



Drawing Management Program Principles and Processes

TG20-1996
(Reaffirmed 2014)

Archived – May 2020 – No further updates or reviews will be performed.

NUCLEAR INFORMATION AND RECORDS MANAGEMENT ASSOCIATION
10 Almas Road, Windham, NH 03087

Technical guidelines developed by a committee, subcommittee, or ad hoc committee of the Nuclear Information and Records Management Association (NIRMA) represent a consensus of the members of the committee, subcommittee, or ad hoc committee with the concurrence of the NIRMA membership and Board of Directors. Guidelines are recommended procedures for establishment of a program or performance of a task related to the interests of NIRMA members. Guidelines represent the consensus of the sponsoring committee on the best information and method of the subject based upon applicable regulatory requirements, industry standards and practical experience. A lesser amount of detail may be used to identify the areas of interface outside the scope of the document. Guidelines are not intended to be interpreted as industry standards but as suggested guidance with the understanding that companies are not obligated to use the suggested guidance.

NOTICE

This document was prepared by a committee of the Nuclear Information and Records Management Association (NIRMA). Neither this committee, NIRMA, members of NIRMA, other persons contributing to or assisting in the preparation of the document, nor any person acting on behalf of these parties (a) makes any warranty or representation, expressed or implied, with respect to the accuracy, completeness, or usefulness of the information contained in this document, or that the use of any information, apparatus, method, or process disclosed in this document may not infringe on privately owned rights, or (b) assumes liabilities with respect to the use of any information, apparatus, method, or process disclosed in this document.

©2002. Nuclear Information and Records Management Association. All rights reserved

CONTENTS

Forward	iv
1 Scope	1
2 Definitions	2
3 Guidelines For Drawing Management	6
3.1 Principles of Drawing Management	6
3.1.1 Scoping	6
3.1.2 Numbering	6
3.1.3 Drawing Types	7
3.1.4 Uniqueness	7
3.1.5 Revision Priority	7
3.1.6 Error Correction	7
3.1.7 Authority	7
3.1.8 Controls	7
3.1.9 Status	8
3.1.10 Title Block	8
3.2 Processes	8
3.2.1 Drawing Change Cycle Overview	8
3.2.2 Drawing Life Cycle	9
3.2.3 Development of Drawing Change Notice (DCN)	9
3.2.4 Development of An Interim Drawing	10
3.2.5 Development of Design Change Package (DCP)	10
4 References	10
Appendix A: Revision Priority System	11
Table 2.1: Drawing Types	13
Figures	
3-1: Drawing Change Cycle	14
3-2: Drawing Life Cycle	15
3-3: Drawing Change Notice	16
3-4: Interim Drawing Life Cycle	17

FOREWORD

[This Foreword is not part of the Nuclear Information and Records Management Association Guideline for Drawing Management Program, Principals and Processes, NIRMA TG20-1996]

NIRMA provides this guideline as one of a series of documents to help organizations implement the concepts contained in the NIRMA document, Position Paper on Configuration Management (Reference 3). This guideline contains a comprehensive overview of drawing management principles and their relationship to Configuration Management. A subsequent document focused on providing guidance on the application of existing and evolving technologies in the implementation of these principles is planned.

This guideline addresses drawing management concepts from the nuclear utility owner/operator and the Department of Energy (DOE) perspective. The developers of this document consulted with and reviewed related efforts of other nuclear industry organizations including: Electric Power Research Institute (EPRI), Nuclear Energy Institute (NEI), Institute of Nuclear Power Operations (INPO), the Department of Energy (DOE), and the Nuclear Regulation Commission (NRC). NIRMA intends to build on the efforts of these organizations and to work with them and other organizations, as appropriate, to strengthen configuration management initiatives within the nuclear industry.

The Drawing Control Subcommittee of the NIRMA Configuration Management Committee developed this guideline. The subcommittee solicited input and assistance from committee members and their parent organizations. This guideline thus benefits from members' experience in the enhancement of configuration management for their facilities.

NIRMA wishes to acknowledge the efforts of the following subcommittee members who provided a significant contribution to the development of this guideline:

Gerald W. Brothers
Subcommittee Co-Chair
Consultant

Anthony Medrano
Arizona Public Service Co.

Ann Vogel
Subcommittee Co-Chair
Baltimore Gas and Electric Company

John Penhaker
TRW

Gay Wyn Quance
Consultant

Richard A. Giska
NIRMA Board Sponsor
PRC

Julia Schmidt
Washington Public Power Supply

Ladd Allison
Washington Public Power Supply

Michael D. Stout
Pennsylvania Power & Light Co.

Dave Ambrose
Digital Equipment

Robert Vecchiarello
Intergraph Corporation

Alan Ettlinger
New York Power Authority

This guideline has been approved by the NIRMA Board of Directors.

Craig Kraft
Houston Lighting and Power Co.

DRAWING MANAGEMENT PROGRAM PRINCIPLES AND PROCESSES

1. SCOPE

This guideline provides specific information related to the establishment of a drawing management program. The guideline is written from the perspective of a nuclear utility or a Department of Energy-managed facility. However, it provides guidelines applicable to drawing management for any facility in a regulated environment.

Specific objectives of this guideline are:

- Provide industry management with an understanding of the basic concepts of drawing management.
- Identify the key elements of an effective drawing management program.
- Illustrate how effective drawing management contributes to an effective overall configuration management program.
- Identify drawing management requirements for generating and maintaining configuration of design drawings to be consistent with associated design bases input documents.
- Provide the basis for follow-on NIRMA Guideline(s) to address strategies for applying technology to the management of drawings.

