

The logo features the acronym "ANRIC" in a large, white, serif font. Below it, the tagline "your success is our goal" is written in a smaller, white, sans-serif font. The background is a blue world map with a grid of latitude and longitude lines, set against an orange background.

**ANRIC**

your success is our goal

# **SUBSECTION HA, Subpart B**

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**Richard Barnes**



# AGENDA

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- Responsibilities
  - Why is Section III successful – Basic Principles
  - Defined Responsibilities in Section III
- Control of Materials
  - NCA-3800, NCA-4250 & HAB-3800
- Quality Assurance for Components
  - NCA-4000 & HAB-4000



**Section III, Division 5**

**High Temperature Reactors – Subsection HA**

**SUBPART B**

**GRAPHITE MATERIALS**

## **HAB-1100 GENERAL**

### **HAB-1110 SCOPE**

The rules of this Subpart and Subsection HH, Subpart A constitute requirements for the design, construction, examination, and testing of Graphite Core Components and Graphite Core Assemblies used within the reactor pressure vessels of nuclear power plants.

*(a)* This Subpart contains General Requirement Articles HAB-1000 through HAB-9000.

*(b)* Subsection HH, Subpart A contains Technical Rules for Design and Construction, Articles HHA-1000 through HHA-5000, including Mandatory Appendix HHA-I, Mandatory Appendix HHA-II, Mandatory Appendix HHA-III, and Nonmandatory Appendix HHA-A.



# Integrity of The Pressure Boundary

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**The Integrity of the Pressure Boundary**

**Is Achieved**

**Through a Controlled, Systematic Approach**

The logo for ANRRC (American Nuclear Regulatory Commission) is located on the left side of the slide. It features the acronym "ANRRC" in large, white, bold, sans-serif capital letters. Below it, the tagline "your success is our goal" is written in a smaller, white, lowercase sans-serif font. The background of the logo is a blue silhouette of the United States map, overlaid on an orange grid pattern.

# Control & Systematic

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- **What do we mean by control?**

- Defined requirements which are required by the regulatory authority, to be implemented

- **What do we mean by systematic?**

- Repeatable steps of a recognized process that produces the pressure boundary integrity required

The logo for ANRICO is located on the left side of the slide. It features the word "ANRICO" in large, white, bold, sans-serif capital letters. Below it, the tagline "your success is our goal" is written in a smaller, white, lowercase sans-serif font. The background of the logo is a blue silhouette of a world map with a white grid overlay, set against an orange background.

# Control

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## Embodies the concepts of:

- Responsibility
- Accountability
- Compliance and enforcement

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# Systematic

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## Basic Elements Addressed

- Materials
- Design
- Fabrication & installation
- Examination
- Testing
- Overpressure
- Quality management system



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# Underlying Assumption

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Personnel involved in the implementation of these principles are people who

“WANT to produce a SAFE product”



# In Summary

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## Process of Implementation

1. Define requirements
  - technical standards to be used
  - relationship between CSA standards and other codes
  - quality management
2. Define responsibility & accountability
3. Enforce compliance



# Defined Responsibility

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- Regulator
- Inspection Agency
- Designer
- Manufacturer
- Installer
- Owner/Operator

# Control of Activities

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## Quality Management System

- Owners activities - CSA N286 Series
- Component manufacture
  - SEC III, NCA-4000; ISO-9000 Series; Z-299 Series
- Material Organization
  - Manufacture, Supply & Services
    - SEC-III NCA-3800
    - CSA Z299 Series & ISO-9000 Series

## Quality Management System

**Quality Assurance are Monitored**

# Sound Engineering Principles

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## Consensus Codes and Standards

### CSA Standards:

- **N285 Series**
- **B51**

### ASME Standards:

- **BPV Code**
  - Section III, Section VIII
- **B31 Codes**
  - B31.1, B31.3
- **B16 Standards**
  - B16:5, B16:34



# Guaranteed Compliance

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Certification of design documents

Design Registration




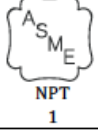
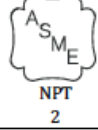
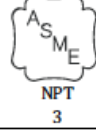
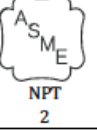
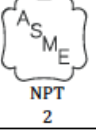
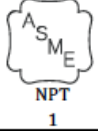
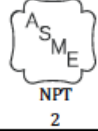
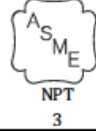
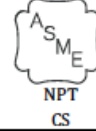
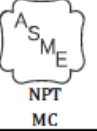
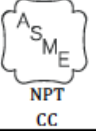
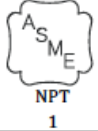

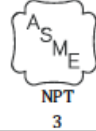
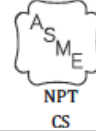

