

**TWO DAYS ADVANCED TRAINING  
FOR THERMAL POWER GENERATION**



**WATER CHEMISTRY**  
corrosion assessment & control

**MAY 2017**

**DELHI**  
23 & 24

**MUMBAI**  
26 & 27

**CHENNAI**  
29 & 30



## TWO DAY'S CERTIFIED TRAINING PROGRAM

Corrosion is a fact of nature – and an expensive one. We, Mission Energy Foundation, a not-for-profit authority in the energy space estimate that India loses around \$70 billion or equivalent to 4 per cent of its gross domestic product (GDP) to corrosion.

Coal is a complex and relatively dirty fuel that contains varying amounts of sulfur and a substantial fraction of non-combustible mineral constituents, commonly called ash. Corrosion of metallic and ceramic structural materials is a potential problem at elevated temperatures in the presence of complex gas environments and coal derived solid/liquid deposits. Hot corrosion and erosion are recognized as serious problems in coal based power generation plants in India. The coal used in Indian power stations has large amounts of ash (about 35 - 50%) which contain abrasive mineral species such as hard quartz (up to 15%) which increase the erosion propensity of coal. Hot corrosion and erosion in boilers and related components are responsible for huge losses, both direct and indirect, in power generation. An understanding of these problems and thus to develop suitable protective system is essential for maximizing the utilization of such components.

A number of factors have renewed interest in both low- and high temperature corrosion in power generation equipment including traditional coal-fired boilers, gas-fired boilers, natural gas-fired combined-cycle plants, heat recovery steam generators, geothermal plants, environmental control systems, water treatment systems, aging transmission and distribution infrastructure, and new novel power cycles.

The two day workshop “Water Chemistry” is intended to promote a robust exchange of information on the latest research between engineers and scientists on an international scale. Learning and practical experiences shall be shared during the two extensive days of this certified workshop.

## EFFECTS OF CORROSION IN POWER PLANTS

- ✧ Reduced life of components
- ✧ Reduced efficiency of equipment
- ✧ Reduced availability of plant equipment
- ✧ Reduced reliability of equipment & structures
- ✧ Endanger to life of people around
- ✧ Enhanced maintenance
- ✧ Contaminations in process fluids
- ✧ Secondary failures in other associated equipment
- ✧ Higher costs of generation

## OBJECTIVE OF WORKSHOP

“Bring best practices for reducing costs associated corrosion, train engineers who take care of corrosion with marginal impact”

## KEY TAKEAWAYS OF WORKSHOP

- ✧ Learn Corrosion issues in Power Plants
- ✧ Conceptualize Corrosion Processes and its Control
- ✧ Study various Power Plant Treatment Processes and its Importance
- ✧ Familiarize with Principles of Cooling Water Treatments
- ✧ Experience Sharing on Real Life Problems of Corrosion & Control
- ✧ Conceptualize Water and Water/Waste Water Management

# CORROSION CONTROL IN THERMAL POWER PLANTS

**Generators** Maintain low humidity levels of 35 percent or lower using a closed-loop system.

**Pipes** Install insulation with a jacket or protective coating, replace pipes with more resistant materials or improve the piping design so it has better flow geometries.

**Water chemistry changes** When chemicals or organic agents in the water (e.g., anaerobic bacteria) lead to corrosion, a water-conditioning agent may be helpful. Replacing steel components with composite lines may also be effective, particularly in nuclear plants.

**Turbines** Seal openings as tightly as possible.

**Controlling water and steam** Use drains or vacuums to prevent water pooling. Dehumidifiers are good for air that passes through a turbine, drying pockets of water and reducing relative humidity (rH) levels. Oil-fired boilers: Use an open system and a dehumidifier to dry the air to 20 percent rH after shutting down a boiler.

**Protective coatings** Use protective coatings on components exposed to water, the outside environment, or in areas that may experience condensation or moisture. Protective coatings or surfaces are also helpful for preventing erosion-related wear.

**Cooling stacks** Install a windshield or protective liner to prevent chemical attacks and thermal shock.

**Inspections** Regularly inspect and test components that are at risk for corrosion, even if they have protective surfaces. Such components include turbines, ducts, pipes, welded areas, areas with demineralise water and scrubber modules.

## AGENDA

### Day 1

#### **Introduction**

Role of Chemistry in power plants  
Fundamental Chemical Terminology  
Characteristics of waters used in power plants- River, Borewell, Canals, seawater, treated waste Water

#### **Pre-treatment of boiler water**

Conventional- Clarification, Filtration, DM Plant Introduction to New Treatment Technologies- Membrane filtrations, RO, Desalination, EDI, Water, Steam quality requirements, etc.

