I. GENERATION:

A) ECONOMIC DISPATCH

a) Objective: To load generators to their maximum output at the lowest average cost

(1) Tools:
- (a) Generating Facilities
  1. Fossil
  2. Nuclear
  3. Hydro
  4. Combustion Turbine
  5. Other
- (b) Incremental Cost Curves
- (c) Lambda
- (d) SCADA/EMS/DAS System
- (e) Unit Commit
- (f) Load Forecasting
- (g) Interchange Evaluation
- (h) Weather Service
- (i) Load Management System
- (j) Security Analysis

(2) Knowledge Required to Accomplish Task:
- (a) Incremental Cost Curves
- (b) Interchange Availability
- (c) Characteristics of Generating Facilities
- (d) Power System Operating Limitations
- (e) NERC Operating Guides
- (f) Regional/Utility Agreements
- (g) Communication Systems
- (h) AGC
- (i) System Load Profile
- (j) Load Management Capabilities
- (k) Environmental Dispatch
- (l) Transmission Service Fees
- (m) System Lambda
- (n) SCADA/EMS/DAS Operation

(3) Tasks:
- (a) Match Generation to Load Plus Net Scheduled Interchange
- (b) Adjust Generator Loading to Achieve Lowest Possible System Lambda
- (c) Utilize Available Interchange Transactions to Enhance System Economics
- (d) Maintain System Operating Reserve Requirements
- (e) Operate Within NERC Guides
- (f) Operate Within Regional/Utility Guides
- (g) Load Forecasting
- (h) Record Keeping
- (i) Utilize Economic/Operational Study Programs
- (j) Monitor Weather
- (k) Communicate with Plant Operators & Neighboring Utilities
- (l) Operate Load Management Systems

B) HYDRO

a) Objective: To operate hydro facilities in a prescribed manner so as to fully utilize available water resources at the same time complying with the established operating procedures and practices

(1) Tools:
- (a) Mechanical equipment
  1. Blade (Screw), Adjustable, Stationary
  2. Wicket Gate
  3. Lubrication System
     Turbine Bearing Oil
     System Wicket Gate Lubrication
  4. D.C./A.C. Motors and Pumps
  5. Rotor
  6. Cooling System
- (b) Electrical Equipment
  1. Stator/Stator Windings
  2. Field Generator (Amplidyne)
  3. Field Breaker
  4. Switch Yard Equipment
  5. Generator Brushes
  6. Volt Meter
  7. Amp Meter
  8. Synchroscope
  9. Single Line/Three Line Switching Diagrams
  10. SCADA/EMS/DAS Operations
  11. Types of Protective Schemes
  12. Hydros Operated as Condensers
  13. Hydros Operated as Pumps for Pumped Storage Operations
- (c) Administrative
  1. US Army Corp of Engineers Operating Instructions
  2. Navigational Requirements
  3. Flood Control
  4. City, County, State, Federal Notification of Emergency Operations
  5. Record Keeping
- (d) Corps of Engineers
- (e) Communications Systems
- (f) SCADA/EMS/DAS System
- (g) Waste Gate
- (h) Natural/Pumped Storage System
- (i) Regional/Utility/NERC Operating Guides
- (j) Plant Operator
- (k) Emergency Response Procedures

(2) Knowledge Required to Accomplish Task:
- (a) Electrical Theory
- (b) River Flow Characteristics
- (c) Regulatory Agency Water Management Guides
- (d) Black Start Capability
- (e) SCADA/EMS/DAS Operation
- (f) Regional/Utility/NERC Operating Guides
- (g) Emergency Response Procedures
- (h) Forebay, Tail, Head Levels
- (i) Unit Characteristics

(3) Tasks:
(a) Maximize Economic Use of Water Resources
(b) Water Management
(c) Maintenance Scheduling
(d) Remote Operation
(e) Record Keeping
(f) Operate Within Regional/Utility/NERC/Guides
(g) Operate Within Regulatory Agency Guides
(h) Communicate With Plant Personnel
(i) Reactive Power Dispatch

C) NUCLEAR

a) Objective: To operate nuclear facilities in a prescribed manner so as to economically utilize available generation while complying with established operating procedures & practices

(1) Tools:
(a) SCADA/EMS/DAS System
(b) Plant Operator
(c) Regional/Utility/NERC Operating Guides
(d) Regulatory Agency Operating Guides
(e) Emergency Response Procedures
(f) Communication Systems
(g) Incremental Cost Curves

(2) Knowledge Required to Accomplish Task:
(a) Electrical Theory
(b) Plant Characteristics
(c) Basic Nuclear Plant Operation/Terminology
(d) Regional/Utility/NERC/Regulatory Agency Operating Guides
(e) Incremental Cost Curves
(f) Security Requirements
(g) Emergency Response Procedures
(h) Switch Yard Requirements/Restrictions
(i) Communication Systems
(j) SCADA/EMS/DAS Operation

