



DEPARTMENT OF THE AIR FORCE

AIR FORCE CIVIL ENGINEER CENTER

TYNDALL AIR FORCE BASE FLORIDA

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FROM: AFCEC/DD
139 Barnes Drive Suite 1
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SUBJECT: **Engineering Technical Letter (ETL) 13-4 (Change 1): Standby Generator Design, Maintenance, and Testing Criteria**

1. Purpose. This ETL provides criteria for design, maintenance, and testing of Air Force emergency and standby generator systems. It supersedes ETL 11-21, *Emergency and Standby Generator Design, Maintenance, and Testing Criteria* (Change 2), dated 16 March 2012. Requirements in this ETL modify or replace guidance within Air Force instruction (AFI) 32-1062, *Electrical Power Plants and Generators*, and AFI 32-1063, *Electric Power Systems*, as detailed in paragraphs 1.1, 1.2, and 6. **Use the *Inspection Checklist for the Generator Operating Log* (see paragraph 3.8) for all requirements of this ETL in lieu of AF IMT 487 (revision pending) until further notice.**

1.1. Criteria replaced by this ETL include:

1.1.1. AFI 32-1062:

- paragraph 9
- paragraph 10 and subparagraphs
- A2.3

1.1.2. AFI 32-1063:

- paragraph 1.8.8
- paragraph 4
- paragraphs 5.1 and 5.2
- paragraphs 7.1, 7.2, and 7.3, and their subparagraphs

1.2. Use this ETL with AFI 32-1062; AFI 32-1063; Title 40 Code of Federal Regulations (CFR) Part 60 Subparts IIII and JJJJ; 40 CFR Part 63 Subpart ZZZZ; 40 CFR Part 89.

Note: Use of the name or mark of a specific manufacturer, commercial product, commodity, or service in this ETL does not imply endorsement by the Air Force.

Summary of Revisions: Expanded guidance for semiannual RPIE generator testing (paragraph 15.3.1) to recommend testing with loss of power to the entire facility when verifying connectivity and proper operation of all mission loads.

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2. Application. Requirements in this ETL are mandatory and apply to all Air Force installations, including Air Force Reserve Command (AFRC), Air National Guard (ANG) units, and joint bases where generators are accountable on Air Force records.

2.1. Authority: Air Force policy directive (AFPD) 32-10, *Air Force Installations and Facilities*

2.2. Effective Date: Immediately

2.3. Intended Users:

- Major command (MAJCOM) engineers
- MAJCOM functional managers
- Base civil engineers (BCE)
- Base maintenance organizations
- Base operations support contractors
- Civil engineer logistics squadrons

2.4. Coordination:

- MAJCOM civil engineers (A7)
- AFCEC/CFT
- AF/A7CO

2.5. Existing Waivers. All waivers to requirements of AFI 32-1062 and AFI 32-1063 issued prior to the publication date of ETL 11-21 are invalid and must be reaccomplished as part of the validation process.

2.6. Contractor Compliance. Contractor personnel responsible for inspection, maintenance, and/or testing of Air Force backup generators must comply with this ETL.

3. Referenced Publications and Forms.

Note: Unless otherwise noted, the latest version of a publication applies.

3.1. Code of Federal Regulations (CFR):

- All Stationary Generators: 40 CFR 63, Subpart ZZZZ, *National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE)*; Paragraphs 6580–6675
- Stationary Compression Ignition (Diesel) Generators: 40 CFR Part 60, Subpart IIII, *Standards of Performance for Stationary Compression Ignition Internal Combustion Engines*,
 - Paragraphs 4200, 4204–4209, 4211–4214, and 4218-4219
 - For facilities in U.S. territories and Alaska: paragraphs 4215 and 4216
 - For compression ignition generators that use special fuels: paragraph 4217

- Stationary Spark Ignition (Gasoline or Natural Gas) Generators: 40 CFR Part 60, Subpart JJJJ, *Standards of Performance for Stationary Spark Ignition Internal Combustion Engines*; Paragraphs 4230, 4233–4237, and 4243–4248
- All Portable (transportable) Generators: 40 CFR PART 89, Control of Emissions from New and In-Use Nonroad Compression-Ignition Engines

3.2. Federal Specification:

- A-A 52557, *Fuel Oil, Diesel; For Posts, Camps, and Stations*, <http://www.wbdg.org/ccb/FEDMIL/aa52557a.pdf>

3.3. Department of Defense (DOD):

- MIL-PRF-2104, *Lubricating Oil, Internal Combustion Engine, Combat/Tactical Service*, http://quicksearch.dla.mil/basic_profile.cfm?ident_number=3148&method=basic
- MIL-PRF-46167, *Lubricating Oil, Internal Combustion Engine, Arctic*, http://quicksearch.dla.mil/basic_profile.cfm?ident_number=25241&method=basic
- MIL-STD-3004, *Quality Assurance/Surveillance for Fuels, Lubricants and Related Products*, http://www.assistdocs.com/search/document_details.cfm?ident_number=207391&StartRow=12651&PaginatorPageNumber=254&oneormore_words_string=WOOD%20FINISHES&search_method=CONTENT.
- Design Standard AW 78-24-28, *Pressurized Hydrant Fueling System*
- Design Standard AW 78-24-29, *Pressurized Hot Fueling System*

3.4. Unified Facilities Criteria (UFC) (available at

http://www.wbdg.org/ccb/browse_cat.php?o=29&c=4)

- UFC 3-460-01, *Design: Petroleum Fuel Facilities*
- UFC 3-501-01, *Electrical Engineering*
- UFC 3-520-01, *Interior Electrical Systems*
- UFC 3-560-01, *Electrical Safety, O&M*
- UFC 4-141-04, *Emergency Operations Center Planning and Design*
- UFC 4-211-02, *Aircraft Corrosion Control and Paint Facilities*
- UFC 4-510-01, *Design: Medical Military Facilities*

3.5. Air Force (AFIs and AFPD available at <http://www.e-publishing.af.mil/index.asp>):

- AFI 13-204V3, *Airfield Operations Procedures and Programs*
- AFI 23-204, *Organizational Fuel Tanks*
- AFI 32-1062, *Electrical Power Plants and Generators*
- AFI 32-1063, *Electric Power Systems*
- AFI 32-1064, *Electrical Safe Practices*
- AFI 32-7040, *Air Quality Compliance And Resource Management*
- AFI 32-7044, *Storage Tank Environmental Compliance*

- AFI 65-601V1, *Budget Guidance and Procedures*
- AFI 91-203, *Air Force Consolidated Occupational Safety Instruction*
- AFD 32-10, *Installations and Facilities*
- ETL 09-10, *Aurora Electrical System Vulnerability Assessment and Mitigation Actions*
- ETL 10-7, *Connection Methods for Standby Generators – 600 Volts or Less*, http://www.wbdg.org/ccb/browse_cat.php?o=33&c=125
- ETL 11-1, *Civil Engineer Industrial Control System Information Assurance Compliance*, http://www.wbdg.org/ccb/browse_cat.php?o=33&c=125
- T.O. 42B-1-1, *Quality Control of Fuels and Lubricants*

3.6. National Fire Protection Association (NFPA) (available at <http://www.nfpa.org>):

- NFPA 30, *Flammable and Combustible Liquids Code*
- NFPA 70, *National Electrical Code (NEC)*
- NFPA 70B (latest version), *Recommended Practice for Electrical Equipment Maintenance*
- NFPA 99, *Health Care Facilities Code*
- NFPA 110, *Standard for Emergency and Standby Power Systems*

3.7. Other:

- Defense Information Systems Agency Circular (DISAC) 350-195-2, *Auxiliary Electric Power Systems*, <http://www.disa.mil/About/Issuances>
- IEEE 1547, *Standard for Interconnecting Distributed Resources with Electric Power Systems*, http://grouper.ieee.org/groups/scc21/1547/1547_index.html

3.8. Forms and Templates

(available on Air Force Portal AFCEC Electrical Engineering site:

<https://www.my.af.mil/qcss->

<af/USAF/ep/contentView.do?contentType=EDITORIAL&contentId=c2D8EB9D63C49E8B4013C86DBD2091008&channelPagelId=s2D8EB9D637283B5601377B2CE4030666&programId=t2D8EB9D6386BFB8B01394F5729351F52>):

- *Inspection Checklist for the Generator Operating Log*
- *Generator Authorization and Design Approval Request*
- *New Facility Generator Authorization Request*
- AF IMT 719, *Historical Record – Diesel-Electric Generator and System*, <http://www.e-publishing.af.mil/index.asp>

4. Definitions and Clarifications.

4.1. Standby Power: Alternate power source that is available through either automatic or manual operation. Standby power may be real property or equipment based on AFCEC authorization.

