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WASHINGTON DC

DAFMAN32-1062_DAFGM2024-01
14 February 2024

MEMORANDUM FOR DISTRIBUTION C
MAJCOMs/FOAs/DRUs/FLDCOMs

FROM: HQ USAF/A4
1030 Air Force Pentagon
Washington, DC 20330-1030

SUBJECT: Department of the Air Force Guidance Memorandum (DAFGM) to Department of the Air Force Manual (DAFMAN) 32-1062, *Electrical Systems, Power Plants and Generators*

By Order of the Secretary of the Air Force, Air Force Manual (AFMAN) 32-1062, *Electrical Systems, Power Plants and Generators*, is re-designated Department of the Air Force Manual (DAFMAN) and this DAF Guidance Memorandum (DAFGM) immediately implements changes to DAFMAN 32-1062. Compliance with this memorandum and its attachments is mandatory. To the extent its direction is inconsistent with other Department of the Air Force publications, the information herein prevails in accordance with Department of the Air Force Instruction (DAFI) 90-160, *Publications and Forms Management* and Department of the Air Force Manual (DAFMAN) 90-161, *Publishing Processes and Procedures*.

This memorandum grants the National Guard Bureau (NGB) to oversee generator installations for NGB-related purposes, while also streamlining Generator Requests through CE DASH and standardizing Generator Status Reporting via APIMS. It establishes a requirement for BCE approval for all portable generator connection points, extending this approval to generators for facilities listed in Chapter 3 and increases the size limit for portable generators at connection points without authorization for an EAID.

The use of an asterisk (*) identifies a substantive change over the previous guidance. It becomes void after one year has elapsed from the date of this memorandum, upon publication of an interim change to, or rewrite of DAFMAN 32-1062, whichever is earlier.

TOM D. MILLER
Lieutenant General, USAF
DCS/Logistics, Engineering & Force Protection

Attachment:
DAFMAN32-1062_DAFGM2024-01, *Electrical Systems, Power Plants and Generators*

The below changes to DAFMAN 32-1062, dated 20 October 2020, are effective immediately. The use of an asterisk (*) identifies a substantive change over the previous guidance. Compliance with **Attachment 1** in this publication is mandatory.

* **Changed.** This DAFMAN applies to the entire DAF, including DAF civilian employees and uniformed members of the United States Air Force (USAF), the United States Space Force (USSF or Space Force), the Air Force Reserve (AFR), the Air National Guard (ANG), military and civilian personnel (including tenants and contractors) performing work or inspections in accordance with this DAFMAN.

*1.2.2. **Changed.** Develop, maintain, clarify, and publish guidance for electrical systems, powerplants, and generators programs in coordination with SAF/IEE.

*1.3. **Changed. Major Command (MAJCOM), Field Command (FLDCOM).**

*1.4.1. **Changed.** Review and coordinate on generator authorization and design requests or recommended alternatives for AFRC installations. AFRC can submit requests for technical support to Air Force Civil Engineer Center, Operations Directorate (AFCEC/CO). Process generator authorization and design requests for AFRC.

*1.4.2. **Changed.** Review annual RPIE generator inventory and authorization reports, list of generators that are oversized, and those available for relocation.

*1.5.1. **Changed.** Review and coordinate on generator authorization and design requests or recommended alternatives for ANG installations. ANG can submit requests for technical support to Air Force Civil Engineer Center, Operations Directorate (AFCEC/CO). Process generator authorization and design requests for ANG.

*1.5.2. **Changed.** Review annual RPIE generator inventory and authorization reports, list of generators that are oversized and available for relocation.

*1.7.1.1. **Changed.** For generator installations that are not listed in paragraphs 3.1.1 through 3.1.34 process generator authorizations, designs, and classifications, to include Critical Operations Power Systems (COPS).

*1.7.1.3. **Changed.** Approve use of generators for prime power, cogeneration, or micro-grid applications. Document all microgrids using the generator authorization module in CE-DASH: <https://usaf.dps.mil/sites/CE-DASH-Tools/GenAuthorization/Module/Home.aspx?page=Home>

*1.7.2. **Changed.** Maintain the master list of RPIE generators available for relocation as compiled from AFCEC/COM and documented in CE DASH CEMIRT Home Page.

*1.7.1.2. Delete

*1.7.1.3. **Changed.** Approve use of generators for prime power, cogeneration, or micro-grid applications. Document all microgrids in CE-DASH: <https://usaf.dps.mil/sites/CE-DASH-Tools/GenAuthorization/Module/Home.aspx?page=Home>.

*1.7.2. **Changed.** Maintain the master list of RPIE generators available for relocation as compiled from AFCEC/COM and documented in CE DASH CEMIRT Home Page.

*1.7.6. **Changed.** For generators installations on facilities not listed in paragraph 3.1.1 through 3.1.34 coordinate authorization and designs through AFCEC/CO when projects are programmed without an existing generator authorization.

***1.8. Changed. Installation/Center/Space Base Delta Commander.** As the Responsible Official, be the approving authority for deviations from manufacturer service intervals and ensure compliance with all applicable air quality permits. The list of applicable laws includes, but is not limited to: Title 40 Code of Federal Regulations (CFR), Part 63 Subpart ZZZZ, National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines; 40 CFR Part 60 Subpart JJJJ, New Source Performance Standards (NSPS) - Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (the "spark ignition NSPS rule"); 40 CFR Part 60 Subpart IIII, Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (the "Compression Ignition NSPS rule"); 40 CFR Part 1039, Control Of Emissions from New and In-Use Nonroad Compression-Ignition Engines; 40 CFR Part 90, Control of Emissions From Nonroad Spark-Ignition Engines at or Below 19 Kilowatts; 40 CFR Part 1048, Control of Emissions from New Large Nonroad Spark-Ignition Engines.