(3) Tasks:
(a) Record Keeping
(b) Communicate with Plant Personnel
(c) Economic Dispatch
(d) Operate Within Regional/Utility/NERC/Regulatory Guides
(e) Follow Emergency Response Procedures
(f) Operate SCADA/EMS/DAS
(g) Reactive Power Dispatch

D) FOSSIL

a) Objective: To operate fossil fuel facilities in a prescribed manner so as to economically utilize available generation while complying with established operating procedures & practices

(1) Tools:
(a) SCADA/EMS/DAS System
(b) Plant Operator
(c) Regional/Utility/NERC Operating Guides
(d) Communications Systems
(e) Incremental Cost Curves

(2) Knowledge Required to Accomplish Task:
(a) Electrical Theory
(b) Unit Characteristics
(c) Regional/Utility/NERC Guides
(d) Incremental Cost Curves
(e) Basic Power Plant Operation
(f) Environmental Requirements
(g) SCADA/EMS/DAS Operation
(h) Black Start Procedures

(3) Tasks:
(a) Economic Dispatch
(b) Operate within Regional/Utility/NERC Operating Guides
(c) Communicate with Plant Personnel
(d) Operate SCADA/EMS/DAS
(e) Schedule Maintenance Outages
(f) Reactive Power Dispatch

E) COMBUSTION TURBINE

a) Objective: To operate combustion turbine facilities in a prescribed manner so as to economically utilize available generation while complying with established operating procedures & practices

(1) Tools:
(a) SCADA/EMS/DAS System
(b) Plant Operator
(c) Regional/Utility/NERC Operating Guides
(d) Communications Systems
(e) Incremental Cost Curves
(f) Single Engine
(g) Dual Engine
(h) Multi-Fuel
(i) Combined/Cycle
(j) Remote Operation - Start/Stop
(k) Synchronous Condenser Operation
(l) Black Start Capable

(2) Knowledge Required to Accomplish Task:
- (a) Electrical Theory
- (b) Unit Characteristics
- (c) Regional/Utility/NERC Guides
- (d) Incremental Cost Curves
- (e) Basic Power Plant Operation
- (f) Environmental Requirements
- (g) Synchronous Condenser Operation
- (h) Operating Reserve Requirements
- (i) Emergency Procedures
- (j) SCADA/EMS/DAS Operation
- (k) Black Start Capable

(3) Tasks:
- (a) Start-Stop-Remote Operation
- (b) Start-Stop Synchronous Condenser Operation
- (c) Economic Dispatch
- (d) Operate within Regional/Utility/NERC Operating Guides
- (e) Communicate with Plant Personnel
- (f) Operate SCADA/EMS/DAS
- (g) Schedule Maintenance Outages
- (h) Reactive Power Dispatch

F) OTHER

(1) RDF
(2) SOLAR
(3) DIESEL
(4) GEO THERMAL
(5) FUEL CELL
(6) DISTRIBUTION LEVEL GENERATION
(7) WIND

IIa A.C. TRANSMISSION:

A) VOLTAGE AND VAR CONTROL

a) Objective: Maintain proper system voltage to:
- * Prevent voltage collapse
- * Prevent equipment damage
- * Enhance economic operation
- * Enhance system stability

(1) Tools:
(a) Capacitor Banks
(b) Load Tap Changers
(c) Generators
(d) Synchronous Condensers
(e) Reactors
(f) Static VAR Compensators
(g) Line and Cable Switching
(h) Interconnected Operations
(i) Relay Action (ie: under & over voltage)
(j) Voltage Regulators
(k) D.C. Line Controls
(l) Contingency (Security) Analysis
(m) Phase Shifter
(n) Load Flow Studies
(o) SCADA Alarm Limits

(2) Knowledge Required To Accomplish Task:
(a) Knowledge of Voltage Control Devices and Tools
(b) Electrical Theory
(c) System Characteristic
(d) Region/Utility Operating Guidelines
(e) Switching Procedures
(f) Knowledge of Interconnected Operations
(g) Operation of Load Flow Program
(h) SCADA Alarm Limits

(3) Tasks:
(a) Switching Voltage Control Devices In/Out of Service.
(b) Direct Plant and Station Operators
(c) Monitor System Voltage
(d) Interconnected Communication
(e) Record Keeping
(f) Decision Making
(g) Run Load Flow Studies
(h) SCADA Alarm Limits

A) PROTECTION/RELAYING

a) Objective: To identify and isolate faults in order to minimize equipment damage, reduce outage time and to enhance overall system reliability

(1) Tools:
(a) SCADA Systems
(b) Alarm Systems
(c) Relays
(d) Fault Location Equipment
(e) Oscillograph
(f) Sequence of Events Recorders
(g) Substation Equipment
(h) D.C. Runback Schemes
(i) Generator Runback Schemes
(j) Generator Tripping Schemes

