



# Substation Physical Security Design Options for Compliance With NERC CIP 014-1

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**Abstract**—The electric utility industry has adjusted their thinking of substation physical security as a result of recent attacks and the issuance by NERC of CIP-014-1. As a result there is a substantial investment in upgrading existing station security and providing enhanced security at new stations. With this new design approach, there are a significant number of options, considerations and products to evaluate during the design of a physical security system. This paper will highlight key considerations that should be addressed during the design and implementation of a system to comply with CIP 014-1.

Today's approach to physical security revolves around four key concepts:

- Deter an attack
- Detect a threat
- Delay access to the station
- Accurately assess and respond to the attack

## DESIGN CONSIDERATIONS – YARD LAYOUT

- EXCLUSION ZONE
- STATION ACCESS
- BALLISTIC PROTECTION
- YARD LIGHTING

## DESIGN CONSIDERATIONS – MATERIAL

- FENCE FABRIC
- CAMERA SELECTION
- CUT & CLIMB DETECTION
- MICROWAVE DETECTION

## DESIGN CONSIDERATIONS - OTHERS

- GROUNDING
- OVERHEAD CLEARANCES
- PERMITTING



## CONCLUSION

Substation physical security is an incredibly important aspect of the overall reliability of the US electric grid. When designing the physical security system for a new or existing station, there are numerous design considerations that need to be taken into account. These depend on the overall security posture of the utility, the equipment in the station, the current and ultimate layout of the site, as well as specific environmental and local, municipal and state guidelines and requirements. It is also extremely important to understand the overall objectives of the security system when selecting the types of fence material and detection devices.