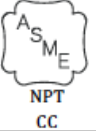
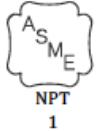

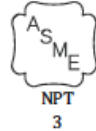

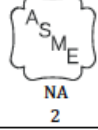
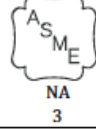
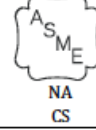

Third Party Inspection

Certified Material Test report

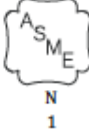
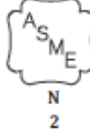
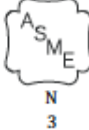
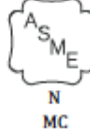
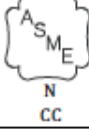
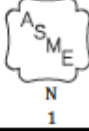
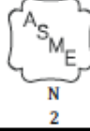
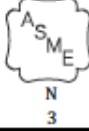
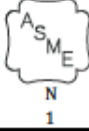
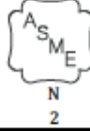
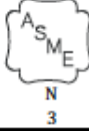
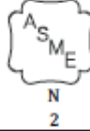
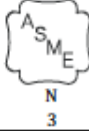

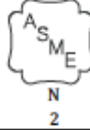
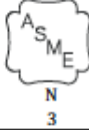
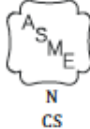
Manufacturer Data Reports

Certificate of Authorization

**Table NCA-8100-1  
Certificates and Certification Mark Issued by the Society for Construction of Nuclear Power Plants (Cont'd)**

Type of Organization	Scope	Division 1					Division 2	Data Report Form	Notes
		Class 1	Class 2	Class 3	Class CS	Class MC	Class CC		
NV Certificate Holder	Pressure and vacuum relief valves				None	None	None	NV-1	(1), (11)
NPT Certificate Holder	Tubular products welded with filler metal				None			NM-1	(1), (7)
	Part							N-2	(1), (4), (8), (9)
	Appurtenance							N-2	(1), (4), (8), (9)
	Piping subassembly				None	None	None	NPP-1	(1), (3), (9), (10)
NA Certificate Holder	All items						None	N-5	(1), (9)
Quality System Certificate Holder	Material	None	None	None	None	None	None	None	(7), (9)
NS Certificate Holder	Supports	None	None	None	None	None	None	None	(5)
Owners	Owner	None	None	None	None	None	None	N-3	...

**Table NCA-8100-1**  
**Certificates and Certification Mark Issued by the Society for Construction of Nuclear Power Plants**

Type of Organization	Scope	Division 1					Division 2	Data Report Form	Notes
		Class 1	Class 2	Class 3	Class CS	Class MC	Class CC		
N Certificate Holder	Vessel				None		None	N-1/N-1A	(9)
	Concrete containment	None	None	None	None	None		C-1	...
	Pump				None	None	None	NPV-1	(1)
	Line valve				None	None	None	NPV-1	(1), (6)
	Storage tank	None			None	None	None	N-6	...
	Piping systems				None	None	None	N-5	(1)
	Core support structures	None	None	None		None	None	NCS-1	(2)



**Table HAB-8100-1  
Certificates Issued by the Society for Construction of Nuclear Graphite Core Components and Assemblies**

Type	Scope	Data Report Form	Notes
G Certificate Holder	Design	G-1	(1)
GC Certificate Holder	Construction	G-1	(1)
	Material manufacture	None	(2)
	Graphite core component machining	G-2	(3)
	Installation	G-4	(4)
Graphite Quality Systems Certificate Holder	Material manufacture	None	(2)
	Graphite core component machining	G-2	(3)
	Installation	G-4	(4)
Owner	Owner	N-3	...

**NOTES:**

(1) The G-1 Data Report shall be traceable to the serial number for the vessel in which it is installed.

(2) Material (HAB-1220) shall be documented by a Certified Material Test Report in accordance with [Article HHA-2000](#).

(3) Data Report Form G-2 for Graphite Core Components shall be forwarded in duplicate to the GC Certificate Holder of the finished Graphite Core Assembly.

(4) Data Report Form G-4 for installation shall be forwarded in duplicate to the GC Certificate Holder of the finished Graphite Core Assembly.