(2) Knowledge Required to Accomplish Task:
- (a) Bus Protection
- (b) Transformer Protection
- (c) Zone Protection
- (d) Fuse Coordination
- (e) Auto Reclosing Schemes
- (f) Knowledge of Current Weather and Atmosphere Conditions
- (g) Equipment Failure
- (h) Mis-Operations
- (i) Power Flow
- (j) Current System Regional Conditions
- (k) Understanding of Metering & Relaying One Line Diagrams
- (l) Understanding Application of Relay Schemes, such as:
  1. Overcurrent Relaying
  2. Directional Relaying
  3. Distance Relaying
  4. Differential Relaying
  5. Pilot Relaying
  6. Static Relaying
  7. Back-up Relaying
  8. Transfer Trip
  9. Breaker Failure

(3) Tasks:
- (a) Monitor System
- (b) Record Keeping
- (c) Operate Controllable Devices
- (d) Coordinate Testing & Maintenance of Relays
- (e) Conduct & Direct Switching Operations
- (f) Analyze Abnormalities
- (g) Read & Analyze Fault Locators
- (h) Interpreting Relay Target Information
- (i) Monitor Weather Conditions
- (j) Regional Communications

C) SAFETY

a) Objective: Safety of personnel, public and equipment while operating the transmission system

(1) Tools:
- (a) Protection/Relaying Schemes
- (b) Utility Safety Manual
- (c) Occupational Safety & Health Act (OSHA) Guidelines
- (d) SCADA/EMS/DAS System
- (e) NERC Guides
- (f) Regional/Pool Guides
- (g) 911 (Outside Responders)
- (h) Communication System
- (i) Utility Switching Manual/Guides
- (j) Kirk Key Interlock Systems
- (k) Interconnected Switching Guides

(2) Knowledge Required to Accomplish Task:
- (a) OSHA Rules
- (b) Utility Safety Rules
- (c) Utility Operating Policies
- (d) Interconnected Operations
- (e) Equipment Limits
- (f) Electrical Theory
- (g) Utility/Regional Clearance and Tagging Policies & Procedures
- (h) Clearance Requirements
- (i) Utility/Region Switching Guidelines
- (j) Grounding Procedures

(3) Tasks:
- (a) Enforce Safety Rules
- (b) Enforce Utility Policy
- (c) Practice Clear/Concise Written & Verbal Communication Skills
- (d) Record Keeping
- (e) Enforce Utility/Region Switching Procedure

D) SWITCHING

a) Objective: Analyze, review, direct & monitor switching operations for pre-scheduled maintenance outages or emergency situations

(1) Tools:
- (a) SCADA/EMS/DAS System
- (b) Communications Systems
- (c) Log/Report
- (d) Regional Coordination or Security Center
- (e) Map Board
- (f) Utility Operating Guides
- (g) Contingency Analysis
- (h) Field Personnel
- (i) Substation/Line Equipment
- (j) System One Line Diagrams
- (k) Regional/Pool Switching Guides
- (l) Request for Outage/Switching Procedures
- (m) Electric Safety Code

(2) Knowledge Required to Accomplish Task:
- (a) Utility/Regional Clearance Policies
- (b) Electrical Theory
- (c) Interconnected Operations
- (d) SCADA/EMS/DAS Operation
- (e) Switching Device Capabilities & Limitations
- (f) System Characteristics
- (g) Voltage and VAR Control
- (h) Security/Load Flow Analysis
- (i) Characteristics of Underground Transmission Operations
- (j) Sectionalizing
- (k) Synchronizing
- (l) Communications Systems
- (m) Grounding Procedures
- (n) Written/Verbal Communication Skills
- (o) Knowledge of Safety Rules
- (p) Utility/Regional Clearance and Tagging Policies & Procedures
- (q) D.C. Line/Generator Runback Schemes
- (r) Electric Safety Code

(3) Tasks:
- (a) Direct Personnel in the Operation of Switching Equipment
- (b) Record Switch/Equipment Operations
- (c) Operate Remotely Controlled Device Via SCADA/EMS/DAS
- (d) Communicate Accurate Equipment Clearances.
- (e) Utilize Operating One Line Diagrams
- (f) Monitor & Analyze System Status
- (g) Develop/Review Switching Procedures

E) LINE LOADING

a) Objective: To transfer energy reliably and economically

(1) Tools:
- (a) Generating Units
- (b) Substation/Line Equipment
- (c) SCADA/EMS/DAS System
- (d) D.C. Line Controls
- (e) Voltage & VAR Control
- (f) Interruptible Loads
- (g) Interconnected Transaction Agreements
- (h) Communication Systems
- (i) Regional Operating Guides & Procedures
- (j) Phase Shifter

(2) Knowledge Required to Accomplish Task:
- (a) Line Loading Capabilities & Limitations
- (b) Economics (Line Loss %)
- (c) System Characteristics
- (d) Electrical Theory
- (e) Regional/Utility Operating Guides & Procedures
- (f) Transfer Limits (Stability Limits)
- (g) Power Transfer Distribution Factors (PTDF's)
- (h) SCADA/EMS/DAS Operation

