ORDER

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

6950.2D

10/1/98

SUBJ: ELECTRICAL POWER POLICY IMPLEMENTATION AT NATIONAL AIRSPACE SYSTEM FACILITIES.

1. **PURPOSE**. This order provides guidance for electrical power policy implementation at the National Airspace System Facilities (NAS) in accordance with the latest version of Order 6030.20, Electrical Power Policy. This order identifies standard electrical power configurations to ensure NAS facility availability commensurate with its assigned mission.

2. **DISTRIBUTION.** This order is distributed to the division level in the Airway Facilities; Office of Communication, Navigation, and Surveillance Systems; Office of System Architecture and Investment Analysis; and Office of Acquisitions in Washington; to division level in the FAA Logistics Center and the FAA Academy at the Aeronautical Center; to the division level in the Office of Communication, Navigation, and Surveillance Engineering and Test Division at the Technical Center; to the branch level in the regional Airway Facilities divisions; and to all Airway Facilities field offices with a standard distribution.

3. **CANCELLATION**. Order 6950.2C, Electrical Power Policy Implementation at National Airspace System Facilities, dated November 16, 1987, is canceled.

4. **BACKGROUND**. The modernization of the NAS and revisions to the Electrical Power Policy created the need to revise this implementation order.

5. **EXPLANATION OF CHANGES.**

a. Extensive revisions to this order have been performed to comply with Public Law 104-113, H.R. 2196, the National Technology Transfer and Advancement Act of 1996, and to modernize outdated requirements contained in the existing order.

b. Specific changes have been made to incorporate sensitive electronic power requirements, especially in the power quality area. Appendix 1, Facility Power Source Codes, has been revised to reflect the current facility types. Also, appendix 1 has been divided into two sections - Part A - General National Airspace System (GNAS) and Part B - Air Route Traffic Control Center (ARTCC). Appendix 2, Current Distortion Guidelines, has been added to provide guidance for individual system/equipment harmonic assessment. Appendix 3, Power Criteria, has been added to give a description of the general power quality to be provided to mission related electronic equipment.

Distribution: A-W(AF/ND/SD/SU)-3; A-X(AF)-3; A-Y(ML/MA)-2; A-Z(ACT-300, 3 Copies); A-FAF-0 (STD)

Initiated By: ANS-600

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6. **APPLICATION.** This order applies to all Federal Aviation Administration (FAA) NAS facilities without regard to maintenance and operational responsibility. The guidance and electrical power configurations identified by this order shall be used by the responsible organizations in establishing configuration requirements for FAA and non-FAA owned facilities. Those facilities solely for military or private use are exempted from this order. Standby power requirements for non-FAA airport lighting systems are identified in Advisory Circular 150/5340-17B, Standby Power for Non-FAA Airport Lighting Systems.

7. **RESPONSIBILITIES.**

a. NAS Transition and Integration (ANS) will issue technical standards and guidance to implement the power configurations necessary to meet requirements of this order and Order 6030.20.

b. Regional Airway Facilities divisions shall periodically review the performance of facility power systems and recommend changes consistent with operational requirements.

c. The appropriate program office or Integrated Product Team shall identify and budget for the power requirements of new facility types during the development process. The NAS Infrastructure Power Systems (NIPS) Product Team shall identify and budget for sustained power support programs required by the latest version of Federal Aviation Administration Acquisition Management System (AMS).

8. **GENERAL GUIDANCE.**

a. For definitions of facility types and services and facility contractions listed in appendix 1, of this order, use the latest version of Order 6000.5, Facility, Service, and Equipment Profile. Where contractions are not contained in Order 6000.5, they will be identified in the latest version of Order 1380.40, Airway Facilities Sector Level Staffing Standard System, Appendix 1, Facility Types, Contractions, and Definitions and the latest version of Order 1375.4, Standard Data Elements and Codes - Facility Identification and Supplemental Standards.

b. Appendix 1, of this order, identifies the standard power configuration which is effective upon issuance of the order. In many cases these standards will differ from present facility installations due to facility and equipment replacement programs or changes to operational service requirements. Changes to standard configurations in this order do not in themselves provide authority or desirability for change from the present configuration. Transition to new standards shall be accomplished under approved projects through normal budgetary actions. Deviations from the configurations in appendix 1 of this order or changes to baseline configurations shall be requested through the NAS Change Proposal (NCP) process in accordance with the latest version of Order 1800.8, National Airspace System Configuration Management, for all new facility or equipment installations. NCPs are not required for present installations which deviate from these standard configurations provided they are in conformance with prior standards and meet the operational requirements of the facility.

c. The Power Source Codes listed in appendix 1, of this order, are defined in Order 6000.5, Appendix 3, Special Use Facilities Master File Reporting Codes, and are further described as follows:

(1) A - denotes a commercial power source, a standby engine generator and an Uninterruptible Power Supply (UPS). This configuration shall provide uninterruptible, conditioned power with AC voltage in and AC voltage out.

