Career Management Consultants & Training Est.
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MU229:
Power Plant Reliability

Training Objectives:

By the end of the training, participants will be gain an in-depth knowledge of:

- ✓ Power plant maintenance reliability program development implementation and control
- ✓ Understanding preventive and predictive maintenance
- ✓ Condition monitoring techniques
- ✓ RCM for power plants and it's importance
- ✓ Plant maintenance cost control and optimization
- ✓ Understanding power plant life cycle
- ✓ Power plant life assessments, evaluation and recommendations
- ✓ Maintenance and reliability data analysis tools and techniques
- ✓ Plant fitness for service standards, damage mechanism API 580, API 571 and API 579
- ✓ Risk based studies for power plant and introduction of RBIs (Reliability Based Inspections)

Training Designed for:

This course is intended for all Technical Staff who are working power generation, utilities, process and other heavy industries. This includes Fresh-graduate Engineers, Under-development Engineers and Engineers who have limited experience in power plant performance and generation. Further, this course is suitable for all experienced technical personnel in power plant generation field who have no engineering degrees or formal training in engineering. Managers and engineers of different disciplines might find this course very useful as an awareness course in power plant performance and efficiency.

Training Program:

FIVE DAYS:

- ❖ PRE-TEST
- ❖ Introduction
- ❖ Module 1: Understanding Plant Environment
  - Process, Plant and People
  - Manpower, Measurement, Materials, Methods
  - Role of a Plant in a Business Objective
  - Mission, Vision and Values
  - Corporate Business Plans and impact on Plant Environment
- ❖ Module 2: Plant Design Objective/Procurement/EPC Issues
  - Design requirements for a Plant
  - Process Plants Power Generation Plants
    - Thermal Power Plants
    - Combined cycle power plants
    - Boilers, Gas turbines, HRSG, Steam turbine and Generators
    - Design trends (Typical machine OEM examples)
    - Critical Plant Equipment, Rotary Kilns, Furnaces etc.
    - Commissioning Phase

- EPC Issues, Deviation from design
- OEMs perspective/Owner

❖ Module 3&4: Introduction to Plant Maintenance

- Maintenance organization and exposition
- Maintenance philosophies/strategies
- Associated Maintenance procedure
- Asset Management concept
- PAS55-1 / PAS55-2 understanding
- Contents of the maintenance program
- Types of maintenance strategies
  - Gas turbines, HRSG, boilers, steam turbines, generators
  - Critical process equipment, furnaces, distillation towers etc.
  - Misc rotating & static equipment / structures (BOP)

❖ Module 5: Plant Life Cycle Understanding

- Understanding Plant Life (design) vs actual useful life
- Effect of plant maintenance strategy on life
- Understanding criticality of process/equipment
- Risk analysis and life expansion evaluation and recommendations
  - Process, Power Generation Plants
  - Examples, GTs, Steam turbines, boilers, generators, BOP
  - Complete risk report example, critically analysis

❖ Module 6: Failure Considerations and Analysis

- Definitions, philosophy, fail safe design concept
- System configuration and redundancy
- Non redundant / redundant single path, parallel, multiple path system
- Life cycle process, classification of failures
- MSG, MSG-2 and MSG-3 maintenance process design and decision logic
- RCM Reliability Centered Maintenance program in plants
- Failure effect categorization/critically
- Time-to-failure, failure scenario's

❖ Module 7: Plant Maintenance and Performance Data Collection

- Prime sources of information, types of data & collection system
- Process flow diagram, reports and repeaters
- Component removals and failures, trips on plant
- Service difficulty / occurrence report, structural irregularity report
- Analysis techniques, six sigma tools, distribution fitting for data
- Data display and reporting
- Plant performance report, statistics summary
- Statistics, variations, critical failure report

❖ Module 8: Reliability Programs

- Reliability analysis
- Understanding reliability program implementation
- Cost vs ROI on reliability program

- Performance measurement and parameters
- Monthly plant reliability report
    - Plant, systems, components, structures, critical systems
    - Critical systems and rotating equipment
- Reliability Based Inspections
- MRB, RCB and RRB functioning (base lines)
- Implementing recommendations

❖ Module 9: Maintenance Program Implementation

- Documents (OEM, MPD, Operator specific maintenance program, modification)
- Plant Operator's Maintenance program, General requirements
- Scheduled/ Inscheduled maintenance
- Task/function codes
- Logistics and man hour planning aspects
- Maintenance task packaging
    - Turnaround checks
    - Equalized programs
    - Phased programs
- Maintenance task cards, computerized maintenance management systems
- Maintenance program, implementation and development
    - Staggered Implementation plan
    - Service experience
    - Periodic review
    - Inspection interval escalations
    - Successive reviews and amendments
- Lean Maintenance concepts and integration with existing programs
- Efficiency & effectiveness of maintenance program
- Inventory monitoring to support maintenance program

❖ Module 10: Plant Maintenance Work Scopes

- Work-scope planning guides and examples (OEMs)
    - Gas turbines, HRSG, steam turbines
    - Generators, BOP, Furnaces and Kilns
    - System viz, fuel, electrical, hydraulic, air etc.
- Understanding work-scope cost
- HARD/SOFT time threshold for:
    - Systems, components, structures
    - BOP including structures

❖ Module 11: Maintenance Cost

- Direct and indirect cost associated with plant
- Maintenance cost baselines
- Maintenance contracts – Cost aspects
- Maintenance cost reporting, data analysis
- Cost benefit model, change proposals
- Cost analysis

- Module 12: Maintenance Organization Exposition
  - Documents/manuals
  - Overall exposition manual
  - Engineering procedures manual
  - Associate maintenance procedures
  - Reliability reports
- Module 13: Plant life extension and evaluation
  - Developing a base line study level for plant
  - Remaining life assessment
  - Current reliability levels / last shutdown / turnaround reports
  - RBIs current state / future
  - Life evaluation questionnaire
  - Risk assessment of systems / components
  - Recommendations for life extensions, work-scopes
  - Investments into assets
  - Case study 1400MW plant life extension
- Case Studies
  - Reliability Improvement Program (example)
  - Maintenance Planning (case study/workshop)
  - Maintenance Cost Analysis (workshop)
- Course Conclusion
- POST-TEST and EVALUATION

Training Requirement:

"**Hand's on practical sessions, equipment** and **software** will be applied during the course if required and as per the client's request".

Please note that the above topics can be amended as per client's learning needs and objectives. Further, it should be forwarded to us a month prior to the course dates.

Training Methodology:

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:-

- 30% Lectures, Concepts, Role Play
- 70% Workshops & Work Presentations, Techniques, Based on Case Studies & Practical Exercises, Software & General Discussions
- Pre and Post Test

Training Certificate(s):

Internationally recognized certificate(s) will be issued to each participant who completed the course.

Training Fees:

As per the course location - This rate includes participant's manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Note: The 5% VAT (Value Added Tax), will be effective starting 01st of January 2018 as per the new regulation from the UAE Government. The VAT applies for all quotation both for local and abroad.

Training Timings:

Daily Timings:

07:45 - 08:00	Morning Coffee / Tea
08:00 - 10:00	First Session
10:00 - 10:20	Recess (Coffee/Tea/Snacks)
10:20 - 12:20	Second Session
12:20 - 13:30	Recess (Prayer Break & Lunch)
13:30 - 15:00	Last Session

For training registrations or in-house enquiries, please contact:

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Training & Career Development Department