

# COMMERCIAL GRADE DEDICATION AND UTILIZATION OF UNQUALIFIED SOURCE MATERIAL

Joshua Grimm  
Quality Assurance Manager  
NuSource, LLC

June 2020

# Commercial Grade Dedication Versus




Utilization of Unqualified Source Material

# Who is this guy?

- Joshua Grimm
  - QA Manager for NuSource, LLC
    - NuSource is an N Type Certificate Holder that supplies safety-related engineered hardware solutions to the nuclear power industry.
- Nuclear Experience
  - Former Navy (MM1/SS)
  - Former ANI/ANII
  - Worked at Watts Bar Unit 2
  - 20+ years in the nuclear field
- Five ASME Sec. III groups, including:
  - Chair of Subgroup – Materials, Fabrication, and Examination
  - Secretary of Working Group – Quality Assurance, Certification, and Stamping
  - Member of the Section III Main Committee

# This presentation is intended to:



Clarify what utilization of unqualified source material entails.

Discuss the difference between material, source material, qualified source material, and unqualified source material.

Provide an example of where utilization of unqualified source material can be performed, and result in an item that is not safety-related.

Review NRC definitions that would be applicable to performing commercial grade dedication.

Review EPRI Guidance and NRC Regulatory Guide 1.184.

PLEASE NOTE: While this presentation may cover a significant number of experiences, each instance should be individually considered to ensure proper regulatory compliance is maintained.

## First, let's establish...

- If we perform commercial grade dedication, we have not necessarily met the Code requirements for utilizing unqualified source material.
- If we perform utilization of unqualified source material, we have not necessarily performed Commercial Grade Dedication.
- These two activities are identified separately by two different entities (the NRC and ASME) and have different, albeit similar, requirements.
- Without being performed within a program that both satisfies 10CFR50 Appendix B and accepts 10CFR21 responsibility, the resulting work product is not considered a “basic component” by the NRC. (E.G.: Not “safety-related” in the U.S.)

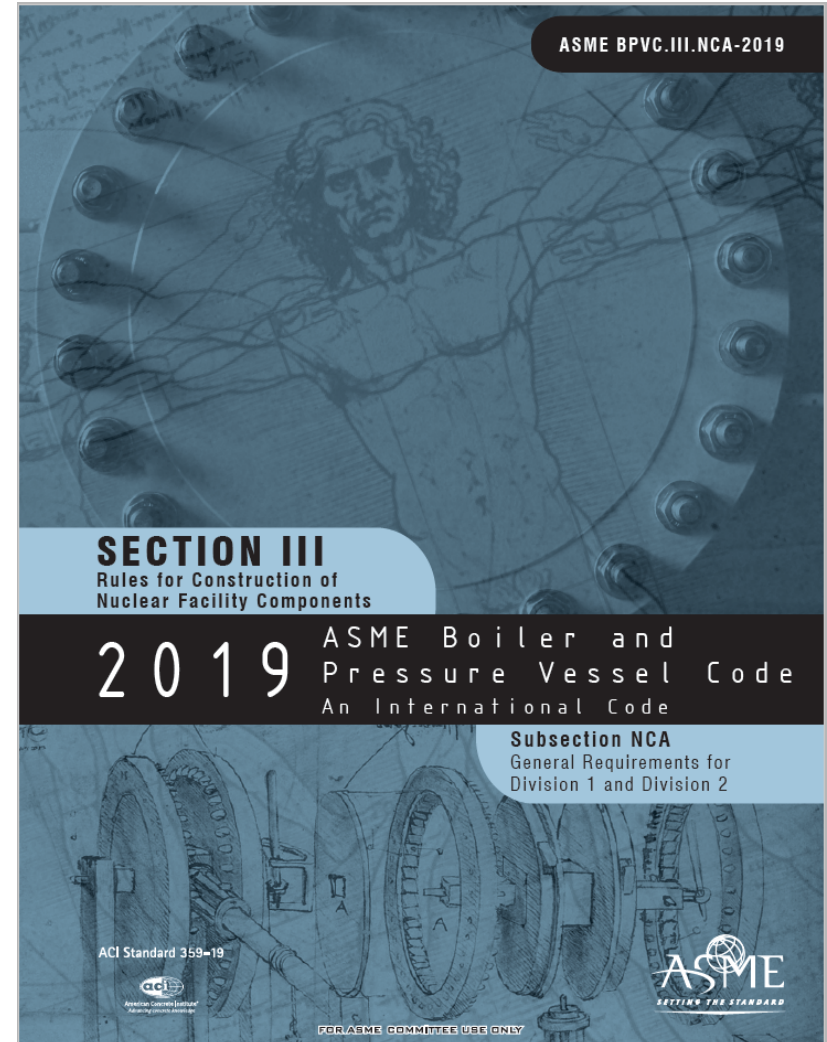
If an entity performing utilization of unqualified source material does not accept 10CFR21 responsibility, the end result never becomes a “basic component,” and is not “safety-related” source material within the U.S.