(2) D - denotes a commercial power source and a battery standby power system. A UPS is not included in this category.

(3) V - denotes a photovoltaic or wind generator with a battery system.

(4) Z - denotes a single source of power continuously generated by an independent generating device; e.g., thermoelectric, prime power engine generator, nuclear, fuel cell, etc.

(5) 1 - denotes a commercial power source and a standby engine generator.

(6) 4 - denotes a single source of power.

(7) 8 - denotes dual, independent sources of commercial power; i.e., two separate substations.

d. For an airport identified as a Continuous Power Airport (CPA), as defined in Order 6030.20, only the facilities associated with the operation of the one designated CPA runway shall be configured with CPA facility power service levels indicated in appendix 1 of this order.

e. Where specified, power equipment used for support of Category II and III operations shall be capable of transferring to an alternate source within 1 second. The 1-second transfer time can be obtained by powering the facility with the engine generator during the Category II or III conditions and using commercial power as the standby source. Should the engine generator fail, the facility load will automatically transfer back to commercial power within the required 1-second transfer time. Once the Category II or III conditions have subsided, the facility shall be returned to the commercial (primary) power source.

f. Appendix 1, of this order, indicates the standard power service for each facility type. In some instances, an alternate configuration may satisfy facility requirements more cost-effectively. Requests for the following alternate configurations shall be accomplished through the NCP process:

(1) Power Source Code V may be used in place of Codes 4, 1, and D where reliability and life cycle cost considerations are favorable compared with engine generator systems or the installation and costs of primary commercial power. Battery reserve power for these systems should be sized for a minimum of 4 hours service based on the worst case environmental conditions for the particular facility location.

(2) Power Source Code Z may be used in place of Code 4 where reliability and life cycle cost considerations are favorable compared with the installation and costs of primary commercial power.

(3) Power Source Code D should be used in lieu of Code 1 when equipment upgrade allows facility's operational requirements to be satisfied by a battery standby power system.

g. Facilities with standby power systems, capable of being remotely monitored, should monitor the status of commercial power and standby power systems.

h. FAA facilities with standby power systems authorized by appendix 1, of this order, which are owned and operated by a non-FAA authority, must meet the requirements of the latest version of Order 6950.11, Reduce Electrical Power Interruptions at FAA Facilities.

9. **TECHNICAL GUIDANCE.**

a. Electrical power characteristics of the power provided to electronics equipment shall meet the conditions defined in appendix 3 of this order. Should the electrical power characteristics deviate from appendix 3 requirements, refer to the latest version of Order 6950.25, Use of Electrical Power Conditioning Devices at FAA Facilities, for corrective actions.

b. The quality of electrical power provided shall be of the reliability, availability, and voltage and frequency standards required for the facility. VOLTAGE Total Harmonic Distortion (THD) shall not exceed 5% THD or 3% HD for any single harmonic. These limits shall apply at the service entrance only. These limits are goals at all other facility voltage bus locations. Distortion exceeding these limits, including at the engine generator output, should be evaluated by personnel, who are competent in the technical power quality discipline, for adverse impact to equipment and power distribution system. For CURRENT distortion considerations, refer to paragraph 9j(5).

c. Specific requirements for various power services are as follows:

(1) Facilities which utilize a standby engine generator, Power Source Code 1, shall provide standby power within 15 seconds of a failure of the prime power source and shall be capable of sustained operation. ARTCC facilities using Power Source Code 1, will be provided standby power service as defined in the latest version of Order 6470.5, Maintenance of ARTCCs.

(a) In general, a 72 hour fuel supply shall be maintained. A reduced fuel supply may be maintained at locations where fuel is readily available and delivery agreements are in place; e.g., major airports and where fuel volume is continuously monitored. At facilities with difficult access, fuel supplies shall be determined on a site-by-site basis. In all cases, fuel supplies shall be based on actual engine generator loading, not on maximum engine fuel consumption rates.

(b) Facilities with pipeline-fed standby engine generators do not require stored fuel supplies, with the exception of facilities located in areas subject to pipeline failures. At these locations, fuel supplies shall be established on a site-by-site basis.

