

'Power Plant Cycling' Conference

3-day (28-30 Nov. 2012) International Conference on:

Cyclic Operation of Power Plants/CCGTs

- Technical, Operational and Cost Issues

With specific reference to cycling plant experience and creep-fatigue/ thermal fatigue behaviour of new high temp. alloys such as P91, P92, P23, P24

Announcement &
Registration Form

A parallel 4-day (26-29 Nov) **Training Course** on 'Gas Turbine Technology, Materials, Coatings, damage, failure and Lifting Issues' will be held at the same venue.

Dates
28-29 Nov. 2012
- Conventional Power Plant
30 Nov. 2012 - CCGTs/ HRSGs

Venue
Charlotte, North Carolina
(Venue details will be announced later)

The Conf. will be preceded by a 2-day (26-27 Nov) back-to-back **Training Course** on 'Crack Assessment in industrial components - including worked examples'.

Organiser



European Technology Development

www.etc1.co.uk

'Power Plant Cycling' Conference

CONFERENCE OBJECTIVES

Because of changes in demand and competition within the power generation market, fossil fuel fired plants in many countries are now subject to unscheduled cyclic operation, two shifting or load following. Even state-of-the art natural gas fired combined cycle plants are now in a scenario where two shifting is a threat to profitability. The aim of the seminar is to identify the basic causes of equipment and component problems in two shift operation, and to begin to identify procedures which will minimise operating and maintenance costs.

The intention of this 3-day International Conference is to provide an international forum for the exchange of knowledge, information and experience. Hence plant owners and operators will be the prime audience in this seminar. It is also envisaged that researchers, plant manufacturers and inspection bodies will benefit from this experience/ information exchange. The underlying aim will be 'how to reduce costs associated with plant cycling'. Key aspects will be engineering design and materials R&D, cost analysis and plant management.

The Seminar is being organised in two parts: **Days 1 and 2 will be devoted to conventional steam plant** while **Day 3 will deal with CCGTs** - both turbine and heat recovery steam generator sections of the plant.

TECHNOLOGY BACKGROUND

The severe conditions of cyclic operation can, at worst, result in an increase in unscheduled outage rates due to an increase in the frequency of failures of key items of equipment, such as boiler plant, steam and gas turbines, and alternators. Clearly such events could have a dramatic effect on costs.

Even normal two shift operation will have an untoward effect on profitability, primarily due to increased wear and tear of components, this impacting on operating, overhaul and maintenance costs. However two shifting will often imply an increased NDT budget, extra training for plant operating personnel, replacement of critical components and automation of the plant to ensure faster safer start ups and shutdowns. The nature of the creep-fatigue interaction is such that ageing plant which have seen a good deal of operating life under base load conditions could show dramatic drop in component safe operating life when subjected to cyclic operation.

Specific **objectives** of the seminar will therefore be to discuss and identify:

- Key equipment design, materials and corrosion aspects
- Operational constraints
- Manpower, management and automation issues
- Component replacement, maintenance and operating costs
- Strategies for optimising cyclic operation.

The prime organiser of this seminar, namely ETD has been involved in detailed review of the technical and cost issues of plant cycling. Their experience and studies have included plant from Europe, North America and Australasia. The Seminar is an extension of this study and an opportunity to exchange information on experience worldwide.

CONFERENCE SCOPE & INVITATION FOR PAPERS

Day 1 will cover technical issues - plant experience and research findings.

Day 2 will include manpower, plant automation and cost issues/ cost modelling.

Day 3 will cover GT and HRSG issues.

Abstracts (up to about 250 words) are invited (by **2nd March 2012**) on the **following** or **related topics** on plant cycling, including load following (**Submission of full Papers** or Presentations will be required by **7th November 2012**):

Papers/ Presentations are invited on topics related to plant cyclic operation. The topics below are shown only as examples.

Conventional Steam Plant (Days 1 and 2)

- Thermal fatigue of HP, LP turbines, steam chests, boiler headers, air heaters, steam lines.
- stress corrosion and corrosion fatigue on cracking of LP turbines, generator end rings, boiler parts, superheater, and reheater pipework and hanger supports.
- oxide scale spalling and enhanced erosion corrosion of plant internals, particularly due to reheater pipework operating in excess of normal temperatures.
- fireside corrosion and erosion
- reliability, maintenance, slagging and fouling corrosion and erosion of back end components
- over-heating on pipework and generator system components.
- low cycle fatigue on electrical generator components.
- enhanced materials degradation on FGD systems
- water treatment plant issues
- need for additional instrumentation
- requirements for automation of plant
- development of inspection strategy, plant condition monitoring and outage /repair strategies
- costs associated with cyclic operation (fuel, manpower, engineering costs, repairs etc)
- improvements to plant and operating procedures to optimise cost effectiveness
- ***New materials issues***