(3) Tasks:
(a) Generator Loading
(b) Monitor and Analyze System
(c) Record Keeping
(d) Remote Control Switching
(e) Direct Personnel Switching
(f) Adjust Interchange Schedules
(g) Communicate with Interconnected Systems
(h) Operate Load Management Programs
(i) Operate Substation/Line Equipment
(j) Control D.C. Line Loading

F) STABILITY

a) Objective: Keep all parts of the transmission system in synchronism with each other

(1) Tools:
(a) Generating Unit
(b) Auto/Manual Load Shedding
(c) Substation/Line Equipment
(d) SCADA/EMS/DAS System
(e) Power System Stabilizers (PSS)
(f) Voltage & VAR Control Equipment
(g) D.C. Line Damping Controls
(h) Security Analysis
(i) Load Flow Analysis
(j) Underfrequency Relays

(2) Knowledge Required to Accomplish Task:
(a) Synchronis Operation
(b) Steady State Stability
(c) Transient Stability
(d) Dynamic Stability
(e) Equipment Capabilities & Limitations
(f) Interconnected Operation
(g) Out-of-Step Relaying
(h) AGC
(i) Transfer Limits
(j) D.C. Line Capabilities/Operation
(k) Generator Capabilities/Characteristics
(l) SCADA/EMS/DAS Operation
(m) Underfrequency Load Shedding Schemes

(3) Tasks:
(a) Adjust Interchange Schedules
(b) Switching
(c) Operate Substation/Line Equipment
(d) Operate Load Management
(e) Monitor and Analyze System
(f) Communicate with Interconnected Systems
(g) Direct Generator Unit Loading
(h) Shed Firm Load
(i) Operate Within System/Regional/NERC Guides

IIb D.C. TRANSMISSION

A) VOLTAGE CONTROL AND VAR CONTROL

a) Objective: Maintain proper D.C. system voltage

(1) Tools:
(a) A.C. Capacitor Banks
(b) Synchronous Condensers
(c) Static VAR Compensators
(d) LTC's
(e) Reduced Voltage Operation
(f) Monopole Operation
(g) Metallic Return Mode
(h) Ground Return Mode
(i) Reducing or Increasing Power Flow
(j) Interconnected Operations
(k) Filter Banks

(2) Knowledge Required to Accomplish Task:
(a) Knowledge of Voltage Control Devices and Tools
(b) Electrical Theory
(c) D.C. System Operations
(d) D.C. Conversion Characteristics
(e) A.C./D.C. Interconnected Operation Characteristics
(f) Region/Utility Operating Guidelines
(g) A.C./D.C. Switching Procedures

(3) Tasks:
(a) Monitor SCADA/EMS/DAS Alarms
(b) Switching Voltage Control Devices In/Out of Service
(c) Increasing/Decreasing Flows on D.C. Line
(d) Bipole & Monopole Operation
(e) Reduced Voltage Operation

B) PROTECTION/RELAYING

a) Objective: To identify and isolate faults in order to minimize equipment damage, reduce outage time and to enhance overall system reliability

(1) Tools:
(a) Valve Hall
(b) Oscillation Dampening
(c) Runback Protections
(d) Monopole Operation Features
(e) Bus Protection Schemes
(f) Line Protection Schemes
(g) Breaker Failure Schemes
(h) Lightning Arrestors
(i) Generator and Transformer Protection
(j) Cooling Equipment
(k) Fault Location Equipment
(l) Sequence of Events Recorder
(m) Vendor Manuals

(2) Knowledge Required To Accomplish Task:
(a) D.C. System Operations
(b) D.C. Line Operating Modes
(c) Relay Protection Schemes
(d) A.C./D.C. System Interconnection Stability
(e) D.C. System Stability
(f) Effects of D.C. Misoperation on A.C. System
(g) Commutation Failure

(3) Tasks:
(a) Monitor System
(b) Regional Communication
(c) Monitor SCADA/EMS/DAS Alarms
(d) Regulate D.C. Line Loading
(e) Control D.C. Line Operating Mode (monopole/bipole)
(f) Read and Analyze Fault Locators
(g) Operate Controllable Devices
(h) Control Voltage Remotely
(i) Dispatch Crews
(j) Record Keeping
(k) Monitor Weather Conditions
(l) Coordinate Testing and Maintenance of Relays
(m) Conduct and Direct Switching Operations

C) SAFETY

a) Objective: Safety of employees, general public, and equipment in the operation of the D.C. system

(1) Tools:
(a) Protection/Relaying Schemes
(b) Kirk Key Interlocks
(c) Utility Switching Guidelines
(d) D.C. Manufacturers/Utility Guidelines
(e) Regional/Pool Guidelines
(f) NERC Guidelines
(g) Communication Systems
(h) OSHA Guides
(i) Interconnected Switching Guides
(j) SCADA/EMS/DAS System