(c) Closed transition switching; e.g., Uninterruptible Power Transfer (UPT), shall be installed where justified by operational requirements, after coordination with the electric utility.

(2) Facilities which utilize a battery standby power system, Power Source Code D, shall provide standby power immediately (without interruption) upon failure of the prime power source and shall be capable of sustained operation for a minimum of 4 hours at the lowest normal operating temperature of the facility, usually the inside ambient temperature.

(a) A permanently wired means of connection with an appropriate transfer switch may be provided to permit a safe and accurate means to connect and disconnect an external generator to the facility's electrical system to permit recharge of the batteries in the event of a prolonged prime power outage.

(b) The battery system outputs shall be in multiples of 12 volts; e.g., 12, 24, 36, 48 volts and be sized for the systems served.

d. Facilities which utilize a dual source (Power Source Code 8) shall provide transfer from source to source within a maximum of 15 seconds.

e. Site generated power systems (Power Source Code V and Z) shall be established to provide continuous power without required on-site maintenance activity more frequent than the normal facility preventive maintenance schedule.

f. Agency owned prime engine generator power systems shall only be utilized where no other source of power is available or where the expense of other sources of power would exceed that of establishing and operating such a system. The system shall consist of at least two engine generators specifically designed for continuous operations, and shall have either automatic transfer switches designed in accordance with agency standards or 24-hour attendance.

g. Where system/equipments or subsidiary components are co-located at a facility or shelter and different power configurations are required by appendix 1, of this order, or where "same as host facility" appears in appendix 1, the following criteria shall be used, provided that power quality, capacity, and availability are not degraded:

(1) Where engine generator standby power is available, equipment, systems and components may be configured to Power Source Code 1. Standby battery systems connected to engine generators are not required to have the minimum 4-hour battery reserve.

(2) At facilities where batteries are the primary source of standby power, new equipment that has requirements for standby power may be reconfigured to Power Source Code D.

(3) At facilities with Power Source Code A, only systems/equipments designated as Power Source Code A in appendix 1, of this order, shall be allowed on the output of the facility UPS.

h. Power distribution systems shall be in accordance with FAA orders and specifications and with applicable national and local codes.

i. Power conditioning devices, not addressed by the power source codes in appendix 1, of this order, may be required at some facilities to provide a stable regulated power source. Each installation shall be separately justified, in accordance with the requirements of Order 6950.25. Prior to the installation of a power conditioning device to power specific loads in an existing facility, the following analyses shall be obtained:

(1) An analysis of the existing electronic equipment load characteristics to establish power consumption, current harmonics, inrush current profile, power factor, etc.

(2) An analysis to insure compatibility between the equipment load analysis obtained and the proposed power conditioning device.

(3) An analysis of the impact of the proposed power conditioning device on its source and the rest of the facility; e.g., voltage regulation, harmonic distortion, inrush currents and transient generation, resulting from powering the equipment load.

(4) On a study conducted in accordance with the latest version of Order 6950.27, Short Circuit Analysis and Protective Device Coordination Study (SCA/PDC).

(5) An analysis of the potential to introduce or worsen a "single point of failure" and the subsequent impact to the NAS.

j. Before connecting any equipment to a power bus/system, the following criteria must be satisfied:

(1) The equipment shall be operated and maintained in accordance with established FAA practices. For leased equipment that will be operated or maintained by a contractor, the contract shall require the equipment to be operated and maintained in accordance with FAA practices. Maintenance records and equipment shall be available at each leased equipment location for review and technical evaluation by designated FAA personnel. Equipment shall be tested until the FAA is assured it is compatible with the system from which it will be powered. Testing shall not be performed on a critical power system or on the output of a Power Source Code A system, unless there is an UPS specifically provided for testing purposes. All testing shall be completed and approved prior to the equipment being connected in an operational environment. At no time shall any equipment be connected to an existing facility's power system if it adversely affects the operation or performance of other equipment.

(2) The power required by the equipment must be analyzed to insure that the facility power system does not become overloaded or unbalanced.

(3) Peak inrush current and current THD of electronic equipment shall not exceed the limits specified in Specification FAA-G-2100, Electronic Equipment, General Requirements. All other loads shall have a peak inrush current characteristic that will not cause power anomalies detrimental to the facility operation, nuisance over-current device operation, or operational problems with the source.

(4) Power factor at the service entrance shall be within 0.8 lagging to 1.0 or as required by the local utility contract. Power factor at the engine generator output shall be 0.8 lagging to 1.0. Power factor at all other locations shall be considered with regard to energy conservation and performance of power sources and power conditioners. The total power factor is the product of the displacement power factor and the distortion power factor, $PF_{TOT} = (PF_{disp})(PF_{dist})$.

