

# FUNDAMENTALS OF POWER PLANT CHEMISTRY

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23 – 24 April 2012, Kuala Lumpur, Malaysia



Expert Course Faculty: **Paul William Tunaley**

Organised By  
**powerEDGE**<sup>®</sup>



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## Course Overview

This 2 day course aims to de-mystify what power plant chemists do in and around the power generation facility. This is your opportunity to explore and understand important Power Generation chemistry concepts, principles, and technology which are presented in a reader-friendly format and illustrated with examples.

Whether in a technical, managerial or supporting role, professionals like yourself need to understand the chemical terminology and technology of the power generation business in order to maximise effectiveness of your job.

Power plant chemistry has a unique language, and its application must be mastered and understood by professionals operating in such a facility. A clear understanding of Power Generation water treatment plant equipment and processes, and chemical control regimes for plant items will provide an excellent foundation for smooth communication and increased efficiency in inter-department project team efforts.

The trainer will explain the basic concepts behind the plant items, in addition to their function. Presentation of the course will be through a combination of lectures, presentations and group activities

## Course Learning Outcome

At the end of the training course participants will have gained an understanding of chemistry aspects associated with power generation. Participants will learn about the following:

- The types of water treatment plant used, their advantages and disadvantages
- The potential for disaster by failing to maintain proper control of boiler water and steam cycle chemistry
- The importance of controlling stator coolant chemistry
- The control of cooling water chemistry to maintain optimum plant efficiency
- The importance of choosing the correct types of fuel to avoid boiler problems
- The importance of monitoring lubricating oil and electrical oil quality to ensure long plant life

## Who Should Attend

The course is intended for professional who work and service the Power Generation businesses who require an understanding of the modern Power plant chemistry. Maintenance supervisors & coordinators, Operations engineering staff & supervisors and technical support staff will find this course useful. New engineering entrants and forward-looking executives who are interested in enhancing their knowledge and awareness of this aspect for increased productivity & contribution to the team they're supporting can also attend.

## Unique Features with **powerEDGE** Training

- Pre-Course Questionnaire to help us focus on your learning objectives
- Detailed Course & Reference Manual for Continuous Learning and Sharing
- Practical Exercises & Case Examples to better understand the principles
- Limited class size to ensure One-to-One Interactivity
- Assessment at the end of the course to help you develop a Personal Action Plan

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## Course Outline

### FUNDAMENTAL CHEMICAL TERMINOLOGY

- Chemical symbols
- solubility of substances in water
- conductivity of water and aqueous solutions
- pH of water and aqueous solutions
- concentration of dissolved substances in water

### SCALING AND CORROSION

- Scale formation and its causes
- Types of corrosion
- the role of dissolved oxygen
- the role of pH

### RAW WATER

- Sources of raw water for power plants
- characteristics of water from these sources

### CONDENSATE AND BOILER FEED WATER

- Quality requirements; sources of contamination; chemical treatment regimes

### BOILER/ HRSG WATER

- Quality requirements
- effects of contaminants
- chemical treatment regimes
- storage regimes

### STEAM

- Quality requirements
- effects of contaminants on superheater
- reheater and turbine

### COOLING WATER

- Sources of cooling water
- effects of contaminants
- treatment of water to prevent scaling and corrosion

### STATOR COOLANT

- Quality requirements

### ALTERNATOR COOLANT (HYDROGEN)

- Properties of hydrogen
- hydrogen purity requirements

### LUBRICATING OILS

- Lubrication science (tribology)
- the effects of moisture, acidity and contaminants

### ELECTRICAL OILS

- Electrical breakdown
- the effects of moisture, acidity and contaminants
- dissolved gas analysis as a diagnostic tool

### FUELS

- Fuel quality
- boiler fireside corrosion
- characteristics of fuel ash

### MAKE-UP WATER TREATMENT PLANT

- Pre-treatment plant - removal of suspended solids
- Demineralisation (de-ionisation) plant
  - Overview of deionisation technology
  - Cation exchange
  - De-gassing
  - Anion exchange
  - Mixed beds
  - Ion exchange resin regeneration processes
  - Plant design considerations
- Reverse osmosis plant
  - Overview of reverse osmosis
  - Pre-treatment requirements
  - Membrane technology
- Electro de-ionisation plant - a relatively new technology
- Waste water treatment plant

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## Your Expert Faculty: Paul William Tunaley



Paul has been an independent consultant since 1998 where he has helped organizations like Drax power, Eggborough power, Innogy Cogen, International Power, PB Power, TXU Europe, GE Capital Equipment Services in preparation of IPPC management system documentation, provision of environmental support to FGD construction project; auditing of ISO 14001 environmental management system, technical due diligence – CCGT and coal-fired power stations and inspection and reporting on the Environment Agency's IPC Public Registers, preparation of data for Corporate environmental performance reports.

