Course Overview, Course Goal, and Objectives

Welcome to the Public Assistance Electrical Systems Considerations course.

This course will provide an overview of electrical systems in the context of Public Assistance grant funded projects. By the end of the course, State, Local, Tribal, and Territorial Applicants and Recipients will be able to understand a general overview of electrical systems considerations and project eligibility.

Upon successfully completing the course, the participants will be able to:

- Describe Public Assistance policy and guidance related to electrical systems
- Identify common reasons why electrical systems projects are deemed ineligible for Public Assistance grant funding
- Identify documentation considerations associated with electrical systems, including documenting damage prior to repair
- Identify special considerations for eligible electrical systems projects

Select this link to access the Public Assistance acronym list.

Lesson 1 Overview and Objectives

This lesson provides an overview of electrical systems, including the different components and examples of each. The module will also identify examples of the different types of electrical systems facilities and distribution networks.

At the end of this lesson, participants will be able to:

- Review administrative requirements of the course
- Describe the different components of electrical systems
- Identify types of electrical systems facilities and distribution networks

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Electric Power Systems

An electric power system is a network of electrical components deployed to supply, transfer, store, and use electric power.

Electrical Power Systems:

- Provide looped, network, or radial distribution service or other redundancies in the electrical service to critical facilities, such as

hospitals and fire stations
- Install surge suppressors and lightning arrestors

Examples of Electrical Systems Components

The following are examples of electrical systems components:

- Poles
- Guy wires
- Cross-arms
- Conductors
- Transformers

Utility Poles

An utility pole is a structure secured into the ground and used to provide overhead support for public utility equipment like power lines, telephone wires and other types of communication cable, streetlights and traffic related equipment.

These poles range in height and material, and they are anchored into the ground by different methods.

In some cases, a single pole may be designed to support numerous types of public utility equipment.

Possible Hazard Mitigation of Utility Poles

- Replace damaged poles with higher-rated poles (preferably two classes stronger) of the same or different material. When replacing poles with higher-rated poles, install guys and anchors to provide lateral support for poles supporting pole-mounted transformers, regulators, capacitor banks, reclosers, air-break switches, or other electrical distribution equipment

- Remove large diameter lines

- Add cross-bracing to H-frame poles to provide additional strength

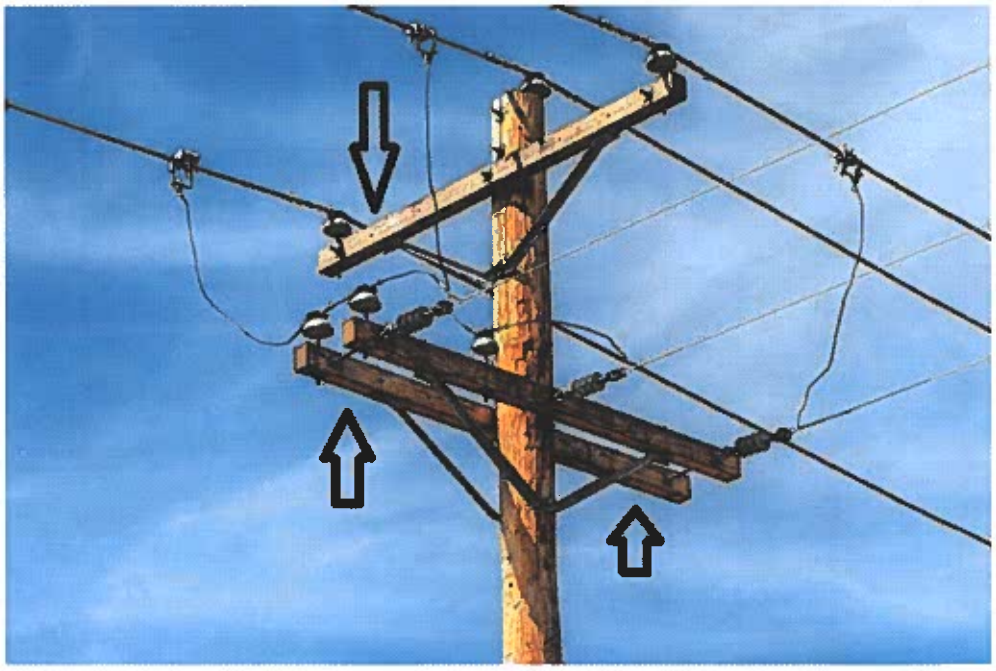
Guy Wires

A guy-wire or guy-rope, also known as simply a guy, is a tensioned cable designed to add stability to a free-standing structure.

They are used commonly on wind turbines, utility, and poles.

Utility Pole Cross-arms

A utility pole cross-arm is an arm fastened at right angles to an upright (as the horizontal member of a cross or a traverse on a telephone pole).



Conductors

A conductor is an object or type of material which permits the flow of electric charges in one or more directions.

For example, a wire is an electrical conductor that can carry electricity along its length.

Transformers

A transformer is designed to convert the generated high voltage to lower voltages for distribution.

Possible Mitigation

- Elevate pad transformers above the Base Flood Elevation

- Support pole-mounted transformers with multiple poles

Transmission and Distribution Lines

Possible Mitigation

- Add guy-wires or additional support

Examples of Electrical Systems Facilities and Networks

Below are a few examples of electrical systems facilities and networks

- Substations
- Powerlines
- Drainage channel or irrigation system
- Water or sewer line system
- Generation Plant
- SCADA

Module Summary

This module is complete.

Participants can now:

- Identify Administrative requirements of the course
- State the goals and objectives of the course
- Describe the different components of electrical systems
- Identify types of electrical systems facilities and distribution networks

The next module will introduce electrical systems eligibility requirements.

Lesson 2 Overview and Objectives

This lesson provides an overview of the eligibility requirements for electrical systems. It identifies the specific requirements for reconductoring and reasons why projects are commonly deemed ineligible.

