‘New High Temp. Materials’ Seminar

aimed at industry

Use of 9-12Cr Martensitic (P91, P92, P911, P122) & 2Cr Bainitic (P23, P24) Steels *in* Thick and Thin Section Components

Fabrication, welding, operation, failure, weld repair & integrity / life assessment issues

*Aimed at exchanging information on **plant experience** and **related research***

This international gathering of industry engineers and researchers will be preceded by a two-day **P91 Course** on 8-9 September – same venue.

Seminar Programme

Venue: IOM3, London (www.iom3.org.uk)

Dates: 10- 11 SEPTEMBER 2008

ORGANISED BY:

- P91 Users Group
- European Technology Development

Why This Seminar?

The pace of change in power and petrochemical plant sector has never been faster with a continuing move from the low alloy materials to higher strength higher alloy materials that can withstand higher temperatures and pressures. All of this in an effort to increase output, efficiency and flexibility and reduce pollution and associated penalties. The new high strength materials such as the now ubiquitous higher Cr martensitic steels have another particular benefit in that due to their higher creep strength components can be manufactured in *smaller wall thickness* thus saving time and costs in manufacturing, welding, transportation, erection etc. The smaller wall thickness also means that the adverse thermal fatigue effect due to *plant cycling*, now becoming a common mode of operation worldwide, will be less. However, the *drawback* can be the relative sensitivity of these steels to heat treatment details during steel production and component manufacture. This includes ***forming/bending or welding***, the criticality of ***pre- and post-weld heat treatment*** and the resulting ***micro-structural details.***

The other factors that need special consideration are ***component monitoring and integrity/ life assessment at the mid-life stage***. The last factor can be particularly problematic as cavitation in these steels, which has been successfully used in the low alloy steels for creep ***life exhaustion studies***, appears late in life and therefore new concepts/ technologies/ techniques are required to enable plant operators to predict damage/ failure and make 'run, repair or replace' decisions. Similarly a number of research studies have now shown that ***steam side oxidation*** of these new steels may not be as good as expected of higher Cr steels. This has implications on the use of very thin wall boiler tubing for superheaters made from these high strength steels.

Unlike most other 'research' conferences these 'New Materials Seminars' are aimed at industry. They bring together industry engineers and researchers from around the world to discuss successful fabrication, use and integrity assessment of these steels. Like the June 2007 seminar participation by the alloy producers, plant operators, manufacturers, service providers and researchers is expected *from Europe, Japan, North America and elsewhere.*

*The **Feedback** from the 2007 seminar on this issue (please see separate box) speaks volumes for the usefulness of these industry and research Seminars.*

Who Should Attend?

- *Plant managers, operators and maintenance engineers* of the HRSG/power and petrochemical plant using P/T 91 or intending/planning to use this material.
- *Plant manufacturers and alloy producers* who should be aware of the pitfalls and unsatisfactory practices and who wish to exchange experience.
- All those *involved in P/T 91 component damage/ cracking assessment* and wishing to know its behaviour in plant.
- Engineers from *service providing / consulting companies.*
- *Inspection* personnel seeking an appreciation of the problems and damage/ cracking behaviour of high temperature components using P/T 91 material.
- *Planning personnel* seeking a better understanding of the issues involved with the integrity of P/T91 components and required replacement / repair strategies.
- *Insurance Personnel* wishing to increase their knowledge of practical problems involved with the use of this new material now popular with manufacturers.
- *Researchers* involved in developing P/T91 component integrity, life and crack assessment strategies and methodologies who need to know the industry experience, concerns and needs.