(5) The impact to the bus of the CURRENT THD of each electronic equipment/ system and environmental equipment/system (such as air conditioners, lighting, UPS, etc.) shall be considered when connecting to a bus. The curve in the graph, Current Distortion as a Function of System Load, in appendix 2 shall be used as a guideline to indicate when current distortion mitigation may be necessary to prevent the connection of high harmonic generative loads that will affect the VOLTAGE THD and thus, the power budget of the facility. When the distortion exceeds the curve for the specific load, an evaluation/analysis shall be performed by personnel, who are competent in the technical power quality discipline, to insure that there are no adverse impacts to equipment operation or the power distribution system.

10. **SPECIAL CONSIDERATIONS.** At some facilities, special situations may dictate a power configuration different from that described in paragraph 8 and assigned in appendix 1. Some of the special situations are discussed below:

a. **Meteorological.** A facility located in an area with a history of electrical, ice, or wind storms, which have caused abnormally frequent prime power disruptions and/or excessively long outages, may qualify for a higher grade power configuration if such disruptions cannot be tolerated.

b. **Accessibility**. A facility located in a remote area where a prime power outage is likely to be of a duration incompatible with operating requirements, and could result in excessive exposure of maintenance personnel to hazards, may qualify for a higher grade power configuration.

c. **Defense Readiness**. In some cases, the requirement to maintain an effective defense readiness posture differs from the normal operational requirement.

d. **Military Requirements**. A higher grade power configuration may be necessary due to specific military requirements.

e. **Power Quality**. A facility located in an area of poor utility power quality, that would adversely affect facility operation.

11. **IMPLEMENTATION**. All commissioned facilities shall be provided with power that is within the prescribed limits established by the facility standards and this order.

a. New installations shall be configured in accordance with this order.

b. An exception to the standard configuration identified by facility standards and this order shall be separately justified in accordance with paragraph 8b when a retention, establishment, modification or improvement project is proposed.

c. Changes to the power system or the installation of new equipment requires the accomplishment or update of short circuit analysis and protective device coordination studies in accordance with FAA-STD-032, Design Standards for National Airspace System Physical Facilities, and Order 6950.27.

Stanley Rivers

Stanley Rivers
Director of Airway Facilities

APPENDIX 1. PART A, FACILITY POWER SOURCE CODES: GNAS

FACILITY TYPE	DEFINITION	POWER SOURCE CODE	COMMENTS
AFSS	Automated Flight Service Station	1	
ALS	Approach Lighting System	4 (CAT I) 1 (CAT II/III) 1 (CPA)	CAT II/III requires 1 sec. transfer
ARMS	Airport Remote Monitoring System	D	
ARSR	Air Route Surveillance Radar	1	
ARTS - II	Automated Radar Terminal System	1	
ARTS - III	Automated Radar Terminal System	A	
ASDE	Airport Surface Detection Equipment	A	Includes Antenna, but not heater
ASI	Altimeter Setting Indicator		same as host facility
ASOS	Automated Surface Observation System	4	
ASR	Airport Surveillance Radar	1	
ATCBI	Air Traffic Control Beacon Interrogator	1	
ATCRB	Air Traffic Control Radar Beacon	1	
ATCT (As defined by Order 6480.7)	Airport Traffic Control Tower	4 (Low and Intermediate activity with non-radar approach control) 1 (Low and intermediate activity with radar approach control, major activity)	"critical services" (per Order 6480.7)=D "critical services" (per Order 6480.7)=1
ATIS	Automatic Terminal Information System		same as host facility
AWANS	Aviation Weather and NOTAM System	4	

Power Source Code Definitions:
A = Commercial Power + Engine Generator + UPS
D = Commercial Power + Batteries
V = Photovoltaic/Wind Generator + Battery
Z = Independent Generation
1 = Commercial Power + Engine Generator
4 = Commercial Power
8 = Dual Independent Commercial Power

APPENDIX 1. PART A, FACILITY POWER SOURCE CODES: GNAS (CONTINUED)

