Frequently Asked Questions Regarding DOE Order 420.1C, Chg. 3, *Facility Safety*

Q1. What is the difference between an "invoked standard" and an "applicable standard?" stated in DOE O 420.1C, Chg. 3?

A1. An invoked standard is defined by DOE Order 251.1D as one that is a required method specified in a DOE directive. A specific list of invoked standards is provided in Section 6 of the DOE Order 420.1C, Chg. 3. In practice, to identify an "invoked standard," the Order must contain a requirement statement ("must" statement) that identifies that a specific standard is a required method. All other standards are considered referenced standards, although some may be specifically identified as providing "acceptable methods" for meeting Order requirements.

An applicable standard (i.e., DOE technical standard or industry code or standard) is one for which it has been determined by the contractor (typically with approval by DOE) that it will be used for a specific facility/site. A summary section describing applicable standards is added in Section 7 of DOE Order 420.1C, Chg. 3. DOE Order 420.1C, Chg. 3 allows some flexibility in determining which standards will be applicable but once so determined, the Order requires that the applicable standards be followed unless relief is obtained. The number of invoked standards is relatively small and clearly defined whereas the number of applicable standards could potentially be very large. Together, the invoked standards, the applicable standards, and any other applicable DOE requirement documents make up the "Code of Record" for a given project or design.

Q.2 What are the relief provisions in the DOE O 420.1C, Chg. 3for exemptions and equivalencies for invoked and applicable codes and standards and DOE standards?

A.2 Relief provisions for exemptions and equivalencies for both invoked and applicable codes and standards and DOE standards are stated in DOE O 420.1C, Chg. 3 in Sec 3.c.(1) and (2) and in Attachment 1, Sec 2. Relief provisions may be summarized as shown in the Table below:

Exemptions and Equivalencies Approval Process		
Requirements	**Exemptions**	**Equivalencies**
DOE O 420.1C, Chg. 3 Requirements ('must' statements) and invoked standards	Approved by HQ Head of Departmental Element and NNSA; requires CTA concurrence and OPI consultation. [DOE O 420.1C, Chg. 3, Sec 3.c.(1) and (2)	Approved by HQ Head of Departmental Element and NNSA; requires CTA concurrence and OPI consultation. [DOE O 420.1C, Chg.3, Sec 3.c.(1) and (2)
Requirements of applicable codes & standards and DOE technical standards	Approved by HQ Head of Departmental Element and NNSA; requires CTA concurrence and OPI consultation. [DOE O 420.1C, Chg. 3, Sec 3.c.(1) and (2)]	Approved at the field level; must demonstrate an equivalent level of safety. [DOE O 420.1C, Chg. 3, Sec 3.c.(1) and (2)]

Q.3 Are there any alternate relief provisions, other than what is in Q.2 above, stated in the DOE O 420.1C, Chg. 3?

A.3 Yes, there are few special cases or off-ramps stated in the DOE O 420.1C, Chg. 3 for effective and efficient use of the relief provisions.

(i) DOE-O-420.1C, Chg. 3, Attachment 2, Ch. II, *Fire Protection*, Sec. 3.b.(2) designates DOE-STD-1066-2016 as the applicable fire protection standard for use at DOE facilities. Relief provisions follow the process discussed in Q.2 above.

Alternately, site fire protection and emergency response programs may specify the provisions for relief (for both exemptions and equivalencies). Such provisions should either describe specific relief sought or describe a process for obtaining relief. Approval of such provisions is required by the DOE Field Element as stated in DOE-O-420.1C, Chg. 3, Attachment 2, Ch. II, *Fire Protection*, Sec. 3.a.(2). This includes relief provisions (exemption and equivalency) for the requirements in the DOE-STD-1066-2016 and other applicable NFPA standards, but not relief from other DOE O 420.1C fire protection requirements.

If the contractor wants to use an alternate standard or method to the applicable DOE-STD-1066-2016, an Order exemption or equivalency must be pursued, which would require approval of HQ, concurrence by CTA, and consultation with the OPI.

