

**Frequently Asked Questions Regarding DOE Order 420.1C, *Facility Safety*, and its supporting directives, DOE-STD-1020-2012, *Natural Phenomena Hazards Analysis and Design Criteria for DOE Facilities*, and DOE-STD-1066-2012, *Fire Protection***

**Q-1: For existing facilities how do I determine the list of applicable design codes and standards?**

**A:** For existing facilities the code of record (i.e. those codes and standards in effect at the time that the facility was designed) is the list of applicable design codes and standards. In the case of major modifications to existing facilities, the design codes and standards of O 420.1C apply.

**Q-2: I work at an existing facility. What changes in DOE O 420.1C do I have to be concerned about?**

**A:** DOE O 420.1C, Attachment 2, Chapters II, III, IV, and V have the requirements that are applicable to existing facilities in the operating phase. Attachment 2, Chapter I and Attachment 3 apply to new nuclear facilities and major modifications to the existing nuclear facilities.

**Q-3: Does DOE O 420.1C allow delegation of all responsibilities of the AHJ or Building Code Official to the contractor?**

**A:** No, DOE may not delegate approval of exemptions to DOE Orders and applicable codes and standards. However, DOE field elements may delegate authorities and responsibilities for routine activities to contractors while retaining the ultimate responsibility that these roles are adequately fulfilled.

DOE-STD-1066-2012, *Fire Protection*, provides discussion on delegation of these responsibilities (see Section 5.2.4, *Delegated Authority* of DOE-STD-1066-2012).

**Q-4: What does the following mean regarding the use of the DOE G 420.1-1A, *Nonreactor Nuclear Safety Design Criteria for use with DOE O 420.1C, Facility Safety*?**

*DOE G 420.1-1A provides an acceptable method to meet the requirements stated in this chapter. DOE O 251.1C requires that any implementation selected must be justified to ensure that an adequate level of safety commensurate with the identified hazards is achieved.*

[DOE O 420.1C, Attachment 2, Chapter I, Section 3.b.(8)]

**A:** "Justify" means to document a defensible technical basis for any alternative approach to the requirements and methods of the Order and its guidance documents; DOE Order 251.1C, *Departmental Directives Program*, dated January 15, 2009, states:

*(1) Provide an acceptable, but not mandatory means for complying with requirements of an Order or rule. Note: Alternate methods that satisfy the requirements of an Order are also acceptable. However, any implementation selected must be justified to ensure that an adequate level of safety commensurate with the identified hazards is achieved.*

(DOE O 251.1C, Section 5.d. Guides.)

Adequate level of safety is equivalent to "adequate protection," which is defined as those measures that permit a facility to operate safely for its workers and the surrounding community (see Deputy Secretary Poneman letter, July 19, 2012). Adequate protection is achieved when all necessary measures are being taken in a manner that is consistent with applicable requirements and regulatory

process. Adequate protection in design is achieved by meeting Departmental requirements with regard to the design of engineered safety systems and controls, which protect workers and the public from normal operations and possible accidents.

**Q-5: Is DOE-STD-1189-2008, *Integration of Safety into the Design Process*, required by this Order?**

**A:** Yes, DOE O 420.1C, like its predecessor, clearly invokes the use of STD-1189 for design of Hazard Category 1, 2, and 3 nuclear facilities and associated major modifications:

*Safety must be integrated into the design early in, and throughout, the design process through the use of DOE-STD-1189-2008. [DOE O 420.1C, Attachment 2, Chapter I]*

In addition to O 420.1C, DOE O 413.3B, *Program and Project Management for the Acquisition of Capital Assets*, dated November 29, 2010, also clearly requires implementation of DOE-STD-1189:

*For projects that are Hazard Category 1, 2, and 3 nuclear facilities or include major modifications thereto (as defined in 10 CFR Part 830), the requirements in DOE-STD-1189, as amended, shall be fully implemented. [DOE O 413.3B, Attachment 1, Section 13]*

Some parts of DOE-STD-1189-2008 are not written as requirements, but rather as recommendations. For example, Appendix B in DOE-STD-1189-2008 regarding chemical hazard evaluation is provided as guidance, not requirements.

**Q-6: What does *Very High Assurance* mean in the following passage regarding confinement ventilation?**

*An active confinement ventilation system as the preferred design approach for nuclear facilities with potential for radiological release. Alternate confinement approaches may be acceptable if a technical evaluation demonstrates that the alternate confinement approach results in very high assurance of the confinement of radioactive materials.*

*The guidance for confinement ventilation systems and evaluation of the alternatives, is provided in DOE Guide (G) 420.1-1A, *Nonreactor Nuclear Safety Design Guide for Use with DOE O 420.1C, Facility Safety*.” [DOE O 420.1C, Attachment 2, Chapter I, Section 3.b.(3).(c)]*

**A:** Alternate approaches to an active confinement ventilation system are containment and passive confinement. A containment approach differs from a confinement approach in that the goal of containment is 100% containment of radioactive materials. In reality, even a containment approach results in some level of leakage but this is managed to an absolute minimum by code compliance which requires periodic penetration leak rate tests and full building leak rate tests (ANS 56.8, *Containment System Leakage Testing Requirements*).