FACILITY TYPE	DEFINITION	POWER SOURCE CODE	COMMENTS
AWIS	Airport Weather and Information System		same as host facility
AWOS	Automated Weather Observation System	4	
BDIS - Class A	Automatic Interchange Service B - Solid State	A	
BRITE	Brite Radar Indicator Terminal Equipment		same as host facility
BUEC	Back-up Emergency Communications	D	
CCMS	Central Control Monitoring System	A	"CPU only"
CCTV	Closed Circuit TV	4	
CD	Common Digitizer	1	
CERAP	Combined Center/Rapcon	1	
CFCC	Central Flow Control Computer	A	
CMLT	Communication Microwave Link Terminal	1	
COMCO	Command Communication Outlet	1	
DASI	Digital Altimeter Setting Indicator		same as host facility
DF	Direction Finder	4	
DFI	Direction Finder Indicator		same as host facility
DME	Distance Measuring Equipment		same as host facility
DMUX	Data Multiplex		same as host facility
EARTS	En Route Automated Radar Tracking System	A	
EOF	Emergency Operation Facility	1	
ERMS	Environmental Remote Monitoring System	TBD	

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APPENDIX 1. PART A, FACILITY POWER SOURCE CODES: GNAS (CONTINUED)

FACILITY TYPE	DEFINITION	POWER SOURCE CODE	COMMENTS
ETVS	Enhanced Terminal Voice Switching	TBD	
FCPU	Facility Central Processor Unit		same as host facility
FDEP	Flight Data Entry and Printout Equipment		same as host facility
FDIOR	Flight Data Input/Output Remote		same as host facility
FFM	ILS Far Field Monitor	D	
FLP	Field Lighting Panel		same as host facility
FM	Fan Marker	D	
FOTS	Fiber Optic Transmission System		same as host facility
FSDPS	Flight Service Data Processing System	A	
FSS	Flight Service Station	4	
GATR	Ground/Air Transmitter/Receiver	D	
GDL	Guidance Light Facility	4	
GMMS	GNAS Maintenance Control Center	1	
GOES	Geostationary Operational Environmental Satellite System		same as host facility
GS	Glide Slope		same as LOC
GWDS	Graphics Weather Display System		same as host facility
HCVR	High Capacity Voice Recorder	A	
ICSS	Integrated Communications Switching System	A (AFSS, TRACONS With ARTS III) Other	 same as host facility
IM	Inner Marker	D	
LCOT	UHF/VHF Link Terminal	4	

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APPENDIX 1. PART A, FACILITY POWER SOURCE CODES: GNAS (CONTINUED)

FACILITY TYPE	DEFINITION	POWER SOURCE CODE	COMMENTS
LDA	Localizer Directional Aid	D	
LDIN	Lead in Light Facility	4	
LFDS	Large Facility Demarcation System	A	same as host facility
LINCS	Leased Interfacility NAS Communications System		same as host facility
LLWAS	Low-Level Wind Shear Alert System	D (sensor) Central/Display Equipment	same are host facility
LMM	Compass Locator at the ILS Middle Marker	D	
LNKR	Link Repeater	4	
LOC	Localizer	D 1 (CPA)	
LOM	Compass Locator at the ILS Outer Marker	D	
LRNCM	Long Range Navigation C Monitor		same as host facility
MALS; MALSR	Medium Intensity Approach Lighting System; Medium Intensity ALS (MALS) with Runway Alignment Indicator Lights	4 (CAT I) 1 (CPA)	
MAPS	Meteorological and Aeronautical Presentation System	4	
MCC	Maintenance Control Center	1	
MCR	Multichannel Recorder		same as host facility
MLS	Microwave Landing System	D	
MM	Middle Marker	D	
Mode S	Mode Select Beacon System	1	
MTI Reflector	Moving Target Indicator - Reflector	V	

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APPENDIX 1. PART A, FACILITY POWER SOURCE CODES: GNAS (CONTINUED)

FACILITY TYPE	DEFINITION	POWER SOURCE CODE	COMMENTS
NDB	Non-Directional Beacon	4	
NRCS (NARACS)	National Radio Communications System	1 (National Emergency Operating Facilities)	
NXRAD (NEXRAD)	Next Generation Weather Radar	1	
OASIS	Operational And Supportability Implementation System	TBD	
OCC	Operational Control Center	TBD	
ODALS	Omnidirectional Airport Lighting System	4	
OM	Outer Marker	D	
PAPI	Precision Approach Path Indicator	4	
PRM	Precision Runway Monitor	1	
RBC	Rotating Beam Ceilometer	4	
RCAG	Remote Center Air/Ground	D 1 with AC Linear Power Amplifier (LPA)	
RCE	Radio Control Equipment		same as host facility
RCIU	Remote Control Interface Unit		same as host facility
RCLR	Radio Communications Link Repeater	D (Single Path) 1 (Dual/Triple Path)	
RCLT	Radio Communications Link Terminal		same as host facility
RCO	Remote Communications Outlet	4	
RDVS	Rapid Deployment Voice Switch		same as host facility

