

ELECTRICAL PREDICTIVE MAINTENANCE ITINERARY

ENERGIZED PROCEDURES

✓ Voltage Considerations

- ◆ Steady State Limits
 - Utility Service
 - Building Main Service
 - Voltage at the Load
- ◆ Voltage Drop
 - Distribution Feeders
 - Main Service to Loads
- ◆ Millivolt Drop
 - Breakers
 - Disconnects
 - Bolted Connections
 - Standard Limits

✓ Infrared Thermography

- ◆ Infrared Theory
 - Radiation
 - Properties of Infrared Energy
 - Temperature and Radiation
 - Basics of Measurement
- ◆ Infrared Problem Determination
 - Like to Like Comparisons
 - Ambient Comparisons
 - Temperature Rise Comparisons

✓ Ultrasound

- ◆ Ultrasonic Basics
 - Types of Ultrasound
 - Power
 - Pulse Echo
 - Airborne
 - Industry Applications
 - Electrical
 - Mechanical
 - Pneumatic
 - Frequency Ranges
- ◆ Advantages of Ultrasound
 - Direction Dependent
 - Multiple Applications
 - Early Warning Indication
- ◆ Ultrasound and Electric Systems
 - Arcing
 - Tracking
 - Corona

✓ Insulation Resistance Testing

- ◆ Insulation Fundamentals
 - Separation of Conducting and Non Conducting Materials
- ◆ Resistance Characteristics
 - Good Insulation
 - Poor Insulation
- ◆ Insulation Degradation
 - Mechanical Causes
 - Environmental Conditions
- ◆ Testing Classifications
 - Test Voltages
 - Temperature Corrections
- ◆ Testing Procedures
 - Short Time Spot Test
 - Time Resistance
 - Polarization Index Test

✓ Low Resistance Testing

- ◆ Low Resistance Testing Theory
 - Contact Resistance-No Load
 - Contact Resistance-Loaded
- ◆ Performance Criteria
 - Manufacturing Process
 - Installation
 - Maintenance Testing
- ◆ Electrical Systems Application
 - Breakers
 - Disconnects
 - Contactors
 - Bolted Connections
 - Batteries
 - Transformers
- ◆ Data Interpretation
 - Like to Like Comparison
 - Relative Measurements

✓ Transformer Turns Ratio

- ◆ Theory of Transformer Turns Ratio
 - Primary/Secondary Ratios
 - Exciting Current of Transformers
 - What is Transformer Polarity?
- ◆ Benefits of Transformer Turns Ratio
 - Ratio Verification
 - Excitation Current Levels
 - Winding Polarity
- ◆ Testing Techniques
 - Voltage and Current for Testing
 - Testing Time
 - Ratio Calculations
 - Data Evaluation

✓ Bolt Torque Specifications

- ◆ Steel Heat Treated
- ◆ Stainless Steel
- ◆ Aluminum Alloy
- ◆ Silicon Bronze

✓ Energized Maintenance Procedures

- ◆ Liquid Transformers
- ◆ Electrical Service Switchgear
- ◆ Emergency Generators
- ◆ Main Breakers
- ◆ Feeder Breakers
- ◆ Electric Bus and Buss Duct
- ◆ Automatic Transfer Switches
- ◆ Fused Disconnects
- ◆ Motor Control Centers
- ◆ Motor Starters
- ◆ Distribution Panels
- ◆ Dry Transformers
- ◆ Branch Circuit Panels

✓ De-Energized Maintenance Procedures

- ◆ Liquid Transformers
- ◆ Electrical Service Switchgear
- ◆ Emergency Generators
- ◆ Main Breakers
- ◆ Feeder Breakers
- ◆ Automatic Transfer Switches
- ◆ Fused Disconnects
- ◆ Motor Control Centers
- ◆ Distribution Panels
- ◆ Dry Transformers

✓ Computerized Maintenance Software