

DR. M. E. Rana

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I hold Ph. D degree since 1975, a UMIST (UK) product, having four (4) years research experience, 18 years academic and administrative experience to a professor level cum University /UNESCO coordinator for equipment procurement, augmented with 23 years direct oil and gas field experience (sweet/sour, downhole to GOSP, transportation, processing and manufacturing, Refinery, Natural Gas, LNG, LPG, Power Plants (Steam/Gas), Steam Boilers (Gas/Oil fired), Urea Plants, Ammonia Plants, Methanol Plants, MSF/MEE Water Desalination Plants, RO/DM Water Plants, Water cum Gas Treatment for Downhole Injection, Marine & Aviation Facilities to shipment). Entire 45 years are spent in corrosion engineering with an authority in all sections of corrosion and corrosion control to FEED, detailed engineering design, selection of materials, protective coatings, corrosion/scale inhibitors, biocides, production chemistry, selection of corrosion monitoring hardware to locations to installation and commissioning cum monitoring, chemical evaluations, writing specifications cum scope of works. Also, have established fourteen (14) laboratories (corrosion & corrosion control, failure analyses, metallography, petroleum testing, basic chemistry, instrumental analysis, unit operation, heat transfer, microbiological, strength of materials, oil & gas analyses, chemical evaluations, coating evaluations, water & power plants). In addition, I have given 10 different training courses to oil & gas industry + three (3) training courses in the pipeline, conducted numerous failure analyses, procured equipment including complete water treatment plants. I am fully conversant with field experience in inspection, maintenance, turnarounds, repairs, hydrotesting, pigging operations including intelligent pigging, reservoir souring, multi-well chemical tracers, water shut off & mothballing. Last but not least, I have 20 publications with more in the pipeline. Also written, reviewed and rewritten seven (7) basic practices and standards.

PROFILE

DR. M. E. RANA

Qualifications:

- Ph. D (Corrosion Science & Corrosion Engineering, UMIST, Victoria University of Manchester, UK, 1975).
- P/G Diploma of Merit (Refining & Petrochemical Techniques & Economics , UNESCO Institute Enrico Mattei, Milano Italy, 1970).
- M.Sc. (Chemistry, Pakistan, 1968).
- EX-Memberships: M. I. Corr. T. (UK), M.I.M.F. (UK), Sustaining Member (NACE-Texas/USA), Member of Corrosion Engineering Society, (UK/USA) and Life member (Institute of Engineers Pakistan).
- Language – Urdu (Native) & English.

EXPERIENCE

Research: 4 years (UMIST and Salford University-UK).

Academic: 18 years (Lecturer to Full Professor cum UNESCO/University Coordinator-Bright Star University of Technology - Libya).

Industrial: 23 years (Onshore/Offshore Oil/Gas & Water, Corrosion Engineering cum Production Chemistry-Sirte Oil Company-Libya, Harouge Oil Operations-Libya and GTS-Petronas-Malaysia).

Industries Served: Sweet/Sour Oil & Gas Production, Processing & Manufacturing, Downhole to Terminals, GOSP, Gas & Oil Transport, Refinery, Natural Gas, LNG, LPG, Power Plants (Steam/Gas), Steam Boilers (Gas/Oil fired), Urea Plants, Ammonia Plants, Methanol Plants, MSF/MEE Water Desalination Plants, RO/DM Water Plants, Water cum Gas Treatment for Downhole Injection, Marine & Aviation Facilities and Reservoir Engineering.

Special Operations: Reservoir Souring, Multi-well Chemical Tracers, Water Shut-Off, Inspection & Maintenance, Turnarounds, Pigging, Intelligent Pigging, Pipeline Cleaning, Hydrotesting & Drying and Mothballing.

Major Activities

Research – Corrosion and corrosion products on lead and lead alloys & Corrosion of Iron Silicon Anodes.

Academic – Teaching cum Administrative, UNESCO/University Coordinator.

Industrial – FEED to Detailed Engineering, Supervision, Corrosion Monitoring Production Chemistry, Corrosion, Scale & Biocide Control, Water and Gas Treatment for Downhole Injection, Chemical Evaluations, Chemical Trials from Bench to Laboratory to Field, Selection of Protective Coatings, Linings, Heat Shrinkable Sleeves, Fusion Bonded Epoxy and Three Layers Coatings including Surface Preparation and Inspection.