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APPENDIX 1. PART A, FACILITY POWER SOURCE CODES: GNAS (CONTINUED)

FACILITY TYPE	DEFINITION	POWER SOURCE CODE	COMMENTS
REIL	Runway End Indentification Lights	4	
RMCC	Remote Monitor Control Center		same as host facility
RMCF	Remote Monitor Control Facility		same as host facility
RMLR	Radar Microwave Link Repeater	1 (single Long Range (LRR) Path) A (dual/triple LRR path)	
RMLT	Radar Microwave Link Terminal		same as host facility
RMVC	Remote Maintenance VORTAC Concentrator		same as host facility
RRH	Remote Readout Hygrothermometers	4	
RRCS	Remote Radio Control System		same as host facility
RTR	Remote Transmitter/Receiver	D	
RVR	Runway Visual Range	4 (CAT I) 1 (CAT II (TD)) 1 (CAT III) (TD, MP, RO) 1 (CPA (TD)) D (Type 347AH (TD,MP,RO)	 RO, MP = 4 RO, MP =4

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APPENDIX 1. PART A, FACILITY POWER SOURCE CODES: GNAS (CONTINUED)

FACILITY TYPE	DEFINITION	POWER SOURCE CODE	COMMENTS
SALS, SSALR, SSALS	Shortened Approach Light System Simplified Short Approach Lighting System with Runway Alignment Indicator Lights Simplified Short Approach Light System	4 (CAT I) 1 (CPA)	
SCC	Systems Command Center	1	
SCIP	Surveillance and Communications Interface Processor		same as host facility
STARS	Standard Terminal Automation Replacement System	1 (ARTS II Replacement) A (ARTS III Replacement)	
STVSS	Small Tower Voice Switching System		same as host facility
TACAN	Tactical Air Navigation	1	
TCCC	Tower Control Computer Complex		same as host facility
TCS	Tower Communications System		same as host facility
TDWR	Terminal Doppler Weather Radar	1	
TMCC	Traffic Management Computer Complex		same as host facility
TMLI	Television Microwave Link Indicator		same as host facility
TMLR	Television Microwave Link Repeater		same as host facility
TMLT	Television Microwave Link Terminal		same as host facility
TMU	Traffic Management Unit	A	

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APPENDIX 1. PART A, FACILITY POWER SOURCE CODES: GNAS (CONTINUED)

FACILITY TYPE	DEFINITION	POWER SOURCE CODE	COMMENTS
TOWB	Tower Building	4 (Low and Intermediate Activity with non-radar approach control) 1 (Low and Intermediate Activity with radar approach control, major activity) 1 (All towers over 65 feet in height (cab floor) with elevator)	
TRACO (TRACON)	Terminal Radar Approach Control Facility	1	
TWEB	Transcribed Weather Broadcast		same as host facility
VASI	Visual Approach Slope Indicator	4	
VOR	Very High Frequency Omnidirectional Range	D	
VOT	VHF Omnidirectional Range Test	4	
VSCS	Voice Switching and Control System		Same as host facility
WAAS	Wide Area Augmentation System	TBD	

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APPENDIX 1. PART B, FACILITY POWER SOURCE CODES: ARTCC

FACILITY TYPE	DEFINITION	POWER SOURCE CODE	COMMENTS
ACCC	Area Control Computer Complex	A	
ADAS	AWOS Data Acquisition System	A	
AMCC	ARTCC Maintenance Control Center	A	
ARTCC	Air Route Traffic Control Center	A	
AWP	Aviation Weather Processor	A	
BUEC	Back-up Emergency Communications	A	
CCCH	Central Computer Complex Host	A	
CCMS	Central Computer Monitoring System	A	"CPU only"
CCTV	Closed Circuit TV	1	
CDC	Computer Display Channel	A	
CFCC	Central Flow Control Computer	A	
CHILR	Chiller System	1	
CTRB	Center Building	1	
CTS	Coded Time Source	A	
CUE	Computer Update Equipment	A	
CWP	Central Weather Processor	A	
DARC	Direct Access Radar Channel	A	
DCC	Display Channel Complex	A	
DCCR	Display Channel Complex Replacement	A	
DLP	Data Link Processor	A	
DMN	Data Multiplexing Network	A	
DMUX	Data Multiplexer	A	
DRG	Data Receiver Group	A	
DSR	Display System Replacement	A	
DSRCE	Down Scoped Radio Control Equipment	A	
DYSIM	Dynamic Simulator	A	
DVRS	Digital Voice Recording System	A	