4.2. Prime Power: Standby power capable of operating continuously. The generator may be considered prime when the utility source is not available or unreliable.

Generators designed to operate in parallel with the utility are also considered to be prime power.

4.3. Backup generators may be Real Property Installed Equipment (RPIE) or Equipment Authorization Inventory Data (EAID) portable units. RPIE generators support mission-critical functions where delayed power restoration is unacceptable. RPIE generators may be approved for missions that require immediate power restoration, uninterrupted power, or support to emergency systems defined in NFPA 70, *National Electrical Code* (NEC) Article 700. EAID generators support mission-critical or infrastructure-critical functions where delayed power restoration is acceptable. During a commercial power outage, a lack of infrastructure-critical function could result in an environmental or other non-mission-related condition.

4.3.1. “Emergency Systems” defined in Table 1 are needed for life safety (e.g., hospitals), not mission-critical functions. NEC Article 700 **only** applies to life safety applications.

4.3.2. Mission-critical functions fall under NEC Articles 701, 702, or 708.

Table 1. Backup Generator Classifications

System	Compliance	RPIE	EAID
Emergency	Generator systems required to comply with NEC Article 700, “Emergency Systems,” must also comply with NFPA 110 Level 1 criteria.	X	
COPS ¹	Generator systems required to comply with NEC Article 708, “COPS,” must also comply with NFPA 110 Level 2 criteria.	X	
Other Permanently Installed	Systems using permanently installed generators not designated as Emergency Systems or COPS must comply with NEC Article 701, “Legally Required Standby Systems,” and also comply with NFPA 110 Level 2 criteria.	X	
POL/Fuels ²	See paragraph 13 of this ETL for RPIE or EAID determination.	X	X
Portable	Systems using portable generators must comply with NEC Article 702, “Optional Standby Systems.”		X
¹ 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 classifications. ² Permanent generators installed as RPIE for POL/Fuels facilities may be maintained in accordance with EAID when another government agency (e.g., Defense Logistics Agency) is funding the maintenance in compliance with the manufacturer’s recommendations.			

4.4. Backup generator functions are classified as “Emergency,” “Critical Operations Power System (COPS),” “Other Permanently Installed,” “POL/Fuels,” or “Portable” systems, in accordance with design compliance criteria in Table 1. AFCEC/CO may classify EAID generators as “Other Permanently Installed” to support a deployable mission in a real property facility.

4.5. *Semimonthly:* Twice a month.

4.6. *Semiannually:* Every six months.

4.7. An uninterruptible power supply (UPS) has the following characteristics:

- Purchased with funds other than 3400 (Operations and Maintenance Appropriations)
- Owned by a mission, not the BCE
- Classified as equipment, not RPIE
- Meets NEC (NFPA 70-2011) definition as “...used to provide alternating current power to a load for some specified period of time in the event of power failure.”

4.8. *Diversified Load:* “Diversity factor” is the sum of individual maximum demands divided by the maximum demand on the power station (installed load/running load), is usually more than 1, and is mostly used for distribution feeder size and transformer, as well as to determine the maximum peak load. “Demand factor” is the maximum demand of a system divided by the total connected load on the system and is always less than 1. The lower the demand factor, the less system capacity required to serve the connected load. Demand factors should be applied when sizing generators. Diversity factor is typically used for sizing services at the transformer, so if it is not applicable to the design, it should be stated.

4.9. *Reciprocating Internal Combustion Engine (RICE):* Means any reciprocating internal combustion engine which uses reciprocating motion to convert heat energy into mechanical work and which is not mobile. Stationary RICE differs from mobile RICE in that stationary RICE is not a nonroad engine as defined at 40 CFR 1068.30, and is not used to propel a motor vehicle or a vehicle used solely for competition.

- **Compression Ignition Engine (Diesel Engine):** Means a RICE that is not a spark ignition engine. Compression ignition engine (diesel engine) is an internal combustion engine that uses the heat of compression to initiate ignition and burn the fuel that has been injected into the combustion chamber.
- **Spark Ignition Engine (Gasoline or Natural Gas Engine):** Is a RICE with a spark plug (or other sparking device) and with operating characteristics significantly similar to the theoretical Otto combustion cycle. Spark ignition engines usually use a throttle to regulate intake air flow to control power during normal operation. Dual-fuel engines in which a liquid fuel (typically diesel fuel) is used for CI and gaseous fuel (typically natural gas) is used as the primary fuel at an annual average ratio of less than 2 parts diesel fuel to 100 parts total fuel on an energy equivalent basis are spark ignition engines.

4.10. Portable Generator. This definition for a portable generator will only be used for the purpose of interpreting CFR requirements and not for classifying generators per the intent of this ETL. Any generator that is used in a portable (or transportable) application in which the engine will not stay at a single location for a full year or more.

- Legally considered “NonRoad” RICE engines under 40 CFR 89. All generators must be evaluated to determine if any of the EPA requirements set forth in the EPA regulations in Section 4.11 below apply, and if any such requirements do apply, then the generator must be operated in compliance with the EPA identified requirements.
- By definition no RPIE generator is a “portable generator” and nearly all EAID generators are “portable generators”. However, any EAID generator remaining in a single location for at least a full year is legally reclassified and a “stationary generator”.

4.11. Stationary Generator. This definition for a stationary generator will only be used for the purpose of interpreting CFR requirements and not for classifying generators per the intent of this ETL. Any generator that is used either in a fixed application or in a portable (or transportable) application in which the engine will stay at a single location for at least a full year.

- Legally considered “stationary RICE” engines under 40 CFR Part 63, Subpart ZZZZ, 40 CFR Part 60 Subpart JJJJ, and 40 CFR Part 60 Subpart IIII.
- By definition, all RPIE generators are “stationary generators”; however, if an EAID generator remains in one location for one year or more it is also legally considered a “stationary generator”.