At the end of this lesson, participants will be able to:

- Identify the eligibility requirements for electrical systems
- Identify common reasons why electrical system projects are deemed ineligible for Public Assistance Program funding

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Components of Eligibility

The four basic components of eligibility are:

- Applicant
- Facility
- Work
- Cost

FEMA refers to these components as the building blocks of an eligibility pyramid. Generally, FEMA must determine each building block eligible, starting at the foundation (Applicant) and working up to cost at the top of the pyramid.

Eligible Applicants

FEMA provides assistance to eligible Applicants. FEMA must first determine whether an Applicant is eligible

before evaluating the Applicant's claim.

The following are a list of eligible Applicants.

- State and Territorial Governments
- Tribal Governments
- Local Governments
- Certain Private Nonprofit Organizations

State and Territorial Governments

State and Territorial governments, including the District of Columbia, American Samoa, the Commonwealth of the Northern Mariana Islands, Guam, Puerto Rico, and the U.S. Virgin Islands, are eligible Applicants.

Tribal Governments

Federally recognized Tribal Governments, including Alaska Native Villages and organizations (hereinafter referred to as "Tribal Governments"), are eligible Applicants.

Alaska Native corporations are not eligible as they are privately owned, for-profit company

Local Governments

The following types of local governments are eligible Applicants:

- Counties and parishes
- Municipalities, cities, towns, boroughs, and townships
- Local public authorities
- School districts
- Intrastate districts
- Councils of governments (regardless of whether incorporated as nonprofit corporations under State law)
- Regional and interstate government entities
- Agencies or instrumentalities of local governments
- State-recognized Tribes
- Special districts established under State law
- Community Development Districts are special districts that nance, plan, establish, acquire, construct or reconstruct, operate, and maintain systems, facilities, and basic infrastructure within their respective jurisdictions. To be eligible, a Community Development District must be legally responsible for ownership, maintenance, and operation of an eligible facility that is accessible to the general public.

Private Nonprofit Organizations

Only certain Private Nonprofits are eligible Applicants. To be an eligible Applicant, the must show that it has:

A current ruling letter from the U.S. Internal Revenue Service granting tax exemption under sections 501(c), (d), or (e) of the Internal Revenue Code of 1954; or

Documentation from the State substantiating it is a non-revenue producing, nonprofit entity organized or doing business under State law.

Components of Eligibility

For Private Nonprofits, FEMA must determine whether the Private Nonprofits owns or operates an eligible facility in order to determine whether the Applicant is eligible.

Secondly, for state, territorial, tribal and local government applicants, evaluating facility eligibility (e.g. sandbagging and boarding up windows) is not necessary

Eligible Facilities (1 of 2)

In general, a facility must be determined eligible in order for work to be eligible. There are exceptions for some emergency work activities.

A facility is a building, works, system, or equipment, built or manufactured, or an improved and maintained natural feature.

Eligible Facilities (2 of 2)

An example of a system that qualifies as a facility is an electrical power system. Mechanical, electrical, plumbing, and other systems that are components of a facility in which they operate are considered part of that facility.

A natural feature is improved and maintained if it meets all of the following conditions:

- The natural feature has a designed and constructed improvement to its natural characteristics, such as a terraced slope or realigned channel
- The constructed improvement enhances the function of the unimproved natural feature
- The Applicant maintains the improvement on a regular schedule to ensure that the improvement performs as designed

Eligible Public Facilities

An eligible public facility is one that a State, Territorial, Tribal, or local government owns or has legal responsibility for maintaining. Including any:

- Flood control, navigation, irrigation, reclamation, public power, sewage treatment and collection, water supply and distribution, watershed development, or airport facility
- Non-Federal-aid street, road, or highway
- Other public building, structure, or system,

including those used for educational, recreational, or cultural purposes
- Park

Private Nonprofit Facility

An eligible Private Nonprofit facility is one that provides educational, utility, emergency, medical, or custodial care, including for the aged or disabled, and other essential governmental-type services to the general public.

If a Private Nonprofit operates multiple facilities, or a single facility composed of more than one building, FEMA must evaluate each building independently, even if all are located on the same grounds. Buildings that are part of a complex that includes outdoor facilities (e.g., swimming pools, athletic fields, tennis courts) are not evaluated separately from the rest of the complex when determining eligibility of the building.

For example, an outdoor pool usually has a building for bathrooms and controlling entry. In such cases, FEMA does not evaluate the building for eligibility separately because it is an intrinsic part of the pool complex.

Ineligible Facilities

The following are not eligible facilities:

- Unimproved property (e.g., a hillside or slope, forest, natural channel bank)
- Land used for agricultural purposes

General Work Eligibility

Through the Public Assistance program, FEMA provides:

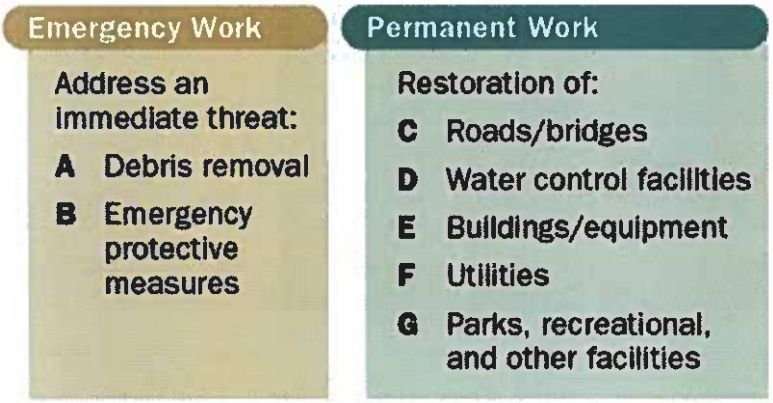
- Grant funding for emergency protective measures and debris removal (Emergency Work)
- Grant funding for permanent

restoration of damaged facilities, including cost-effective hazard mitigation to protect the facilities from future damage (Permanent Work)

Categories of Work

To facilitate the processing of Public Assistance funding, FEMA separates Emergency Work into two categories and Permanent Work into five categories based on general types of facilities.