#### **Boiler Water Treatment**

#### **Cooling Water Treatments**

**Pre- and Post- Operational Chemical Cleaning Power Plant Equipment** (Boilers, Condensers, Pipelines, CT Fills)

#### **Waste Water Treatment & Management**

Introduction to Water & Waste Water, Treatment and Management, including concepts of Water audit & Balance and Recycling

### Day 2

#### **Basics of Corrosion & its Control**

Introduction to Corrosion  
Atmospheric Corrosion  
Soil Corrosion  
Flow Accelerated Corrosion  
Basics of Corrosion Control

#### **Corrosion Control**

Corrosion in Boilers & HRSGs including Acid Dew  
Point Corrosion in HRSGs  
Preservation of boilers and CW Systems

#### **Corrosion Control by Cathodic Protection Corrosion of Boilers & Auxiliary**

#### **Cases of Corrosion in Power plants**

Corrosion of Condensers, Turbines, Structures  
Corrosion Induced damages to RCC structures

#### **Concluding Session & Certificate Distribution**

Interactive session on specific problems of the participants

## **Lead Faculty – Shri A K Sinha**

### **Organizational Affiliations:**

Retired as Additional General Manager (NETRA) (R&D Wing of NTPC), NTPC in July 2012. At NETRA, Shri A K Sinha was heading Corrosion Analysis, Monitoring & Control; Water Treatment; Environmental Sciences and Program Office Groups. With his experience for almost 30 years is with NTPC (R&D) and prior to that, 5 years with BHEL (R&D), Hyderabad. Presently working since 2012 as Principal Consultant & Owner of Corrosion and Water Management Consultants providing consultancies in the areas of Corrosion & Water Management with organizations like Adani Power; Salalah Independent Water and Power Plant, Salalah, Oman; Vedanta Aluminium CPP, Jharsuguda; Lanco Power; Chandrapur Super Thermal Power Station; Koradi Thermal; Mahagenco, IOCL Digboi; Guwahati; RRVUNL Kalisindh, RRVUNL Dholpur Combined Cycle Power Plant, Dholpur, CLP Jhajjar, Essar Power Gujarat Limited, CLP Paguthan CAPP, etc.

Shri A K Sinha also involved in conducting training workshops, etc for various industries & power plants. Also working as Senior Consulting Partner in Neo Green Council – Promoted by Ex- Senior Executives of NTPC to provide solutions to issues of emission, water recycling, corrosion & its control, etc.

### **Qualifications:**

M.Sc (Electrochemistry)

P.G. Dip. In Corrosion Science & Technology, Univ. of Ferrara, (Italy)

### **Institutional Affiliations:**

Member NACE International, Life Fellow Member SAEST and IAAPC  
Core Member CII Aventha Corrosion Management Committee

### **Awards:**

Best Corrosion Scientist Award from NACE International Gateway India Section in 2000

### **Experience:**

Over 39 years' experience in Corrosion Analysis, Monitoring and Control; Corrosion Audit; Water & Waste Water Treatment & Management; Environmental Sciences and Strategic Planning of large R&D establishment & monitoring related to Power Sector.

### **Specialization:**

***“Improving Plant Performance, Availability & Reliability by Chemical Interventions”***



### **Organiser**



**Mission Energy Foundation** is a persistent, private, **not-for-profit** endeavour based in Mumbai, India.

We are a micro-enterprise initiative that strives to spread knowledge in the globalising energy sector. We educate and spread technology awareness through ongoing contacts and discussions with the public and industry concerning what the future of the growing energy sector should be.

**The beginning:** A single man army with its mission to build platforms of discussion, exchange knowledge among industry professionals on core issues pertaining to growing energy sector.

**Today:** A human asset working together as one endeavour that expertise in organising and delivering successful international summits involving who's who from Entrepreneurs to Academicians to Government Authorities to Technology Providers to Consultants to Industry Professionals from the growing energy sector globally.