### Paul's Industry Accomplishments Include:

#### **National Power Plc, West Burton Power Station CHEMISTRY AND ENVIRONMENT MANAGER**

Management of the day to day operations of a 2000 MW power station laboratory providing a Scientific Advisory Service to all site departments and in-company technical working parties including:-

- Compliance monitoring and reporting of all aspects of Environmental Protection Act IPC Authorisation and maintaining working relationships with HMIP, NRA and WRA. Preparing and auditing data for the Station's contribution to the Company's Annual Environmental Performance Review.
- In-house chemical services to all departments, especially in the quality control of waters, fuels and oils. Emissions monitoring, asbestos identification and monitoring, COSHH monitoring and noise monitoring.
- Training of station staff in occupational hygiene, hearing protection and environmental matters, and chemical plant operation.
- Project design & implementation e.g. Sodium Hypochlorite Dosing Plants for Cooling Water treatment; Specification and design of major modifications to demineralisation plant including selecting contractors and the supervision of installation and commissioning.
- Station management representative at Company and external functions connected with environmental aspects of the Station .
- Development and implementation of an Environmental Management System to meet the requirements of BS 7750 (certified by LRQA), including the development of PC based documentation and training systems

#### **National Power plc, Drax Power Station, UK.**

Making improvements to the Station's ISO 14001 (and EMAS) certified Environmental Management System and integrating documentation systems with National Power's new format "O&M Management principles".

#### **National Power Plc, Hub River Power Project, Pakistan SENIOR COMMISSIONING AND ENVIRONMENTAL CHEMIST**

Commissioning of water treatment plant, effluent treatment plant, electrochlorination plant and hydrogen generation plant at Pakistan's largest privately owned power station, for which National Power had the O&M Contract. The work also included establishment of operational scientific services to the station (water, fuel and oil quality control etc.), training of local staff; the development and implementation of an Environmental Management System to ISO 14001 (certified by LRQA, May 1997). Other involvement included assisting in the development and implementation of an ISO 9002 Management System (certified by LRQA Sept. 1996).

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## REGISTRATION FORM

	Early Bird Ends 31 Jan 2012	Normal	Savings
2 Day Programme	SGD \$2199	SGD \$2399	SGD \$200

## 4 ways to Register

- Online: [www.poweredgeasia.com](http://www.poweredgeasia.com)
- Email: [info@poweredgeasia.com](mailto:info@poweredgeasia.com)
- Phone: (65) 6747 0775
- Fax: (65) 67478737

## ATTENDEE DETAILS

Name ..... Job title .....

Tel ..... Email .....

Name ..... Job title .....

Tel ..... Email .....

Name ..... Job title .....

Tel ..... Email .....

Name ..... Job title .....

Tel ..... Email .....

Name ..... Job title .....

Tel ..... Email .....

## COMPANY DETAILS

Organisation name ..... Industry .....

Address .....

Postcode ..... Country .....

Tel ..... Fax .....

## PAYMENT METHODS

By Cheque/ Bank Draft: Make Payable to Asia Edge Pte. Ltd.

By Direct Transfer: Please quote AE1 with the remittance advise

Account Name: Asia Edge Pte. Ltd.

Bank Number: 508 Account Number: 762903-001Swift Code: OCBCSGSG

All bank charges to be borne by payer. Please ensure that Asia Edge Pte Ltd receive the full invoiced amount.

## PAYMENT POLICY

Payment is due in full at the time of registration. Full payment is mandatory for event attendance. I agree to Asia Edge Pte Ltd. payment terms

## CANCELLATIONS & SUBSTITUTIONS

You may substitute delegates at any time. ASIA EDGE PTE LTD does not provide refunds for cancellations. For cancellations received in writing more than seven (7) days prior to the training course you will receive a 100% credit to be used at another ASIA EDGE PTE LTD training course for up to one year from the date of issuance. For cancellations received seven (7) days or less prior to an event (including day 7), no credits will be issued. In the event that ASIA EDGE PTE LTD cancels an event, delegate payments at the date of cancellation will be credited to a future ASIA EDGE PTE LTD event. This credit will be available for up to one year from the date of issuance. In the event that ASIA EDGE PTE LTD postpones an event, delegate payments at the postponement date will be credited towards the rescheduled date. If the delegate is unable to attend the rescheduled event, the delegate will receive a 100% credit

## You may also be interested in

- ✓ Introduction To Clean Coal Technology
- ✓ Introduction to Power Systems
- ✓ Smart Grids
- ✓ Fundamentals of Power Generation

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