These categories and examples of each are shown in the figure below: (Emergency Work and Permanent Work)



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Electrical systems may do emergency protective measures (Category B) when they do a temporary repair that will be removed when the facility is permanently repaired. Permanent repairs will usually fall under utilities (Category F)".

Mutual Aid Eligibility

Three types of mutual aid are eligible:

- Emergency Work
- Emergency utility restoration (regardless of whether it is deemed Category B or F)
- Grant management

Mutual Aid work is subject to the same eligibility criteria as contract work.

Costs to transport the Providing Entity's equipment and personnel to the declared area are eligible.

FEMA may reimburse an eligible applicant for mutual aid costs associated with restoration of an electrical power system, regardless of whether or not the restoration is temporary or permanent, in accordance with the mutual aid agreement

Cost Eligibility

The final component evaluated for eligibility are the costs claimed by the Applicant. Not all costs incurred as a result of the incident are eligible.

To be eligible, costs must be:

- Directly tied to the performance of eligible work
- Adequately documented
- Reduced by all applicable credits, such as insurance proceeds and salvage values
- Authorized and not prohibited under Federal, State, Territorial, Tribal, or local government laws or regulations
- Consistent with the Applicant's internal policies, regulations, and procedures that apply uniformly to both Federal awards and other activities of the Applicant
- Necessary and reasonable to accomplish the work properly and efficiently

A cost is reasonable if, in its nature and amount, it does not exceed that which would be incurred by a prudent person under the circumstances prevailing at the time the Applicant makes the decision to incur the cost.

Reconductoring Example

As a direct result of the event, a conductor is only eligible for replacement (reconductoring) when the Applicant cannot effectively repair it because one of the following exists within a line section:

- Twenty-five percent or more of the conductor spans have visible damage, such as broken strands, splices, or sleeves (installed as a result of the event) or severe pitting, burns, or kinks

- Thirty percent or more of the line spans are visually stretched (out of sag), or do not meet clearance requirements such as conductor-to-conductor or conductor-to-ground clearance

- Forty percent or more of the supporting poles need to be replaced or plumbed (straightened). A pole is considered to be in need of straightening if it is leaning such that it is unsafe to climb.

- Forty percent or more of the supporting structures (other than poles) have damage such as broken cross-arms, braces, ties, insulators, guys, pulled anchors, or bent pins. If more than one element of the support structure is damaged, it still only counts as one damaged support structure. If a pole is counted under the previous bullet, FEMA does not count the supporting structure under this criterion.

- Sixty-five percent or more of any combination of the damage described in the bullets above

- Evidence provided by a licensed Professional Engineer that demonstrates the conductor is damaged beyond repair

Reconductoring (1 of 2)

If the Applicant provides sufficient documentation establishing the pre-disaster condition and a line section of its system meets one of the six criteria above, that line section is eligible to be reconductored.

The use of #2 Aluminum Conductor Steel Reinforced is considered a lower cost alternative to replacing conductor with equal or lesser amperage capacity such as copper weld conductor, hard and soft drawn copper wire, smaller Aluminum Conductor Steel Reinforced , and Amerductor.

Therefore, if a conductor with equal or lesser amperage capacity to #2 Aluminum Conductor Steel Reinforced is eligible for reconductoring, the line section is eligible to be replaced with #2 Aluminum Conductor Steel Reinforced .

When the Applicant replaces conductor with #2 Aluminum Conductor Steel Reinforced , adjustments to other components of the electric distribution and transmission systems to accommodate #2 Aluminum Conductor Steel Reinforced , including, but not limited to, adjusting span lengths between utility poles and increasing pole heights and standards to meet appropriate design requirements are eligible.

The Applicant does not need to cite a codes and standards for this additional work even though the appropriate design requirements may come from Federal, State, Territorial, Tribal, or local codes or standards, including National Electrical Safety Code or Rural Utilities Service standards.

Reconductoring (2 of 2)

If the Applicant prefers to reconductor a line with conductor of lesser amperage capacity than #2 Aluminum Conductor Steel Reinforced , such as #4 Aluminum Conductor Steel Reinforced (including associated adjustments in span lengths and pole heights), FEMA will provide Public Assistance funding for the work as long as the cost is less than the cost of reconductoring with #2 Aluminum Conductor Steel Reinforced (including associated adjustments in span lengths and pole heights).

If the Applicant plans to upgrade its conductor to an amperage capacity above #2 Aluminum Conductor Steel Reinforced, and there is no code or standard requiring the upgrade that meets the eligibility requirements discussed in Chapter 2:VII.B of the Public Assistance Program and Policy Guide, the additional upgrades are not eligible and the Applicant must request an Improved Project.

If the damage does not meet the criteria for replacement, only the repair of the damaged line section(s) is eligible.

Frequent Reasons Why Projects Are Deemed Ineligible

- Ineligible work and costs
    - Ineligible work performed by a

providing entity
    - Work eligibility criteria not met
    - Eligibility within a designated area
- Legal responsibility
- Improper Procurement
- Increased Operating Costs

Ineligible Work and Costs

This includes:

- Revenue lost due to shutdown of a utility
- Increased operating costs, such as increased costs for obtaining an alternative source of power because of the shutdown of a power generation plant
- General post-disaster surveys, inspections, and assessments

Ineligible Work Performed by a Providing Entity

This includes:

- Dispatch operations outside the receiving State, Territory, or Tribe
- Training and exercises
- Support for long-term recovery and mitigation operations

Minimum Work Eligibility Criteria

At a minimum, work must meet each of the following three general criteria to be eligible:

- Be required as a result of the declared incident
- Be located within the designated area, with the exception of sheltering and evacuation activities
- Be the legal responsibility of an eligible Applicant

If this criterion is not met, work is deemed ineligible.

Eligibility Within a Designated Area

To be eligible, work must be located in the designated area defined in the declaration (with the exception of sheltering and evacuation activities).

Emergency Work or Permanent Work performed on a facility located outside of the designated area is not eligible.

