

Contents

Technical Reference Notice of Disclaimer	iii
List of Figures	viii
List of Tables	ix
1 Introduction	
1.1 Purpose And Scope	1-1
1.2 Organization	1-2
1.3 Requirements Terminology	1-2
1.4 Reason for Reissue	1-3
2 General Information	
2.1 Requirement Heading Marked With “*”	2-1
2.2 Requirement Heading Marked With “†”	2-1
2.3 Power Plant Analysis and Requirement Verification	2-1
2.4 Instrumentation Characteristics for Power Plant Analysis	2-2
3 Selecting Power Plants and Its Elements	
3.1 Information for Selecting the Plant	3-1
3.2 Battery Requirements	3-1
3.2.1 *Flooded Lead-Acid Battery	3-1
3.3 *Rectifier Characteristics	3-2
3.3.1 Rectifier AC Input	3-2
3.4 *AC Input Voltage Limits	3-2
4 Plant Electrical, Distribution, Status & Alarms, and Controls	
4.1 Power Plant Electrical, Voltage, Charge and Discharge Buses	4-1
4.1.1 *Plant Voltage and Regulation	4-1
4.1.2 *Charge and Discharge Buses†	4-2
4.1.3 *Charge and Discharge Bus Overcurrent Protection and Disconnect	4-3
4.1.4 *Electrical Noise	4-4
4.1.5 *Electromagnetic Interference (EMI)†	4-5
4.1.6 *Electrostatic Discharge (ESD)†	4-5
4.1.7 *Electrical Isolation	4-5
4.1.8 *Withstand Surge Capability	4-6
4.1.9 *Frame Current	4-7
4.1.10 Efficiency	4-7
4.1.11 *Transient Limits	4-7
4.1.12 Low Voltage Disconnect and Minimum Plant Voltage	4-8
4.2 DC Distribution and Protection	4-9
4.2.1 Secondary Distribution	4-9
4.3 Definitions of Status Indicators and Alarms	4-10

4.3.1	*Status Indication and Alarm Outputs	4-10
4.3.2	*Powering of Visual Alarm & Status Indicator	4-12
4.3.3	Visual Alarm Color Codes	4-12
4.3.4	*Battery Plant Alarms	4-13
4.4	Control Subsystem Requirements	4-14
4.4.1	*Measurement Requirements	4-15
4.4.2	*High dc Voltage Limits and Control Functions	4-15
4.4.3	*Battery On Discharge	4-16
4.4.4	*Remote Rectifier Shutdown	4-16
4.4.5	*Rectifier Auto-Restart	4-17
4.4.6	*Control Subsystem Powering	4-17
4.4.7	*Control Subsystem Modular Design†	4-18
4.4.8	Feeder Current Measurement	4-18
4.4.9	Alarm Cut-Off Device	4-19

5 Physical

5.1	*Mounting Arrangements	5-1
5.2	*Grounding	5-1
5.3	*Modularity	5-1
5.4	*Mechanical and Physical Shock	5-2
5.5	*Earthquake	5-2
5.6	*Weight	5-2
5.7	*Thermal†	5-2
5.8	Materials	5-3
5.9	Handling	5-3
5.10	Instruments	5-3
5.11	Paint	5-4

6 Components

6.1	*Transformers and Magnetic Coils†	6-1
6.2	*Hook-Up Wire†	6-2
6.3	*Power Conductors†	6-3
6.4	*Hardware Electrical and Mechanical†	6-4
6.5	*Electrical Power Wire Terminations†	6-5
6.6	*Resistors†	6-5
6.7	*Electrolytic Capacitors†	6-6
6.8	*Capacitors, Non-Electrolytic†	6-7
6.9	*Semiconductors†	6-7
6.10	*Circuit Breakers†	6-8
6.11	*Fuses†	6-8
6.12	*Meters†	6-9
6.13	*Relays†	6-9
6.14	*Switches†	6-9
6.15	*Printed Wire Boards†	6-11

7 Environmental, Safety and Miscellaneous

7.1 *Operating Environment†	7-1
7.2 *Fire Resistance†	7-1
7.3 *Shipping Temperature and Humidity†	7-1
7.4 *Acoustical Noise†	7-2
7.5 *Safety and Hazards†	7-2
7.6 *Documents†	7-2
7.7 *Toxic Materials†	7-3
7.8 *Marking of Components†	7-3
7.9 *Sparing†	7-4
7.10 *Nameplate†	7-4
7.11 Life and Reliability	7-5

Appendix A: References

Requirement-Object Index

List of Figures

Figure 1-1	Central Office Power Plant - Block Diagram	1-3
Figure 4-1	Charge-Discharge Buses and Overcurrent Protection Loop and Battery Voltages	4-19
Figure 4-2	Charge-Discharge Buses and Protection	4-20
Figure 4-3	Simulated Withstand Surge Waveforms	4-21
Figure 4-4	Status Indication and Alarm	4-22
Figure 4-5	Control	4-23

List of Tables

Table 4-1	Battery Plant Alarms	4-13
Table 4-2	High dc Voltage Alarm – Typical Voltage Range	4-14