

EPS



INTRODUCTIONS

Sales Manager



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WHAT... is Electrical Preventive Maintenance?

Electrical Preventive Maintenance is the practice of implementing routine and recurring maintenance procedures to prevent damage or malfunction to electrical connections and electrical distribution system equipment.







WHY: Reasons to Invest in EPM

PERSONNEL SAFETY

Avoidance of Shock, Burns or Electrocution

FACILITY SAFETY

Avoidance of Fire or Other Damage

RELIABILITY OF POWER

Avoidance of Interruption to Business or Operations

INSURANCE EXPENSE

Reduce Risk to Insurance Underwriters











HOW: Procedures for Good Preventive Maintenance **VISUAL INSPECTION**

INFRARED THERMOGRAPHY

LOAD MONITORING

DE-ENERGIZED MAINTENANCE

INSULATION TESTING (CABLE & EQUIPMENT)

TRANSFORMER TESTING

GROUND TESTING





HOW: **Equipment and Techniques**

INFRARED THERMOGRAPHY **FLIR T440**











Photo and Identification

INFRARED THERMOGRAPHY



	Location	Acid Warehouse
	Equipment ID	Westinghouse dis
	IR Problem	Yes
	IR Grade	Sever Grade +35
	Remedy	Replace asap



1	Ar1 Max. Temperature	53
	Sp1 Temperature	32
	Delta T Value	20









INFRARED THERMOGRAPHY









13.0 °C





HOW: **Equipment and Techniques LOAD MONITORING Fluke 1738**

Observe typical profiles of Voltage, Current, and Power over a representative time period.

Observe and Record maximum levels of Demand

Observe and Record Harmonic Distortion and other anomalies.

NEC Article 220.87(1) The maximum demand data is available for a 1-year period.









HOW: Equipment and Techniques **DE-ENERGIZED MAINTENANCE**

Cleaning

Megger Testing

Re-Torqueing Terminations

EXERCISING











WHEN: **Frequency of Procedures**

Three -Year Recurring Schedule

- Year 1 Infrared Thermography
- Year 2 De-energized Maintenance
- Year 3 Transformer Testing
- Year 4 Repeat

Monitor Year-toYear Trends with **Records of Test Data**











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Prepared By



MAINTAINING RECORDS

Single-Line Diagrams are very useful for documenting a facility's electrical system, observing trends, and developing Fault Studies, Coordination Studies, and Arc-Flash Analysis.

Single-Line Diagrams are also helpful for Lock-Out/Tag-Out management









MAINTAINING RECORDS

One-Line Diagram

Fault Study

AIC Ratings Coordination

Arc Flash







MAINTAINING RECORDS

Fault Studies or Short-Circuit Studies calculate the amount of current that would flow in the event of a (worse-case) three-phase fault.

Fault current values derived from a fault study are essential for sizing the minimum **AIC** Rating (Ampere Interrupting Capacity) of electrical distribution equipment and over-current protection devices.

Failure to utilize equipment with adequate AIC Rating can result in extreme damage of equipment and extreme risk to personnel.







MAINTAINING RECORDS

Coordination Studies are necessary to ensure that the appropriate settings for over-current protection devices are used. It is ideal that the over-current protection device nearest a fault is the first (fastest) to trip, and that upstream, higher rated devices remain unchanged.









MAINTAINING RECORDS

Arc-Flash Studies are another product of single-line power studies, used to determine the Flash Hazard **Boundary** and the calories/cm2 for identifying the appropriate **Protective Clothing and PPE.**



Arc Flash and Shock Hazard Appropriate PPE Required

1' - 0"	Flash Hazard Boundary	
0.7	cal/cm2 Flash Hazard at 18 Inch	es
#0	Protective Clothing and PPE I	ion-mel
480	Volts Shock Hazard when cover	is remo
3' - 6"	Limited Approach	
1' - 0"	Restricted Approach - Class 00	Voltage
0' - 1"	Prohibited Approach - Class 00	Voltage
E quipment I	lame: IT5 PRI (Upstream Trip Device:	BL-22)
Harrington I	lectric Co 10/27/2013 Easy F	ower v9





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Gloves Gloves

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IEEE 1584



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