included in two others co-ordinated actions, which has to be followed.

He also informed the attendance about a NoE "Sustainable integration of European research in residual lifetime prediction technologies".

A. Pourbaix added that EU Officers were invited to EUROCORR for its Jubilee Year, which can be usefull for the image of corrosion research and prevention to EU.

9. STATUS OF EFC WP4 PLANNED PUBLICATIONS

9.1. "Corrosion of metallic heritage artefacts" - by Ph. Dillmann (Annex VI)

Ph. Dillmann explained that this EFC Series book is going to be published on behalf of the WP4 as there was a common session "Heritage Artefacts" and "Nuclear Corrosion" during EUROCORR'2004, since heritage artefacts are used as archaeological artefacts for waste management studies.

This book aims to "filling the gap" between the Nuclear Corrosion world, carrying out studies on long term corrosion prediction, and the "conservation of heritage artefacts" world.

Ph. Dillmann presented:

- ✓ The plan and content of the Green Book:
 - *4 chapters: general overview, mechanisms and prediction, investigation and archaeology, monitoring and conservation,
 - * preface by A. Pourbaix, foreword by D. Féron, introduction by the editors and 20 papers.
- ✓ The key dates, achieved and coming:
 - * the papers reviewed are about to be returned to the authors for modification,
 - * the manuscript should be sent to the EFC Editor by June, 2005.

D. Féron added that, after the Workshop of Cadarache in 2001 and the common session in EUROCORR'2004, it is clear that there are links between Nuclear Corrosion and the conservation of heritage artefacts, even if the language used is sometimes different.



9.2. Other publications - by D. Féron (Annex I)

Two other EFC Series books are planned:

- ✓ Corrosion in LWRs (see point 3)
- ✓ "Corrosion issues in Light Water Reactors"
 - *27 papers presented during EUROCORR'2003 and 2004, during WP4/WP5/WP18 sessions, divided in 6 chapters: overviews, SCC susceptibility, SCC propagation, Zirconium behaviour, tribocorrosion, practical experience,
 - * papers are under reviewing for a return to the authors by the end of May, 2005 and a return to the EFC for a second review by September, 2005,
 - * edition by the end 2005.

The proceedings of the 2nd International Workshop "Prediction of Long Term Corrosion Behaviour in Nuclear Waste Systems" are about to be published by the ANDRA:

- ✓ Publication without reviewing, available free of charge on demand.
- ✓ Ready-to-print version will be sent to the authors by the end of April, 2005 with their agreement awaited by mid-May, 2005.
- ✓ Draft about to be sent to P. McIntyre who will write the foreword, and to receive his agreement before publication.
- ✓ The layout of the first pages is showed, for information.

D. Féron added that the WP4 is opened to this kind of publications that allows to disseminate widely and free of charge presentations done during congresses. But, as underlined by A. Pourbaix, the agreement of the EFC BoA has to be asked and obtained before any publication.

D. Féron precised that agreements had been obtained, both from the EUROCORR'2004 organizers and from the EFC Secretariat (P. McIntyre).



10. EUROCORR'2005: WORKSHOP, GENERAL SESSION AND "WP4 HISTORY" - BY D. FÉRON (Annex I)

D. Féron reminded that EUROCORR'2005, that will take place in Lisbon (Portugal) on September 04-08th, 2005, celebrates the Golden Jubilee Year of the EFC. So each WP Chairman is asked to make an historical review of the main events and scientific/technical challenges of his own WP.

D. Féron presented a draft of the slides he prepared for the WP4 review and asked for the contribution and comments of the participants, during and after the meeting. All the WP4 members are requested to review this presentation, which is added to the minutes of the meeting (see Annex Ib).

D. Féron reminded:

- ✓ The general topic of EUROCORR'2005: "Corrosion Control for Sustainable Development".
- ✓ The two sessions organized by the WP4:
 - * a 2-days workshop (Workshop 8) entitled "Corrosion Issues in Future Nuclear Systems" that will include a keynote by D. Quadakker, 22 orals and 3 posters,
 - Proceedings are planned to be published in an EFC Series book (see announcement in Annex I),
 - * a 1-day session (Session D) that will include a keynote by J. Hickling (from EPRI), 12 orals and 9 posters,
 - s a selection of papers is planned to be published in the Journal of Nuclear Materials.

11. EUROCORR'2006: GENERAL SESSION AND WORKSHOP (PROPOSAL) - BY D. FÉRON (Annex I)

EUROCORR'2006 will take place in Maastricht (The Netherlands) on September, 2006.

D. Féron reminded the general topic of EUROCORR'2006: "Reliability management of technical systems", and the two sessions planned by the WP4:

- ✓ A Nuclear Corrosion session.
- ✓ A workshop:
 - * the proposal of workshop presented in Nice about "Corrosion Issues related to LWR Ageing and Life Extension" has been cancelled, as the congress "Fontevraud 6" that is about this particular topic will take place just a week before EUROCORR'2006
 - * a new proposal for a workshop on "Corrosion issues in reprocessing plants", justified by the fact that Europe (France and United Kingdom) has two of the three existing reprocessing plants, needs the agreement of the involved industries; D. Féron mentionned that the oral agreement of BNFL and AREVA have already been received, while the agreement of JNFL (which is interested) and maybe others industries are under discussion (see the project of announcement in Annex I).

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12. MISSING ITEMS

M. Belgome informed the participants about the way the WP4 members list is about to be up-dated:

- ✓ WP4 Steering Committee members will receive the whole WP4 members list and asked to check the members name and information for their own country.
- ✓ If some information are still missing, the members concerned will be sent a letter asking them to check and correct their address/fax and phone number/e-mail, and if they still want to be member of the WP4.
- ✓ The persons who do not longer want to be member will be suppressed from the WP4 members list.
- ✓ The persons who will not answer will be supposed to be no longer interested in the WP4 activities and their suppression from the WP4 members list will be submitted to the approbation of the Steering Committee.

M. Belgome reminded that, as it has been decided that every exchanges regarding WP4 matters will be made by e-mail, this information is highly necessary for each member.

D. Féron reminded the future meetings to occur:

- ✓ ECG-COMON (for members): June 06-07th, 2005 in Ljubljana (Slovenia).
- ✓ EUROCORR'2005: September 04-08th, 2005 in Lisbon (Portugal) with a Nuclear Corrosion general session and a workshop on "Corrosion Issues in Future Nuclear Systems".
- ✓ WP4 Autumn meeting: during EUROCORR'2005, on a date not known for the moment.

13. CLOSURE

D. Féron thanked the attendance and S. Van Dyck for the "accomodation".

D. Féron closed the meeting.