For example: There are significant damages in county A, B, and C. Generation plant is located in county E. Conductors have to pass through county D. Some of the line damages and a few towers spans throughout the various county lines. Only damages within the designated counties would be considered eligible for Public Assistance.

Legal Responsibility

To be eligible, work must be the legal responsibility of the Applicant requesting assistance.

To determine legal responsibility for Emergency Work, FEMA evaluates whether the Applicant requesting the assistance either had jurisdiction over the area or the legal authority to conduct the work related to the request at the time of the incident.

Lesson 2 Summary

This lesson is complete.

Participants can now:

- Identify the eligibility requirements for electrical systems
- Identify common reasons why electrical system projects are deemed ineligible for Public Assistance Program funding

The next lesson will explain how to document disaster-related damage for electrical systems.

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Lesson 3 Overview and Objectives

This lesson provides the processes involved in documenting disaster-related damage to electrical systems, including records of pre-disaster conditions, emergency work, mutual aid, and permanent work. It also explains rules preventing duplication of benefits and provides a case study to examine best practices.

At the end of this lesson, participants will be able to:

- Identify proper procedures for documenting pre-disaster and disaster-related damage for expense reimbursement

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Documentation Supporting Pre-disaster Condition of a Conductor

To document the pre-disaster condition of a conductor, the Applicant should provide the following information:

- A signed, dated, and stamped letter from a licensed professional engineer who has direct experience with the damaged electrical transmission or distribution system certifying the pre-disaster capacity and condition of the conductor along with records providing satisfactory evidence of the pre-disaster capacity and condition of the conductor. Records may include, but are not limited to, maintenance records, contract documents, work orders, inspection logs, or a description of past inspection and maintenance activities certified by a licensed professional engineer.
- If available, copies of construction work plans demonstrating the utility's past practices and current and future projects
- If required by Rural Utilities Service, a copy of any corrective action plans submitted to Rural Utilities Service in compliance with 7 Code of Federal Regulations.

If the Applicant is able to provide the information above, FEMA does not require further documentation to establish pre-disaster condition. The Applicant is not precluded from substantiating the pre-disaster condition with other documentation if it is unable to provide the documentation described above.

Documentation

For electric transmission and distribution facility conductors specifically:

- A signed, dated, and stamped letter from a licensed Professional Engineer who has direct experience with the damaged electrical transmission or distribution system certifying the pre-disaster condition of the conductor along with records providing satisfactory evidence of the pre-disaster capacity and condition of the conductor. Records may include, but are not limited to, maintenance records, contract documents, work orders, inspection logs, or a description of past inspection and maintenance activities certified by a licensed Professional Engineer.
- Construction work plans demonstrating the utility's past practices and current and future projects

- If required by the Rural Utilities Service ,a copy of any corrective action plans submitted to RUS in compliance with Title 7 of the Code of Federal Regulations 1730.25, Corrective action (Rural Utilities Service borrowers only)
- Staking sheets

Duplication of Benefits

FEMA is legally prohibited from duplicating benefits from other sources. If the Applicant receives funding from another source for the same work that FEMA funded, FEMA reduces the eligible cost or de-obligates funding to prevent a duplication of benefits.

Rural Electric Cooperative (1 of 8)

Second Appeal Analysis

Applicant: Southern Star Electric and Telecommunication Utility

03/14/2016

Background

From April 9 to 11, 2013 a severe winter storm produced high winds and ice that extensively damaged an electrical distribution system owned and operated by Southern Star Electric and Telecommunication Utility (Applicant) - a component unit of the city of Luthersville, Kansas. FEMA prepared a new Project for $69,316.50 in Public Assistance funding to replace approximately 1.5 miles of electrical conductors. FEMA had previously funded temporary repairs of these conductors through emergency protective measures, as documented in another Project.

In the new Project, FEMA included the Applicant's conductor replacement certifications, signed and stamped by the Applicant's engineer, documenting and recommending replacement per the six criteria contained within Disaster Assistance Policy 9580.6, Electric Utility Repair (Public and Private Nonprofit).

FEMA hired a contractor to validate the Applicant's Storm Damage Checklist inspection sheets. Within the PW scope of work, FEMA listed the three sources of information that the Applicant should provide to establish the pre-disaster condition per DAP 9580.6.

FEMA, however, stated that the Applicant must provide two additional forms of documentation to establish the pre-disaster condition: a summary of the past five years of load growth for the line section and "inspection records, maintenance records, information relating to age / capacity, and technical data that validates the mechanical and electrical characteristics of the conductor compared to the original manufacturer's design specification.

Rural Electric Cooperative (2 of 8)

On August 30, 2013, FEMA notified the Kansas Homeland Security and Emergency Management Department (Grantee) of the ineligibility determination and the Applicant's appeal rights. The rationale for the determination was threefold. First, the Applicant did not comply with the documentation requirements of Disaster Assistance

Policy 9580.6 by failing to provide "substantial technical data" to verify that the damage was a direct result of the disaster in accordance with Title 44 of the Code of Federal Regulation (44 C.F.R.) 206.223(a)(1). Second, the Applicant did not document the adopted code or standard that dictated the requirements and methods used for conductor replacement as required by 44 C.F.R. 206.226(d). Finally, repair activities appeared to be contingent upon federal funding as such work had not commenced. FEMA obligated the new Project for zero dollars.

First Appeal

In a first appeal letter submitted October 28, 2013, the Applicant appealed FEMA's denial of $69,316.50 in costs to replace electrical conductors. With the appeal, the Applicant provided: conductor replacement certifications from DGR Engineering; Kansas Utilities Board inspection reports from 2004 to 2012; maintenance work orders; maintenance records; a document describing participation of Rural Electric Cooperatives in the development of 9580.6, Electric Utility Repair (Public and Private Nonprofit); and affidavits from employees and industry experts. The Applicant also submitted a letter from DGR Engineering stating that the damaged lines were "maintained in good repair and in intact operating condition" prior to the disaster. The Applicant maintained that the conductor met the criteria in the Kansas Electrical Code, which is the code or standard under which it operates and was consistent with 44 C.F.R. 206.226(d)(3).