# Overview

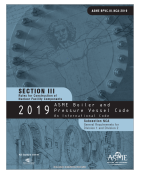
Reviewing the applicable terms and their definitions...

ASME Section III, NCA-9200:

- “material”
- “source material”
- “qualified source material”
- “unqualified source material”



# Definitions (reference NCA-9200 – 2019 Edition)

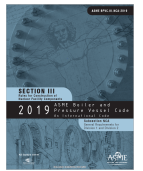


**material:** for Section III, Division 1, metallic materials manufactured to an SA, SB, SFA, or any other material specification permitted in Section III and that are manufactured, identified, and certified in accordance with the requirements of Section III. For Section III, Division 2, metallic materials,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

*NOTE: “Meets Section III NX-2000 requirements” for Division 1 in addition to ASME Section II requirements.*



## More Definitions (reference NCA-9200 – 2019 Edition)



**Utilization of unqualified source material** is a defined process within ASME Section III where unqualified source material is processed into qualified source material.

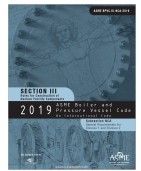
- This is currently in NCA-4255.5.
- Prior to the 2017 Edition, this was in NCA-3855.5.

**source material**: metallic products used by a Material Organization or Certificate Holder in a product form conversion process in the manufacture of material [NCA-4251.2(a)(1)] or in a qualification process based on test and examination to the requirements of the material specification [NCA-4255.5(a)(2) and NCA-4255.5(a)(3)]. Source material may be qualified or unqualified.

*NOTE: Source material meets Section II requirements, but has not yet been endorsed as meeting Section III.*



## Even More Definitions (reference NCA-9200 – 2019 Edition)

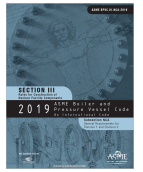


**qualified source material:** metallic products produced by an approved supplier, Material Organization, or Certificate Holder in accordance with the requirements of NCA-3800 or the output of the qualification process requirements of NCA-4255.5.

**unqualified source material:** source material not produced by a Certificate Holder, Material Organization, or approved supplier in accordance with the requirements of Section III, NCA-3800.



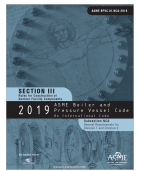
# Utilizing Unqualified Source Material



NCA-4255.5(a) – *abbreviated*: ... **When included in its scope of activities** as permitted by the provisions of this subarticle, a Material Organization may accept certification of the requirements of the material specification ... and may use or furnish unqualified source material provided ...

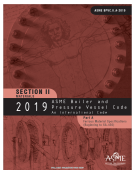
- (a)(1): No welding with filler metal be performed;
- (a)(2): A product analysis verifying chemical composition be performed;
- (a)(3): All other requirements of the material specification on each piece of the material be performed;





- (a)(4): Where Certificates of Compliance [NCA-3862.1(g)] are acceptable, testing of each piece for all other requirements of the material specification (3) is not required.
- (a)(5): The provisions of (1) through (4) above are performed in accordance with the Material Organization's Quality System Program.
- (b): The provisions of (a)(1) through (a)(4) above may be performed by the Certificate Holder in accordance with his Quality Assurance Program.

*The result of the process of Utilizing Unqualified Source Material is qualified source material. For this qualified source material to be certified as meeting Section III and become "material," it must also meet the applicable requirements in NB/NC/ND (NX) – 2000.*



## ASME Section II versus ASME Section III



Utilization of unqualified source material could take a plate that was not processed by an NCA-3800 program (e.g.: a vendor that does not have a Certificate of Authorization or a Quality Systems Certificate), verify it complies with ASME Section II requirements, and certify the plate accordingly. (Think ASTM material and certifying it as SA material.)

**Please note:** This does not necessarily mean the source material has been evaluated or certified to meet Section III requirements. Nor does it mean that the material is inherently “safety-related” (that’s a programmatic question).