5. Acronyms

AF/A7C	- The Civil Engineer
AFCEC/CN	- Air Force Civil Engineer Center, Energy Directorate
AFCEC/CO	- Air Force Civil Engineer Center, Operations Directorate
AFCEC/COM	- Air Force Civil Engineer Center, CEMIRT Division
AFCEC/COS	- Air Force Civil Engineer Center, Engineer Division
AFI	- Air Force instruction
AFPD	- Air Force policy directive
ATS	- automatic transfer switch
BCE	- base civil engineer (or equivalent)
CE	- civil engineer
CEMIRT	- Civil Engineer Maintenance, Inspection, and Repair Team
CI	- Compression Ignition Engine (Diesel Engine)
CFR	- Code of Federal Regulations
COPS	- critical operations power system
DISA	- Defense Information Systems Agency
DOD	- Department of Defense
EAID	- equipment authorization inventory data
EGT	- exhaust gas temperature
EPS	- electrical power system
ETL	- Engineering Technical Letter

IEEE	- Institute of Electrical and Electronics Engineers
IMT	- Information Management Tool
kVA	- kilovolt-ampere
kW	- kilowatt
LPG	- liquid petroleum gas
MAJCOM	- major command
MAJCOM/A7	- major command, civil engineer
MAJCOM/A7O	- major command, operations division
MAJCOM/A7OI	- major command, infrastructure branch
MAJCOM/CV	- major command, vice commander
MIL-HDBK	- Military Handbook
MTS	- manual transfer switch
NEC	- National Electrical Code
NFPA	- National Fire Protection Association
NG	- natural gas
NSN	- National Stock Number
NSPS	- New Source Performance Standards
POL	- petroleum, oil, and lubricants
RICE	- Reciprocating Internal Combustion Engine
RPIE	- real property installed equipment
SI	- Spark Ignition Engine (Gasoline or Natural Gas Engine)
T.O.	- Technical Order
UFC	- Unified Facilities Criteria
UPS	- uninterruptible power supply

6. Summary of Requirements. This ETL updates RPIE and EAID generator design, maintenance, refueling, and testing criteria in AFI 32-1062 and AFI 32-1063. Guidance is also provided for generator authorization and program management.

6.1. AFI 32-1062. Paragraph 10 and Attachments 3 and 5 of AFI 32-1062 define requirements for generator lubricating oil change intervals and oil analysis procedures.

6.1.1. EAID Generators.

- AFI 32-1062 does not permit extending oil change intervals beyond one year.
- This ETL authorizes extending oil change intervals based upon oil analysis (see paragraph 20).

6.1.2. RPIE Generators. Maintaining generators in accordance with manufacturers' criteria ensures generator reliability and long service life.

- AF 32-1062 requires annual oil changes.
- This ETL requires oil changes and servicing based on the manufacturer's inspection, maintenance, and service actions and schedules. Deviations from manufacturers' recommendations are permitted only in accordance with paragraph 20 of this ETL.

6.2. AFI 32-1063. This ETL provides clarification in the following areas:

- Responsibilities for determining generator authorization and classification
- RPIE generator design criteria
- Alternatives for EAID and RPIE generator condition load testing assessments
- Fuel storage and availability requirements for refueling
- Alternatives for backup generator operational testing

6.3. Authorization and Classification of Existing Generator Inventory. In accordance with AF/A7C memorandum for Authorization and Size Validation of Emergency and Standby Generators (Attachment 4), dated 1 April 2013, all existing facilities requiring a standby generator (RPIE or EAID) must be vetted through the generator authorization and classification process by written request (templates available in Attachment 3). Authorizations and classifications based on ETL 11-21 are valid when documented in the facility generator record.

6.4. New and replacement generators require AFCEC authorization, classification, and design approval. Authorization and classification is obtained in advance of design approval. Use *New Facility Generator Authorization Request* (paragraph 3.8) or written request (template available in Attachment 1) during planning/programming and *Generator Authorization and Design Approval Request* (paragraph 3.8) or by written request (template available in Attachment 2) when design information is available.

6.5. Revalidation of facilities authorized standby generators must be conducted every five years per paragraph 24. A new authorization request is required for facilities with relevant changes to mission requirements or modifications to the authorized electrical system.

6.6. Generator authorizations will be assigned by facility number. Facilities with multiple generators will have a single authorization for all standby generators attached to the facility.

6.7. Environmental Protection Agency (EPA) Requirements: Federal regulatory air quality requirements for generator engines must be met; however, they vary greatly from engine to engine and are frequently amended. Requirements include emissions limits, operating limits, management practices, maintenance requirements, performance testing, record keeping, reporting, etc. The specific requirements differ according to: whether the engine is new or existing, whether the engine is located at an area source or major source of hazardous air pollutants (HAP) emissions, and whether the engine is a compression ignition or a spark ignition engine. Several regulations have expanded the number and type of stationary RICE that must comply with federal requirements. These include:

- Stationary Generators:
 - 40 CFR Part 63, Subpart ZZZZ, National Emission Standard for Hazardous Air Pollutants (NESHAP) for RICE used for prime power - "the RICE rule"
 - 40 CFR Part 60 Subpart JJJJ, New Source Performance Standards (NSPS) - Standards of Performance for Stationary SI Internal Combustion Engines – "the Spark Ignition NSPS rule"
 - 40 CFR Part 60 Subpart IIII, Standards of Performance for Stationary CI Internal Combustion Engines – "the Compression Ignition NSPS rule"
- Portable Generators: 40 CFR PART 89, Control of Emissions from New and In-Use Nonroad Compression-Ignition Engines

7. Air Force Civil Engineer Center (AFCEC) Responsibilities.

7.1. AFCEC/CO or designee is the approval authority for generator authorization, design, and classification to include COPS.

7.2. AFCEC/COM will provide, upon request, a list of RPIE generators available for relocation (see paragraph 23).

7.3. AFCEC/CO is the approval authority for five-year revalidation of generator authorizations (see paragraph 24) and the use of generators for prime power or cogeneration.

7.4. AFCEC/CZ provides guidance regarding local emission restrictions, spill containment, and fuel tank inspection requirements. Installation Management Flights coordinate on generator installations/relocations to ensure compliance with regulations.

7.5. AFCEC/CN will review and coordinate on the usage of generators for Co-Generation and Prime Power.

7.6. AFCEC/CF will submit authorization and design approval requests to AFCEC/CO when projects are programmed without approval.

8. MAJCOM Responsibilities:

8.1. Review and coordinate on generator authorizations, designs, and classifications or recommend alternative for approval or disapprove with no further action.

8.2. Review annual RPIE generator inventory reports and provide AFCEC/COM Civil Engineer Maintenance, Inspection, and Repair Team (CEMIRT) a list of generators that are oversized, available for relocation, and cannot be redistributed within their command (see paragraph 23).

8.3. MAJCOM/A7O will coordinate the five-year revalidation of generator authorizations with AFCEC/CO and forward validation reports to AFCEC/COSM by 1 October of the reporting year (see paragraph 24).

8.4. Coordinates prime and cogeneration requests for utility tariff control through AFCEC/CN (information copy to AFCEC/COSM) and reviews environmental permits for compliance.

8.5. MAJCOMs will ensure BCEs develop written prioritized refueling plans and requirements to support EAID and RPIE generator operation during extended power outages of not less than seven days.

8.6. MAJCOM/CV will approve deviations for Semiannual Full-System Testing per paragraph 15.3.3.

9. Wing Commander or Equivalent Responsibilities. Approves deviations from manufactures service intervals per paragraph 20.2.5.

10. BCE Responsibilities:

10.1. Provide, operate, test and maintain all RPIE generators, except units supporting missile systems or special-use tenant generators without a signed Memorandum of agreement (MOA). Operate and maintain EAID generators assigned to the BCE.

10.2. MOAs must be established for special-use of tenant generators. This ETL is the standard for operation, testing, and maintenance of generators. MOAs must address reimbursable/non-reimbursable expenses and requests for additional levels of maintenance. Defense Logistics Agency (DLA) -capitalized real property and generator operation and maintenance may be funded through the DLA S/R&M (sustainment, restoration and modernization) process.

10.3. Must maintain access to manufacturer manuals or T.O.s for all equipment items.

10.4. Develop and coordinate RPIE and BCE owned EAID generator authorization, design, and classification requests through MAJCOM/A7O including generators procured with MILCON, O&M, SRM, DLA, or other funding sources. See memorandum templates in Attachments 1 and 2 or *Generator Authorization and Design Approval Request* and *New Facility Generator Authorization Request* in paragraph 3.8. Authorizations will become part of the generator record.