The following definition of Configuration Management was developed by NIRMA and is presented in Reference 3:

“Configuration Management is the effective management of a facility's as-built configuration and operation to ensure compliance with approved and/or accepted technical requirements and other governing criteria.”

The following concepts and functions are fundamental to configuration management.

- Management of the facility's configuration and pertinent configuration items is achieved through the integration of managed processes that identify and document the physical and functional characteristics of a facility's structures, systems, components, and computer software.
- Those managed processes also ensure that changes to the documented characteristics are properly developed, assessed, approved, issued, implemented, verified, recorded and incorporated into the facility's documentation.

The primary objective of a configuration management program, and of a drawing management program is identified in Reference 3:

“To ensure accurate information is available for making safe, knowledgeable, timely, and cost effective decisions related to changes at a facility over its operating life.”

Within this framework, the specific objectives of a drawing management program include:

- Ensuring drawings are appropriately identified, reviewed and approved, developed, indexed, stored, distributed, used, and maintained.
- Providing change control mechanisms to ensure drawings are updated in a timely manner.
- Ensuring that when a drawing is modified, related documents are identified and are updated as appropriate in a time frame commensurate with the needs of the facility.

This guideline covers the following aspects of drawing management:

- Functions and requirements of an identification system.
- Life-cycle stages of a drawing from initial creation through archiving.
- Various types of drawings and specific issues associated with a given drawing type.
- Use and requirements of interim drawings and change packages as applicable to drawings.
- Use and requirements for change notices as applicable to drawings.
- Special issues associated with vendor drawing management.

This guideline does not address:

- Technical details on the preparation of drawings such as symbology, technical content, and format guidance obtained from ANSI and other standards.
- Document control issues which are generic to other document types.
- Records management aspects pertaining to drawings.

2. DEFINITIONS

The following terms are used in conjunction with drawing management programs.

2.1 As-Built.

A drawing that has been verified to reflect the actual as-found or existing physical configuration. The As-Built drawing incorporates all approved design changes. Not all drawings need be As-Built at completion of a project. The Design Authority determines those drawings which require updating and the schedule for the updating.

2.2 Associated Lists.

Includes parts lists, data lists, drawing lists that tabulate parts, drawings or documents referenced on drawings, or specifications pertaining to an item.

2.3 Baseline.

1) A quantitative expression of projected costs, schedules, or technical progress which serves as a base or standard for measurement during the performance of an effort. 2) The established plan against which the status of resources and progress of a project can be measured.

2.4 Change Control.

Change Control is an element of Configuration Management which ensures that all changes are properly identified, designed, approved, implemented and documented. This process maintains the configuration management relationship (consistency) between the design, facility configuration and associated documents, including drawings.

2.5 Change Notice.

A controlled document that changes or impacts a drawing or other document and is issued in order to provide immediate notification of an approved change. A Change Notice often requires the same or equivalent level of approval as the original drawing. Change Notices are normally incorporated onto the drawing at a later time.

2.6 Checker.

A technically qualified individual responsible for performing an independent check of a drawing to verify its completeness and accuracy. A Checker should have a level of ability sufficient to perform the design being checked.

2.7 Configuration Item (CI).

An aggregation of hardware, software, or any of its discrete portions that satisfies an end use function and is designated for configuration management. CIs may vary widely in complexity, size, and type. During development, manufacture, construction, and installation, CIs are those items whose performance parameters and physical characteristics are separately defined to achieve the overall end use function and performance.

2.8 Configuration Management.

The effective management of a facility's as-built configuration and operation to ensure compliance with approved and/or accepted technical requirements and other governing criteria. ⁽³⁾

2.9 Controlled Drawing.

Drawings that are prepared, reviewed, and approved in accordance with a formal drawing management change control process; have controlled distribution, and are subject to revision and voidance control.

2.10 Critical Drawing.

Those drawings that require quick update after a change to the facility configuration. Critical Drawings are always updated to the as-built configuration within a specified period of time. See Appendix A.

2.11 Design Authority.

The organization responsible for establishing the design requirements and ensuring that design output documents appropriately and accurately reflect the design basis. The Design Authority is responsible for design control and ultimate technical adequacy of the engineering design process. These responsibilities are applicable whether the process is conducted internally, partially contracted to outside organizations, or fully contracted to outside organizations.

2.12 Design Basis.

Design Basis consists of the design inputs, the design constraints, and the design analysis and calculations. It includes topical areas such as seismic qualification, fire protection, and safe shutdown. The Design Basis encompasses consideration of such factors as facility availability, facility efficiency, costs, and maintainability, and that subset that relates to safety and the authorization basis. The Design Basis explains why a design requirement has been specified in a particular manner or as a particular value.

2.13 Design Change Package (DCP).

A set of documents which provides information needed to review, approve, and implement a design change. These may include interim drawings and other documentation necessary to implement a specific change. The design, as reflected in the DCP, need not reflect the facility as-built documentation until after completion of the change. Documents within a DCP may have a separate numbering system from as-built facility documents.

2.14 Design Input.

Those criteria, parameters, bases or other design requirements upon which detailed final design is based.

2.15 Design Output.

Documents, such as drawings and specifications defining the technical requirements and configuration of structures, systems, components, and computer firmware.