**Table NCA-3200-1  
Document Distribution for Division 2 Construction**

Document	Prepared by	Reviewed by	Certified by	Approved by	Provided to [Note (1)]	Available on Request
Design Specification (NCA-3250)	O	O	O	---	D, C, I, J	---
Construction Specification (NCA-3340)	D	O	D	O	O, C, F, M	I, J
Design Drawings (NCA-3340)	D	O	D	O	O, C, F, M	I, J
Design Report (NCA-3350)	D	O	D	O	O	I, J
Construction procedures [Note (1)] (NCA-3451)	C, F	D	---	D	D, O	I, J
Certified Material Test Reports or Certificates of Compliance [Note (1)] (CC-2130)	M	C, F	M	---	C, F, O	I, J, D
Shop and field drawings [Note (1)] (NCA-3452)	C, F	D	---	D	C, F	I
Construction Report (NCA-3454)	C	O, D	D	O	D, O, J	I, J
Data Report Form C-1 (NCA-8410)	C	---	D, C, I	---	O	I, J
Data Report Form N-2 (NCA-8410)	F	---	F, I	---	C	I, J
Data Report Form N-3 (NCA-8420)	---	O, I	---	J	---	---

**Legend:**

O — Owner or his designee  
D — Designer  
C — Constructor  
F — Fabricator

M — Material manufacturer  
I — Inspector  
J — Enforcement authority

**Table HAB-3255-1  
Document Distribution for Design and Construction of Graphite Core Components and Assemblies**

Document	Prepared by	Reviewed by	Certified by	Approved by	Provided to [Note (1)]	Available on Request
Design Specification (HAB-3250)	O	O	O	---	D, G, IG, J	---
Construction Specification (HAB-3340)	D	O	D	O	O, G, GMO	IG, J
Design Drawings (HAB-3340)	D	O	D	O	O, G, GMO	IG, J
Design Report (HAB-3352)	D	O	D	O	O, G	IG, J
Material Data Sheets (HAB-3353)	D	O	D	---	O	J
Construction procedures (HAB-3451)	G, GMO	D	---	D	D, O	IG, J
Certified Material Test Reports	GMO, G	D	GMO, G	---	G, O	IG, J
Shop and field drawings (HAB-3452)	G, GMO	D	---	D	G	IG
Construction Report (HAB-3454)	G	D, O	D	O	D, O, J	IG, J
Data Report G-1 (HAB-8410)	G, D	IG	G, IG	---	O, IG	J
Data Report G-2 and G-4 (HAB-8410)	G, GMO	IG	G, GMO, IG	---	G, IG	J
Data Report N-3 (HAB-8420)	O	I	O, I	J	---	---

**Legend:**

O = Owner or his designee  
D = Designer (G Certificate Holder)  
G = GC Certificate Holder  
GMO = Graphite Material Organizations (Material Manufacturer, Graphite Core Component Manufacturer, and Installer).

IG = Authorized Nuclear Inspector (Graphite)  
I = Inspector  
J = Enforcement authority

**Table NCA-3200-1  
Document Distribution for Division 2 Construction**

Document	Prepared by	Reviewed by	Certified by	Approved by	Provided to [Note (1)]	Available on Request
Design Specification (NCA-3250)	O	O	O	..	D, C, I, J	..
Construction Specification (NCA-3340)	D	O	D	O	O, C, F, M	I, J
Design Drawings (NCA-3340)	D	O	D	O	O, C, F, M	I, J
Design Report (NCA-3350)	D	O	D	O	O	I, J
Construction procedures [Note (1)] (NCA-3451)	C, F	D	..	D	D, O	I, J
Certified Material Test Reports or Certificates of Compliance [Note (1)] (CC-2130)	M	C, F	M	..	C, F, O	I, J, D
Shop and field drawings [Note (1)] (NCA-3452)	C, F	D	..	D	C, F	I
Construction Report (NCA-3454)	C	O, D	D	O	D, O, J	I, J
Data Report Form C-1 (NCA-8410)	C	..	D, C, I	..	O	I, J
Data Report Form N-2 (NCA-8410)	F	..	F, I	..	C	I, J
Data Report Form N-3 (NCA-8420)	..	O, I	..	J	..	..

**Legend:**

O — Owner or his designee  
D — Designer  
C — Constructor  
F — Fabricator

M — Material manufacturer  
I — Inspector  
J — Enforcement authority

**Table HAB-3255-1**  
**Document Distribution for Design and Construction of Graphite Core Components and Assemblies**

Document	Prepared by	Reviewed by	Certified by	Approved by	Provided to [Note (1)]	Available on Request
Design Specification (HAB-3250)	O	O	O	...	D, G, IG, J	...
Construction Specification (HAB-3340)	D	O	D	O	O, G, GMO	IG, J
Design Drawings (HAB-3340)	D	O	D	O	O, G, GMO	IG, J
Design Report (HAB-3352)	D	O	D	O	O, G	IG, J
Material Data Sheets (HAB-3353)	D	O	D	...	O	J
Construction procedures (HAB-3451)	G, GMO	D	...	D	D, O	IG, J
Certified Material Test Reports	GMO, G	D	GMO, G	...	G, O	IG, J
Shop and field drawings (HAB-3452)	G, GMO	D	...	D	G	IG
Construction Report (HAB-3454)	G	D, O	D	O	D, O, J	IG, J
Data Report G-1 (HAB-8410)	G, D	IG	G, IG	...	O, IG	J
Data Report G-2 and G-4 (HAB-8410)	G, GMO	IG	G, GMO, IG	...	G, IG	J
Data Report N-3 (HAB-8420)	O	I	O, I	J	...	...