TYPICAL INTERNATIONAL FEEDBACK FOR THE SEMINAR HELD IN JUNE 2007

1) Thank you for an excellent week's schedule of papers on T/P91, 92 and 23. It was a most useful and informative week, not only in the papers presented but in the exchange of views and experience ….
D Anderson, Technical Authority & Section Manager-Boiler Mech. Design, Doosan Babcock Energy, ***UK***

2) Congratulations …… for the high quality technical Seminar you organized last week in London. I appreciated the presentations of all the speakers.
Dr Eng Leonardo Cipolla, Centro Sviluppo Materiali (CSM), ***Italy***

3) I want to thank ETD team for the organisation of the Seminar. It was a good occasion to hear and to discuss the potential of new materials ...and the "on-site reality".
The cruise on River Thames was also a success: a good way to visit the heart of London ….. and to exchange information with other participants.
Patrick Billard, Electricite de France, ***France***

4) I would like to thank ETD organizers for the wonderful seminar and courses that were presented last week. They were very informative and I learnt a lot.
Mahnaz Missaghi, Sask Power, ***Canada***

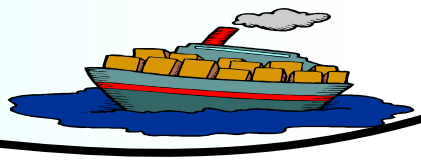
5) Thank you once again for a very informative seminar and course.
Rick Bingham, MPR Associates, ***USA***

6) I think both the seminar and course were extremely successful, thank you very much for organising these.
Dr Huijun Li, Australian Nuclear Science and Technology Organisation (ANSTO), ***Australia***

7) Many thanks for the course, seminar and the ability to sit in on the P91 Users Group meeting. The week spent with Dr Shibli, Dr Robertson and colleagues on the course was most enlightening …..
Mike Pearson, Mechanical Engineer / Equipment Inspector, Genesis Energy, ***New Zealand***

Seminar Dinner & Boat Cruise on River Thames

10th September 2008, 1930 – 2230 hrs



What Do You Get ?

This is the 3rd known industry oriented Seminar largely devoted to the understanding of the issues involved in the practical use of P/T91, P/T92, P/T911, P112, P/T23/, P/T24 based on plant experience and predictions made by the leading researchers. *Plant operators, manufacturers (including welding companies and welding consumable manufacturers) and service providers will be encouraged to raise/ discuss problems from their personal/company experience during the seminar.* The participants will also get the *Seminar notes/ presentations* (and formal papers where these become available) on a CD.

Deadline for Abstracts and Presentations

As the Seminar is aimed more at bringing together industrial audience and related research the speakers are not obliged to provide formal papers. Instead, the intention is to provide ***proceedings*** on a CD consisting of presentations in pdf format. *However, if the presenters wish to offer formal papers these can also be included in the CD and may also be published in a refereed journal.*

Deadline for the submission of ***papers*** and/or ***presentations***: ***2nd September 08.***

Organising & Technical Committee

Dr A Shibli, ETD, UK
Dr D Robertson, ETD, UK
Prof F Masuyama, Kyushu Institute of Technology, Japan
Dr T Ogata, CRIEPI, Japan
Dr D J Allen, E.ON, UK
Dr P Billard, Electricite de France
Mr R Emmott, TransAlta, Canada
Mr A Pasha, Vogt Power, USA
Dr H Li, ANSTO, Australia
Prof R Viswanathan, EPRI, USA
Mr P Ennis, Juelich Research, Germany
Dr Eng, T Igari, Mitsubishi Heavy Industry, Japan
Mr D Fitzgerald, Progress Energy, USA
Dr T Itay, Israel Electricity Corporation

Who Are We ?

European Technology Development Ltd. (ETD) is a UK based engineering advisory, consulting and R&D company specialising in high temperature plant life assessment/extension, maintenance, materials and engineering issues in all type of power generating and petrochemical/ process plant. ETD has, in the recent past, organised various international workshops/ courses/ conferences in Europe and Asia mainly on the issues such as: industrial plant life assessment/extension, high temperature plant materials, plant component safety and durability, performance of in-service welds, power plant cycling, risk based maintenance (RBM), probabilistic assessment, weld repairs etc. The company is leading and co-ordinating a number of large leading edge international industry initiatives (supported by the industry from North America, Japan, Europe and elsewhere or by government organisations such as the European Commission) on issues related to the assessment and improvement of high temperature plant performance, materials and design, and maintenance and inspection strategies. The company has carried out/ participated in leading edge projects on P91 weld repairs, crack assessment, integrity issues and has carried out studies of P/T91 performance in plant worldwide. Further information about ETD, its projects, life assessment courses offered and other activities can be seen at: www.etd1.co.uk www.ommi.co.uk

DAY - 1

EXPERIENCE IN THE FABRICATION & OPERATION OF HRSGs / BOILERS USING P/T91, P/T92, E911, P122, T/P23, T/P24 ETC.