(2) Knowledge Required To Accomplish Task:
(a) D.C. Operation
(b) D.C. Operation Guidelines
(c) OSHA Rules
(d) Utility Safety Rules
(e) Utility Operating Policies
(f) Interconnected Operations
(g) Equipment Limits
(h) Electrical Theory
(i) Utility/Regional Clearance and Tagging Policies & Procedures
(j) Clearance Requirements
(k) Utility/Region Switching Guidelines
(l) Grounding Procedures
(m) SCADA/EMS/DAS Operation

(3) Tasks:
(a) Enforce Safety Rules
(b) Enforce Utility Policy
(c) Practice Clear/Concise Written and Verbal Communication Skills
(d) Record Keeping
(e) Enforce Utility/Region Switching Procedure

D) SWITCHING

a) Objective: Analyze, review, direct & monitor switching operations for pre-scheduled maintenance outages or emergency situations

(1) Tools:
(a) Protection/Relaying
(b) Utility Switching Guidelines
(c) D.C. Manufacturers Guidelines
(d) Region/Pool Guidelines
(e) NERC Guidelines
(f) OSHA Guidelines
(g) Communication Systems
(h) Map Board
(i) Log/Report
(j) Regional Coordination or Security
(k) SCADA/EMS/DAS System
(l) Contingency Analysis
(m) Field Personnel
(n) Substation/Line Equipment
(o) System One Line Diagrams
(p) Request for Outage/Switching Procedures

(2) Knowledge Required To Accomplish Task:
(a) D.C. Operation
(b) D.C. Operation Guidelines
(c) Equipment Isolation
(d) Utility/Regional Clearance Policies
(e) Electrical Theory
(f) Interconnected Operations
(g) SCADA/EMS/DAS Operation
(h) Switching Device Capabilities & Limitations
(i) System Characteristics
(j) Voltage and VAR Control
(k) Security/Load Flow Analysis
(l) Characteristics of Underground Transmission Operations
(m) Sectionalizing
(n) Communications Systems
(o) Grounding Procedures
(p) Written/Verbal Communication Skills
(q) Knowledge of Safety Rules
(r) Utility/Regional Clearance and Tagging Policies & Procedures
(s) D.C. Line/Generator Runback Schemes

(3) Tasks:
(a) Direct Personnel in the Operation of Switching Equipment
(b) Record Switch/Equipment Operations
(c) Operate Remotely Controlled Devices via SCADA/EMS/DAS
(d) Communicate Accurate Equipment Clearances
(e) Utilize Operating One Line Diagrams
(f) Monitor and Analyze System Status
(g) Develop/Review Switching Procedures
(h) D.C. Startup and Shutdown Procedures

E) LINE LOADING

a) Objective: To transfer energy reliably and economically

(1) Tools:
(a) SCADA/EMS/DAS System
(b) Voltage & VAR Control
(c) Inter-Connected Transaction Agreements
(d) Communication Systems
(e) Regional Operating Guides and Procedures
(f) Substation/Line Equipment
(g) D.C. Line and Generator Runback Schemes
(h) D.C. Control Systems
(i) Substation/Line Equipment

(2) Knowledge Required to Accomplish Task:
(a) Economics (Line Loss %)
(b) Interconnected Systems
(c) Electrical Theory
(d) SCADA/EMS/DAS Operation
(e) D.C. Operation
(f) D.C. Operation Guidelines
(g) System Characteristics
(h) Regional/Utility Operating Guides & Procedures
(i) D.C. Operating Modes
1. Monopole
2. Ground Return
3. Metallic Return
4. Bipole
5. Reduced Voltage

(3) Tasks:
(a) Monitor and Analyze Systems
(b) Changes in Generator Loading
(c) Schedule Changes
(d) Control D.C. Line Loading
(e) Select Proper D.C. Line Operating Mode
(f) Generator Loading
(g) Record Keeping

III. DISTRIBUTION:

A) VOLTAGE AND VAR CONTROL

a) Objective: Maintain proper system voltage to:
* Prevent customer and/or utility equipment damage
* Enhance economic operation
* Maintain a high level of power quality

(1) Tools:
(a) Capacitor Banks
(b) Substation Transformer Load Tap Changers
(c) Reactors
(d) Line and Cable Switching
(e) Interconnected Operations
(f) Relay Action (ie: under & over voltage)
(g) Voltage Regulators
(h) Contingency Analysis
(i) Load Flow Studies
(j) SCADA Alarm Limits
(k) Real-time load measurement records

(2) Knowledge Required To Accomplish Task:
(a) Knowledge of Voltage Control Devices and Tools
(b) Electrical Theory
(c) System Characteristic
(d) Region/Utility Operating Guidelines
(e) Switching Procedures
(f) Knowledge of Interconnected Operations
(g) Operation of Load Flow Program
(h) SCADA Alarm Limits