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APPENDIX 1. PART B, FACILITY POWER SOURCE CODES: ARTCC (CONTINUED)

FACILITY TYPE	DEFINITION	POWER SOURCE CODE	COMMENTS
EARTS	En Route Automated Radar Tracking System	A	
EOF	Emergency Operation Facility	1	
ERMS	Environmental Remote Monitoring System	TBD	
FAATSAT	FAA Telecommunications Satellite	TBD	
FAB	Center Fan and Blower System	1	
FDEP	Flight Data Entry and Printout Equipment	A	
FDIOC	Flight Data Input/Output Center	A	
FOTS	Fiberoptic Transmission System	A	
FSDPS	Flight Service Data Processing System	A	
GOES	Geostationary Operational Environmental Satellite System	A	
HCVR	High Capacity Voice Recorder	A	
LFDS	Large Facility Demarcation System	A	
LINCS	Leased Interfacility NAS Communications System	1	UPS provided by Lesser
MPS	Maintenance Processing System	A	
NADIN	National Airspace Data Interchange Network	A	
NRCS (NARACS)	National Radio Communications System	1	
NXRAD (NEXRAD)	Next Generation Weather Radar	A	
OCC	Operational Control Center	TBD	
PAMRI	Peripheral Adapter Module Replacement Item	A	
RCAG	Remote Center Air/Ground	A	
RCE	Radio Control Equipment	A	
RCIU	Remote Control Interface Unit	A	

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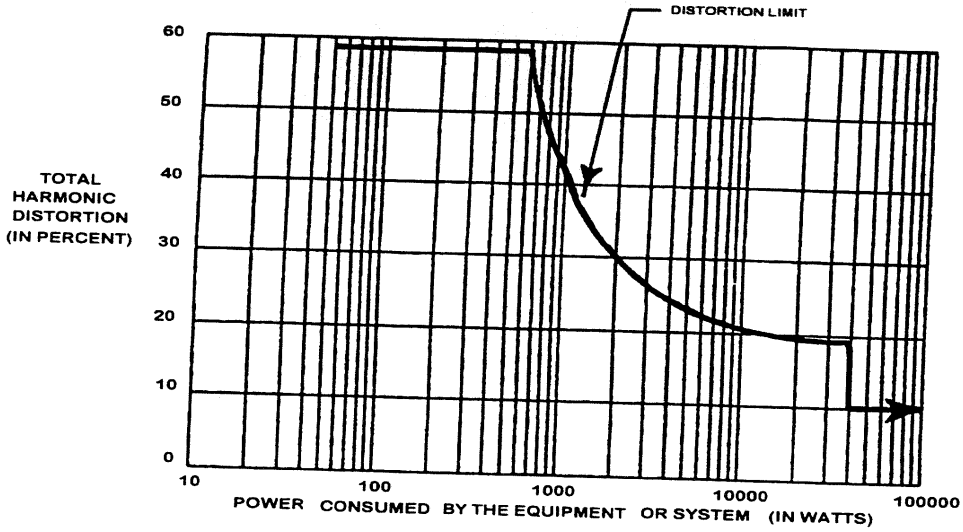
V = Photovoltaic/Wind Generator + Battery
Z = Independent Generation
1 = Commercial Power + Engine Generator
4 = Commercial Power
8 = Dual Independent Commercial Power

APPENDIX 1. PART B, FACILITY POWER SOURCE CODES: ARTCC

FACILITY TYPE	DEFINITION	POWER SOURCE CODE	COMMENTS
RCLT	Radio Communications Link Terminal	A	
RMLT	Radar Microwave Link Terminal	A	
RRWDS	Radar Remote Weather Display System	A	
RMSC	Remote Monitoring Subsystem Concentrator	A	
RUMS	Remote User Monitoring System	1	
TDS	Telecommunications Demarcation System	A	
TMU	Traffic Management Unit	A	
UNCS		1	UPS provided by lessor
VEARS	VSCS Emergency Access Radio System	A	
VSCS	Voice Switching and Control System	A	
VTROL	Center Environmental Control System	1	
VTS	Voice Transmission Switch	A	
WAAS	Wide Area Augmentation System	TBD	
WMSC	Weather Message Switching Center	1	

Power Source Code Definitions:
A = Commercial Power + Engine Generator + UPS
D = Commercial Power + Batteries
V = Photovoltaic/Wind Generator + Battery
Z = Independent Generation
1 = Commercial Power + Engine Generator
4 = Commercial Power
8 = Dual Independent Commercial Power