***1.9.4. Changed.** The BCE is authorized to approve generators in facilities listed in paragraph 3.1.1 to 3.3.34. Coordinate all generator sizing designs for RPIE and BCE-owned EAID generators including generators procured with military construction, O&M, sustainment, restoration, and modernization, Defense Logistics Agency, or other funding through AFCEC/COSM in accordance with design criteria UFC 3-540-01. Authorizations will be maintained in a generator record log. All authorizations will be maintained in a generator record log. Memorandum templates and fillable form examples are located on the CE DASH site:

<https://cs2.eis.af.mil/sites/10159/Shared%20Documents/Forms/AllItems.aspx>. **Note:** AFRC installations submit to HQ AFRC/A4C for final approval. ANG installations submit to National Guard Bureau (NGB) Civil Engineer Technical Service Center (CETSC) (NGB/A4OC) for processing.

***1.9.5. Changed.** Conduct an annual inventory of all CE-operated and maintained RPIE and EAID generators by 1 August each year, including generators that are replacement-eligible and annotate all National Security Exemption. RPIE generators shall be reconciled with real property records, SMS BUILDER records, and EAID generators with Custodian Authorizations and Custody Receipt Listing records. The inventory should include making the necessary updates to the equipment inventory in the Facility Power module of the Air Program Information Management System (APIMS). **Note:** AFRC installations submit to HQ AFRC/A4C for final approval. ANG installations submit to NGB/A4OC CETSC for processing.

***1.9.6. Changed.** Conduct a validation of generator authorizations annually to identify changes to mission or electrical system configurations. Revalidations must be certified by the BCE in the form of an inventory list that includes building locations, mission supported, and any changes in mission or loads based on data recorded on AF Form 487, *Generator Operating Log (Inspection Checklist)*, from the previous year. Air Program Information Management System (APIMS) will serve as the validation platform for authorization, <https://apims.af.mil/apims/>. **Note:** AFRC installations submit to HQ AFRC/A4C for final approval. ANG installations submit to NGB/A4OC CETSC for processing.

***1.9.7. Changed.** Ensure compliance with all applicable U.S. federal, state, and local requirements (including permits); or, for installations located outside the United States, the country-specific DoD Final Governing Standards (FGS) (or DoDM 4715.05, Volumes 1-5, Overseas Environmental Baseline Guidance Document (OEBGD), where no FGS exists). This includes the recording maintenance/testing information and operational data (generator runtime, the reason the generator was operated [emergency situation, maintenance/testing, or non-emergency situation] etc.) into the Facility Power module of Air Program Information Management System (APIMS) as the system of record.

***1.9.8. Changed.** Develop written prioritized refueling plans and requirements to support generator operation (EAID and RPIE and other generator operation identified within an approved MOA) during extended power outages of at least seven days. The 7-day fuel plan must be repeatable. All combustible fuels must comply with applicable state and federal fuel standards. Liquid propane gas and natural gas are permitted only in accordance with UFC 3-540-07, Appendix C.

*1.9.10. **Changed.** Account for generators in accordance with UFC 3-540-07. The more restrictive requirements in **paragraph 1.9.7.** in this AFGM will apply until UFC 3.540-07 is updated.

*1.9.12. **Added.** The BCE approves all generator connection points with Manual Transfer Switch (MTS) on all facilities to include, Electric Vehicle Charging Facilities (EVCF) that are not assigned to a critical mission in chapter 3 and facilities with a RPIE generator in the case of a failure in the Automatic Transfer Switch (ATS) or RPIE generator.

*1.12. **Changed.** Tenant Organizations. All tenant organizations shall submit a work request for any generator system or generator connection point to be connected to real property, and establish a MOA with the BCE for the operation and maintenance of the generator on a reimbursable basis. Tenant organizations lacking a signed MOA transferring electrical systems responsibility to the BCE must satisfy all requirements of this instruction organically or through unit funded, contract maintenance services.

*2.2. **Changed. Standby Generators.** The BCE will ensure that authorized mission-essential functions are supported by standby generators. **(T-2)** Generators authorized to support mission-essential functions are installed and connected to provide power to mission-essential functions and any critical facility infrastructural support systems within a single facility in the event there is a loss of commercial power. If unique circumstances exist where one standby system is required to support multiple facilities, the BCE (or appropriate commander) will submit an authorization request to AFCEC/COSM for processing. **(T-2)** Installation Energy Plans or other energy resilience planning may identify opportunities to interconnect multiple standby generators and multiple facilities; in such cases, SAF/IEE may approve projects based on the concept of interconnecting multiple standby generators and multiple facilities. **Note:** AFRC installations submit to HQ AFRC/A4C for final approval. ANG installations submit to NGB/A4OC CETSC for processing.

*2.3.1.2. **Changed.** Critical Operations Power Systems (COPS). The BCE must ensure the “COPS” classification (applies to NEC® Article 708, *Critical Operations Power Systems [COPS]*) complies with NFPA 110, Level 2 criteria. COPS design, operational, and testing requirements are extensive and rigorous, requiring commitment of significant manpower and fiscal resources. AFCEC/CO is the approval authority for COPS classification. **Note:** AFRC installations submit to HQ AFRC/A4C for final approval. ANG installations submit to NGB/A4OC CETSC for processing. **Note:** AFRC installations submit to HQ AFRC/A4C for final approval. ANG installations submit to NGB/A4OC CETSC for processing.

*2.3.3. **Changed.** Others. Generators (25 kilowatts or less) not classified as RPIE or EAID are not addressed in this manual. These generators are unit-owned equipment items, and not the responsibility of the BCE to maintain, test, or operate, and are subject to purchase and acquisition policies generally applicable to equipment.