Scope Of Works/Specifications Written: See slides 5 -7

Projects Handles: See Slides 8-9

Studies Conducted: See slides 10-11

Materials Selections: See slide 12

Failure Analyses Conducted: See slides 13 – 14

Oil & Gas Chemicals Evaluations: See slide 15

Laboratories Procured, Established and Operated: See slide 16

Training Courses Given to Oil & Gas Industry: See slide 17

Training Courses to be given to Oil & Gas: See slide 18

Training Courses Received: 1

Software Used: See slide 19

Publications: See slides 20 – 21

Publications in the pipe line: See slide 22

Basic Practices/Standards Written, Reviewed & Rewritten: See slide 23

Scope Of Works /Specifications Written 1/3

- **Protective Coatings:** Internal/External (Tanks, Pipelines, Vessels, Valves & etc.), Fusion Bonded and Three Layers Epoxy Coatings for underground oil/gas transmission pipelines, Heat Shrinkable Sleeves, Surface Preparation and Coating Inspection.
- **Material Selection:** Oil and Gas Productions, Transportation, Gas Plants, LNG, LPG, Refinery, MSF & MEE Water Desalination Plants, RO & DM Plants, Travelling Water Screens, Sea Water lines, etc.
- **Corrosion Monitoring:** locations, Hardware, Instruments Selection, Programs & Schedules.
- **Water Treatment:** Cooling and downhole injection.
- **Gas Treatment:** Transportation and downhole injection.
- **Oil Treatment:** Transportation & storage
- **Failure Analysis:** Pipes, vessels, heat exchangers in refineries, stripper, condensers pumps in urea plant, insulation joints, coating, de-bonding, downhole tubing, underground and aboveground pipeline failures.
- **Corrosion Under Insulation**
- **Selection of corrosion inhibitors, scale inhibitors, biocides & chemicals evaluation.**
- **Chemical Trials** from desk top to laboratory to oil/gas (sour/sweet) field (downhole to terminal) and water flood.
- **Reservoir Souring**
- **Water Shut-Off**
- **Multi-well Chemical Tracers**

Scope Of Works /Specifications Written 2/3

- Water treatment plant.
- Rehabilitation of Cathodic Protection.
- Water compatibility for reservoir flooding.
- NDT for charred vessel integrity.
- Sulphate removing for water flood application.
- Feasibility, compatibility & chemical evaluation for water Injection applications.
- Failure analysis
- Total corrosion assessment & auditing for entire complex
- NORMS - evaluation and control measures
- Water quality evaluation for reservoir flooding and optimization of treatment

Scope Of Works /Specifications Written 3/3

- Corrosion control, scale control, SRB control & procurement of respective equipment.
- Procurement of Satellite water analyses laboratory.
- Procurement of corrosion monitoring hardware and instruments.
- Procurement of complete laboratories.
- Procurement of chemical injection skids for oil, gas and water treatment.
- Pigging and Intelligent Pigging new and old Pipelines
- Material selection, corrosion control, RBI, welding & inspection for Air Separation Plant.
- Laboratory management, equipment selection and maintenance
- Many more

Major Projects Handled 1/2

- Procurement, installation and commissioning of entire Higher Petroleum Institute set up to university level recognition.
- Shifting, reinstallation and commissioning of entire Higher Petroleum Institute equipment and machinery to a new a university.
- Procurement, installation and commissioning of entire new university set up from scratch to UNESCO recognition.
- Construction, hydrotesting, drying and corrosion inhibition of new cross country Oil/Gas transmission lines.
- Pipe line repairs and patch ups.
- Tubes replacement in MSF & MEE water desalination plants.
- Corrosion probes installation in a newly built gas plants.
- Corrosion probes replacement across the entire industrial complex.
- Corrosion monitoring audit of entire industrial complex.
- Acid cleaning of boilers.
- Water quality evaluation for reservoir flooding and optimization of treatment.
- Satellite water treatment laboratory from procurement to installation and commissioning.
- Commissioning of water treatment plant for water Injection.

Major Projects Handled 2/2

- Design and P.I.Ds review and modification from Corrosion and Corrosion Control viewpoint (CMP).
- Water disposal.
- Corrosion Control, Scale Control, SRB Control Procurement of Equipment.
- Procurement of Chemical Injection Skids.
- Procurement of Oil & Gas Laboratories, Installation, commissioning and Operation.
- Chemical Evaluations for Oil, Gas, Condensate and Water application.
- Chemical Squeezing into the reservoir.
- FEED and Detailed Engineering Design for LNG Storage Tanks & Earthwork.
- FEED & Detailed Engineering Design of Crude Oil Storage Tanks.
- Acid cleaning of Water Treatment Systems.
- Pigging & Intelligent Pigging for Oil & Gas Lines.
- Hydrotest, Pipeline Cleaning and Drying.
- Asset Life Integrity for Slug Catcher.
- Corrosion monitoring, Probes Selection, Chemicals injections, Coating and Cathodic Protection.
- P/S Potential Survey & C. P. design.
- Crude oil characterization, condensate quality and treatment.