10.5. Conduct an inventory of all CE operated and maintained RPIE and EAID generators by 1 August including those that are replacement eligible (see paragraph 23.1.3.1) and forward a copy to the MAJCOM. Reconcile inventory results with real property records for RPIE generator accountability or with custodian authorization

and custody receipt listing (CA/CRL) records for EAID generators. Include generator classification and all generator data in accordance with the Inspection Checklist for the Generator Operating Log identified in Paragraph 3.8.

10.6. BCE is responsible for five-year field validation of generator authorizations for changes to authorized mission or system configuration. Forward validation reports to MAJCOM/A7O for revalidation (see paragraph 24).

10.7. The BCE is responsible for ensuring compliance with applicable provisions of 40 CFR Part 63 Subpart ZZZZ (all stationary prime power generators), 40 CFR Part 60 Subpart JJJJ (all stationary SI generators), 40 CFR Part 60 Subpart IIII (all stationary CI generators), and 40 CFR PART 89 (portable diesel generators), which, depending on generator location and age, may require operation and maintenance of generators in accordance with the manufacturer's written instructions or procedures.

10.8. Develop written prioritized refueling plans and requirements to support EAID and RPIE generator operation during extended power outages of not less than seven days. Send a copy of refueling plans annually along with generator inventory to MAJCOM/A7O.

10.9. Establish the onsite fire extinguisher requirement near the generator in accordance with AFI 91-203.

11. Facility Manager Responsibilities:

11.1. Verify proper function of all building equipment and systems while connected to actual facility load and under generator operation; sign Inspection Checklist for the Generator Operating Log following semi-annual generator test.

11.2. Obtain MAJCOM/CV approval for extending the semiannual full-system testing per paragraph 15.3.3.

12. Tenant Organizations:

12.1. Submit a work request for any generator system that will be connected to real property and establish an MOA with the BCE for the operation and maintenance of the generator on a reimbursable basis if needed.

13. Authorization and Classification of Generators.

13.1. AFCEC/CO may authorize the use of generators for prime power or cogeneration on a case-by-case basis. Tariff control is not permitted for standby generators. Primary control of the system must remain under installation control and the operation must not adversely affect the mission requirement. When submitting a request for cogeneration with the area electrical power system (EPS), the base must

demonstrate that their system complies with Institute of Electrical and Electronics Engineers (IEEE) 1547, *Standard for Interconnecting Distributed Resources with Electrical Power Systems*. Additionally, the base must negotiate an interconnection agreement with the area EPS supplier. Standby generators may be authorized to support mission-essential functions. A generator installed to support a mission-essential function will be installed and connected to provide power only to mission-essential functions within a single facility. Using one generator to support multiple facilities is not authorized due to simultaneous risk to multiple missions. If unique circumstances exist where one generator is needed to support multiple facilities, an authorization request must be submitted and approved by AFCEC/CO.

13.2. Types of Generator Authorizations may be one of the following:

13.2.1. RPIE generators support mission-critical functions where controlled shut-down or delayed power restoration is unacceptable. RPIE generators may be approved for missions that require immediate power restoration, uninterrupted power, or support emergency systems defined in NEC Article 700.

13.2.2. EAID portable units.

13.2.3. Other generators (5 kW or less) that are not RPIE or EAID are exempt from the authorization process and are not further addressed in this ETL.

13.3. RPIE classifications may be one of the following:

13.3.1. Emergency. “Emergency” classification is appropriate for life safety systems required to comply with NEC Article 700 and must also comply with NFPA 110, *Standard for Emergency and Standby Power Systems*, Level 1 criteria.

13.3.2. COPS. “COPS” classification is for NEC Article 708 systems and must also comply with NFPA 110 Level 2 criteria.

13.3.3. Other Permanently Installed. “Other Permanently Installed” classification is for other mission-critical functions not designated as “Emergency” or “COPS” and must comply with NEC, Article 701, “Legally Required Standby Systems,” and NFPA 110 Level 2 criteria.

13.3.4. POL/Fuels. RPIE “POL/Fuels” classification is for Type III, IV, and V hydrant fueling systems designed in accordance with DOD Standard Designs AW 78-24-28, *Pressurized Hydrant Fueling System*, and AW 78-24-29, *Pressurized Hot Fueling System*, with manual interlocked transfer switch. Continental United States (CONUS) generators may be sized for 50 percent of pumping capacity. Outside Continental United States (OCONUS) generators may be sized for 100 percent of pumping capacity. **Note:** Fuels Information Service Centers (FISC, Fuels Operations Facility) are authorized a generator.

13.4. EAID Classifications for Portable Generators (Trailer-Mount or Skid-Mount).

13.4.1. POL/Fuels. EAID “POL/Fuels” classification for Types I and II hydrant fueling systems, bulk fuel storage areas, non-hydrant operating storage areas, and vehicle fueling stations. EAID generators for POL/Fuels facilities must be prepositioned. **Note:** Detached fuels testing labs not located in a fuels operations facility must have a generator connection plug and a manual transfer switch (MTS).

13.4.2. Portable. “Portable” 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.

13.5. Typical facility authorizations and corresponding generator classifications permitted are listed below, per general criteria in UFC 3-520-01, *Interior Electrical Systems*. Other facilities may be approved by AFCEC/CO.

- 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* (Emergency or Portable).
- Air navigation aids and facilities, and airfield lighting (COPS or Other Permanently Installed)
- Mission/emergency-essential refrigerated storage rooms (Portable)
- POL storage and dispensing facilities (POL/Fuels RPIE or EAID)
- Mission-essential/critical utility plants (Other Permanently Installed)
- Critical sewage lift stations with low-level to high-level alarm duration less than EAID deployment time (Other Permanently Installed)
- Typical sewage lift stations with adequate alarm notification to start prepositioned generator (Portable or Other Permanently Installed when required by local laws)
- CE control centers (Portable or Other Permanently Installed)
- Mission-essential/critical communication facilities and telephone exchanges (Other Permanently Installed)
- Fire stations, including fire alarm, fire control, and radio equipment (Emergency)
- Mission-essential computer automated data processing facilities (Other Permanently Installed)
- Air traffic control towers (COPS or Other Permanently Installed)
- Base weather stations (Other Permanently Installed or Portable)
- Surveillance and warning facilities (Other Permanently Installed)
- Primary command and control facilities (does not include headquarters facilities without direct and essential command and control functions) (Other Permanently Installed)
- Remotely Piloted Aircraft control pods that are hardwired into a RPIE facility (Other Permanently Installed).

- Munitions Storage Facilities (Other Permanently Installed)
- Entry control points, security gates, and related security lighting systems (Portable)
- Aircraft and aircrew alert facilities (Other Permanently Installed)
- Law enforcement and security facilities (COPS, Other Permanently Installed, or Portable)
- Emergency operations center (EOC) in accordance with UFC 4-141-04, *Emergency Operations Center Planning and Design* (Other Permanently Installed)
- 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)
- One dining facility per installation or geographic location (Other Permanently Installed or Portable)
- 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) (Aircraft fuel cell repair facilities are not authorized emergency or standby power)
- Readiness facilities relying on electrical power to support tactical or mission-essential operations (Other Permanently Installed)
- Intelligence processing facilities providing mission-essential support to combat and contingency tactical missions (Other Permanently Installed)
- 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)
- Emergency lighting, elevators, fire alarms, security systems, or other life safety equipment within high-occupancy buildings or places of assembly of 1,000 or more people, for safely moving people out (Emergency)

14. Generator Installation Requirements.

14.1. RPIE Generator Designs. All RPIE generator designs must be approved in writing by AFCEC/CO or designee prior to finalizing project purchase and/or programming and/or design; the approval memo becomes part of the generator permanent record. Submit the generator authorization request during project initiation (programming) and design approval request at the 65 percent design milestone. If electrical design changes are made after the 65 percent design submittal, another design approval request is required. Submit requests in accordance with the templates provided in Attachments 1 and 2 or downloaded from the location identified in paragraph 3.8.