**Legend:**

O = Owner or his designee

D = Designer (G Certificate Holder)

G = GC Certificate Holder

GMO = Graphite Material Organizations (Material Manufacturer, Graphite Core Component Manufacturer, and Installer).

IG = Authorized Nuclear Inspector (Graphite)

I = Inspector

J = Enforcement authority

## **HAB-3250 PROVISION OF DESIGN SPECIFICATIONS**

### **HAB-3251 Provision and Correlation**

It is the responsibility of the Owner to provide, or cause to be provided, Design Specifications for Graphite Core Components and Graphite Core Assemblies. The Owner, either directly or through his designee, shall be responsible for the proper correlation of all Design Specifications. The applicable data from Construction Specification and Design Drawings shall be provided in sufficient documented detail to form the basis for Graphite Core Component Machining and Installation in accordance with this Subpart and [Subsection HH, Subpart A](#).

### **HAB-3252 Contents of Design Specifications<sup>2</sup>**

(a) The Design Specifications shall contain sufficient detail to provide a complete basis for design in accordance with this Subpart and [Subsection HH, Subpart A](#). Such requirements shall not result in a Graphite Core Assembly that fails to conform to the rules of this Subpart and [Subsection HH, Subpart A](#). All Design Specifications shall include (1) through (11) below:

- (1) the functions and boundaries of the items covered ([HAB-3254](#))
- (2) the design requirements for the Graphite Core Components and Graphite Core Assembly

### **HAB-3255 Certification of the Design Specifications**

The Design Specifications shall be certified to be correct and complete and to be in compliance with the requirements of [HAB-3250](#) by one or more Certifying Engineers, competent in the applicable field of design and related nuclear power plant requirements and qualified in accordance with the requirements of Section III Appendices, Mandatory Appendix XXIII. These Certifying Engineers are not required to be independent of the organization preparing the Design Specifications. Document distribution for design and construction is shown in [Table HAB-3255-1](#).

## **HAB-3300 RESPONSIBILITIES OF A DESIGNER**

### **HAB-3320 CATEGORIES OF THE DESIGNER'S RESPONSIBILITY**

The Designer has the following categories of responsibility:

- (a) obtain a G Certificate ([HAB-3330](#))
- (b) prepare the structural design of the components and assemblies in conformance with this Subpart and [Subsection HH, Subpart A](#) and the Design Specification ([HAB-3250](#))
- (c) prepare the Design Drawings and Construction Specification ([HAB-3340](#))
- (d) prepare and submit the Design Report ([HAB-3352](#))
- (e) conduct surveillance of construction to the extent designated by the Owner in the Design Specification ([HAB-3220](#))
- (f) review construction documents ([HAB-3450](#)) as specified in the Construction Specification
- (g) establish and maintain a Quality Assurance Program ([HAB-3460](#))
- (h) modify Design Drawings and Construction Specification ([HAB-3370](#))
- (i) certify the Construction Report ([HAB-3380](#))
- (j) document distribution as shown in [Table HAB-3255-1](#)
- (k) generate of the material data sheets ([HAB-3353](#)).

## **NCA-3300 RESPONSIBILITIES OF A DESIGNER — DIVISION 2**

### **NCA-3320 CATEGORIES OF THE DESIGNER'S RESPONSIBILITY**

The Designer has the following categories of responsibility:

- (a) prepare structural design of the component in conformance with this Section and the Design Specification ([NCA-3250](#))
- (b) prepare the Design Drawings and Construction Specification ([NCA-3340](#))
- (c) prepare and submit the Design Report ([NCA-3350](#))
- (d) surveillance of construction to the extent designated by the Owner in the Design Specification ([NCA-3220](#))
- (e) review of construction documents ([NCA-3450](#)) as specified in the Construction Specification
- (f) establish and maintain a Quality Assurance Program ([NCA-4134](#))
- (g) modifications of Design Drawings and Construction Specification ([NCA-3370](#))
- (h) certification of the Construction Report ([NCA-3380](#))
- (i) document distribution as shown in [Table NCA-3200-1](#)

## **NCA-3360 CERTIFICATION OF THE CONSTRUCTION SPECIFICATION, DESIGN DRAWINGS, AND DESIGN REPORT**

*(a)* The Construction Specification, Design Drawings, and Design Report shall be reviewed and certified to be correct and in accordance with the Design Specification and this Section by one or more Certifying Engineers, on behalf of the Designer. The Certifying Engineers shall be competent in the field of design of concrete components and qualified by the designer in accordance with the requirements of Section III Appendices, Mandatory Appendix XXIII. These Certifying Engineers are not required to be independent of the organization designing the component. Distribution of Construction Specification, Design Drawings, and the Design Report is shown in [Table NCA-3200-1](#).

