IEEE Standard Criteria for Security Systems for Nuclear Power Generating Stations

IEEE Power & Energy Society

Sponsored by the
Nuclear Power Engineering Committee

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IEEE Standard Criteria for Security Systems for Nuclear Power Generating Stations

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Abstract: Criteria are provided for the design of an integrated security system for nuclear power generating stations. Requirements are included for the overall system, interfaces, subsystems, and individual electrical and electronic equipment. This standard addresses equipment for security-related detection, surveillance, access control, communication, data acquisition, and threat assessment.
Keywords: access control, central alarm station (CAS), cyber security, duress alarms, integrated security system, intrusion detection, line supervision, perimeter intrusion alarm, portal security lighting, remote video surveillance, secondary alarm station (SAS), security lighting, security systems, threat assessment, uninterruptible power supply (UPS) system, voice communications

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Introduction

This introduction is not part of IEEE Std 692-2010, IEEE Standard Criteria for Security Systems for Nuclear Power Generating Stations.

The physical protection and security of nuclear power generating stations concerns utilities, manufacturers, the general public, and those who are responsible for licensing and regulating nuclear power generating stations and other nuclear facilities. This standard is intended to establish both guidance and minimum requirements for acceptable security system design for nuclear power generating stations. This standard focuses on the design, operation, and maintenance of various security-related electrical and electronic equipment, including integration to achieve an acceptable security system. As described in this standard, to be effective, the electrical and electronic aspects of such an integrated security system need to include 11 essential elements:

- Perimeter intrusion alarms
- Security lighting
- Video surveillance
- Access control
- Interior intrusion detection
- Data acquisition, processing, and display
- Voice communications
- Line supervision
- Duress alarms
- Power supplies
- Maintenance and testing

The integrated security system and each of these 11 elements are addressed in separate clauses of this standard.

The development of these criteria was initially undertaken in January 1978. The standard was originally issued in 1986 and then updated in 1997 and later reaffirmed in early 2005. In September 2005, Working Group 3.2 (Nuclear Security) of Nuclear Power Engineering Committee's Subcommittee 3 (Operations, Maintenance, Aging, Testing, and Reliability) was directed to undertake another update of the standard.

This new revision incorporates the following improvements and updates:

- Update of the Introduction
- Development of high-level design basis requirements for the integrated security system and each of its 11 elements
- Re-format and revision of each clause to achieve improved consistency, clarity, usability, and level of detail
- Update of definitions to reflect current security term usage
- Update of terminology throughout the standard to reflect current industry usage
- Update of each of the four figures to reflect current industry approaches
- Deletion of several overly prescriptive requirements in favor of performance-based approaches

— Deletion of references to obsolete technology and replacement with current state-of-the-art usage

— Update and validation of guidance and requirements in Clause 4, Clause 5, Clause 6, and Clause 7 on threat assessment

— Update of Clause 6 to address IESNA comments on the 1997 version, to reflect current approaches, and to provide guidance on maintaining minimum illumination levels throughout the life of the plant

— Addition of guidance in Clause 4 and Clause 10 on addressing cyber security issues

— Addition of new requirement to consider duress alarms in badging areas that are located outside the Protected Area

— Update of bibliography

This revision is intended primarily to assist development of security systems at new nuclear power generating stations but may also be helpful for design modification efforts at older plants and at other nuclear facilities. The working group attempted to stay abreast of and consistent with the rapidly changing security requirements evolving after the September 11, 2001 terrorist event in the U.S., but at the same time avoided the level of detail that could compromise any safeguard aspects of such changes.

Note that this standard is not intended to cover all security-related topics. An understanding of the goals and objectives of the security system with an appreciation for the financial, operational, testing, and maintenance functionality of the site will enhance the compatibility of the various plant systems, features, and operator actions required to mitigate events such as radiological, fire, loss of site power, and security events. The plant layout shall be compatible with the need to control access and maintain separation of areas due to pipe break accident, missiles, fire, radiation exposure, and flooding considerations. Physical protection measures should be incorporated into the design prior to the start of construction to enhance physical protection and non-obtrusive security system installation and to minimize cost.

Consequently, such features as listed below should be incorporated in the initial design:

— Embedment of card readers/conduit

— Hardened walls, floors, and ceilings

— Bullet-resistant features

— Minimized utility ports

— Utility port barriers

— Security door hardware

This standard is not intended to cover the following security-related topics:

— Development of threat and response criteria

— Security force composition, deployment, or weaponry

— Classification of vital equipment or vital areas

— Contingency plans

— Security requirements during the plant construction stage

— Personnel screening

— Physical, civil, and structural aspects of security boundaries

— Controls on safeguards information

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Contents

IEEE Standard Criteria for Security Systems for Nuclear Power Generating Stations

1. Overview

1.1 Scope

The standard provides criteria for the design, testing, and maintenance of security system equipment for nuclear power generating stations. Such equipment includes permanently or temporarily installed systems, subsystems, and components used by the security force for physical protection of the station against security threats. It includes equipment for security-related detection, assessment, surveillance, access control, communication, and data acquisition.

1.2 Purpose

This standard establishes criteria for the design of an integrated security system for nuclear power generating stations. These criteria assist in the selection and application of equipment to detect, monitor, display, and record security conditions and events.

2. Normative references

There are no publications normatively referenced in this standard.