14.2. EAID Generator Authorizations. All EAID generator authorizations must be approved in writing by AFCEC/CO or designee prior to finalizing project purchase and/or programming documentation and/or design; the approval memo becomes

part of the generator permanent record. Submit generator authorization request during project initiation (programming). EAID generators only require authorization; design approvals are not required. Submit requests in accordance with the template provided in Attachment 1 or downloaded from the location identified in paragraph 3.8.

14.3. Partial Facility Generator Power. When only a portion of a facility is authorized generator power, that portion of the facility must be serviced by a separate subpanel fed from the generator and switched by either a MTS or ATS, depending on the mission of the facility. When the authorized mission-essential load is greater than 70 percent of the total facility load, a whole-building generator may be requested. For existing facilities without segregated mission-essential subpanels, replacement generators and transfer switches will be sized only for the authorized mission-essential load, and a plan must be devised for load-shedding all non-essential loads.

14.4. Generator Sizing. Existing, new, or replacement EAID or RPIE generator systems must be sized to achieve greater than 50 percent rated load and capable of supporting measured or calculated diversified, starting, and step load as defined by a qualified electrical design engineer. For existing generator replacements, provide support for load size. Acceptable forms of support would include the monthly load data recorded on *Generator Operating Log (Inspection Checklist)* (see paragraph 3.8) for the past 12 months, conducting a load test showing average load and peak over a three-day period during a period of full operation, or submitting accurate facility one-lines with all associated panel schedules.

14.5. Load Banks. For generator installations sized 250 kW and higher, the design must include provision for portable load bank/generator connection at the ATS or distribution equipment (not at the generator). Size the connection at a minimum of the generator kW rating. Connections will be designed per ETL 10-7, *Connection Methods for Standby Generators - 600 Volts or Less*, for 200A and below. Mechanical lugs are authorized for use above 200A.

14.6. Mission UPS. Mission UPSs installed to provide power conditioning and transitional backup power until RPIE generators assume the load must be configured to minimize UPS battery charging during generator operation. Ideally, UPS battery charging must be disabled. The generator will be sized for actual UPS mission critical loads and not based on maximum UPS capacity.

14.7. ATS or MTS.

14.7.1. Replace all solid neutral (3-phase, 3-pole) ATSS with switched neutral (3-phase, 4-pole) ATSS whenever the existing generator or ATS is replaced.

14.7.2. Solid neutral MTSs are allowed for connecting EAID generators only when the EAID generator neutral-ground connection (main bonding jumper) is properly bonded or removed per NEC Article 250.

14.8. Medical Facility Generators. Design of medical military facility generator systems must comply with UFC 4-510-01.

14.9. Standby Generators for Hangar Door Secondary Operation. This is not normally accepted and must be strongly justified when a secondary manual method cannot be installed. Existing and new backup generator installations for hangar door systems require AFCEC/CO approval, including instances where the generator is supplied as part of the hangar door installation. If approved, connections must be located within four (4) feet of the hangar floor below the hangar door motor.

14.10. Generator Connections. Standby generator connections may be authorized locally by the BCE when a generator is not authorized.

14.10.1. Generator connections must comply with ETL 10-7.

14.10.2. ATSS are not permitted for "Connection Only" authorization. Having a connection capability is not a basis for approval of a RPIE or EAID generator.

14.11. Automatic Transfer Switches. Transfer switches must have internal or external bypass capability. External ATS bypass is preferred using two appropriately rated double-throw switches (one ahead of ATS normal input and one connected to ATS output).

15. RPIE Generator and ATS Testing and Inspections.

15.1. Semimonthly RPIE Generator Inspections. Visually inspect RPIE generators and document on *Inspection Checklist for the Generator Operating Log* (Section 16 only) and file the form with the generator record.

15.1.1. Pre-operational Inspection. Complete a pre-operational inspection in accordance with manufacturer's recommendations, manufacturer instruction manuals, or NFPA 110, Chapter 8.

15.1.2. Battery Inspection. Inspect battery(s) for damage and charging system operation.

15.1.3. An engine start is optional.

15.1.4. Geographically separated equipment located more than 20 miles from the servicing installation may be inspected monthly if the batteries and generator operation are monitored by a remote monitoring system complying with ETL 11-1, *Civil Engineer Industrial Control System Information Assurance Compliance*.

15.2. Monthly RPIE Generator Operational Inspection and Testing. Accomplish operational inspection and testing on all RPIE generators in addition to the *semimonthly* visual inspection specified in paragraph 15.1.

15.2.1. Exercise the generator for a minimum of one hour using one of the following two methods (with facility load, load bank, or combination):

15.2.1.1. Method 1: Loading that maintains the minimum exhaust gas temperature (EGT) recommended by the manufacturer. The one-hour generator exercise time for Method 1 operational inspections includes warm-up, load test, and cool-down.

15.2.1.2. Method 2: Under operating temperature conditions and at not less than 30 percent of the generator nameplate kW rating. The one-hour generator exercise time for Method 2 operational inspections includes warm-up, load test, and cool down.

Note: Additional semiannual testing is required if any monthly test with facility load only is less than the minimum EGT and less than 30 percent of the generator nameplate rating (see paragraph 15.3.2.2).

15.2.2. Document monthly inspections on *Inspection Checklist for the Generator Operating Log* and file the form with the generator record.

15.3. Semiannual RPIE Generator Inspections and Testing. Accomplish inspections and full-system tests (generator, ATS with typical mission-essential facility load) on RPIE generators.

15.3.1. Test generators under facility load.

15.3.1.1. Semiannual generator testing is typically conducted with loss of commercial power to the ATS. Only the generator, transfer switch, and UPS (if installed) are tested; this does not assure that mission equipment and facility support equipment are connected to the correct power bus. If the test will also be used to verify connectivity and correct operation of all mission loads, it should be accomplished during a loss of power to the entire facility. Critical missions are highly encouraged to request loss of power to the entire facility to allow mission operators to verify their loads adequately. Regardless of the generator test method it will not identify potential grounding issues and voltage fluctuations associated with all parallel load switching scenarios downstream of the generator and Automatic Transfer Switch (ATS) without the development of additional site specific test criteria.

15.3.1.2. Uninterruptible Power Supplies (UPSs) are usually designed for a 15-minute run time at full capacity, but may run past the one-generator test period if actual loads are less than the full capacity of the UPS. For this reason, UPS status must be monitored to ensure operators do not falsely conclude that the load was carried by the generator.

15.3.1.3. Mission operators should not plan for UPS support longer than 15 minutes. If standby generators do not operate correctly during commercial power outages, mission operators should take immediate actions following their established mission shut-down and transfer processes to avoid mission disruption and equipment damage.

15.3.2. Load generators with available facility load (augmented with load banks, as necessary) to achieve not less than 50 percent of the generator nameplate kW rating for one continuous hour and not less than 75 percent of the generator nameplate kW rating for one continuous hour for a total test duration of not less than two continuous hours.

15.3.2.1. RPIE generators rated 25 kW and lower are not required to meet the 50 percent or 75 percent load requirement. Test with actual facility loads for a minimum of one hour.

15.3.2.2. RPIE generators meeting the monthly load testing requirements in paragraph 15.2.1 with facility load only are not required to meet the 50 percent or 75 percent load requirement during the *semiannual* inspection. Test with actual facility loads for a minimum of one hour.