*(b)* In order for the Designer to certify the Construction Specification and Design Drawings, it is necessary that the Design Specification has been certified. For the Constructor or Fabricator to do work in accordance with Construction Specifications and Design Drawings, it is necessary that these documents have been certified.

## **NCA-3380 CERTIFICATION OF CONSTRUCTION REPORT**

The Construction Report shall be evaluated by the Designer, who shall certify that the Construction Report conforms to the requirements of Division 2 and the Design Specification. He shall also provide any supplemental analysis needed to substantiate this evaluation. Prior to certification, he shall review the file of as-built, design, shop, and field drawings to establish that the list provided by the Constructor in the Construction Report corresponds to the as-built, design, shop, and field drawings that will be maintained as a file by the Owner. Distribution of the Construction Report is shown in [Table NCA-3200-1](#).

## **NCA-3350 DESIGN REPORT**

The Designer shall prepare a Design Report in sufficient detail to show that the applicable stress limitations are satisfied when the component is subject to the loading conditions specified in the Design Specification and this Section. The Design Report prepared by the Designer shall contain calculations and sketches substantiating that the design is in accordance with the Design Specification and this Section. Distribution of the Design Report is shown in [Table NCA-3200-1](#).

## HAB-3260 REVIEW OF DESIGN REPORT

(a) The Design Report that the Designer provides shall be reviewed by the Owner or his designee to determine that all the Design and Service Loadings as stated in the Design Specification have been evaluated, and that the acceptance criteria explicitly provided for in this Subpart and [Subsection HH, Subpart A](#), or additional acceptance criteria permitted by this Subpart and [Subsection HH, Subpart A](#) when established in the Design Specification, associated with the specified Design and Service Loadings, have been considered. The responsibility for the method of analysis and the accuracy of the Design Report remains with the Designer.

(b) Documentation shall be provided by the Owner or his designee to indicate that the review required by (a) above has been conducted. Prior to the certification of the component, a copy of this documentation shall be attached to the copy of the Design Report that is made available to the Authorized Nuclear Inspector (Graphite). A copy of this documentation shall be included with the Design Report, which is filed at the location of the installation in accordance with [HAB-4134.17](#) and made available to the regulatory and enforcement authorities having jurisdiction at the site of the nuclear power plant installation. Document distribution for design and construction is shown in [Table HAB-3255-1](#).

## NCA-3260 REVIEW OF DESIGN REPORT

(a) The Design Report that the Certificate Holder or the Designer provides shall be reviewed by the Owner or his designee to determine that all the Design and Service Loadings as stated in the Design Specification have been evaluated, and that the acceptance criteria explicitly provided for in this Section, or additional acceptance criteria permitted by this Section when established in the Design Specification, associated with the specified Design and Service Conditions, have been considered. The responsibility for the method of analysis and the accuracy of the Design Report remains with the Certificate Holder or the Designer.

(b) Except as provided for in (c) below, documentation shall be provided by the Owner or his designee to indicate that the review required by (a) above has been conducted. Prior to the stamping of the component, a copy of this documentation shall be attached to the copy of the Design Report that is made available to the Inspector. A copy of this documentation shall be included with the Design Report that is filed at the location of the installation in accordance with [NCA-4134.17](#) and made available to the regulatory and enforcement authorities having jurisdiction at the site of the nuclear power plant installation. Document distribution for Division 2 construction is shown in [Table NCA-3200-1](#).

(c) When a Certified Design Report Summary ([NCA-3551.3](#)) is furnished in lieu of a Design Report ([NCA-3551.1](#)), for standard supports, documentation shall be provided by the Owner or the Owner's designee to indicate that the Certified Design Report Summary has been reviewed in accordance with (a) above. Prior to stamping of the component, including piping systems, a copy of this documentation shall be attached to the Certified Design Report Summary that is made available to the Inspector. A copy of this documentation and the Certified Design Report Summary shall be filed at the location of the installation in accordance with [NCA-4134.17](#) and made available to the regulatory and enforcement authorities having jurisdiction at the site of the nuclear power plant.