*2.4.1. **Changed.** Redundant Generators. Requirements for new redundant generators must be documented by the mission owner and verified by AFCEC/COSM before being included in programming documents (e.g., DD Form 1391, FY Military Construction Project Data) to include any of the N+1, N+2, and N+X configurations. **(T-2)** An N+X configuration is a redundancy measure where N represents the number of assets, for instance generators, required to power the mission and X is the number of backup assets. **Note:** AFRC installations submit to HQ AFRC/A4C for final approval. ANG installations submit to NGB/A4OC CETSC for processing.

*2.4.3. **Added.** Central Microgrid Plants. When a central micro-grid power production plant is installed and island-able from the commercial power source, the micro-grid is a part of the standby generator system. When analyzing the building’s generator redundancy and power availability it is to be considered.

*2.4.4. **Added.** All government funded Microgrid systems must be commissioned through a third-party contract or AFCEC/COM and documented in CE DASH. Any changes to the system function or performance from the original approved installation must be reported to AFCEC/COSM within 90 days

through the generator tool in CE DASH. (T-2) Systems must be revalidated every 5 years either by a third-party contract or AFCEC/COM and documented using the generator tool in CE DASH

<https://usaf.dps.mil/sites/CE-DASH-Tools/GenAuthorization/Module/Home.aspx?page=Home>.

(T-2)

***3.1. Changed. Facilities Authorization for Generators.** The facilities listed in paragraphs **3.1.1 through 3.1.34** are authorized generators as classified and indicated below, based on the specified UFC or the criteria in UFC 3-540-01 Appendix F Table F-2, *Generator Design*. Other critical mission facilities not addressed in this list, AFCEC/COSM must receive submissions for further processing. To streamline resources and prioritize maintaining mission essential generator support, the MAJCOM A4C or SF/S4O has the option to establish an approval process for generators. This process would provide oversight on types and sizes, either independently or through delegation of authority to supporting Detachment Commanders. The primary objective, if implemented, is to ensure the efficient allocation of generators while considering limited resources of funds and manpower, as well as adhering to local air permitting constraints.

***3.1.33. Added.** A centralized government Electric Vehicle Charging Facility (EVCF) is considered mission critical and is authorized backup power [Other Permanently Installed].

***3.1.34. Added.** Decentralized EVCF that is connected to a mission-critical facility authorized backup power as outlined in this chapter is considered an authorized load for backup generator power.

Administrative changes to AFMAN 32-1062, Electrical Systems, Power Plants and Generators

OPR: AF/A4CF

REPLACE “AFCEC/COSM” with “AFCEC/COM” (located at page 4, paragraph 1.7.2). 8 July 2021.

**BY ORDER OF THE
SECRETARY OF THE AIR FORCE**

AIR FORCE MANUAL 32-1062

20 OCTOBER 2020



CIVIL ENGINEERING

**ELECTRICAL SYSTEMS, POWER
PLANTS AND GENERATORS**

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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(Mr. John W. Henderson)

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This Air Force Manual (AFMAN) implements Air Force Policy Directive (AFPD) 32-10, *Installations and Facilities*. It provides acquisition and operation and maintenance (O&M) requirements for power systems, individual real property installed equipment (RPIE), and Equipment Authorized Inventory Data (EAID) generators. It applies to all civilian employees and uniformed members of the Regular Air Force, Air Force Reserve, and Air National Guard (ANG). Ensure all records created as a result of processes prescribed in this publication are maintained in accordance with AFMAN 33-322, *Records Management and Information Governance Program*, and disposed of in accordance with the Air Force Records Disposition Schedule located in the Air Force Records Information Management System. Refer recommended changes and questions about this publication to the Office of Primary Responsibility using the AF Form 847, *Recommendation for Change of Publication*; route AF Forms 847 from the field through the appropriate functional chain of command. This publication may be supplemented at any level, but all supplements must be routed to the Office of Primary Responsibility listed above for coordination prior to certification and approval. The authorities to waive wing/unit level requirements in this publication are identified with a Tier ("T-0, T-1, T-2, T-3") number following the compliance statement. See Department of the Air Force Instruction 33-360, *Publications and Forms Management*, for a description of the authorities associated with the Tier numbers. Submit requests for waivers through the chain of command to the appropriate Tier waiver approval authority, or alternately, to the requestor's commander for non-tiered compliance items. The use of the name or mark of any specific manufacturer, commercial product, commodity, or service in this publication does not imply endorsement by the Air Force.

SUMMARY OF CHANGES

This document has been substantially revised and must be completely reviewed. Major changes include revised guidance for generator authorizations and sizing approvals to reflect changes in Major Command (MAJCOM) roles and responsibilities. Guidance has also been updated for Environment Protection Agency requirements that impact air permitting. Responsibility has been assigned for third party funded contracts for projects that include prime power or micro-grid applications. The waiver authority for many requirements in this AFMAN has been reduced to reflect the need for installation-level ownership, management of risk, and commitment to executing Civil Engineer competencies. Engineering Technical Letter 13-4, Change 1: *Standby Generator Design, Maintenance, and Testing Criteria*, has been recinded.

Chapter 1

ROLES AND RESPONSIBILITIES

1.1. The Assistant Secretary of the Air Force Installations, Environment and Energy (SAF/IE). SAF/IE:

1.1.1. Establishes and issues policies for electrical systems, power plants, and generators that translate the ideas, goals or principles contained in the Air Force mission, vision and strategic plans.

1.1.2. Has overall responsibility for electrical systems, power plants, and generators to ensure the sustainability and operational readiness of the Department of the Air Force including, but not limited to, advocating for sufficient resources to sustain the mission.

1.1.3. Provides guidance, direction, and oversight for all matters pertaining to the formulation, review, and execution of plans, policies, programs, and budgets to ensure the sustainment and protection from mission degradation related to electrical systems, power plants, and generators.