Major Studies Conducted/Reviewed 1/2

- Reservoir souring.
- Water shut-off.
- Multi-well tracers for reservoirs water flood.
- Water compatibilities for reservoir flood.
- Sulphate removing for water flood application.
- Feasibility, compatibility & chemical evaluation for water injection applications.
- Water quality evaluation for reservoir flooding and optimization of treatment.
- Chemical Squeezing for reservoir
- Corrosion and corrosion reviews.
- Corrosion study & risk based inspection (RBI).
- Corrosion design basis memorandum (CDBM).
- Corrosion management plan (CMP).
- Assets life integrity.
- Assets life Integrity and life extension.
- Assets life extension & damaged assessment + life extension (joint Petronas/Shell)

Major Studies Conducted

2/2

- Rehabilitation of Gas/Condensate Pipeline using polymer liners
- VPO PTS Adequacy on Content & Compliance Process to Support TIPS.

Materials Selections

- Tubes in Heat exchanger in the Refinery.
- Tubes in MSF and MEE Water Desalination Plants
- Tubes in Reboilers in the MSF Water Desalination Plants
- Pumps in MSF Water Desalination Plants
- Tubes in Stripper in Urea Plant
- Tubes in HP Condenser in Urea Plant
- High Pressure and high temperature Gas Plant
- Tubes in Exchangers in Gas Plant
- Corrosion Monitoring Hard Wares
- Chemical Injection Skids
- Pipelines for Oil & Gas Transportation
- Water Treatment Plants
- Cooling Water Pipelines
- Flowlines
- Sea Water Lines
- LNG Tanks and Associated Pipes
- Material Selection, Inspection Specification for New LNG Storage Tank & Getty

List of Failure Analyses Conducted 1/2

- Reflux Condenser, high Pressure Carbamate Condenser, High Pressure Stripper, Hydrogen Reactor, CO2 Compressor & High Pressure Fresh Water Pump in Urea Plant.
- Flowline Spools, Insulating Joints , Dis-bonded Coating.
- Flowlines, Oil & Gas Valves.
- Above- ground/Underground Pipelines.
- Tubes in Boilers, Waste Heat Boilers & Reboilers Tubes/Shell in Urea and Gas Plants.
- Tube, Spray Nozzles, Water Boxes, Travelling Screens in MSF and MEE Water Desalination Plants.
- Down-Hole Tubing of Source Water Supply Well & Oil & Gas Wells.
- Heat Exchangers failures in Refinery & Petrochemical Plants
- Sea Water Condenser in Gas Plant
- Mug Compressor in Methanol
- GRP Water Injection Lines
- Aircraft Landing Gear

List of Failure Analyses Conducted 2/2

- Oil & Gas Pipelines.
- Corrosion in CO₂ removal system aMDEA circuit in Ammonia Plant.
- CO₂ Corrosion LNG Plant.
- Corrosion Damage Mechanism for Fabrication of Heat Exchanger.
- And many more

Oil & Gas Chemicals Evaluations

- Corrosion Inhibitors.
- Scale Inhibitors.
- Biocides.
- De-Emulsifiers.
- Reverse De-Emulsifiers.
- Wax Depressants.

List Of Laboratories Procured, Established and Operated

- Corrosion & Corrosion Control
- Metallography
- Chemical Evaluations
- Coating Evaluations
- Instrumental Analysis
- Petroleum Testing
- Central Oil & Gas Analyses
- Water & Power Plants
- Unit Operations
- Heat Transfer
- Strength of Materials
- General Science
- Microbiological Testing
- Strength of Materials

List of Training Courses Given to Oil & Gas Industry

- Basic Corrosion
- Corrosion Engineering
- Materials and Materials Selection
- Strength of Materials
- Karl Fisher Titration
- pH and its applications
- Conductivity and its Applications
- Pitting Corrosion & Damage Mechanism
- Intrusive Corrosion Monitoring Techniques for Oil & Gas Facilities
- Non-Intrusive Corrosion Monitoring Techniques for Oil & Gas Facilities
- Inspection Techniques for Oil & Gas Facilities

List of Training Courses to be given to Oil & Gas Industry

- Corrosion Under Insulation.
- API 571 Damage Mechanisms Affecting Fixed Equipment in the Refining Industry.
- Corrosion and Corrosion Control in the Petroleum Refining Plant.