Further, we cannot perform Commercial Grade Dedication and automatically presume we have met the requirements in NCA-4255.5.

There is no mention of “commercial grade dedication” in Section III for material.

## Example:

- Assume we purchased material from a foreign facility in a country not bound by NRC regulatory requirements.
- In this scenario the vendor:
  - Has either an ASME Certificate of Authorization or a Quality System Certificate;
  - Has utilization of unqualified source material within their ASME Scope;
  - Does not accept Part 21 reporting requirements.
- The unqualified source material would be processed in accordance with NCA-3800/4200 quality program requirements.
  - Incorporated by reference in 10CFR50.55a para. (a)(1)(i)(E)(17).
- However, since this vendor does not accept 10CFR Part 21 reporting responsibility – the source material would not be a “basic component” (as defined in 10CFR Part 21, section 21.3).
  - Since Part 21 is not accepted by the vendor, this definition would never be acknowledged or applied.
  - Further, the vendor may not report any defects discovered in the fabrication process after shipment has occurred.

## Example, continued:

The vendor may have a program that addresses the 18 criteria required by 10CFR50 Appendix B. However, just because they have a program that meets these requirements doesn't mean they acknowledge or accept it as such.

Further, if the vendor does not accept Part 21, the material never becomes a “basic component” as identified in Part 21 – Reporting of Defects and Noncompliance Section 21.3.

The result is a piece of source material processed in accordance with ASME Section III requirements that is not a basic component (e.g.: safety-related within the U.S.).

**commercial grade dedication:** a process by which a commercial-grade item (CGI) is designated for use as a basic component. This acceptance process is undertaken to provide reasonable assurance that a CGI to be used as a basic component will perform its intended safety function and, in this respect, is deemed equivalent to an item designed and manufactured under a 10 CFR Part 50, Appendix B, quality assurance program. *This assurance is achieved by identifying the critical characteristics of the item and verifying their acceptability by inspections, tests, or analyses by the purchaser or third-party dedicating entity.*

<https://www.nrc.gov/reactors/new-reactors/oversight/quality-assurance/vendor-insp/comm-grade-dedication.html>



**basic component:** When applied to nuclear power plants licensed under 10 CFR part 50 or part 52 of this chapter, basic component means a structure, system, or component, or part thereof that affects its safety function necessary to assure (a) the integrity of the reactor coolant pressure boundary; (b) the capability to shut down the reactor and maintain it in a safe shutdown condition; or (c) the capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to those referred to in 50.34(a)(1), 50.67(b)(2), or 100.11 of this chapter, as applicable.

**critical characteristics:** When applied to nuclear power plants licensed pursuant to 10 CFR Part 50, critical characteristics are those important design, material, and performance characteristics of a commercial grade item that, once verified, will provide reasonable assurance that the item will perform its intended safety function.

Find the full definitions at: <https://www.nrc.gov/reading-rm/doc-collections/cfr/part021/part021-0003.html>

Confusion may lie within the misperception that Material Organizations inherently have a 10CFR50 Appendix B and Part 21 compliant program.

While it is accurate that Material Organizations have a program that meets the basic requirements of 10CFR50 Appendix B, that does not mean they accept Part 21.

As the term “basic component” lies within 10CFR Part 21, if a Material Organization does not accept the reporting requirements therein, the material they provide is not safety-related.

- The definition doesn’t apply if the Material Organization doesn’t accept the document within which the term is established.

NCA-4255.5 permits this activity when it is included within the Material Organizations scope of activities. *Not all Material Organizations can utilize unqualified source material.*

## Hasn't This Come Up Before?

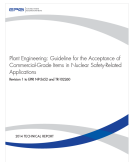


EPRI Document 3002002982 (Guideline for the Acceptance of Commercial-Grade Items in Nuclear Safety Related Applications) addresses this exact topic, head-on in Section 3.4.1:

*“An example of controlling an item under a 10CFR50 Appendix B – compliant QA Program would be the method used by ASME quality system certificate (QSC) or N certificate holders to upgrade unqualified source material in accordance with their Code-compliant QA programs applicable Code requirements (for example, NCA-3855.5). In this case, the certificate holder satisfies the requirements of 10CFR50, Appendix B, through compliance with the requirements of the ASME Code and accepts responsibility for reporting of defects and noncompliance in accordance with the requirements of 10CFR21 when providing the material as a basic component.”*