1.1.4. SAF/IE or designee may review all T-1 and T-2 waiver decisions to ensure consistency with published policy, guidance, and approved Installation Energy Plans.

1.2. Air Force Deputy Chief of Staff for Logistics, Engineering and Force Protection, Directorate of Civil Engineers (AF/A4C). AF/A4C shall:

1.2.1. Oversee the electrical systems, power plants, and generators program to ensure compliance with applicable U.S. Codes, Federal Regulations, higher directives, and authorities and develop Management Internal Control Toolset self-assessment communicators.

1.2.2. Develop, maintain, clarify, and publish guidance for the electrical systems, power plants, and generators programs.

1.2.3. Oversee engagements with congressional representatives, congressional staff, and interdepartmental personnel with respect to electrical systems, power plants, and generators as delegated by SAF/IE.

1.3. Major Command Deputy Commanders (MAJCOM/CDs). shall approve deviations for semi-annual full-system testing, per [paragraph 1.11.3](#)

1.4. Air Force Reserve Command (AFRC), Installation Operations. AFRC shall:

1.4.1. Review and coordinate on generator authorization and design requests or recommended alternatives for AFRC installations. AFRC submits requests to Air Force Civil Engineer Center, Operations Directorate (AFCEC/CO) for approval, or disapproves submitted request, with no further action.

1.4.2. Review annual RPIE generator inventory and authorization reports, list of generators that are oversized, and those available for relocation provided by AFCEC Civil Engineer Maintenance, Inspection, and Repair Team (CEMIRT) (AFCEC/COM).

1.4.3. Coordinate with AFRC installations to redistribute available generators.

1.4.4. AFRC Headquarters (HQ) may delegate the tasks detailed in [paragraphs 1.4.1 through 1.4.3](#)

1.5. Office of the Director, Air National Guard (ANG). ANG shall:

1.5.1. Review and coordinate on generator authorization and design requests or recommended alternatives and submit requests to AFCEC/CO for approval, or disapprove with no further action.

1.5.2. Review annual RPIE generator inventory and authorization reports, list of generators that are oversized and available for relocation provided by AFCEC/COM CEMIRT.

1.5.3. Coordinate with ANG installations to redistribute available generators.

1.5.4. Office of the Director, ANG may delegate the tasks detailed in [paragraph 1.5.1 through 1.5.3](#)

1.6. Air Force Installation and Mission Support Center (AFIMSC). AFIMSC shall:

1.6.1. Review annual RPIE generator inventory and authorization reports, and list of generators that are oversized and available for relocation provided by AFCEC/COM CEMIRT. **Note:** This may not be delegated below the AFIMSC Detachment Commander level.

1.6.2. Coordinate with bases and AFCEC Mechanical and Electrical Division (AFCEC/COSM) to redistribute available generators. **Note:** This may not be delegated below the AFIMSC Detachment Commander level.

1.7. Air Force Civil Engineer Center. AFCEC shall:

1.7.1. Manage the approval process, in coordination with SAF/IE and AF/A4C.

1.7.1.1. Approve Generator authorization, design, and classification, to include Critical Operations Power Systems (COPS)

1.7.1.2. Revalidate annual generator authorizations see ([paragraph 1.9.6](#)).

1.7.1.3. Approve use of generators for prime power, cogeneration, or micro-grid applications.

1.7.2. Maintain the master list of RPIE generators available for relocation as compiled from AFCEC/COSM, and shall forward a copy to Air Force Installation and Mission Support Center/Installation Engineering Division (AFIMSC/IZB).

1.7.3. Provide guidance regarding federal, state, and local environmental compliance, including, but not limited to, air quality, spill containment, and fuel tank inspection requirements.

1.7.4. Provide an enterprise-level compliance management system (i.e., Air Program Information Management System) and maintain air quality compliance guidance (e.g., operations, maintenance, repair, and replacement of engines).

1.7.5. Review and coordinate on use of generators for co-generation, prime power, renewable, or micro-grid applications. The AFCEC Energy Directorate (AFCEC/CN) is the approval authority for all projects funded by third party contracts for co-generation, prime power, renewable, or micro-grid applications using energy cost savings. AFCEC/CN has

responsibility for certifying operational third party funded co-generation, prime power, renewable, or micro-grid applications for the life of third party contracts.

1.7.6. Coordinate authorization and design approval requests to AFCEC/CO when projects are programmed without generator authorization.

1.8. Installation Commander (or Equivalent). shall, as the Responsible Official, be the approving authority for deviations from manufacturer service intervals and ensure compliance with all applicable air quality permits. **(T-0).** The list of applicable laws includes, but is not limited to: Title 40 Code of Federal Regulations (CFR), Part 63 Subpart ZZZZ, *National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines*; 40 CFR Part 60 Subpart JJJJ, *New Source Performance Standards (NSPS) - Standards of Performance for Stationary Spark Ignition Internal Combustion Engines* (the “spark ignition NSPS rule”); 40 CFR Part 60 Subpart IIII, *Standards of Performance for Stationary Spark Ignition Internal Combustion Engines* (the “Compression Ignition NSPS rule”); 40 CFR Part 1039, *Control Of Emissions from New and In-Use Nonroad Compression-Ignition Engines*; 40 CFR Part 89, *Control of Emissions from New and In-Use Nonroad Compression-Ignition Engines*; 40 CFR Part 90, *Control of Emissions From Nonroad Spark-Ignition Engines at or Below 19 Kilowatts*; 40 CFR Part 1048, *Control of Emissions from New Large Nonroad Spark-Ignition Engines*.