15.3.3. Using Organization Denial for Semiannual Full-System Testing. The using organization may not deny the BCE permission to accomplish a full-system test. However, the BCE will make every effort to accommodate the user's mission operations within the testing month, but in no case will the time since the last full-system test exceed six months, except a *semiannual* full-system functional test with facility loads may be denied one time if approved in writing by the MAJCOM/CV, resulting in an automatic three-month extension that will extend the maximum time between full-system tests to nine months. If the MAJCOM/CV directs that a full-system test not be performed, the BCE must advise the wing commander that a second postponement will result in decertification and removal of the RPIE generator from the facility. The BCE will copy the MAJCOM/A7O, AFCEC/CO, and AF/A7C on this action. File correspondence in the generator folder. The MAJCOM/CV may not delegate this authority.

15.3.4. Exemptions to Semiannual Inspection and Testing. Generators supporting an actual power outage during a six-month period do not require an additional semiannual full-system test, provided the following conditions are met:

15.3.4.1. The outage duration was at least one hour. Separate outages cannot be added together to meet this requirement.

15.3.4.2. The transfer switch operated properly during the outage.

15.3.4.3. All items were checked/annotated on *Inspection Checklist for the Generator Operating Log*.

15.3.4.4. A post-operational inspection was accomplished.

15.4. Semimonthly ATS Inspections. Visually inspect ATSS semimonthly in accordance with manufacturers' recommendations, manufacturers' instruction manuals, or the requirements of NFPA 110, Chapter 8.

15.5. Additional Requirements for Select Mission-Essential Facilities.

15.5.1. Exercise emergency systems supporting navigational aids for air traffic control facilities according to AFI 13-204V3, *Airfield Operations Procedures and Programs*, in addition to requirements in this ETL.

15.5.2. Exercise emergency power systems supporting defense communications systems (DCS) or related communications activities according to Defense Information Systems Agency Circular (DISAC) 350-195-2, *Auxiliary Electric Power Systems*.

15.5.3. Exercise emergency power systems that support medical facilities according to NFPA 99, *Health Care Facilities Code*, in addition to requirements in this ETL.

15.5.4. Generator systems required to comply with NEC Article 708 must also comply with NFPA 110 Level 2 criteria.

16. POL/Fuels RPIE Generator Inspections and Testing.

16.1. Monthly Inspections and Testing.

16.1.1. Accomplish a pre-operation inspection in accordance with applicable T.O.s, commercial manuals, or locally developed procedures.

16.1.2. Engine start is required.

16.1.3. Document inspection on *Inspection Checklist for the Generator Operating Log* and file the completed form with the generator records.

16.2. Quarterly POL/Fuels Testing.

16.2.1. Load generators with designed pumping capability for one continuous hour.

16.2.2. Verify operation of MTS or interlocked switching devices.

16.2.3. Document quarterly inspections on *Inspection Checklist for the Generator Operating Log* and file the form with the generator record.

16.3. Annual Inspections and Testing. Load generators to achieve not less than 50 percent of the generator nameplate kW rating for one continuous hour and not less than 75 percent of the generator nameplate kW rating for one continuous hour, for a total test duration of not less than two continuous hours.

17. EAID Generator Inspections and Testing (Including EAID Classified as POL/Fuels).

17.1. Monthly Inspections and Testing.

17.1.1. Accomplish a pre-operation inspection in accordance with applicable T.O.s, commercial manuals, or locally developed procedures.

17.1.2. Engine start is required.

17.1.3. Document inspection on *Inspection Checklist for the Generator Operating Log* and file the form with the generator record.

17.2. Quarterly Testing.

17.2.1. Load generators to achieve not less than 50 percent of the generator nameplate kW rating for 30 continuous minutes and not less than 75 percent of the generator nameplate kW rating for one continuous hour, for a total test duration of not less than 90 continuous minutes.

17.2.2. Document quarterly inspections on *Inspection Checklist for the Generator Operating Log* and file the form with the generator record.

17.3. Annual Inspections and Testing.

17.3.1. Exercise EAID generators *annually* while connected to the facility or system they primarily support. Generator facility connections must comply with ETL 10-7. Generator connections described in ETL 10-7 cannot also be used as an emergency means of isolation that is required by the NEC.

17.3.2. Inspect electrical connection plugs and receptacles for corrosion before each use. Repair as necessary and coat contacts with proper electrical connection corrosion-preventive compound.

18. CE Deployable Generator Inspections and Testing.

18.1. Deployable Generators. Deployable generators are defined as those assigned to a unit type code (UTC) or equipment supply list.

18.2. Testing Upon Receipt. Power production personnel must test CE deployable generators upon receipt. After testing and documenting operating parameters on AF IMT 719, *Historical Record – Diesel-Electric Generator and System*, and *Inspection Checklist for the Generator Operating Log* (paragraph 3.8), power production personnel must purge, shelve, and prepare the generators for immediate deployment.

18.3. Annual Inspection and Operational Testing. Inspect and operationally test deployable generators *annually* for a minimum of one continuous hour while loaded to at least 75 percent of rated capacity.

18.4. CE Deployable Generator Maintenance. Maintain CE deployable generators in accordance with T.O. data or commercial guidance.

18.5. Non-CE Deployable Generators. Maintenance, testing, and operation of non-CE deployable generators (e.g., combat communication, air control squadron, material maintenance squadron) are governed by their own T.O.s or the manufacturer's guidance instead of this ETL.

19. Lubricating Oils.

19.1. Follow the engine manufacturer's recommendations for the type and grade of oil as closely as possible. Lubricating oils satisfying minimum requirements of military specifications MIL-PRF-2104, *Lubricating Oil, Internal Combustion Engine, Combat/Tactical Service*, and MIL-PRF-46167, *Lubricating Oil, Internal Combustion Engine, Arctic*, are acceptable for many diesel engines but may not be adequate for some high-speed engines.

19.2. Confirm the suitability of military specification lubricating oils with the engine manufacturer before use.

20. RPIE Generator Maintenance and Service Requirements.

20.1. Accomplish RPIE generator inspection, maintenance, and service in accordance with manufacturers' requirements and/or recommendations, or applicable T.O.s. Power production personnel must follow the manufacturer's recommendations on scheduling and maintenance procedures unless local conditions and operations justify deviations. Additionally there may be regulatory maintenance and maintenance recordkeeping requirements that vary greatly from engine to engine according to: whether the engine is new or existing, whether the engine is located at an area source or major source of hazardous air pollutants (HAP) emissions, and whether the engine is a compression ignition or a spark ignition engine, which include: 40 CFR Part 63 Subpart ZZZZ (all stationary prime power generators), 40 CFR Part 60 Subpart JJJJ (all stationary SI

generators), 40 CFR Part 60 Subpart IIII (all stationary CI generators), and 40 CFR PART 89 (portable diesel generators).

20.2. Deviation from Manufacturer's Service Intervals. Although deviating from manufacturers' specified service intervals is not recommended, oil change intervals may be extended for generators provided:

20.2.1. Requirements in 40 CFR Part 63 Subpart ZZZZ (all stationary prime power generators), 40 CFR Part 60 Subpart JJJJ (all stationary SI generators), 40 CFR Part 60 Subpart IIII (all stationary CI generators), and 40 CFR PART 89 (portable diesel generators), are not violated (when applicable, based on generator age and location).

20.2.2. The RPIE generator is not under warranty and is at least three years old.

20.2.3. Oil change interval must never exceed 24 months or 1,000 engine hours of operation.

20.2.4. Oil analysis results conducted at the same frequency specified for changing the oil are within the required limits specified by the manufacturer and CFR, Title 40, Chapter I, Subchapter C, Part 60, Subpart IIII, and Part 63, Subpart ZZZZ paragraph 63.6625(i). The analysis must include viscosity, acid content, particulates, water, or other contaminants, and recommended actions after results are provided. Total engine hours and time since last oil change must be printed on the oil analysis results.

20.2.5. For deviations from the manufacturer's recommendations, the BCE must ensure the wing commander (or equivalent) approves operational risk management (ORM) assessment and rationale for deviation from the manufacturer's recommendations. A copy of the wing commander's approval memo must be maintained with the generator maintenance record.