(3) Tasks:
(a) Switching Voltage Control Devices In/Out of Service.
(b) Direct Field Line workers and Technical Staff
(c) Monitor System Voltage
(d) Interconnected Communication
(e) Record Keeping
(f) Decision Making
(g) Run/Obtain Load Flow Information From Studies
(h) SCADA Alarm Limits

B) PROTECTION/SECTIONALIZING/RELAYING

a) Objective: To identify and isolate faults in order to:
* Minimize equipment damage
* Reduce outage time
* Maintain a high level of system reliability

(1) Tools:
(a) SCADA/EMS/DAS/ Systems
(b) Alarm Systems
(c) Relays
(d) Fault Location Equipment

(e) Sequence of Events Recorders
(f) Substation Equipment
(g) Sectionalizing maps and schematics

(2) Knowledge Required to Accomplish Task:
(a) Bus Protection
(b) Transformer Protection
(c) Zone Protection
(d) Fuse Coordination
(e) Auto Reclosing Schemes
(f) Knowledge of Current Weather Conditions
(g) Equipment Failure
(h) Mis-Operations
(i) Power Flow
(j) Current System Regional Conditions
(k) Understanding of Sectionalizing Diagrams & Maps
(l) Understanding of Relay Schemes

(3) Tasks:
(a) Monitor System
(b) Record Keeping
(c) Operate Controllable Devices
(d) Coordinate Testing & Maintenance of Relays
(e) Conduct & Direct Switching Operations
(f) Analyze Abnormalities
(g) Read & Analyze Fault Locators
(h) Interpreting Relay/Recloser Target Information
(i) Monitor Weather Conditions
(j) Regional Communications

C) SAFETY

a) Objective: Safety of personnel, public and equipment while operating the distribution system

(1) Tools:
(a) Protection/Relaying/Recloser Schemes
(b) Utility Safety Manual
(c) OSHA Guidelines
(d) SCADA/EMS/DAS System
(e) Electric Safety Code (ESC)
(f) Regional Guidelines
(g) 911 (Outside Responders)
(h) Communication System
(i) Utility Switching Manual/Guides
(j) Interconnected Switching Guides

(2) Knowledge Required to Accomplish Task:
(a) OSHA Rules
(b) Utility Safety Rules
(c) Utility Operating Policies
(d) Interconnected Operations
(e) Equipment Limits
(f) Electrical Theory
(g) Utility/Regional Tagging Procedures
(h) Clearance Requirements
(i) Utility/Region Switching Guidelines

(j) Grounding Procedures
(k) ESC Provisions/Recommendations

(3) Tasks:
(a) Enforce Safety Rules
(b) Enforce Utility Policy
(c) Practice Clear/Concise Communication Skills
(d) Record Keeping
(e) Enforce Utility/Region Switching Procedures

D) SWITCHING

a) Objective: Analyze, review, direct & monitor switching operations for pre-scheduled maintenance, outages or emergency situations to minimize customer interruptions of power

(1) Tools:
(a) SCADA/EMS/DAS System
(b) Communications Systems
(c) Log/Report
(d) Regional Coordination or Security Center
(e) Map Board
(f) Utility Operating Guides
(g) Contingency Analysis
(h) Field Personnel
(i) Substation/Line Equipment
(j) System One Line Diagrams
(k) Utility/Regional Switching Guides
(l) Request for Outage/Switching Procedures
(m) Geographical distribution system maps
(n) Automated Mapping & Facilities Management (AM/FM) or Graphical Information Systems (GIS) on-screen system maps

(2) Knowledge Required to Accomplish Task:
(a) Utility/Regional Clearance Policies
(b) Electrical Theory
(c) Interconnected Operations
(d) SCADA/DAS Operation
(e) Switching Device Capabilities & Limitations
(f) System Characteristics
(g) Voltage and VAR Control
(h) Security/Load Flow Analysis
(i) Characteristics of Underground Distribution
(j) Sectionalizing
(k) Phasing and Phase Rotation
(l) Communications Systems
(m) Grounding Procedures
(n) Written/Verbal Communication Skills
(o) Knowledge of Safety Rules
(p) Utility/Regional Clearance/Tagging Procedures
(q) AM/FM or GIS System Functions
(r) Electric Safety Codes

(3) Tasks:
(a) Direct Personnel in Operating Switching Equipment
(b) Record Switch/Equipment Operations
(c) Operate Remote Controlled Devices Via SCADA/DAS
(d) Communicate Accurate Equipment Clearances
(e) Utilize Operating One Line Diagrams
(f) Monitor & Analyze System Status
(g) Develop/Review Switching Procedures
(h) Utilize Geographical System Maps
(i) Operate AM/FM or GIS System

E. LINE LOADING

a) Objective: To Transfer energy reliably and economically

(1) Tools:
(a) Substation/Line Equipment
(b) SCADA System
(c) Voltage & VAR Control
(d) Interruptible Loads
(e) Interconnected Transaction Agreements
(f) Communication Systems
(g) Regional Operating Guides & Procedures
(h) Generation