(ii) DOE O 420.1C, Chg. 3, Attachment 3, Sec. 3.b states: "*The Safety Design Strategy developed in accordance with DOE-STD-1189-2016 may be used to specify provisions for relief (exemptions and equivalencies) from identified applicable design and construction codes and standards.*" - DOE STD 1189-2016 requires the Safety Design Strategy (SDS) be used for obtaining DOE Filed Element approval (DOE STD 1189-2016, Sec 3.0) of any safety decisions for new nuclear projects and major modification projects. The SDS may also be used for identifying applicable codes and standards that is documented in the Code of Record (DOE STD 1189-2016, Sec 3.8.2).

(iii) DOE Order 420.1C Chg. 3, Attachment 2, Chapter III, Nuclear Criticality Safety, Paragraph 3.b, states: "*The CSP document must describe how the contractor will satisfy the requirements of the ANSI/ANS-8 series of nuclear criticality safety standards that are in effect as of the date this Order, unless otherwise modified and approved by the DOE Head of Field Element. The CSP document must include an explanation as to why any recommendation in applicable ANSI/ANS-8 standards is not implemented."*

For this requirement, the DOE Head of Field Element is assumed to be a Senior Technical Safety Manager per DOE Order 426.1A, *Federal Technical Capability Program*, or else this safety responsibility would need to be performed by a designated individual who is so qualified. No additional DOE Headquarters, CNS, or CTA review or concurrence is needed for modifications to ANSI/ANS-8 series standard requirements when approved by the DOE Head of Field Element. The Order provides pre-approval via the phrase "unless otherwise modified and approved by the DOE Head of Field Element" for these standards and allows the DOE Head of Field Element to approve such modifications.

The intent is to hold each Field Element responsible for determining the applicable set of criticality requirements from the ANSI/ANS-8 series standards and approving the site-specific application of those requirements.

The only time a Field Element would be required to seek CTA concurrence would be if the Field Element wanted to use a different standard than the ANSI/ANS-8 series for ensuring criticality safety.

Q.4 Regarding relief from DOE-O 420.1C, Chg. 3, Section 3.c.(1), may authority for review and approval of exemptions and equivalencies be delegated?

A.4 Yes. As with any safety management responsibilities, the Department's policy and procedure for delegating these is described in DOE Order 450.2, *Integrated Safety Management,* Change 1, dated January 17, 2017, Appendix A, "Delegations of Authority to Perform Safety Management Functions." This Appendix applies to delegation of all DOE safety responsibilities, unless explicitly prohibited; here is what the Order says: "*When not prohibited by law or by the Secretary, DOE officials may delegate authority to perform their assigned safety management functions*." It is anticipated and encouraged that Headquarters organizations will delegate these authorities for certain requirements, especially for invoked codes and standards, where the field office may have more technical expertise.

Q.5 The DOE O 420.1C, Chg. 3 appears to be making a significant change in the scope of the Order by removing "onsite" in Section 3.a. The scope of the Order is changed to be applicable to off-site contractor facilities. Why is this change being made? What is the expected impact?

A.5 This change is being made to clarify requirements and responsibilities for offsite leased facilities, and as written the change is not expected to have a significant impact. The main target of this change is for potential leased facilities that might be used for performing nuclear activities in the future, although no such facilities are currently identified. For non-nuclear leased facilities, the Order change makes it clear that application is at the discretion of the field element manager (as stated in DOE O-420.1C, Chg. 3, Attachment 2, in Chapter II, Sec 2 and in Ch. IV, Sec 2), who is at the appropriate position to balance risk and mission. While DOE has an obligation under 10CFR851 for worker safety and health at non-nuclear leased facilities, there is no obligation for DOE oversight of the design of such leased facility which are under the regulatory authority of a State or City jurisdiction. Finally, damage to mission-related equipment is a programmatic issue not a safety issue. The contractor has an inherent incentive to protect this equipment.

Q.6 DOE-STD-3009-2014, *Preparation of Nonreactor Nuclear Facility Documented Safety Analysis*, is identified as an invoked standard in Section 6. Does this mean that Order 420.1C, Chg 3 requires existing, approved Documented Safety Analyses (DSAs) that meet DOE-STD-3009-94 for existing DOE nuclear facilities need to be changed to meet DOE-STD-3009-2014?