### **Mission Energy Foundation (A not-for-profit Organisation)**

003, B-16, Sector 1, Shanti Nagar, Mira Road, Thane, Maharashtra - 401107  
Phone: +91 2265220770 / 71, <http://missionenergy.org>



# Delegate Registration Form

## DELEGATE DETAILS

I Would Like to Attend at:

Delhi - 23-24 May 2017  Mumbai - 26-27 May 2017  Chennai - 29-30 May 2017

Company : \_\_\_\_\_

Address : \_\_\_\_\_

City: \_\_\_\_\_ Pincode: \_\_\_\_\_ State: \_\_\_\_\_

Delegate (1): \_\_\_\_\_ Job Title: \_\_\_\_\_

Tel: \_\_\_\_\_ Mobile: \_\_\_\_\_ Fax: \_\_\_\_\_

Email: \_\_\_\_\_ Alt Email: \_\_\_\_\_

Delegate (2): \_\_\_\_\_ Job Title: \_\_\_\_\_

Tel: \_\_\_\_\_ Mobile: \_\_\_\_\_ Fax: \_\_\_\_\_

Email: \_\_\_\_\_ Alt Email: \_\_\_\_\_

Delegate (3): \_\_\_\_\_ Job Title: \_\_\_\_\_

Tel: \_\_\_\_\_ Mobile: \_\_\_\_\_ Fax: \_\_\_\_\_

Email: \_\_\_\_\_ Alt Email: \_\_\_\_\_

(For more than 3 delegates kindly make copies of the registration form)

Please indicate if you have already registered by Phone  Fax  Email  Web

**Please note:** If you have not received an acknowledgment before the conference, please call us to confirm your booking.

## Payment Terms

Payment is required within 10 working days on receipt of invoice. If a booking is received 10 working days before the conference a credit card number will be taken to confirm your place, likewise if full payment has not been received before the conference date.

### NOTE:

- Kindly fill the registration form completely
- Kindly provide with a valid email id for correspondence
- A confirmation of the registration will be sent via email after receipt of the payment
- No refund will be made in case of no-show / no-attendance
- Registration fee is exclusive of service tax as applicable
- Registration fee include lunch, refreshment and conference document/material at the venue.
- It does not include cost of accommodation and travel

### Cancellation Policy:

Should a delegate be unable to attend, a substitute delegate from the company is always welcome at no extra charge. Alternatively, for any cancellations, the following rules shall apply

- 70% refund of registration fee if cancellation is done on or before 20 working days of the schedule
- 50% refund of registration fee if cancellation is done on or before 15 working days of the schedule
- Thereafter, no refunds can be made

### Important note:

Please quote the name of the participant and event title on the advice when remitting payment. Bank charges to be deducted from the participation organisation's own accounts. Attendance will only be permitted upon receipt of full payment. It may be necessary for reasons beyond the control of the organiser to alter the content of the event date or location or the identity of the speaker/s.

## REGISTRATION FEE

INR 19500 + Govt. Taxes

# MAY 2017

DELHI  
23 & 24

MUMBAI  
26 & 27

CHENNAI  
29 & 30

## Way to Register

**Phone:** 022 65220770/71

**Fax:** 022 28103842

**Post:** 003, B-16, Sector 1, Shanti Nagar, Mira Road (East)  
Thane, Maharashtra – 401107

**Online:** <http://flyash.missionenergy.org/>

**Email:** [help@missionenergy.org](mailto:help@missionenergy.org)

## Group Discount

**Mission Energy Foundation** recognises the value of learning in terms. Group bookings at the same time from the same company receive discount:

>3 Delegates	5%
>7 Delegates	10%

This offer is exclusive of the early bird discount. Call us for a special discount rate for terms of 10 and above (Not applicable to clinic(s) only bookings).

## Payment Methods

### By Check/Bank Draft :

All instruments to in favor of  
“**Mission Energy Foundation**” (payable at Mumbai) and sent to, Mission Energy Foundation, 003, B-16, Sector 1, Shanti Nagar, Mira Road (East), Thane, Maharashtra 401107 | +91 22 65220770 / 71

### Organisation Details :

Organisation: Mission Energy Foundation  
CIN: U74120MH2012NPL233716  
PAN: AAICM0818M  
Service Tax: AAICM0818MSD002

### By Direct Transfer :

Bank Name: Kotak Mahindra Bank  
Account Name: Mission Energy Foundation  
Account Number: 0111221660  
Account Type: Current Account  
Branch Name: Mira Road (East)  
Branch Address: E-Wing, Latif Park, Mira Bhayandar Road,  
Mira Road (E), Thane - 401107  
Branch Telephone: +91 22 28120740 / 48 / 49  
MIRC Code: 400485051  
IFSC / RTGS: KKBK0000649  
SWIFT Code: KKBKINBB

All bank charges to be borne by payer. Please ensure that our bank receives the full invoiced amount.

### By Credit Card :

<https://www.payumoney.com/events/#/buyTickets/www.flyash.missionenergy.org>