## **HAB-3400 RESPONSIBILITIES OF A GC CERTIFICATE HOLDER**

### **HAB-3420 CATEGORIES OF THE GC CERTIFICATE HOLDER'S RESPONSIBILITIES**

The GC Certificate Holder is responsible for

- (a)* obtaining a GC Certificate ([HAB-3430](#)).
- (b)* constructing the components and assembling the components in accordance with the Design Drawings and Construction Specification(s) and in accordance with this Subpart and [Subsection HH, Subpart A](#).
- (c)* qualifying Graphite Material Organizations ([HAB-3800](#)).
- (d)* establishing and maintaining a Quality Assurance Program ([HAB-3460](#)).
- (e)* documenting a Quality Assurance Program ([HAB-3462](#)).
- (f)* filing the Quality Assurance Manual ([HAB-3463](#)).
- (g)* preparing construction procedures ([HAB-3451](#)).
- (h)* preparing shop and field drawings ([HAB-3452](#)).
- (i)* preparing the Construction Report ([HAB-3454](#)).
- (j)* obtaining agreement with an Authorized Inspection Agency ([HAB-8130](#)).
- (k)* completing Data Reports ([HAB-3455](#)).
- (l)* documenting distribution as shown in [Table HAB-3255-1](#).
- (m)* conducting mechanical testing of Graphite Core Components ([HHA-4200](#)).

- (n)* making available to the Authorized Nuclear Inspector (Graphite) the documents specified by this Subpart and [Subsection HH, Subpart A](#) and those requested by him to ensure compliance with Code requirements.

- (o)* reviewing Certified Material Test Reports for materials ([HAB-1220](#)) used by him.

- (p)* preparing, accumulating, controlling, and protecting required records while in his custody ([HAB-4134.17](#)).

- (q)* documenting review and approval of material used by him as permitted by [HAB-1140\(e\)](#).

- (r)* subcontracting ([HAB-3125](#)) for materials manufacture, design, component machining, installation, examination, testing, and inspection. The GC Certificate Holder shall retain overall responsibility, including certification.

## **HAB-3454 Contents of the Construction Report**

The GC Certificate Holder shall provide a Construction Report. The report shall include the following:

- (a)* a summary of construction progress showing key dates of major construction activities
- (b)* a complete and detailed record of all Graphite Core Component and Graphite Core Assembly acceptance testing
- (c)* a summary of quality control records for Graphite Core Components
- (d)* a list of as-built, design, field, and shop drawings showing the latest revision used for construction and date
- (e)* a summary of deviations (nonconformances) giving a brief description of the nature of the deviations (non-conformances) and the corrective actions and the date when the corrective actions were taken
- (f)* records of where each component is installed in the Graphite Core Assembly
- (g)* distribution and approvals as shown in [Table HAB-3255-1](#).



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**HAB-3800/-3850/-3860**

# **CONTROL OF GRAPHITE MATERIAL**

## **HAB-3800 GRAPHITE MATERIAL ORGANIZATION'S QUALITY SYSTEM PROGRAM**

The requirements of [HAB-3800](#) provide for various entities known as GC Certificate Holders, Graphite Material Organizations known as Material Manufacturers, Graphite Core Component Manufacturers, Installers ([HAB-3820](#)), and approved suppliers ([HAB-3855.3](#)). These entities are involved in performance of operations, processes and services related to the procurement, manufacture, and supply of material, machining of components, and installation of Graphite Core Components into Graphite Core Assemblies as defined in the glossary ([HAB-9200](#)).

## **HAB-3820 CERTIFICATION OR QUALIFICATION OF GRAPHITE MATERIAL ORGANIZATIONS**

(a) A Graphite Material Organization shall be certified by obtaining a Graphite Quality Systems Certificate issued by the Society verifying the adequacy of the Graphite Material Organization's Quality System Program.

(b) Alternatively, the GC Certificate Holder ([HAB-3461](#)) may qualify Graphite Material Organizations not certified by the Society by evaluation of the organization's Quality System Program in accordance with the requirements of [HAB-3842](#).

(c) A GC Certificate Holder may furnish material, machine Graphite Core Components or perform installation when stated in the scope of its certificate. In this case, a Graphite Quality Systems Certificate is not required, nor is the user of the material, Graphite Core Components or installation services required to survey, qualify, or audit such a GC Certificate Holder.

## **HAB-3830 RESPONSIBILITIES OF GRAPHITE MATERIAL ORGANIZATIONS**

The Graphite Material Organization shall be responsible for establishing, documenting, implementing, and maintaining a Quality System Program in accordance with the requirements of [HAB-3850](#), and as applicable to its scope of activities:

- (a) material manufacture (Material Manufacturers)
- (b) Graphite Core Component machining (Graphite Core Component Manufacturers)
- (c) installation (Installers)
- (d) establishing and maintaining measures for the traceability of material and Graphite Core Components while under its control ([HAB-3856](#))
- (e) controlling quality during construction, including control of testing, examination, and treatment of material and Graphite Core Components ([HAB-3857](#), [HAB-3858](#))
- (f) approving and controlling operations performed by suppliers of subcontracted services ([HAB-3855](#))
- (g) preparing Certified Material Test Reports ([HAB-3860](#))
- (h) shipment of material and parts ([HAB-3857.4](#)).