Registration and Welcome	*0845 – 0930 hrs*

***Session 1*: Construction of HRSG and Conventional Boilers: Materials Development, Production, Fabrication, Heat Treatment and Design Issues**

0930 – 1300 hrs

1. **Recent developments in ASME codes concerning high Cr martensitic steels**
   F Masuyama, Kyushu Institute of Technology, ***Japan***
   J Shingledecker, ex-ORNL, ***USA***

2. **Very heavy section 9Cr martensitic steel castings for ultra-supercritical applications and new developments for 700°C applications**
   Steve Birks, Goodwin Steel Castings Ltd., ***UK***

3. **Experience of Bharat Heavy Electricals with the fabrication of P91, P92, P23 and 304H SS components for ultra supercritical power plants**
   S Suresh, BHEL, Tiruchirappalli, Tamil Nadu, ***India***

Coffee Break	*1100 – 1130 hrs*

4. **The prospects for development of a high strength ferritic steel for advanced steam power plant**
   P J Ennis and W J Quadakkers, Juelich Research Centre, ***Germany***

5. **Suggestions for Grade 91 and creep strength enhanced ferritic steel specifications**
   M L Santella, Oak Ridge National Laboratory, ***USA***

6. **Issues facing the designers with P122 and P23 materials**
   D Fitzgerald, Progress Energy, California, ***USA***

Lunch	*1300 – 1400 hrs*

Session 2: **Plant Experience in the Use of Thick and Thin Section Components and Cracking / Failure** *1400 – 1730 hrs*

1. **ESB approach to P91 and E911 component life management**
   S Scully, Electricity Supply Board, ***Ireland***

2. **IEC Strategy to monitor and manage P91 components vulnerable to early damage and cracking**
   T Itay, E Asulin, Israel Electricity Corporation, ***Israel***

3. **TransAlta's experience with the fabrication, installation and use of P91 in the new built power plants in Canada**
   R Emmott, Director- Technical Services, TransAlta, ***Canada***

Coffee Break	*1530 – 1600 hrs*

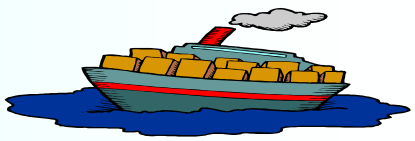
4. *Keynote:* **Chinese experience in the use of P91 steel**
   S-T Tu, Chairman of Chinese High Temperature Materials and Strength Committee, Shanghai, ***China***

5. **Life management of Grade 91 power plant components - The UK "GENSIP" programme**
   S Brett, RWEnpower, D Allen, E.ON, ***UK***

6. *Short contributions:* **Opportunity for the delegates to discuss their *experience* with the use of new steels in conventional and HRSG plants** *(1700 – 1730 hrs)*
   Note: *An opportunity for the attendees to verbally discuss their experience or make brief (about 5 minutes each) presentations.*

Seminar Dinner & Boat Cruise on River Thames

1930 – 2230 hrs



DAY - 2

R&D, WELDING, REPAIRS & INTEGRITY / LIFE ASSESSMENT ISSUES

***Session 3*:** **R & D Issues and Implications for Plant Manufacture and Integrity**
0900 – 1030 hrs

1. **P91 longer term creep ductility issues and potential implications for defect tolerance in plant operating under steady and/or cyclic load conditions**
   *A Shibli, European Technology Development, Leatherhead, Surrey, **UK***

2. **Microstructure characterisation of the Gleeble simulated P92 HAZ**
   *M Drew, D Sunjaya, H Li, D Dunne, E Pereloma, ANSTO, **Australia***

3. **Evaluation of creep damage in the HAZ of high Cr steel welds**
   *M Tabuchi, NIMS, Tsukuba, **Japan***