**Note:** NCA-3855.5 was relocated to NCA-4255.5 in the 2017 Edition of ASME Section III.

## As a matter of fact...



Further, in the same EPRI document 3002002982 (Step 5.2.2, page 5-24) we read **(emphasis added)**:

*“As discussed in Section 3.4.1, controlling an item under a 10CFR50, Appendix B-compliant QA program would be the method used by ASME QSC or certificate of authorization (N certificate) holders to upgrade unqualified source material in accordance with their Code-compliant QA programs and applicable Code requirements (for example: NCA-3855.5). **In this case, dedication is not required** because the certificate holder satisfies the requirements of 10CFR50, Appendix B, through compliance with the requirements of the ASME Code and accepts responsibility for reporting of defects and noncompliance in accordance with the requirements of 10CFR21 when providing the material as a basic component.”*

# Does the NRC Have Any Comments?

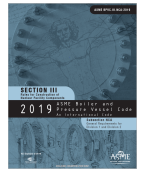


## Regulatory Guide 1.164 (June 2017): Dedication of Commercial-Grade Items for use in Nuclear Power Plants

*... Provides guidance for dedication of commercial-grade items and services used in nuclear power plants. This RG endorses, in part, the Electric Power Research Institute (EPRI) 3002002982, Revision 1 to EPRI NP-5652 and TR-102260, “Plant Engineering: Guideline for the Acceptance of Commercial-Grade Items In Nuclear Safety-Related Applications” (Ref. 6), with respect to acceptance of commercial-grade dedication of items and services to be used as basic components for nuclear power plants.*

No exception to paragraph 3.4.1 or this aspect of Step 5.2.2 is identified within the Regulatory Guide.

# Commercial Grade Dedication versus Utilization of Unqualified Source Material



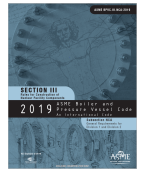
## Commercial Grade Dedication:

- We have taken something that was not safety-related;
- Identified critical characteristics;
- Established reasonable assurance that the item in question will meet its safety function;
- After these activities are complete, the items can be identified as a basic-component, and utilized in a safety-related application.

## Utilization of Unqualified Source Material:

- No welding with filler metal;
- Chemical composition verified;
- Requirements of the material specification met.
- After these activities are complete, the *unqualified* source material is considered qualified source material.

# Commercial Grade Dedication versus Utilization of Unqualified Source Material



The applicable material specification identifies the applicable design and acceptance requirements to be verified. No further dedication activity is required – it is inherently performed by controlling the item under an Appendix B Program.

However, if it is determined that further work is being performed and commercial grade dedication activities are required, the utilization of unqualified source material process as outlined in NCA-4255.5 may be used as part of the dedication activity. In this scenario, the utilization of unqualified source material is part of a larger activity and not the entirety.

## Conclusion

- Vendors may have an ASME Section III quality program (NCA-4000), but this does not automatically mean the vendor is a safety-related supplier in the U.S. nuclear industry.
- For a vendor to provide a safety-related product (a “basic component”), they must meet the requirements of 10CFR50 Appendix B and accept the reporting requirements of 10CFR21.
- The performance of utilization of unqualified source material by a Quality Systems Certificate Holder or a N Certificate Holder does not require Commercial Grade Dedication if:
  - They meet the requirements of 10CFR50 Appendix B; and
  - They accept 10CFR21 reporting responsibility; and
  - The provisions of NCA-4255.5 are within their scope, and followed.
- If Commercial Grade Dedication is required, the utilization of unqualified source material as outlined in NCA-4255.5 may be used as a part of that dedication activity.



## Now for the fun part... Questions?



## References:

- ASME Section III (2019 Edition)
- [www.nrc.gov](http://www.nrc.gov)
- *ML090890707* – NRC Responses to Commercial Grade Dedication and General Questions Received During the Vendor Workshop on New Reactor Construction in December 2008
- *ML14153A175* – Comparison of ASME Section III NCA-3855.5 (Utilization of Unqualified Source Material V. NRC 10CFR Part 50 Appendix B Commercial Grade Dedication)
- *ML14153A177* – Commercial Grade Dedication of Material (2014 NRC Vendor Workshop)
- *ML18150A371* – Control of Items Under 10CFR50, Appendix B with, and without, commercial grade item dedication.
- *Regulatory Guide 1.164* – Rev. 0 dated June 2017
- *EPRI 3002002982* – Plant Engineering: Guideline for the Acceptance of Commercial-Grade Items in Nuclear Safety-Related Applications