Software Used

- BP Cassandra – Corrosion Prediction Software
- Norsok M-506 – Corrosion Prediction Software
- ECE 5, Corrosion Prediction Software (Trial Version)
- Predict 6.1 Corrosion Prediction Software (Trial Version)
- HydroCorr
- ScaleChem – Scaling Tendency Prediction
- French Creek – Down-Hole Scaling Prediction Software

List Of Publications (1/2)

1. Morphological and Kinetic Studies on Lead Dioxide Electrodes, Power Sources, (7), Academic Press, London 1979.
2. Corrosion Aspects of Stainless Steel in Surgical Industry, The Pakistan Times, 1980.
3. Self-Polarization of Underground Steel Pipeline; I. J. Technology (India) 1985.
4. Should Engineers Learn to Live with Corrosion; Bright University of Technology Conference (1984), Libya.
5. Basic Corrosion Course, A Manual for Training Man-Power for corrosion Control in SOC, 1996.
6. Failure of Reflux Condenser E-123 Urea-1 Plant, Causes & Prevention, Libyan Corrosion Society Conference, August, 2001.
7. Failure of Insulating Joint Assamoud Well H-8, Causes & Prevention, Libyan Corrosion Society Conference, August, 2002.
8. Lack of Cathodic Protection under Dis-bonded Coating, Libyan Corrosion Society Conference, August, 2002.
9. Selecting Corrosion Inhibitors for Application to Oil and Gas Fields and Associated Facilities, Libyan Corrosion Society Conference, October, 2003.
10. Self-Inflicted Corrosion Hazards; Libyan Corrosion Society Conference, October, 2003.
11. SOC experience with Chemicals for Down Hole Application; First International Conference and Exhibition on Oil Field Chemicals, December 2003, Tripoli-Libya.
12. Corrosion and Corrosion Control in High Pressure Stripper, Urea Plant, 5th Libyan Corrosion Conference, Nov. 2005, Tripoli.

List Of Publications (2/2)

13. Comparative Evaluation of Corrosion Inhibitors for Mothballing, 5th Libyan Corrosion Conference Nov. 2005, Tripoli.
14. Failure of 304L Stainless Steel Potable Water Line, 5th Libyan Corrosion Conference Nov. 2005, Tripoli.
15. Field Experience on Corrosion & Corrosion Control in Boilers, 6th Libyan Corrosion Conference Nov. 2007, Tripoli.
16. Field Experience on Biocide Performance, 6th Libyan Corrosion Conference Nov. 2007, Tripoli.
17. Field Experience on Corrosion and Corrosion Control in Thermal Desalination Plants; 7th Libyan Corrosion Conference, Nov. 2009, Benghazi.
18. Field Experience on Corrosion & Corrosion Control in Urea Plant (accepted) 8th Libyan Corrosion Conference, Sep 2011, Zawia (Libya).
19. Down-Hole Tubing Failure of Source Water Supply Well, Cause and Control, (accepted), 8th Libyan Corrosion Conference, Sep 2011, Zawia (Libya).
20. Field Experience on Corrosion & Corrosion Control in Oil and Gas Productions, (accepted) in First International Conference on Oil & Gas, Sep. 2011, Tripoli (Libya).

List of Publications in the Pipeline

1. Selecting Scale Inhibitors for Down Hole Application
 2. Field Experience on Corrosion and Corrosion Control in High Pressure Carbamate Condenser, Urea Plant
 3. Stress Corrosion Cracking in High Pressure Carbamate Condenser, Urea Plant
 4. Field Experience on Corrosion & Corrosion Control in CO₂ Compressor, Urea Plant
 5. Failure of Hydrogen Reactor Cooler, Urea Plant
 6. Failure of Tubes in Primary Condensers, Refinery
 7. Failure of Tubes in Sea Water Condenser, LNG
 8. Failure of Water-Box in Water Desalination Plant
 9. Failure of MUG Compressor's Rotor in Methanol Plant
 10. Oxygen Pitting in LNG Boilers
 11. Failure of P-016A Fresh Water Pump Impeller, Urea Plant
 14. Failure of Re-boiler Tube Bundle, Water Desalination Plant Oil and Gas
 15. NORMS –Emerging Hot Issue in Oil & Gas Productions
- And Many more.

List of Basic Practices/Standard Written

- Chemical Injection and Sampling in Production & Process Equipment.
- Corrosion Monitoring in Production and Process Equipment.
- Procedure for Mothballing and Preserving Process, Production Equipment.
- Pigging Techniques & Operations.
- Corrosion Management Plan (CMP).
- Corrosion Mitigation Strategy For Wet Sour Gas Carbon Steel Pipelines.
- Installation & Commissioning of Cathodic Protection Systems.