1.9. The Base Civil Engineer (BCE). BCEs shall:

1.9.1. Provide, operate, and maintain all real property and RPIE electrical power systems and related items, including EAID assigned to the BCE and RPIE items, with the exception of units supporting missile systems or special-use tenant generators lacking a signed memorandum of agreement (MOA). **(T-1).** The BCE will ensure preventive maintenance procedures comply with AFI 32-1001, *Civil Engineer Operations*. **(T-1).** The BCE will also ensure testing frequencies comply with Unified Facilities Criteria (UFC) 3-540-07, *Operation and Maintenance (O&M): Generators*. **(T-0).** The BCE is responsible for operating and maintaining other real property and RPIE electrical systems (as applicable to each installation), which include:

1.9.1.1. Controls, sensors, and alarm circuits needed for operation of real property facilities, such as tank liquid level sensors and alarms; fire alarm systems; mass notification systems; facility-integrated photovoltaic panels, arrays, and components; joint-service interior intrusion detection systems; electrical heating and air-conditioning systems using equipment similar to RPIE; Electrical systems temporarily deployed during exercises or contingency or wartime operations, or systems permanently assigned to an installation. **(T-2).**

1.9.1.2. Systems for utility plant management and distribution, such as energy management and control systems, which include supervisory control and data acquisition systems and utility monitoring and control systems. The BCE will obtain advance written approval from AFCEC/COSM to install any generator security device, such as those used to mitigate electrical system vulnerability. **(T-2).**

1.9.2. Ensure required MOAs are established; that they address reimbursable/non-reimbursable expenses and requests for additional levels of maintenance; and that they receive Judge Advocate review. **(T-2).** The BCE has no maintenance responsibility for

electrical equipment that is not on the real property record or civil engineer (CE) allowance standard and has no MOA in place. The BCE will maintain and test electrical power systems at special-use or tenant facilities in accordance with the signed MOA and Air Force standards for RPIE and equipment typically assigned to the CE squadron. **(T-2)**. Using organizations are responsible for operator-level maintenance of equipment supplying power exclusively to these facilities when no MOA is in place. Real property accountability for equipment supplying power to a special-use facility or tenant organization resides with the BCE. **(T-3)**.

1.9.2.1. The BCE will review and approve non-RPIE generator connections requested by tenant organizations through the work order process per [paragraph 1.10](#) **(T-3)**.

1.9.2.2. Defense Logistics Agency capitalized real property and generator operation and maintenance that is funded through the Defense Logistics Agency Sustainment, Restoration and Modernization process is not a BCE responsibility without an MOA in place. If a MOA is in place, the terms of the MOA will determine BCE responsibility. **(T-3)**.

1.9.2.3. For Medical/Dental facilities funded through the Defense Health Program Sustainment, Restoration and Modernization program, generator operations and maintenance are not a BCE responsibility without an MOA in place. If a MOA is in place, the terms of the MOA will determine BCE responsibility, and BCE will be obligated to comply with those terms. **(T-2)**. Generator authorization, design, classification and revalidation for medical/dental facilities will be accomplished by the Defense Health Agency.

1.9.3. Develop and maintain as-built electrical system drawings, operating procedures, schematics, manufacturer O&M manuals, and emission certifications. **(T-3)**. The BCE will ensure a copy of local operating procedures, a list of authorized operators, and a one-line diagram are posted at each site. **(T-3)**.

1.9.4. Develop and coordinate design requests and authorizations for RPIE and BCE-owned EAID generators through AFCEC, including generators procured with military construction, O&M, sustainment, restoration, and modernization, Defense Logistics Agency, or other funding. **(T-2)**. All authorizations will be maintained in a generator record log. **(T-2)**. Memorandum templates and fillable form examples are located on the CE DASH site: <https://cs2.eis.af.mil/sites/10159/Shared%20Documents/Forms/AllItems.aspx>. **Note:** ANG installations submit to National Guard Bureau (NGB) Civil Engineer Technical Service Center (CESTC) (NGB/A4OC) for processing and forwarding to AFCEC.

1.9.5. Conduct an annual inventory of all CE-operated and maintained RPIE and EAID generators by 1 August each year, including generators that are replacement-eligible, and forward a copy to AFCEC/COSM. **(T-2)**. RPIE generators shall be reconciled with real property records and EAID generators with Custodian Authorizations and Custody Receipt Listing records. **(T-2)**. **Note:** ANG installations submit to NGB/A4OC CESTC for processing and forwarding to AFCEC.

1.9.6. Conduct a validation of generator authorizations annually to identify changes to mission or electrical system configurations, and forward revalidation reports to AFCEC/COSM for revalidation. **(T-2)**. Revalidations must be certified by the BCE in the form of an inventory list that includes building locations, mission supported, and any changes

in mission or loads based on data recorded on AF Form 487, *Generator Operating Log (Inspection Checklist)*, from the previous year. **(T-3)**. (If the unit is using Air Program Information Management System as the official shop record, Air Program Information Management System will serve as the validation platform for authorization). **Note:** ANG installations submit to NGB/A4OC CESTC for processing and forwarding to AFCEC.

1.9.7. Ensure compliance with all applicable U.S. federal, state, and local requirements (including permits); or, for overseas, the Final Governing Standard (or Overseas Environmental Baseline Guidance Document where no Final Governing Standard exists). **(T-0)**.

1.9.8. Develop written prioritized refueling plans and requirements to support generator operation (EAID and RPIE and other generator operation identified within an approved MOA) during extended power outages of at least seven days. **(T-3)**. All combustible fuels must comply with applicable state and federal fuel standards. **(T-1)**. Liquid propane gas and natural gas are permitted only in accordance with UFC 3-540-07, Appendix C. **(T-1)**.

1.9.9. Establish an onsite fire extinguisher near the generator in accordance with AFMAN 91-203, *Air Force Occupational Safety, Fire, and Health Standards*. **(T-3)**. This shall be compliant with all applicable safety codes and standards such as NFPA 70, *National Electrical Code*®, National Fire Protection Association (NFPA) 70E, *Standard for Electrical Safety in the Workplace*®, AFMAN 32-1065, *Grounding and Electrical Systems*, UFC 3-560-01, *Operation and Maintenance: Electrical Safety*, and all current electrical safe work practices in accordance with 29 CFR Part 1910, *Occupational Safety and Health Standards*. **(T-0)**.