21. EAID Generator Maintenance and Service Requirements.

21.1. Accomplish EAID generator inspection, maintenance, and service actions and schedules in accordance with manufacturers' requirements and/or recommendations, or applicable T.O.s. There may be regulatory maintenance and maintenance recordkeeping requirement that vary greatly from engine to engine according to: whether the engine is new or existing, whether the engine is located at an area source or major source of hazardous air pollutants (HAP) emissions, and whether the engine is a compression ignition or a spark ignition engine, which include: 40 CFR Part 60 Subpart JJJJ (all stationary SI generators), 40 CFR Part 60 Subpart IIII (all stationary CI generators), and 40 CFR PART 89 (portable diesel generators).

21.2. Oil Change Intervals. An oil change may be deferred for a maximum of 12 months, provided:

21.2.1. Total operating hours are less than 150 within the last 12 months. Oil change interval may not exceed 24 months or manufacturer's recommended engine hours.

21.2.2. The oil analysis meets requirements for fuel dilution, viscosity, and total base (acid) content. Sample in accordance with manufacturers' recommendations and field test using oil analysis kit NSN 6630-01-096-4792, *Test Kit, Oil Condition*, or an independent oil analysis company test kit (e.g., Cummins Filtration #CC2543; Caterpillar S•O•SSM; Wix Filters). Record results on *Inspection Checklist for the Generator Operating Log* and AF IMT 719. If an approved field test kit is not available or the above tests are not performed, the oil must be changed.

22. Fuels.

22.1. Fuel oils used for standby generators must meet Federal Specification A-A-52557, *Fuel Oil, Diesel; For Posts, Camps, and Stations*. Follow the specific temperature and applicable service conditions and ensure sulfur content does not exceed environmental restrictions. Do not mix different grades of fuel. Consult T.O. 42B-1-1, *Quality Control of Fuels and Lubricants*, and MIL-STD-3004, *Quality Assurance/Surveillance for Fuels, Lubricants and Related Products*, for additional information.

22.2. Jet fuel potentially may be used with required additives when diesel is not available. Consult the AFCEC/CZTQ for local and Environmental Protection Agency (EPA) emission restrictions. (Consult the manufacturer for kW de-rating when using JP-8 or Jet A(m).)

22.3. Use of natural gas (NG), liquid petroleum gas (LPG), or bio-diesel fuels is not permitted for mission-essential standby generation. NG, LPG, or alternate fuels may be authorized for prime power generation or co-generation. BCEs must either program existing mission-essential generators that use NG, LPG, or bio-diesel for replacement within five years or request a waiver from the MAJCOM/A7 for continued operation. BCEs will ensure refueling plans address backup fuel support for existing mission-essential, non-diesel generators in the event of fuel supply disruption.

22.4. Personnel must be trained to manage fuel storage tanks in accordance with AFI 23-204, *Organizational Fuel Tanks*. Ensure storage tanks are marked according to fuel type and warning signs are appropriately located. If an external fuel tank is installed, post a one-line diagram of the fuel system indicating tank size and valve locations.

22.5. Fuel Tanks of Emergency Generators:

22.5.1. Emergency generator fuel tank(s) must comply with requirements of NFPA-30, NFPA-37, NFPA 54/58, NFPA-110 and applicable state regulations.

22.5.2. For new systems, coordinate with Installation Management Flight to ensure emergency generator fuel tank is included on base Spill Prevention Control and Countermeasures (SPCC) plan per 40 CFR 112 and included in the installation fuel tank inventory per AFI 32-7044, paragraph 1.8.3.7.

22.5.3. Provide secondary containment as required by 40 CFR 112 or equivalent at overseas locations.

22.5.4. Install hazard identification signs as specified in NFPA 704 on stationary aboveground tanks or per Final Governing Standards for overseas locations.

22.5.5. Emergency generator fuel tanks will be inspected monthly and annually as required by AFI 32-7044 with results of inspections posted in the Storage Tank Accounting and Reporting (STAR) system.

22.6. Provide a minimum seven-day fuel supply (based on actual generator load), either in a dedicated on-site storage tank or from a confirmed delivery source. When a delivery source is used to meet the seven-day requirement:

22.6.1. Fuel schedule will accommodate assigned EAID generator tank capacity.

22.6.2. RPIE generators will have a minimum 24-hour local capacity based on the actual generator load fuel consumption rate of the engine.

22.7. BCEs must develop written prioritized refueling plans and requirements to support EAID and RPIE generator operation during extended power outages of not less than seven days.

22.8. BCEs will annually coordinate and review prioritized refueling plans with the logistics readiness squadron (LRS).

23. Reporting RPIE Generators.

23.1. If functional load testing indicates the generator is loaded less than 30 percent of rated capacity over a 12-month period, BCEs will take actions described in paragraphs 23.1.3 through 23.1.4.

23.1.1. RPIE generators used to support large in-rush currents may be sized for starting current. These generators may be excluded from paragraph 23.1.3.

23.1.2. RPIE generators for fire pumps and RPIE generators rated 25 kW and lower are not required to comply with paragraph 23.1.3.

23.1.3. Compile a list of generators that do not meet the required 30 percent loading for facility loads over a 12-month period. Categorize and certify the generators as “Replacement Eligible,” “Replace by Attrition,” or “Replacement Not Feasible.” Document the classification in a memo and file it with the generator records.

23.1.3.1. Replacement Eligible: Viable generator assets that can be moved within the base, command, or across the Air Force.

23.1.3.2. Replace by Attrition: Generator assets that have nearly served their life expectancy (15 to 20 years) and have been identified on the five-year plan for replacement. Documentation must include replacement timeframe and project number.

23.1.3.3. Replacement Not Feasible: Generators that cannot be used elsewhere on base or within the MAJCOM and relocation will be too costly.

23.2. EPA emissions requirements might prevent relocating an existing generator to a different base. Any generator installation (new or replacement) and generator removal requires AFCEC/CZ coordination to ensure clean air compliance regulations are met.

23.3. Consult with the AFCEC/CZ when an EPA-permitted generator is removed from the base; that generator must be removed from the Clean Air Act Title V air permit. Additionally, because the permit requires an accurate list of active permitted generators on base, the BCE should check with AFCEC/CZ to determine if the generator size is small enough to be excluded from the permit.

23.4. By 1 October each year, MAJCOMs will review base generator inventory reports and provide AFCEC/COM CEMIRT a list of “Replacement Eligible” generators that cannot be redistributed within their command. AFCEC/COM will consolidate excess generator inventory and provide listings to the MAJCOMs by 15 December of that year.

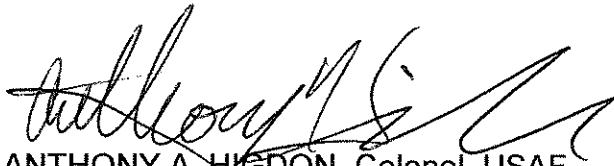
24. Five-Year Revalidation of Generator Authorizations.

24.1. Every five years by 1 August of the reporting year, BCEs must revalidate through the MAJCOM the generator authorization memorandum for changes to mission or modifications to the authorized electrical system. MAJCOMs will coordinate with AFCEC/CO for reauthorization or extension of the existing generator authorization.

24.2. AFCEC/COSM must be notified through the MAJCOM when a generator authorization is no longer required.

24.3. The BCE will prepare a plan for all generators that do not have an AFCEC authorization and are available for relocation or disposition. The plan will be included as a part of the revalidation process.