APPENDIX 2. CURRENT DISTORTION GUIDELINES

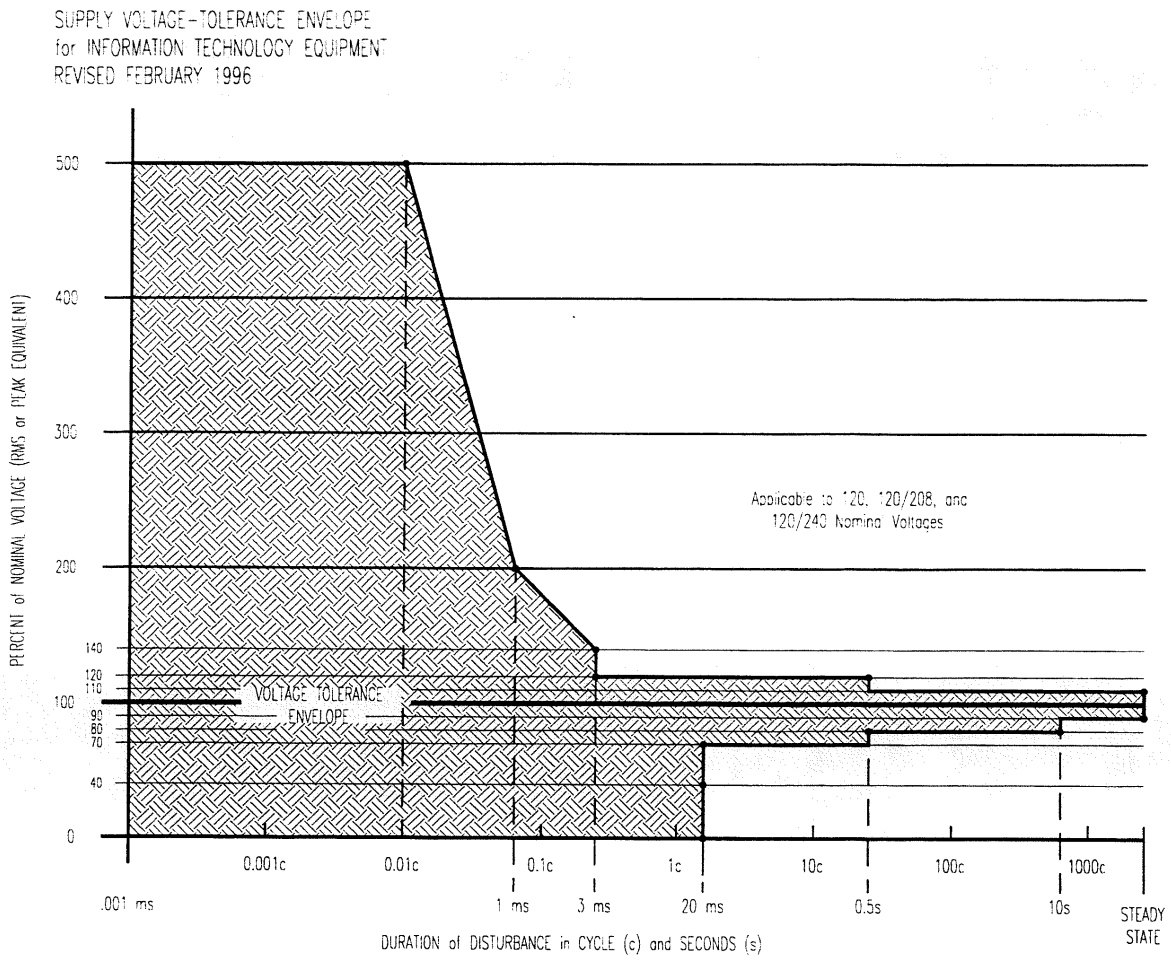


Distortion as a Function of System Load

Current Distortion as a Function of System Load

APPENDIX 3: POWER CRITERIA

GRAPH 1. NEW CBEMA CURVE



ITC granted the FAA permission to reproduce the CBEMA/ITI Curve, revised 2/96.

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APPENDIX 3: POWER CRITERIA (CONTINUE)

TABLE 1. INPUT POWER CHARACTERISTICS

PARAMETERS	RANGES
Voltage Regulation	± 10%
Frequency variation	± 0.5 Hz
Frequency rate of change	1 Hz/sec
3∅ Phase voltage unbalance ±	5%

This table was extracted from specification FAA-G-2100F, Electrical Equipment General Requirements, page 16, paragraph 3.2.1.2.1.

Reference Only Material

.D. NO.	CHG	TITLE	DISTRIBUTION

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