## **HAB-3850 QUALITY SYSTEM PROGRAM REQUIREMENTS**

### **HAB-3851 Responsibility and Organization**

#### **HAB-3851.1 General**

(a) The Graphite Material Organization shall establish a Quality System Program for the control of quality during manufacture or during other work it proposes to perform, and for the traceability of material under its control. The Program shall be planned, documented, implemented, and maintained in accordance with the requirements of [HAB-3850](#).

(b) The establishment of the Program shall include consideration of the technical aspects and provide for planning and accomplishment of activities affecting quality. The Program shall provide for any special controls, processes, test equipment, tools, and skills to attain the required quality and for verification of quality.

**HAB-3860 CERTIFICATION REQUIREMENTS****HAB-3861 Certification Requirements for Graphite Material Organizations**

(a) The Graphite Material Organization whose scope of activities includes Material Manufacture [HAB-3830(a)] shall provide a Certified Material Test Report (HAB-3862) for the material.

(1) The certification affirms that the contents of the report are correct and accurate and that all test results and operations performed by the Graphite Material Organization or its subcontractors are in compliance with the material specification and the specific applicable material requirements of this Subpart and [Subsection HH, Subpart A](#).

(2) Chemical analyses, tests, examinations, and heat treatments required by the material specification that were not performed shall be listed on the Certified Material Test Report as applicable, or may be listed on an identified attachment.

(b) The Graphite Material Organization shall transmit all certifications required by [HAB-3862.1\(b\)](#), received from other Graphite Material Organizations or approved suppliers in accordance with (a) above, to the purchaser at the time of shipment.

(c) The GC Certificate Holder shall complete all operations not completed by the Graphite Material Organization and shall provide a Certified Material Test Report for all operations performed by him or his approved suppliers. The GC Certificate Holder shall certify that the contents of the report are correct and accurate and that all test results and operations performed by the GC Certificate Holder or his approved suppliers are in compliance with the requirements of the material specification and this Subpart and [Subsection HH, Subpart A](#). Alternatively, the GC Certificate Holder shall provide a Certified Material Test Report for the operations it performed and at least one Certified Material Test Report from each of its approved suppliers for the operations they performed.

**HAB-3862 Certification of Material****HAB-3862.1 Material Certification.**

(a) The Certified Material Test Report shall include the results of all required chemical analyses, tests, and examinations.

(b) When required chemical analyses, heat treatment, tests, or examinations are subcontracted, the approved supplier's certification for the operations performed shall be furnished as an identified attachment to the Certified Material Test Report. When operations other than chemical analysis, heat treatment, tests, or examination, that require maintenance of traceability are subcontracted, these operations and the approved suppliers performing them shall be listed on the Certified Material Test Report, or the approved suppliers certification for the operation may be furnished as an attachment to the Certified Material Test Report.

(c) When specific times or temperatures (or temperature ranges) of heat treatments are required by material specifications, they shall be reported. When specific times and temperatures (or temperature ranges) are not required by the material specification, a statement of the type of heat-treated condition shall be reported.

(d) Reporting of actual dimensions and visual examination results is neither required nor prohibited by this paragraph.

(e) Material identification shall be described in the Certified Material Test Report.



**NCA-4000 & HAB-4000**

# **CONTROL OF COMPONENTS**

# Definitions

## NCA-9000

*material:* for Section III, Division 1, metallic materials manufactured to an SA, SB, SFA, or any other material specification permitted in Section III and that are manufactured, identified, and certified in accordance with the requirements of Section III. For Section III, Division 2, metallic materials, as well as nonmetallic materials, conforming to the specifications permitted in Section III.

*component:* a vessel, concrete containment, pump, pressure relief valve, line valve, storage tank, piping system, or core support structure that is designed, constructed, and stamped in accordance with the rules of this Section.

*quality assurance:* as used in this Section, quality assurance comprises all those planned and systematic actions necessary to provide adequate confidence that all items designed and constructed are in accordance with the rules of this Section.

## HAB-9000

### HAB-9100 INTRODUCTION

This Article defines selected terms used in this Subpart and [Subsection HH, Subpart A](#). The definitions in this Glossary shall prevail should a conflict exist with definitions found elsewhere in this Subpart and [Subsection HH, Subpart A](#) or other documents referenced in this Subpart and [Subsection HH, Subpart A](#). Unless defined below, the definitions of Article NCA-9000 shall apply.

# Definitions - examples

## NCA-9000

*N Certificate Holder (Division 1):* the organization assuming responsibility for Code compliance with respect to material, design, fabrication, installation, examination, testing, inspection, certification, and stamping of items requiring a Certification Mark with N Designator.

*N Certificate Holder (Division 2):* the organization assuming responsibility for constructing and stamping of the component, including but not limited to installation of parts in accordance with the Design Drawings and Construction Specification.