4. **Evaluation of high temperature alloys used in Heat Recovery Steam Generators**
   Jorge Pinto Fernandes, Instituto Superior de Engenharia de Lisboa, Lisboa,
   *Eduardo Dias Lopes', Instituto da Soldadura e Qualidade, **Portugal***

Coffee Break	*1030 – 1100 hrs*

***Session 4*:** **Welding, Replacement and Repair Issues** *1100 – 1300 hrs*

1. **Recent study on creep damage assessment methods of P91 weld joint in CRIEPI**
   *T Ogata, CRIEPI, Tokyo, **Japan***

2. **Experimental characterisation and modelling of P92 welds: Tensile & creep behaviour**
   *P Billard, C Petry, EDF, **France***

3. **Welding and weld repair involving 9Cr martensitic steels – issues arising from on-site experience and more recent research findings**
   *D G Robertson, A Shibli, European Technology Development, Surrey, **UK***

4. **Creep deformation and damage in pipe welds; comparison of low-alloy and high-chromium steels**
   *Y Chuman, T Igari, Y Hirose, T Eida, Mitsubishi Heavy Industries, **Japan***

Lunch	*1300 – 1400 hrs*

Session 5: Component Monitoring, Integrity and Life Assessment Issues

1400 – 1600 hrs

1. **Microstructure and hardness changes during creep of high strength 9%Cr steels**
   *F Masuyama, Kyushu Institute of Technology, **Japan***

2. **Life assessment of high temperature components on the basis of the VGB guidelines**
   *K Maile, MPA Stuttgart, **Germany***

3. **Life assessment issues in 9Cr martensitic steels and the development of new innovative techniques**
   *A Shibli, European Technology Development, Leatherhead, Surrey, **UK***

4. **Quantitative Acoustic Emission as a Non Destructive Inspection Method and Its Application for the Assessment of Flaws in High Cr Piping**
   *G Muravin, B Muravin, L Lezvinsky, Margan Physical Diagnostics., Netanya, **Israel***

Panel Discussion *1600 – 1620 hrs*

LESSONS LEARNT FROM MORE RECENT FINDINGS

REGISTRATION FORM

(Please copy and e-mail / fax / post)

New Materials Seminar, *London, 10-11 September, 2008*

REGISTRATION FEE: Amount payable is that shown in the 'Fee + VAT' column.
* Overseas delegates also pay VAT (Value Added Tax) for events held in the UK.

Please (circle) in the table below the amount relevant to you.

	Reduced Fee (until 29th July 08)		**Full Fee** (from 30th July 08)	
	Fee *	**Fee +VAT @ 17.5% * (To Pay)** – Pounds	Fee *	**Fee +VAT @ 17.5% * (To Pay)** – Pounds
Delegates	£400	**470**	450	**528.75**
Presenters	£350	**411.25**	400	**470**
'Seminar'* + *'Course'* *	£900	**1057.50**	£950	**1116.25**

** The P91 Course will precede the seminar and is being held on 8-9 Sep. at the same Venue. For details please visit www.etd1.co.uk and look under 'Training Courses'.

PAYMENT

By UK bank cheque, bankers draft, or bank to bank transfer to:
European Technology Development
(For payment by bank to bank transfer, account details will be supplied on request. Contact details are shown at the bottom of this form). *Please quote reference **'New Materials Seminar 08'** with the payment and state here how you paid or intend to pay* ……
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By Credit Card: Major cards such as Visa/ Master Card/ JCB/ American Express/ Switch are accepted with the exception of Dinners Club. For security please *fax* or post this information.

Name of Account Holder			
Card Type and No.		Expiry date	
Authorisation signature			

Venue: Institute of Materials, Minerals and Mining (IOM3) www.iom3.org

Accommodation: Information on local hotels will be supplied by ETD on request.

Delegate Details: (Required for your badge)

Your **title** and **name:**
Company: Position:
Address:
Phone: Fax: E-mail:

REGISTRATION ADDRESS: Please copy and post/ fax/ e-mail to address below:

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Venue: Institute of Materials (www.iom3.org)