1.9.10. Account for generators in accordance with UFC 3-540-07. **(T-2)**.

1.9.11. Provide training in generator operation to Facility Managers when requested, scheduled during monthly generator testing. **(T-3)**.

1.10. Installation Management Flights (Facility Manager for Air National Guard). Installation Management Flights shall coordinate with the BCE prior to generator installations and relocations to ensure compliance with guidelines (at least 90 days prior to scheduled installation to provide adequate time for permitting and notification requirements). **(T-3)**.

1.11. Installation Facility Managers. Facility managers shall:

1.11.1. Verify proper function of all building equipment and systems during generator functional testing using facility load and sign the AF Form 487 (or electronic version) following the semi-annual generator test. **(T-3)**.

1.11.2. Maintain and post next to the generator a list of facility personnel trained to operate facility generators when generator operation by facility personnel is requested. **(T-3)**. User training is valid for one year only and must be requested through and approved by the BCE. **(T-3)**.

1.11.3. Submit written request to the BCE for MAJCOM/CD approval to extend the semi-annual generator test. **(T-2)**. Request with justification must be submitted at least 90 days prior to the semi-annual generator test. **(T-3)**.

1.11.4. Provide an organizational memorandum for record for facility electrical system testing and maintenance that is deferred for more than six (6) months. **(T-2).**

1.12. Tenant Organizations. All tenant organizations shall submit a work request for any generator system to be connected to real property, and establish a MOA with the BCE for the operation and maintenance of the generator on a reimbursable basis. **(T-2).** Tenant organizations lacking a signed MOA transferring electrical systems responsibility to the BCE must satisfy all requirements of this instruction organically or through unit funded, contract maintenance services. **(T-1).**

Chapter 2

AUTHORIZATION, CLASSIFICATION, AND CONFIGURATION OF GENERATORS.

2.1. Prime Power. AFCEC/CO manages, in coordination with the office of the Deputy Assistant Secretary of the Air Force for Environment, Safety, and Infrastructure (SAF/IEE) and AF/A4C, the use of generators for prime power, micro-grids, or cogeneration. When submitting a request for cogeneration or micro-grids within the area electrical power system, the BCE must demonstrate that the system complies with Institute of Electrical and Electronics Engineers (IEEE) 1547, *Standard for Interconnecting Distributed Resources with Electric Power Systems*, and negotiate an interconnection agreement with the area electrical power system (utility) supplier. **(T-2).** Coordination with the BCE's Environmental Section is required prior to authorization for purposes of regulatory permitting and notifications. **(T-3).**

2.2. Dedicated Standby Generators. The BCE will ensure that authorized mission-essential functions are supported by dedicated standby generators. **(T-3).** Generators authorized to support mission-essential functions are installed and connected to provide power only to mission-essential functions and any critical facility infrastructural support systems within a single facility in the event there is a loss of commercial power. If unique circumstances exist where one standby system is required to support multiple facilities, the BCE (or appropriate commander) will submit an authorization request to AFCEC/CO for approval. **(T-2).** Installation Energy Plans or other energy resilience planning may identify opportunities to interconnect

multiple standby generators and multiple facilities; in such cases, SAF/IEE may approve projects based on the concept of interconnecting multiple standby generators and multiple facilities.

Note: ANG installations submit to NGB/A4OC CESTC for processing and forwarding to AFCEC.

2.3. Types of Standby Generators. Three types of generators may be authorized: RPIE, EAID, and other.

2.3.1. RPIE Generators. Support mission-critical functions where controlled shut-down or delayed power restoration is unacceptable. They may be authorized for missions requiring immediate power restoration, uninterrupted power, or support for emergency systems as defined in National Electrical Code® (NEC®) Article 700, *Emergency Systems*. RPIE generators are classified as "Emergency," "COPS," "Other Permanently Installed," or "Petroleum, Oils, and Lubricants (POL)/Fuels".

2.3.1.1. "Emergency." This classification applies to life safety systems required to comply with NEC® Article 700. The BCE must ensure emergency systems also comply with NFPA 110, *Standard for Emergency and Standby Power Systems*, Level 1 criteria. **(T-1).**

2.3.1.2. "COPS." The BCE must ensure the "COPS" classification (applies to NEC® Article 708, *Critical Operations Power Systems [COPS]*) complies with NFPA 110, Level 2 criteria. COPS design, operational, and testing requirements are extensive and rigorous, requiring commitment of significant manpower and fiscal resources. **(T-1).** AFCEC/CO is the approval authority for COPS classification. **Note:** ANG installations submit to NGB/A4OC CESTC for processing and forwarding to AFCEC.

2.3.1.3. “Other Permanently Installed.” This classification applies to other mission-critical functions not designated as “Emergency” or “COPS.” The BCE must ensure these systems comply with NEC® Article 701, *Legally Required Standby Systems*, and NFPA 110 Level 2 criteria. **(T-1).**

2.3.1.4. “POL/Fuels”. This classification applies to Fuels Information Service Centers (Fuels Operation) and Types III, IV, and V hydrant fueling systems designed in accordance with Department of Defense Standard Designs AW 078-24-28, *DOD Pressurized Hydrant Fueling System Type III*, and AW 078-24-29: *DOD Standard Pressurized Hydrant Direct Fueling System Type IV/V*, with a manual interlocked transfer switch. **(T-0).** The BCE must ensure these systems are sized to 50 percent of pumping capacity within the continental United States and 100 percent of pumping capacity outside the continental United States. **(T-2).**

2.3.2. EAID Portable Units. Either trailer-mount or skid-mount generators are classified as either “POL/Fuels” or “Portable”.