25. Point of Contact. Generator requests and recommendations for improvements to this ETL are encouraged and should be furnished to the Electrical subject matter expert, AFCEC/COSM, 139 Barnes Drive, Suite 1, Tyndall AFB, FL 32403-5319, DSN 523-6813, commercial (850) 283-6813, email: AFCEC.RBC@us.af.mil



ANTHONY A. HIGDON, Colonel, USAF
Deputy Director

- 5 Atchs
- 1. New and Replacement Authorization Template
- 2. Generator Design Evidence Template
- 3. Existing Generator Authorization and Design Sizing Template
- 4. AF/A7C Memorandum for Authorization and Size Validation of Emergency and Standby Generators
- 5. Distribution List

NEW AND REPLACEMENT GENERATOR AUTHORIZATION TEMPLATE

(Date)

MEMORANDUM FOR HQ MAJCOM/A7O
AFCEC/COSM
IN TURN

FROM: XXX CES/CC
123 Bedford Way
All AFB, FL 11111

SUBJECT: Generator Authorization Request for Building <number>, All AFB, FL

1. Project Requested:

MAJCOM:
Base:
Project:
Status:
POC: (Name and Contact Information)
RPIE or EAID:
Classification: (Emergency, COPS, Other Permanently Installed, POL/Fuels, Portable)

2. Project Description: (What mission will the generator support? Mission description? New or replacement generator? Please be specific.)

3. Description of Emergency/Mission-Critical Loads: (Summary of loads that will be on generator power. What and why does it need power? Please be specific.)

4. Impact of Power Loss on Mission: (What is the impact to the mission if power is lost and not restored immediately or within a few hours?)

BCE Signature Block or designee

Attachment:
DD Form 1391 or AF Form 332

(Date)

1st Ind, HQ MAJCOM/A7O

MEMORANDUM FOR AFCEC/COSM

1. Recommend [approval/alternative] for generator authorization as a [RPIE/EAID].
(If recommending alternative state why it does or doesn't meet ETL requirements)
2. [Meets/Does not meet] ETL 13-4 criteria.

A7O Signature Block or designee

NEW AND REPLACEMENT GENERATOR DESIGN EVIDENCE TEMPLATE

(Date)

MEMORANDUM FOR HQ MAJCOM/A7O
AFCEC/COSM
IN TURN

FROM: XXX CES/CC or AFCEE
123 Bedford Way
All Base FL 11111

SUBJECT: Design Evidence – Request for RPIE Generator Design Approval

1. Project Requested:

MAJCOM:
Base:
Project Number:
Status:
Design Review %: <65%, 90%, Other>
POC: (Name and Contact Information)
New/Replacement:
Classification: (Emergency, COPS, Other Permanently Installed, POL/Fuels, Portable)

2. Project Description: (What mission will the generator support? Mission description? Please be specific.)

3. Description of Emergency/Mission-Critical Loads: (Summary of loads that will be on generator power. What and why does it need power? Please be specific.)

4. Design Information:

Service Transformer kVA:
Service Voltage:
Service Entrance Ampacity:
ATS Ampacity:
Emergency Panel Ampacity:
Emergency Connected Load:
Emergency Demand Load:
Avg kW: (Please include if replacement generator/not required for new)
Max kW: (Please include if replacement generator/not required for new)

Generator Rating:

kW: kVA: PF:

Generator Duty:
Type of Fuel:
Fuel Supply:
 Day Tank Capacity:
 Sub-base Capacity:
 External Tank Capacity:
Enclosure Type:
Cooling Type:

BCE Signature Block or designee

Attachments:

1. One-line diagram
2. Emergency Panel Schedule
(Optional attachment is software sizing recommendation)

1st Ind, HQ MAJCOM/A7O

(Date)

MEMORANDUM FOR AFCEC/COSM

1. Recommend [approval/alternative] for generator design evidence and [____kW] generator size. (If recommending alternative state why.)
2. [Meets/does not meet] the requirements of ETL 13-4. (If it doesn't meet ETL requirements, state why.)

A7O Signature Block or designee

EXISTING GENERATOR AUTHORIZATION AND DESIGN SIZING TEMPLATE

(Date)

MEMORANDUM FOR HQ MAJCOM/A7O
AFCEC/COSM
IN TURN

FROM: XXX CES/CC or AFCEE
123 Bedford Way
All Base, FL 11111

SUBJECT: Existing Generator Authorization & Design Sizing

1. Building Description:

MAJCOM:
Base:
Building Number:
Mission-Authorized Emergency Power:

2. Generator Description:

Generator Type: <RPIE or EAID>
Emergency Classification: <Emergency, COPS, Other>
ETL 13-04 Sub Paragraph: <13.5>
Whole Building Generator: <Yes or No>

3. Description of Emergency/Mission-Critical Loads: <Narrative. Include special considerations that may drive a larger generator sizing>

4. Impact of power lost on mission: <Narrative>

5. Generator Design Information:

Service Transformer kVA:
Emergency Connected Load:
Emergency Demand Load:
Average kW: <From last 12 months>
Max kW: <From last 12 months>
Generator Rating (from nameplate): kW: kVA: PF:

Signature Block of XXX CES/CC
(or designated representative)

1st Ind, HQ MAJCOM/A7O

(Date)

MEMORANDUM FOR AFCEC/COSM

1. MAJCOM Recommendation: <Approve RPIE, EAID, Connection Only, Alternative>
(If recommending alternative state why.)

MAJCOM EE (or designee)
Signature Block

AF/A7C MEMORANDUM FOR AUTHORIZATION AND SIZE VALIDATION OF EMERGENCY AND STANDBY GENERATORS



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE
WASHINGTON, DC

1 APR 2013

MEMORANDUM FOR ALL MAJCOM A7

FROM: AF/A7C
1260 Air Force Pentagon
Washington DC 20330-1260

SUBJECT: Authorization and Size Validation of Emergency and Standby Generators

An audit for Air Force Emergency and Standby Generators completed 3 Feb 12 indicated that for the 15 installations selected, 12.7% of existing emergency generators were not authorized, 39.4% of existing standby generators were not authorized, and 67% of existing emergency generators were improperly sized. As a result, AFCEC/CO was assigned the responsibility for authorization and size validation of all AF generators and related appurtenances and published ETL 11-21, *Emergency and Standby Generator Design, Maintenance, and Testing Criteria*.

Since publishing the new ETL, all actions to date focused primarily on procurement of new or replacement generators, namely generator authorizations and 87 design submittals. It is now time to shift focus to authorization and size validation of over 6,000 existing emergency and standby generators. To minimize the impact to installations and commands, emergency Real Property Installed Equipment (RPIE) generator authorizations and size validations have been broken down into four groups. Submit completed RPIE generator packages, not previously submitted and as specified in the ETL, to AFCEC/CO by dates indicated below:

a. 500 kW and above	Suspense Due:	1 June 2013
b. 300 kW – 499 kW	Suspense Due:	02 September 2013
c. 150 kW – 299 kW	Suspense Due:	25 April 2014
d. 5 kW – 149 kW	Suspense Due:	21 November 2014

Authorization and size validation of standby Equipment Authorized Inventory Data (EAID) generators will be worked in FY14/15 once we complete the emergency generators. At the conclusion of this revalidation process of existing emergency and standby generators, all civil engineering owned generators will have an authorization/sizing memo, which is to be retained with the generator.

Close management of our generator program will allow the AF to make more efficient use of our resources and manpower, while still providing secure and reliable power for all AF critical missions. If you or your staff has any questions, please contact our POCs, Ms. Joanie Campbell, P.E., and Mr. James Faison, P.E., at DSN 523-6364/6528, respectively.

TIMOTHY A. BYERS, Maj Gen, USAF
The Civil Engineer
DCS/Logistics, Installations & Mission Support

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SPECIAL INTEREST ORGANIZATIONS

Information Handling Services (1)	Construction Criteria Base	(1)
15 Inverness Way East	National Institute of Bldg Sciences	
Englewood, CO 80150	Washington, DC 20005	