Rural Electric Cooperative (3 of 8)

The Applicant contended that it met all the criteria in Disaster Assistance Policy 9580.6 including providing documentation to establish the pre-disaster condition of the conductors and conductor replacement certifications recommending that the conductor qualified for replacement. By requiring a five-year load growth summary and technical data, Applicant argued that FEMA had essentially modified Disaster Assistance Policy 9580.6 by requiring additional documentation to establish pre-disaster condition. The Applicant provided affidavits from employees and industry experts to support its position.

On December 24, 2013, the Grantee forwarded the first appeal to FEMA Region VII. The Grantee reiterated the Applicant's arguments about 9580.6 being implemented differently for the disaster. The Grantee emphasized that the Applicant had met all requirements set forth in FEMA policy and that laboratory testing was neither required nor feasible. To support the latter point, the Grantee contacted testing laboratories and determined that the testing FEMA requested would exceed the cost to replace the conductor by a factor of 1:9 and would bankrupt the Applicant.

On March 5, 2014, Region VII sent a Request for Information (RFI) to the Applicant for records sufficiently demonstrating the condition and capacity of the conductor prior to the disaster and listed several examples of satisfactory documentation. Region VII also requested a letter from a licensed professional engineer certifying the pre-disaster condition and capacity of the conductor, including specific statements asserting the pre-disaster tension limits and breaking strength of the conductor. The Region asked for copies of construction work plans and "Reliability and Outage Information" for a five-year period ending December 31, 2013 as required by the Kansas Utility Board and [Kansas Administrative Code]."Region VII also requested a description of damages and cost estimates for any damage not already recorded on the new Project and a description of disaster related repair and replacement work completed to date. Additionally, the Region asked the Applicant to confirm that "conductor damaged indicators. from pre-disaster events were not included in the post-disaster inspection counts."

Rural Electric Cooperative (4 of 8)

On April 29, 2014, the Applicant responded to FEMA Region VII's Radio Frequency Interference, noting that Disaster Assistance Policy 9580.6 does not require provision of tension limits or breaking strength of the conductor nor laboratory testing. The Applicant noted that it provided a copy of Region VII's RFI to industry experts who indicated that an engineer could not provide the data requested by FEMA without conducting laboratory testing, which is not required by the REC industry. The Applicant maintained that the conductors failed due to winter ice storm loads exceeding the designed wind and ice loads, not due to age.

The Applicant confirmed that "existing conductor damages were not included in the inspections conducted to determine eligibility for funding under the PA program." The Applicant provided additional documentation to demonstrate the pre-disaster condition and investment in maintenance for previous years, including an inspection and maintenance plan, inspection reports, a long-range plan, and additional affidavits.

FEMA Region VII solicited technical advice from a licensed engineer. The engineer provided his findings in a report titled, FEMA Region VII, Technical Report of Aged, Small Gauge Distribution Conductor at Issue in Southern Star Municipal Electric Utility (hereinafter "Technical Report"). Region VII transmitted the Technical Report to the Applicant on November 14, 2014 and the Applicant responded on February 3, 2015, challenging many of the Technical Report's findings.

Rural Electric Cooperative (5 of 8)

On April 30, 2015, the FEMA Region VII Regional Administrator denied the first appeal, concluding that the Applicant did not sufficiently demonstrate the damage was the result of the declared disaster. The Regional Administrator examined the three criteria contained in Disaster Assistance Policy 9580.6 to establish the pre-disaster condition of the Applicant's conductor. The Regional Administrator found that: the Applicant failed to provide a certification of the pre-disaster condition and capacity of the conductor from a licensed professional engineer and records detailing the pre-disaster condition and capacity; system inspection reports provided by the Applicant presented little evidence of the pre-disaster condition and capacity of the conductor and only addressed poles and associated hardware; copies of construction work plans provided by the Applicant did not address the age or degradation of the conductor and the Applicant did not submit any corrective action plans; and reliability reports provided did not demonstrate an increase in outages since the disaster.

The Regional Administrator estimated that the conductor was about 60 years old and was likely subjected to multiple loading events, such as ice, wind, or other environmental elements which would have impacted the condition and capacity of the conductor over time. The Regional Administrator determined that the criteria listed in Disaster Assistance Policy 9580.6 to establish conductor replacement did not apply because the Applicant did not establish pre-disaster condition; however, FEMA reviewed the documentation provided by the Applicant and noted discrepancies in visual inspections and inspection reports. Lastly, the Regional Administrator mentioned that, based on the criteria of 44 C.F.R. 206.226, the original Project indicated that the Applicant did not demonstrate that an eligible code or standard applied. The Regional Administrator concluded that the criteria of 44 C.F.R. 206.226 do not apply because the Applicant could not demonstrate the damage to the conductors was disaster related.

Second Appeal

On June 23, 2015, the Applicant submitted a second appeal in which it reiterated many of its first appeal arguments. The Applicant again emphasized that DAP 9580.6 does not require laboratory testing and lists the specific criteria which the Applicant met. The Grantee forwarded the second appeal to FEMA Region VII on August 12, 2015, supporting the appeal. On August 14, 2015, FEMA Region VII transmitted the second appeal to FEMA Headquarters.

Rural Electric Cooperative (6 of 8)

Discussion

Pursuant to 44 C.F.R. 206.226, Restoration of damaged facilities, FEMA may reimburse applicants for "work to restore eligible facilities on the basis of the design of such facilities as they existed immediately prior to the disaster." Disaster Assistance Policy 9580.6 establishes criteria to assist FEMA in determining eligibility for repair or replacement of disaster-damaged electric distribution and transmission systems.

Establishing Pre-Disaster Condition

Disaster Assistance Policy 9580.6 lists three sources of information that applicants should provide FEMA to demonstrate the pre-disaster condition of the conductors. The three sources of information should not be

viewed as exhaustive or absolute requirements that must be met by an applicant, but rather as information preferred by FEMA to demonstrate pre-disaster condition. However, if the Applicant is able to provide the three sources of information, FEMA does not require further documentation.