*nonmetallic material:* material that is not metallic, including, but not limited to, concrete, cement grout, and materials made with polyethylene.

*Nonmetallic Material Constituent Supplier:* an organization that manufactures, produces, and supplies the concrete constituents for plastic concrete or grout in accordance with the Construction Specification.

*Nonmetallic Material Manufacturer:* an organization that receives, stores, conveys, and combines the concrete constituents to produce plastic concrete or grout in accordance with the Construction Specification.

*NPT Certificate Holder:* the organization that fabricates parts, piping subassemblies, or appurtenances requiring a Certification Mark with NPT Designator.

*NS Certificate Holder:* the organization holding a valid NS Certificate of Authorization (issued by the Society with or without design) that fabricates all classes of supports and all classes of standard supports. The NS Certificate Holder is not required to apply a Certification Mark.





# Definitions - examples

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## HAB-9000

*G Certificate Holder:* the organization assuming responsibility for Code compliance with respect to design of Graphite Core Components or Graphite Core Assemblies.

*GC Certificate Holder:* the organization assuming responsibility for Code compliance with respect to material, manufacture, installation, examination, testing, inspection, and certification of Graphite Core Components or Graphite Core Assemblies in accordance with the Design Drawings and Construction Specification.

## HAB-4100 REQUIREMENTS

### HAB-4110 SCOPE AND APPLICABILITY

(a) This Article sets forth the requirements for planning, managing, and conducting Quality Assurance Programs for controlling the quality of activities performed under this Subpart and [Subsection HH, Subpart A](#), and the rules governing the evaluation of such Programs prior to the issuance of Certificates for the design and construction of the Graphite Core Assembly. The Quality Assurance requirements for Graphite Material Organizations for material manufacture, Graphite Core Component manufacture, and installation are provided in [HAB-3800](#). GC Certificate Holders are advised to consult other regulations for Quality Assurance requirements governing activities beyond the scope of this Division.

(b) GC Certificate Holders shall comply with the requirements of ASME NQA-1, Part I,<sup>5</sup> Quality Assurance Requirements for Nuclear Facility Applications, as modified and supplemented in [HAB-4120\(d\)](#) and [HAB-4134](#).


## NCA-4100 REQUIREMENTS

### NCA-4110 SCOPE AND APPLICABILITY

(a) This Article sets forth the requirements for planning, managing, and conducting Quality Assurance Programs for controlling the quality of activities performed under this Section and the rules governing the evaluation of such Programs prior to the issuance of certificates for the construction, fabrication, manufacture, and installation of Class 1, 2, 3, CS, MC, and CC items. The Quality Assurance requirements for Material Organizations (Metallic) for all Classes of construction are provided in [NCA-3800](#). The Quality Assurance requirements for Non-metallic Material Organizations, Polyethylene Material Organizations, and Constituent Suppliers for all Classes of construction are provided in [NCA-3900](#). Certificate Holders are advised to consult other regulations for Quality Assurance requirements governing activities beyond the scope of this Section.

(b) N-Type Certificate Holders shall comply with the requirements of ASME NQA-1, Quality Assurance Requirements for Nuclear Facility Applications, Part I,<sup>12</sup> as modified and supplemented in [NCA-4120\(b\)](#) and [NCA-4134](#).

(c) The Quality Assurance Program requirements for an NS Certificate Holder shall comply with [NCA-3680](#) and (b) above. Inspection by an ANI and Certification Mark is not required for supports.



**NCA-4134 N, NV, NPT, NS, and NA Certificate Holders for Class 1, 2, 3, MC, CS, and CC Construction**

**NCA-4134.1 Organization.** The provisions of NQA-1, Requirement 1, shall apply.

**NCA-4134.2 Quality Assurance Program.**

(a) The provisions of NQA-1, Requirement 2, shall apply and the system used to meet these requirements shall be described in the Quality Assurance Manual. The Quality Assurance Manual shall also include a statement of policy and authority indicating management support. The specific responsibilities of the quality assurance organization of the Certificate Holder shall also include the review of written procedures and monitoring of the activities concerned with the Quality Assurance Program as covered in this Article.

**HAB-4134 GC Certificate Holders**

**HAB-4134.1 Organization.** The provisions of NQA-1, Requirement 1 shall apply.

**HAB-4134.2 Quality Assurance Program.**

(a) The provisions of NQA-1, Requirement 2 shall apply and the system used to meet these requirements shall be described in the Quality Assurance Manual. The Quality Assurance Manual shall also include a statement of policy and authority indicating management support. The specific responsibilities of the quality assurance organization of the GC Certificate Holder shall also include the review of written procedures and monitoring of the activities concerned with the Quality Assurance Program as covered in this Article.