2.3.2.1. “POL/Fuels.” The BCE must ensure the EAID “POL/Fuels” classification is applied to Types I and II hydrant fueling systems, bulk fuel storage areas, non-hydrant operating storage areas, and vehicle fueling stations that are prepositioned. **(T-2).** The BCE must ensure that detached fuels testing labs not located in a fuels operations facility have a generator connection plug and a manual transfer switch. **(T-2).**

2.3.2.2. “Portable.” These generators may be authorized for mission-essential functions where delayed power restoration is acceptable and portable generation decreases simultaneous risk to the facility and generator.

2.3.3. Others. Generators (5 kilowatts or less) not classified as RPIE or EAID are not addressed in this manual. These generators are unit-owned equipment items, are not the responsibility of the BCE to maintain, test, or operate, and are subject to purchase and acquisition policies generally applicable to equipment.

2.4. Generator configuration and Redundancy.

2.4.1. Redundant Generators. Requirements for new redundant generators must be documented by the mission owner and verified by AFCEC/CO before being included in programming documents (e.g., DD Form 1391, *FY _____ Military Construction Project Data*). **(T-2).** This includes any of the N+1, N+2, and N+X configurations. **(T-2).** An N+X configuration is a redundancy measure where N represents the number of assets, for instance generators, required to power the mission and X is the number of backup assets. **Note:** ANG installations submit to NGB/A4OC CESTC for processing and forwarding to AFCEC.

2.4.2. Power Availability. Critical missions must also have documented power availability requirements of 99.9%, 99.99%, and 99.999%. **(T-2).** Alternatively, mission owners can also provide their annual “allowable mission downtime” expressed in units of time (i.e. 30 sec, 5 min, 4 hrs, etc.). These levels require more than just a generator and must have a mission-equipment power source to continue electrical service during power source transfer. These power availabilities must also have mission-specific maximum power outage times (i.e., uptime and downtime) to economically design the standby power system.

Chapter 3

AUTHORIZATION AND CLASSIFICATION OF FACILITIES

3.1. Facilities . Listed in **paragraphs 3.1.1** through **3.1.31** will be authorized generators and classified as listed below, per the specified UFC or the criteria in UFC 3-520-01, *Interior Electrical Systems*. **(T-0)**. Other facilities not addressed by these UFCs must be submitted to AFCEC/CO for appropriate level approval. **(T-2)**.

3.1.1. Medical healthcare and ambulatory care facilities (excludes medical business occupancies as defined by NFPA) in accordance with UFC 4-510-01, *Design: Medical Military Facilities*. **(T-2)**.

3.1.2. Air navigation aids and facilities, and airfield lighting COPS or Other Permanently Installed. **(T-2)**.

3.1.3. Mission/emergency-essential refrigerated storage rooms [Portable]. **(T-2)**.

3.1.4. POL storage and dispensing facilities [POL/Fuels RPIE or EAID]. **(T-2)**.

3.1.5. Mission-essential/critical utility plants [Other Permanently Installed]. **(T-2)**.

3.1.6. Critical sewage lift stations with low-level to high-level alarm duration less than EAID deployment time [Other Permanently Installed]. **(T-2)**.

3.1.7. Typical sewage lift stations with adequate alarm notification to start pre-positioned generator [Portable or Other Permanently Installed when required by local laws]. **(T-2)**.

3.1.8. Civil Engineer control centers [Portable or Other Permanently Installed]. **(T-2)**.

3.1.9. Mission-essential/critical communications facilities, information transfer nodes, and telephone exchanges [Other Permanently Installed]. **(T-2)**.

3.1.10. Fire stations, including fire alarm, fire control, and radio equipment [Emergency]. **(T-2)**.

3.1.11. Mission-essential computer automated data processing facilities [Other Permanently Installed]. **(T-2)**.

3.1.12. Air traffic control towers [COPS or Other Permanently Installed]. **(T-2)**.

3.1.13. Base weather stations [Other Permanently Installed or Portable]. **(T-2)**.

3.1.14. Surveillance and warning facilities, to include ground-based space telescopes [Other Permanently Installed]. **(T-2)**.

3.1.15. Primary command and control facilities (does not include headquarters facilities without direct and essential command and control functions) [Other Permanently Installed]. **(T-2)**.

3.1.16. Remotely piloted aircraft control pods that are hardwired into a RPIE facility [Other Permanently Installed or Portable]. **(T-2)**.

3.1.17. Munitions storage facilities [Other Permanently Installed or Portable]. **(T-2)**.

- 3.1.18. Entry control points, security gates, and related security lighting systems [Portable]. **(T-2).**
- 3.1.19. Aircraft and aircrew alert facilities [Other Permanently Installed]. **(T-2).**
- 3.1.20. Law enforcement and security facilities [COPS, Other Permanently Installed, or Portable]. **(T-2).**
- 3.1.21. Emergency operations centers in accordance with UFC 4-141-04, *Emergency Operations Center Planning and Design* [Other Permanently Installed]. **(T-2).**
- 3.1.22. Mission, property, and life support facilities at remote and not readily accessible sites, such as split-site aircraft warning and surveillance installations [Other Permanently Installed]. **(T-2).**
- 3.1.23. One dining facility per installation or geographic location [Other Permanently Installed or Portable]. **(T-2).**
- 3.1.24. Industrial facilities that have noxious fumes requiring removal (provide power for the exhaust system only; in the case of an aircraft corrosion control facility, also provide power to the hangar doors in accordance with UFC 4-211-02, *Aircraft Corrosion Control and Paint Facilities*) [Emergency]. **Note:** Aircraft fuel cell repair facilities are not authorized standby generators. **(T-2).**
- 3.1.25. Readiness facilities relying on electrical power to support tactical or mission-essential operations or facilities uniquely required on the base Contingency Response Plan [Other Permanently Installed]. **(T-2).**
- 3.1.26. Intelligence processing facilities providing mission-essential support to combat and contingency tactical missions [Other Permanently Installed]. **(T-2).**
- 3.1.27. Simulation or materials laboratories where continuous power is needed for human safety or to maintain low-tolerance temperature (<5 degrees Fahrenheit) and humidity (<5 percent) control to avoid catastrophic consequences [Other Permanently Installed]. **(T-2).**
- 3.1.28. Emergency lighting, elevators, fire alarms, security systems, or other facility life safety equipment within high-occupancy buildings or places of assembly of 1,000 or more people, for safely moving people out [Emergency]. **(T-2).**