The first source of information is a "certification of the pre-disaster condition and capacity of the conductor from a licensed professional engineer who has direct experience with the damaged electrical transmission or distribution system" and "records providing satisfactory evidence of the condition and capacity of the conductor as it existed prior to the disaster."

A "signed, dated, and stamped letter from a licensed professional engineer will satisfy the certification requirement" and satisfactory evidence of the condition and capacity of the conductor "may include, but is not limited to maintenance records, contract documents, work orders, inspection logs, etc.." The physical condition of a conductor is commonly documented within inspection reports, which note issues with leaning poles, broken conductor strands, and broken guys. Inspection reports also include information on whether a conductor was functioning as designed prior to the incident. The capacity of a conductor refers to the amount of electricity (amperage) that can flow through it and is dependent on the type of conductor. An inspection report typically speaks to the capacity of a distribution system. While laboratory testing of the tensile strength of a conductor would indicate its physical strength, this is not required to determine the condition and capacity of the conductor as the terms are used in FEMA policy.

On November 7, 2013, the Applicant provided FEMA with a signed, dated, and stamped letter from a licensed professional engineer with 14 years of experience working with the Applicant's electric distribution system. In the letter, the engineer certified that the lines referenced in the new Project were "maintained in good repair and in intact operating condition" to general industry and Kansas Utilities Board requirements prior to the disaster. Thus, the engineer speaks to the physical condition and capacity of the conductor when he states that it was maintained in good repair and operating condition. The Applicant also submitted Kansas Utilities Board inspection reports for 2004 through 2012 indicating defects found and the resulting repair actions taken. Transmission and distribution system inspection guidelines found within maintenance reports require inspection for broken strands, sag, and splices, along with the inspection of other components of the electrical distribution system.

The Kansas Utilities Board inspection reports did not note any maintenance needs or reliability concerns and found that the Applicant conducted inspections "in a manner conducive to the identification of safety, maintenance, and reliability concerns." The fact that the conductor was not mentioned in the Kansas Utilities Board inspection reports indicates that no physical defects were observed.

The absence of any observed reliability concerns sufficiently demonstrates the pre-disaster conductor had the appropriate capacity. Taken together, the November 7 engineer certification letter and Kansas Utilities Board inspection reports adequately document the pre-disaster condition and capacity of the conductor and satisfy the first source of information listed in Disaster Assistance Policy 9580.6.

Rural Electric Cooperative (7 of 8)

The second source of information required by Disaster Assistance Policy 9580.6 is “copies of construction work plans demonstrating the utility’s past practices and current/future projects.” The Applicant provided a 2003 ten-year maintenance plan and a 2013 ten-year maintenance plan indicating that it maintains and upgrades the system. It also submitted maintenance work orders from 2008 to 2012 showing a history of past maintenance. Those documents sufficiently satisfy the second source of information listed in Disaster Assistance Policy 9580.6.

The third source of information is a copy of corrective action plans required by the Rural Utility Service. The Applicant is not currently a Rural Utility Service borrower and, consequently, is not required to provide corrective action plans to Rural Utility Service.

Upon review of all the information provided, the documentation satisfies the sources of information delineated in Disaster Assistance Policy 9580.6. As such, the Applicant has established the pre-disaster condition of the conductor.

Criteria for Conductor Replacement

After an Applicant establishes the pre-disaster condition of the conductors, it must then identify, and FEMA must verify, the disaster-related damage. The extent of damage controls whether FEMA will fund the conductor's repair or replacement. Damage to conductors is often not demonstrated by an outright break in the cable, but rather sagging or stretching, which is more difficult to identify. To assist with this determination, FEMA has pre-determined that a conductor is "eligible for replacement," when it is stretched beyond the point where it can be effectively repaired and re-sagged through predictive modeling to meet appropriate clearances, sag and tension, and to meet pre-disaster reliability.

A conductor is beyond the point where it can be effectively repaired when one or more of the following exists within a line section as a result of the disaster:

- 25 percent or more of the conductor spans are damaged;
- 30 percent or more of the line spans are visibly out of sag or do not meet clearances;
- 40 percent or more of the poles were replaced or need to be replaced due to the disaster;
- 40 percent or more of the supporting structures have a disaster-related damaged component;

The sum of the percentages of any combination of the above criteria is 65 percent or more.

Rural Electric Cooperative (8 of 8)

Conclusion

Through inspection reports, construction work plans, and engineer certifications, the Applicant has provided sufficient documentation to establish the pre-disaster condition of the conductors and has met FEMA's criteria for conductor replacement. As such, the conductors are eligible for replacement.

Lesson 3 Summary

This lesson is complete.

Participants can now:

- Identify proper procedures for documenting pre-disaster and disaster-related damage for expense reimbursement

The next lesson will cover regulations and standards governing the repair, replacement, and rebuilding of electrical systems.

Please select this link for full image description.

Lesson 4 Overview and Objectives

This lesson focuses on the regulations and standards governing the repair, replacement, and rebuilding of electrical systems, including federal requirements, environmental and historic preservation concerns, and mitigation measures.

At the end of this lesson, participants will be able to:

- Identify the benefits of electrical standards, and review the regulations and standards that govern electrical systems

Please select this link for full image description.

Electrical Systems Regulations and Standards (1 of 3)

Electrical standards provide:

- Safety and reliability - adherence to standards help ensure safety, reliability and environmental care. As a result, users perceive standardized products and services as more dependable. This in turn raises user confidence, increasing sales and the take-up of new technologies.
- Support of government policies and legislation - standards are frequently referenced by regulators and legislators for protecting user and business interests, and to support government policies
- Interoperability - the ability of devices to work together relies on products and services complying with standards

Electrical Systems Regulations and Standards (2 of 3)

- Business benefits - standardization provides a solid foundation upon which to develop new technologies and to enhance existing practices. Specifically, standards:
  - Open up market access
  - Provide economies of scale
  - Encourage innovation
  - Increase awareness of technical developments and initiatives
- Consumer choice - standards provide the foundation for new features and options, thus contributing to the enhancement of our daily lives. Mass production based on standards provides a greater variety of accessible products to consumers.