A.6 No. The requirement statements in DOE O 420.1C, Chg. 3 for applying DOE-STD-3009-2014 in limited, prescribed circumstances are essentially unchanged from the existing approved DOE O 420.1C, Change 1, approved in February 2015. Associated with each invoked standard in DOE Order 420.1C are the following attributes: (1) applicability, (2) conditions, and (3) options. These attributes are described in the specific invoking requirements, not in the summary in Section 6. Section 6 contains no requirements (indicated by "must" statements). For DOE-STD-

3009-2014, the specific requirements and context are described in DOE O 420.1C, Chg. 3, Section 4.g and 4.h (for DOE) and Attachment 1, Sections 1.e and 1.f (for DOE contractors). These specific requirement statements state that DOE-STD-3009-2014 is only required for cases where (1) a new nuclear facility or major modification for facilities that would use the DOE-STD-3009 DSA safe harbor (to meet 10 CFR 830), and (2) existing nuclear facilities, regardless of safe harbor, with offsite dose estimates over the Evaluation Guideline of 25 rem (must address Section 3.3.1 of DOE-STD-3009-2014). In the former case, the Order also provides an option for the Head of Departmental Element, with concurrence of the Central Technical Authority, to approve use of DOE-STD-3009-94. Hence, there is no substantive change in the requirements to use DOE-STD-3009-2014.

Q.7 **DOE Order 420.1C, Chg. 3 was approved on November 14, 2019. Attachment 2, Chapter III, of the Order includes the following requirement regarding criticality codes and standards: 3.b. "The CSP document must describe how the contractor will satisfy the requirements of the ANSI/ANS-8 series of nuclear criticality safety standards that are in effect as of the date this Order, unless otherwise modified and approved by the DOE Head of Field Element." Regarding the phrase "in effect as of the date of this Order," currently, is November 14, 2019 the effective date to use for this requirement?**

A.7 Yes. According to the ANS-8 committee, the following ANS codes were in effect as of November 14, 2019:

- ANS-8.1-2014 (R2018), Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors
- ANS-8.3-1997 (R2017), Criticality Accident Alarm System
- ANS-8.5-1996 (R2017), Use of Borosilicate-Glass Raschig Rings as a Neutron Absorber in Solutions of Fissile Material
- ANS-8.6-1983 (R2017), Safety in Conducting Subcritical Neutron-Multiplication Measurements in Situ
- ANS-8.7-1998 (R2017), Nuclear Criticality Safety in the Storage of Fissile Materials
- ANS-8.10-2015, Criteria for Nuclear Criticality Safety Controls in Operations with Shielding and Confinement
- ANS-8.12-1987 (R2016), Nuclear Criticality Control and Safety of Plutonium-Uranium Fuel Mixtures Outside Reactors
- ANS-8.14-2004 (R2016), Use of Soluble Neutron Absorbers in Nuclear Facilities Outside Reactors
- ANS-8.15-2014 (R2019), Nuclear Criticality Control of Selected Actinide Nuclides
- ANS-8.17-2004 (R2019), Criticality Safety Criteria for the Handling, Storage and Transportation of LWR Fuel Outside Reactors
- ANS-8.19-2014 (R2019), Administrative Practices for Nuclear Criticality Safety
- ANS-8.20-1991 (R2015), Nuclear Criticality Safety Training
- ANS-8.21-1995 (R2019), Use of Fixed Neutron Absorbers in Nuclear Facilities Outside Reactors
- ANS-8.22-1997 (R2016), Nuclear Criticality Safety Based on Limiting and Controlling Moderators
- ANS-8.23-2019, Nuclear Criticality Accident Emergency Planning and Response

- ANS-8.24-2017, Validation of Neutron Transport Methods for Nuclear Criticality Safety Calculations
- ANS-8.26-2007 (R2016), Criticality Safety Engineer Training and Qualification Program
- ANS-8.27-2015, Burnup Credit for LWR Fuel

The “date of the Order” will always be the most recent change, whether an administrative change, limited change, or a complete revision. Currently the date of DOE O 420.1C Chg. 3 (Ltd Chg.) is November 14, 2019 as indicated on the first page of the Order.

Although the Order does not require incorporation of new or revised ANS-8 series standards into the criticality safety program description document until the next revision or change to DOE O 420.1 is released, the DOE Head of Field Element may choose to incorporate such standards prior to the next update.

A future change to O 420.1C is under consideration to list the specific standards in the Order itself to remove any potential ambiguities