(2) Knowledge Required to Accomplish Task:
(a) Line Loading Capabilities & Limitations
(b) Economics (Line Loss %)
(c) System Characteristics
(d) Electrical Theory
(e) Regional/Utility Operating Guides & Procedures
(f) Transfer Limits
(g) Power Transfer Distribution Factors (PTDF's)
(h) SCADA/EMS/DAS Operation

(3) Tasks:
(a) Monitor and Analyze System
(b) Record Keeping
(c) Remote Control Switching
(d) Direct Personnel Switching
(e) Adjust Interchange Schedules
(f) Communicate with Interconnected Systems
(g) Operate Load Management Programs
(h) Operate Substation/Line Equipment

IV. COMPUTER AND COMMUNICATION SYSTEMS:

A) COMPUTER SYSTEMS

a) Objective: To enhance the System Operators ability to accurately and expediently perform their required duties

(1) Tools:
- (a) SCADA/EMS/DAS System
- (b) Computerized Communications
- (c) Regional/Pool system
- (d) Personal Computers/Workstations
- (e) Local Area Networks
- (f) Programmer/Analyst
- (g) Hardware Technicians
- (h) Operating Guides
- (i) AM/FM or GIS System

(2) Knowledge Required to Accomplish Task:
- (a) Operation of Hardware
- (b) Codes (System Access, etc.)
- (c) Computer System Characteristics/Topology
- (d) Capabilities of the Software Applications
- (e) Start-up Procedures
- (f) SCADA/EMS/DAS Operation
- (g) Operation of AM/FM or GIS System

(3) Tasks:
- (a) Initiate the Operation of Specific Applications
- (b) Initiation of Computer Start-up Procedures
- (c) Data Entry/Retrieval
- (d) Data Evaluation
- (e) Monitor Computer Operation
- (f) Apply System Changes to AM/FM or GIS System

B) COMMUNICATION SYSTEMS

a) Objective: To transfer voice or data information between two or more locations.

(1) Tools:
- (a) Public Telephone
- (b) Public Branch Exchange (PBX)
- (c) Carrier
- (d) Leased Circuits
- (e) Operating Procedures
- (f) Technical Support
- (g) Pool/Regional Computer Communication System
- (h) Microwave
- (i) Radio Systems
- (j) Chart Recorders
- (k) Fax Machines
- (l) Fiber Optics
- (m) SCADA/EMS/DAS System
- (n) Very Small Apparature Terminal (VSAT)
- (o) Mobile Cellular Phones and Pagers
- (p) Building/Facilities Security Systems
- (q) Digital or Analog Voice Recorders

(2) Knowledge Required to Accomplish Task:
- (a) Operating Procedures
- (b) Telemetering Points
- (c) Equipment Characteristics
- (d) Utility/Regional Operating Guides
- (e) VHF/UHF Radio Procedures
- (f) Telephone Procedures
- (g) SCADA/EMS/DAS Operation
- (h) Cellular Phone/Pager Operating Procedures
- (i) Facilities Security System Functions/Alarms
- (j) Operation Functions of Voice Recorders

(3) Tasks:
- (a) Initiation of Repairs
- (b) Operate SCADA/EMS/DAS System
- (c) Operate Communication Equipment
- (d) Respond to Alarms
- (e) Monitor Communication System
- (f) Record keeping
- (g) Interpretation of Data
- (h) Monitor Facilities Security Systems
- (i) Operate Voice Recorders

V. INTERPERSONAL COMMUNICATIONS:

A) WRITTEN

a) Objective: To clearly and accurately transfer information between individuals.

(1) Tools:
- (a) Memos/Letters
- (b) Switching Orders
- (c) Logs/Notes
- (d) Regional/Pool Computerized Communications System
- (e) SCADA/EMS/DAS System
- (f) Computers, ie: PC, Workstation
- (g) Typewriters
- (h) Operating Guides
- (i) Basic Reading Skills
- (j) Training Programs

(2) Knowledge Required to Accomplish Task:
- (a) Awareness of Target Readers
- (b) Grammar
- (c) Use of Word Processors
- (d) Utility Document Formats
- (e) Utility Standard Terminology
- (f) Operation of Regional/Pool Computerized Communications System
- (g) SCADA/EMS/DAS Operation
- (h) Typing Skills
- (i) Operating Guides
- (j) Basic Reading Skills
- (k) Utility Correspondence Systems, ie: E-Mail, Interoffice Communications
- (l) Basic Writing Skills

(3) Tasks:
- (a) Typing
- (b) Convey Clear & Accurate Written Instructions/Information
- (c) Verification of Written Information
- (d) Proper Interpretation of Written Information
- (e) Use of Utility Correspondence Systems

B) ORAL

a) Objective: To clearly and accurately communicate information between individuals