Electrical Systems Regulations and Standards (3 of 3)

Other reasons for electrical standards and practices:

- The design, installation and testing is based on certain rules, regulations and standards. Generally, rules and regulations are aimed at ensuring the safety of people and property during operation and maintenance.
- The regulations and specifications state the minimum testing required to ensure that the installation is safe. Standards generally describe the construction, performance and testing (basically quality control) of equipment and installation.

Together, these rules and standards assist to achieve quality and safety of the installation or system.

Federal Requirements

National Electric Safety Code (NES)

- American National Standards Institute Standard C2 is a United States standard of the safe installation, operation and maintenance of electric power and communication utility systems including power substations, power and communication overhead lines and power and communication underground lines. It is published by the institute of Electrical and Electronics Engineers.

Rural Utility Service Standards (RUS)

- Rural electric cooperatives, municipal utilities, and public power districts commonly use time and equipment contracts (similar to time-and-materials contracts) for power distribution system repairs. Costs under these contracts are subject to certain criteria.

Environmental and Historic Preservation Concerns (1 of 2)

The Applicant is responsible for obtaining all required environmental and historic preservation permits from the appropriate agencies before proceeding with Emergency Work.

The Applicant should make every effort to inform the Recipient and FEMA of necessary Emergency Work prior to performing the work, when appropriate, to afford FEMA the opportunity to perform environmental and historic preservation reviews prior to the start of work.

Emergency Work is usually excluded from National Environmental Policy Act review through a statutory exclusion. Permanent work will need to go through the traditional environmental and historic reservation reviews.

Environmental and Historic Preservation Concerns (2 of 2)

FEMA must ensure compliance with other Federal environmental and historic preservation laws, regulations, and executive orders, including those related to floodplains, wetlands, federally listed threatened and endangered species and their critical habitats, and historic properties.

Most environmental and historic preservation laws contain emergency provisions to expedite response activities that must be taken to prevent imminent loss of human life or damage to improved property.

When performing Emergency Work, the Applicant should avoid new ground disturbance when possible. If the Applicant cannot avoid new ground disturbance, it must consider impacts to natural and cultural resources and obtain all necessary permits.

National Environmental Policy Act (NEPA)

In 1969, Congress enacted the National Environmental Policy Act in response to public concern about the deteriorating quality of the "human" environment and the inadequate consideration of environmental impacts of major federal projects.

The human environment encompasses the following areas: physical (geology, soils, air, water), biological (plants, animals), social (communities, economics), and cultural (archaeological and historic resources).

The intent of the National Environmental Policy Act is to ensure safe, healthful, productive, and esthetically and culturally pleasing surroundings.

Mitigation

Mitigation is any sustained action taken to reduce or eliminate long-term risk to people and property from natural hazards and their effects.

For mitigation to be effective we need to act now-before the next disaster-to reduce human and financial consequences later (analyzing risk, reducing risk, and insuring against risk).

It is important to know that disasters can happen at any time and any place and if we are not prepared, consequences can be fatal.

Effective mitigation requires that we all understand local risks, address the hard choices, and invest in long-term community well-being. Without mitigation actions, we jeopardize our safety, financial security and self-reliance.

Electrical Systems Mitigation Measures (1 of 2)

The mitigation measures must meet all eligibility requirements. There may be instances where these measures are required by codes or standards.

FEMA considers the following mitigation measures to be cost-effective if the measures do not exceed 100 percent of the eligible repair cost (prior to any insurance reductions), as long as they are listed in Appendix J in the Public Assistance Policy and Program Guide.

Electrical Power Systems

- Provide looped distribution service or other redundancies in the electrical service to critical facilities, such as hospitals and fire stations.
- Install surge suppressors and lightning arrestors.
- Transformers:
    - Elevate pad transformers above the Base Flood Elevation
    - Support pole-mounted transformers with multiple poles

Electrical Systems Mitigation Measures (2 of 2)

Power Poles:

- Replace damaged poles with higher-rated poles (preferably two classes stronger) of the same or different material. When replacing poles with higher-rated poles, install guys and anchors to provide lateral support for poles supporting pole-mounted transformers, regulators, capacitor banks, reclosers, air-break switches,

or other electrical distribution equipment.

- Remove large diameter lines

- Add cross-bracing to H-frame poles to provide additional strength

- Power Lines: Add guy-wires or additional support

Criteria for Approving Mitigation Measures

The following are criteria for approving mitigation measures:

- Technically feasible
- Address the type of event
- Cost-effective - The three criteria for determining cost-effectiveness include:
  - 15% of the total eligible repair cost (prior to any insurance reductions) of the facility(s)
  - 100% of the eligible repair cost (prior to any insurance reductions) of the facility(s) if it is on the FEMA pre-approved list, located in the Public Assistance Policy and guide, Appendix J:
    1. Looped distribution service and other redundancies
    2. Surge suppressors and lighting arrestors
    3. Transformers
    4. Power Poles
- Demonstration through an acceptable benefit-cost analysis methodology that the measure is cost-effective

FEMA's Benefit Cost Analysis Requirements (BCA)

Benefit-Cost Analysis is the method by which the future benefits of a hazard mitigation project are determined and compared to its costs.

A Benefit-Cost Analysis is based on a comparison of the total eligible cost for the mitigation measure to the total value of expected benefits. Benefits include reduction in:

- Damage to the facility and its contents
- The need for emergency protective measures

- The need for temporary facilities
- Loss of function
- Casualties (typically only for earthquake, tornado, and wildfire mitigation)

The result is a Benefit-Cost Ratio, which is calculated by a project's total benefits divided by its total costs.

The Benefit-Cost Ratio is a numerical expression of the "cost-effectiveness" of a project. A project is cost effective when the Benefit-Cost Ratio is 1.0 or greater, indicating the benefits of a prospective hazard mitigation project are sufficient to justify the costs.

Lesson 4 Summary

This lesson is complete.