3.1.29. Space launch/lift, vertical integration facilities [Other Permanently Installed or EAID].

3.1.30. Space command and control, satellite, and cyber operations facilities [Other Permanently Installed or COPS]. **(T-2)**.

3.1.31. As required by other Department of Defense component, Federal branch, or U.S. state. **(T-2)**.

3.1.32. Task Critical Assets and Critical Assets (formerly known as supporting infrastructure critical assets) in accordance with AFI 10-2402, *Critical Asset Risk Management Program* [Other Permanently Installed or COPS]. **(T-2)**. (examples: generators for submarines, National Aeronautics and Space Administration (NASA), National Reconnaissance Office (NRO), Missile Defense Agency (MDA), state tenant on Air Force installation).

WARREN D. BERRY, Lieutenant General, USAF

DCS/Logistics, Engineering & Force Protection

Attachment 1**GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

29 CFR Part 1910, *Occupational Safety and Health Standards*

40 CFR Part 60 Subpart IIII, *Standards of Performance for Stationary Compression Ignition Internal Combustion Engines*, 1 July 2016

40 CFR Part 60 Subpart JJJJ, *Standards of Performance for Stationary Spark Ignition Internal Combustion Engines*, 1 July 2016

40 CFR Part 63 Subpart ZZZZ, *National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines*

40 CFR Part 89, *Control of Emissions from New and In-Use Nonroad Compression-Ignition Engines*, 17 June 17 1994

40 CFR Part 90, *Control of Emissions From Nonroad Spark-Ignition Engines at or Below 19 Kilowatts*, July 3, 1995

40 CFR Part 1039, *Control Of Emissions from New and In-Use Nonroad Compression-Ignition Engines*, June 29, 2004

40 CFR Part 1048, *Control of Emissions from New Large Nonroad Spark-Ignition Engines*, 8 November 2002

UFC 3-520-01, *Interior Electrical Systems*, 6 October 2015

UFC 3-540-07, *Operation and Maintenance (O&M): Generators*, 21 February 2018

UFC 3-560-01, *Operation and Maintenance: Electrical Safety*, 21 February 2018

UFC 4-141-04, *Emergency Operations Center Planning and Design*, 15 July 2008

UFC 4-211-02, *Aircraft Corrosion Control and Paint Facilities*, 12 December 2012

UFC 4-510-01, *Design: Medical Military Facilities*, 1 November 2017

AFPD 32-10, *Installations and Facilities*, 20 July 2020

AFI 10-2402, *Critical Asset Risk Management Program*, 29 August 2017

AFI 32-1001, *Civil Engineer Operations*, 4 October 2019

AFI 33-322, *Records Management and Information Governance Program*, 23 March 2020

AFMAN 32-1065, *Grounding and Electrical Systems*, 17 July 2020

AFMAN 91-203, *Air Force Occupational Safety, Fire, and Health Standards*, 11 December 2018

DAFI 33-360, *Publications and Forms Management*, 1 December 2015

NEC® Article 700, *Emergency Systems*

NEC® Article 701, *Legally Required Standby Systems*

NEC® Article 708, *Critical Operations Power Systems [COPS]*

NFPA 70, *National Electrical Code®* (NEC®)

NFPA 70E, *Standard for Electrical Safety in the Workplace*

NFPA 110, *Standard for Emergency and Standby Power Systems*

IEEE 1547, *Standard for Interconnecting Distributed Resources with Electric Power Systems*

DoD Standard Design AW 078-24-28, *DOD Pressurized Hydrant Fueling System Type III*, 1 March 2020

DoD Standard Design AW 078-24-29, *DOD Standard Pressurized Hydrant Direct Fueling System Type IV/V*, 1 July 2010

Adopted Forms

DD Form 1391, *FY _____ Military Construction Project Data*

AF Form 847, *Recommendation for Change of Publication*

AF Form 487, *Generator Operating Log (Inspection Checklist)*

Abbreviations and Acronyms

AFCEC—Air Force Civil Engineer Center

AFIMSC—Air Force Installation and Mission Support Center

AFMAN—Air Force Manual

AFRC—Air Force Reserve Command

ANG—Air National Guard

BCE—Base Civil Engineer

CE—Civil Engineer

CEMIRT—Civil Engineer Maintenance, Inspection, and Repair Team

CESTC—Civil Engineer Technical Service Center

CFR—Code of Federal Regulations

COPS—Critical Operations Power System

DAFI—Department of the Air Force Instruction

EAID—Equipment Authorized Inventory Data

EPA—Environmental Protection Agency

HQ—Headquarters

IEEE—Institute of Electrical and Electronics Engineers

MAJCOM—Major Command

MAJCOM/CD—MAJCOM Deputy Commander

MOA—Memorandum of Agreement

NEC®—National Electrical Code

NFPA—National Fire Protection Association

NGB—National Guard Bureau

NSPS—New Source Performance Standards

O&M—Operations and Maintenance

POL—Petroleum, Oils, and Lubricants

RPIE—Real Property Installed Equipment

UFC—Unified Facilities Criteria