Combined Cycle Gas Turbines (Day 3)

- Experience with plant cycling and component response
- Creep-fatigue of turbine blades
- Cracking and degradation of combustor cans
- Effect of cyclic operation on thermal barrier coatings
- Thermal fatigue of heat recovery steam generators
- Design improvements
- Stress corrosion cracking when using air cooled alternators
- Cost issues

Oral presentations will be as follows:

- Keynote Papers = 40 minutes (incl. 3 minutes for discussion)
- Other Papers = 30 minutes + (incl. 3 minutes for discussion)

For Technical Enquiries:

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PUBLICATION: Copies of the **Proceedings CD** will be provided at or soon after the Conference. This will consist of Conf. presentations & papers where these are provided.

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CONFERENCE COMMITTEE

Mr R Emmott, Vice President, TransAlta, Calgary, Canada Co-Chairman	Dr B Dogan, ETD Consultant, Charlotte, NC, USA North America Co-ordinator
Mr A Pasha, Technical Director, Vogt Power Int., Louisville, USA Co-Chairman	Prof R (Vis) Viswanathan, Consultant, Palo Alta, Ca., USA
Dr A Shibli, European Technology Development, UK Co-ordinator	Dr S Holdsworth, Empa, Switzerland
Dr D Robertson, European Technology Development, UK	Dr A Tonti, Inail (Ex-ISPEL), Italy
Dr T Igari, Mitsubishi Heavy Industry, Japan	Dr Ting-Leung (Sam) Sham, Oak Ridge National Laboratories, USA

About the Organisers

European Technology Development Ltd. (ETD)

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.etc1.co.uk

ETD has been successfully organising Conferences, Seminar and Training in the USA for the last few years. This has included two Training Courses in Houston, Texas in July 2010 (one on P91 and the other on P23/P24; a Training Course in Chicago on P92/ P91 steels in August 2011. A 1-day Seminar on the use of high Cr martensitic and other new steels/ alloys was organised in Houston in 2010 while a 2-days International Conference was held in Chicago in 2011.

In the past ETD has organized a number of **conferences and seminars** in London on **Power Plant Cycling Issues**. ETD has also produced two **Review Reports on the Cycling Issues of Conventional Power Plants and CCGTs**. These issues included damage due to cyclic and load following operation and the maintenance, staff training, engineering solutions required to reduce such damage, cost due to plant cycling in terms of plant modifications required, additional plant maintenance, and so on.

‘Power Plant Cycling’ Conference

Registration Form (Please fax/ email)

Registration Fee: This is being charged in **US dollars for the USA and Canada** payees and in **GB Pounds for all others.**

* Please put a cross in front of the box applicable to you and show the total at the bottom.

++ <i>Note:</i> Those attending GT course have the opportunity to attend CCGT/HRSG Cycling part of conf. on 30 th Nov.	Until 18 Sep 12		*	From 19 Sep 12		*
	UK£	US\$		UK£	US\$	
Conf: Conv. Power Plant Cycling (28-29 Nov) - Delegates	£300	\$500		£350	\$580	
Conf: Conv. Power Plant Cycling (28-29 Nov) - Presenters	£250	\$420		£300	\$500	
Conf: CCGT/ HRSG Cycling (30 Nov) - Delegates	£150	\$250		£175	\$300	
Conf: CCGT/ HRSG Cycling (30 Nov) - Presenters	£125	\$210		£150	\$250	
Course: Damage/ Crack Assessment (26-27 Nov)	£800	\$1330		£900	\$1500	
GT Course – (26-29 Nov) ++ See note above	£2000	\$3350		£2200	\$3650	
Please show here the Total Amount Payable = £				or, \$		

Conference Registration Fee covers Proceedings on a CD provided, at the conference or soon afterwards, hearty breakfast every morning, coffee, lunches, and Reception on the evening day 2.

The Course Fees cover printed course notes supplied at the start of the Courses, electronic (pdf) copies of the slides, hearty breakfast every morning and coffee/ tea and lunches.

Payment Options

1) By 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).			
2) By UK bank cheque made payable to ‘ETD Ltd.’ Please quote reference ‘ Course +Conf. Charlotte ’ with the payment and state how you paid or intend to pay:.....			
3) 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 <i>fax or post</i> this information.			
Name of Account Holder		Amount to pay	£/\$
Card Type and No.		Expiry date	
Authorisation signature		Security code	

Venue + Accommodation: This information will be provided later.

Delegate Details: (Required for your badge)

Your **title and name:**

Company:

Position (optional):

Address:

Phone:

Fax:

E-mail:

Address for Registration: Please post/ fax/ e-mail this Form to:



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