Participants can now:

- Describe how electrical system regulations and standards apply to FEMA reimbursement program.

The next lesson will review the entire course.

Please select this link for full image description.

Lesson 5 Overview and Objectives

This lesson will review the course objectives. Participants will take a Post-Course Assessment at its conclusion.

- At the end of this lesson, participants will be able to summarize the content of the course.

Please select this link for full image description.

Course Objectives

In this course, you learned how to:

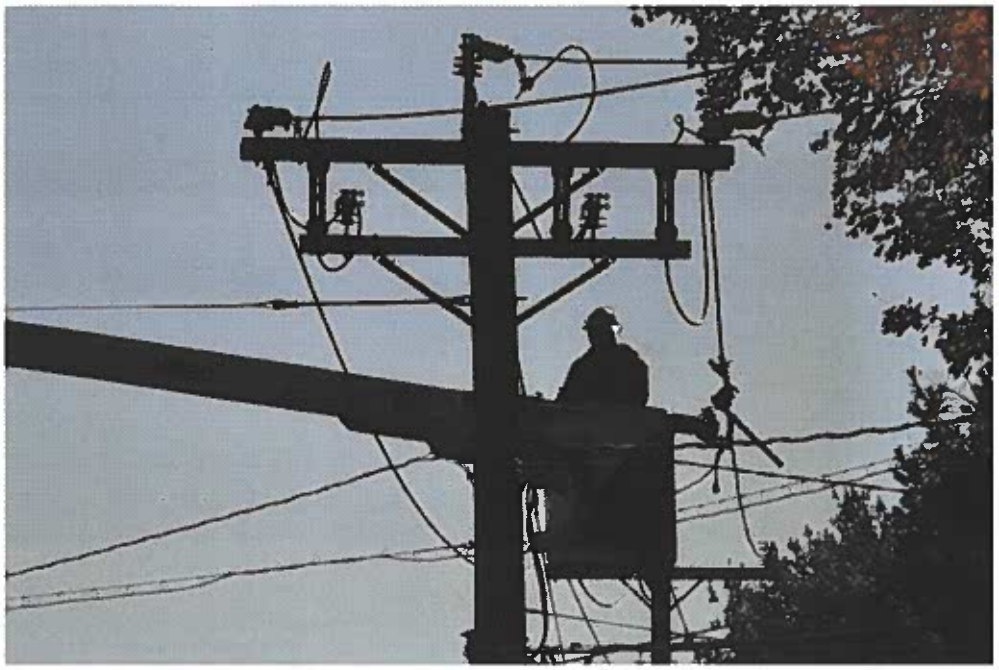
- Describe Public Assistance policy and guidance related to electrical systems
- Identify common reasons why electrical systems projects are deemed ineligible for Public Assistance grant funding
- Identify documentation considerations associated with electrical systems, including documenting damage prior to repair
- Identify special considerations for eligible electrical systems projects

Lesson 1 Objectives

Participants are now able:

- Review Administrative requirements of the course

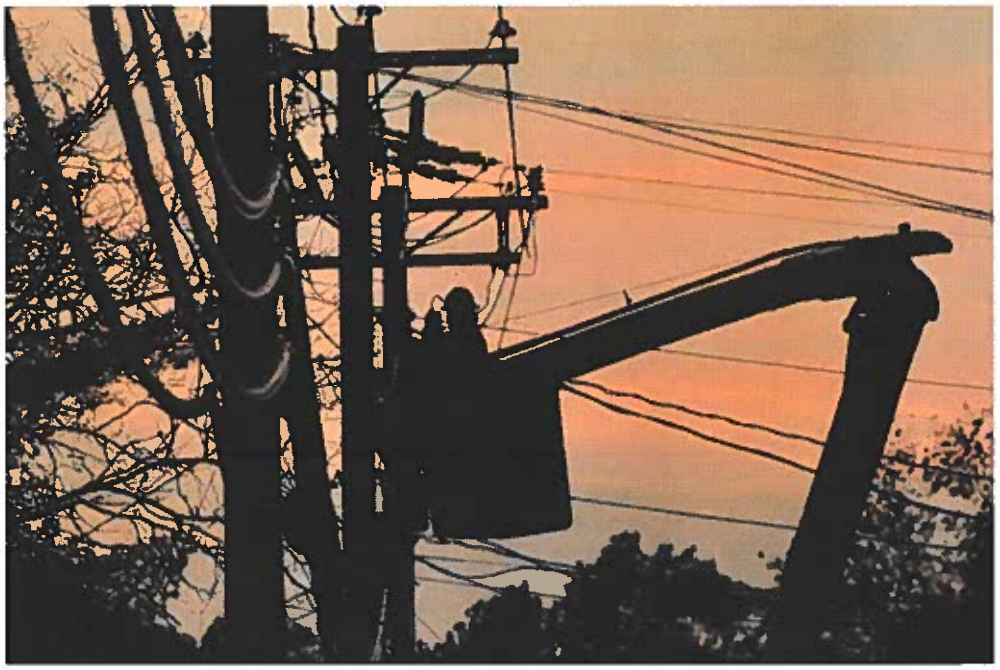
- Describe the different components of electrical systems
- Identify types of electrical systems facilities and distribution networks



Lesson 2 Objectives

Participants are now able to:

- Identify the eligibility requirements for electrical systems
- Identify common reasons why electrical system projects are deemed ineligible for Public Assistance Program funding



Lesson 3 Objectives

Participants learned how to:

- Identify proper procedures for documenting pre-disaster and disaster-related damage for expense reimbursement

Lesson 4 Objectives

Participants are now able to:

- Describe how electrical system regulations and standards apply to FEMA reimbursement program

Course Summary

This course is complete.

Participants can now identify and articulate the following course objectives:

- Describe Public Assistance policy and guidance related to electrical systems
- Identify common reasons why electrical systems projects are deemed ineligible for Public Assistance grant funding
- Identify documentation considerations associated with electrical systems, including documenting damage prior to repair
- Identify special considerations for eligible electrical systems projects

Please select this link for full image description.