(1) Tools:
- (a) UHF/VHF Radio Systems
- (b) Telephone Systems
- (c) Clear Dictation
- (d) Gestures/Expressions
- (e) Multimedia; Tape, Video, Electronic
- (f) Operating Guides
- (g) Training Programs
- (h) Language Interpretation Services

(2) Knowledge Required to Accomplish Task:
- (a) Listening Skills
- (b) Telephone Skills
- (c) UHF/VHF Radio Operating Guides and Regulations
- (d) Operating Guides
- (e) Presentation/Speaking Skills
- (f) Awareness of Audience
- (g) Regional Ethnic Diversity
- (h) Grammar
- (i) Interconnected Standard Terminology
- (j) Industry Standard Terminology

(3) Tasks:
- (a) Convey Clear and Accurate Oral Messages
- (b) Use of Utility Communication systems, ie: Phone & Radio
- (c) Listen
- (d) Interpret Customer Complaint or Concern to Discern Actual Problem
- (e) Obtain Language Interpretive Assistance

C) CRISIS MANAGEMENT

a) Objective: To effectively analyze system needs, prioritize response, and coordinate expedient resolution to simultaneous system, public, or customer problems

(1) Tools:
- (a) Public Telephone
- (b) Public Branch Exchange (PBX)
- (c) Carrier
- (d) Leased Circuits
- (e) Utility/Regional Operating Procedures
- (f) Technical Support Staff
- (g) Regional Computer Communication System
- (h) Microwave
- (i) Radio Systems
- (j) Chart Recorders
- (k) Fax Machines
- (l) SCADA/DAS/EMS System
- (m) Very Small Apparature Terminal (VSAT)
- (n) On-Call Office and Field Personnel
- (o) Stress Management Training

(2) Knowledge Required to Accomplish Task:
- (a) Utility/Regional Operating Procedures
- (b) Telemetering Points
- (c) Equipment Characteristics
- (d) Utility/Regional Operating Guides
- (e) VHF/UHF Radio Procedures
- (f) Telephone Procedures
- (g) SCADA/EMS/DAS Operation
- (h) Procedures/Needs of Public Safety Organizations
- (i) Critical Load/Sites
- (j) Emergency Communication Procedures
- (k) Ability to Identify Critical Needs
- (l) Environmental Regulations and Procedures

(3) Tasks:
(a) Initiation of Repairs
(b) Operate SCADA/EMS/DAS System
(c) Operate Communication Equipment
(d) Respond to Alarms
(e) Monitor Communication System
(f) Record Keeping
(g) Interpretation of Data
(h) Instruct Public Safety Personnel
(i) Coordinate Resolution of System Problems
(j) Prioritize Responses

VI. MARKETING:

A) ENERGY TRANSACTIONS

a) Objective: To sell or purchase energy with other parties

(1) Tools:
(a) Telephone/Pagers
(b) Internet/E-mail
(c) Fax
(d) Computer
(e) E-mail
(f) Trading Systems
(g) Trading Hubs (options)
(h) Contracts
(i) Enabling agreements
(j) Credit arrangements
(k) Transmission agreements
(l) Weather/load information
(m) Generation
(n) Risk management

(2) Knowledge Required to Accomplish Task:
(a) Contacts/Communications
(b) Arranging transactions
(c) Pricing parameters
(d) Costs
(e) Tagging
(f) Confirmation of agreements
(g) Schedule types
(h) Timing requirements
(i) Transmission reservations
(j) Regional/Utility/NAERO operating guides
(k) Curtailment

(3) Tasks:
(a) Purchase energy to cover a system load or for resale
(b) Sale of excess energy
(c) Secure transmission for energy receipt
(d) Account for losses on energy transactions
(e) Contract energy agreements, long, short, and mid-term
(f) Transaction tagging
(g) Record keeping
(h) Schedule reporting

B) TRANSMISSION TRANSACTIONS

a) Objective: To secure transmission rights for the delivery and receipt Of energy

(1) Tools:
- (a) Internet
- (b) Transmission reservation systems
- (c) Transmission Tariff agreements
- (d) Regional membership
- (e) Line loading relief
- (f) Regional communication systems
- (g) Telephone
- (h) Email/internet
- (i) Fax
- (j) Computers

(2) Knowledge Required to Accomplish Task:
- (a) Reservation process
- (b) Timing requirements
- (c) Tariffs
- (d) Transmission system losses
- (e) Transmission types and duration
- (f) Ancillary services
- (g) Available transfer capability (ATC)
- (h) Rates
- (i) Transmission owners/users
- (j) FERC order 889
- (k) NAERO tagging systems

(3) Tasks:
- (a) Reserving transmission
- (b) Combining Regional and individual tariffs
- (c) LLR/TLR Schedule curtailment
- (d) Reporting
- (e) Verify approval of transmission requests
- (f) Standards of conduct
- (g) Process NAERO tags