Passive confinement involves dependence on minimization of paths of leakage of hazardous materials when a ventilation system is not running. The DOE Toolbox Code MELCOR provides a tool for analyzing a building leak path factor (LPF). Very high assurance of adequate confinement under passive

confinement conditions means a technically defensible analysis of the LPF and comparison of the results with applicable dose limits under normal and accident conditions. See *MELCOR Computer Code Application Guidance for Leak Path Factor in Documented Safety Analysis*, May 2004.

**Leak path Factor (LPF)**

*For mitigated analysis, analytical tools used in calculating the LPF shall be appropriate to the physical conditions being modeled, including the use of conservative parameters, such that the overall LPF would be conservative.*[DOE-STD-3009-(DRAFT), DSA Preparation Guide]

**Q-7: Is DOE-STD-1066-2012, *Fire Protection*, required by DOE O 420.1C?**

**A:** It is not required by the Order 420.1C, but the Order does require that any alternate approach must provide an equivalent level of safety. The burden is on the contractor to demonstrate that the alternate approach provides an equivalent level of safety. DOE O 420.1C states:

*Specific Fire Protection Program Criteria. DOE-STD-1066-2012 provides acceptable methods for implementing the requirements in DOE O 420.1C; other methods may be acceptable. Any alternate approach must provide an equivalent level of safety.*

[DOE O 420.1C, Attachment 2, Chapter II, 3.h]

However DOE-STD-1066-2012 is applicable for all organizations that have responsibility for the design, construction, maintenance, or operation of government-owned or government-leased facilities and on-site contractor-leased facilities used for DOE mission purposes. DOE-STD-1066-2012 was specifically written to support effective implementation of Order 420.1C Attachment 2, Chapter II and the Order indicates that it provides acceptable methods for implementation.

Alternative approach to DOE STD 1066 may be documented as a part of the fire protection program documentation that needs to be approved by the Head of the DOE Field Element. Such documentation would describe all the program attributes that apply to the site as delineated in DOE O 420.1C. Any alternative approach must document a defensible technical basis to the requirements and methods of the Order and its supporting language in DOE STD 1066.

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**Q-8: For equivalencies, how do you demonstrate an "equivalent level of safety"?**

**A:** DOE G 420.1-1A provides the following:

*Justification of equivalent codes and standards should demonstrate that the proposed design of the SSCs meets, or exceeds, the level of safety (e.g., meets, or exceeds, the level of protection) provided by the normally applied codes and standards. Evaluation of the level of safety should address:*

- *Critical safety attributes of the SSCs;*
- *Critical characteristics of the SSCs that are important to design, material, and performance of the SSCs;*
- *The reliability of safety SSCs; and,*
- *The margins of safety to failure of the SSCs (e.g., pressure, temperature, environmental conditions, and other design loads) provided by application of the code.*

*For individual components, equivalency should be demonstrated by defining and verifying that the substitute component meets or exceeds these characteristics. Equivalencies should be well documented with a technical basis and should receive peer review by a technically capable and experienced designer.*

[DOE G 420.1-1A, Section 5.4.16 *Equivalencies for Codes and Standards*]

**Q-9: Do I have to follow DOE-STD-1020-2012, *Natural Phenomena Hazards Analysis and Design Criteria for DOE Facilities*?**

**A:** Yes, DOE STD-1020-2012 is clearly invoked in the Order 420.1C. DOE O 420.1C provides requirements for exemptions and equivalencies to the provisions of DOE-STD-1020-2012.

**Q-10: Design Maturity. How do you define Design Maturity in section 3.C.(9) of DOE O 420.1C?**  
*Exemption. The design requirements in this Order do not apply to projects that have reached a high level of design maturity, as determined by the Program Secretarial Offices (PSOs), as of the issuance date of this Order. Examples of projects that have reached a high level of design maturity include projects that have completed the critical decision (CD)-2 milestone or those projects that have completed the CD-1 milestone with a high level of design maturity. This exemption is provided to control project costs; new design requirements in this Order may be considered for inclusion where they provide significant benefits and/or net cost savings.*

**A:** Design Maturity is defined in DOE O 413.3B, *Program and Project Management for the Acquisition of Capital Assets*, dated November 29, 2010:

*The project design will be considered sufficiently mature when the project has developed a cost estimate and all relevant organizations have a high degree of confidence that it will endure to project completion. In determining the sufficiency of the design level, factors such as project size, duration, and complexity will be considered.*

[O 413.3B, App C-4, Design Maturity]

**Q-11: What is HSS's role in the exemption process for DOE O 420.1C requirements?**

**A:** HSS is the Office of Primary Interest (OPI) for DOE O 420.1C. As such, HSS's role in exemptions is to consult with the Program Secretarial Officers (PSOs) as defined in O 251.1C.

*Exemptions are the release from one or more requirements in a directive. Unless specified otherwise in the directive, Exemptions are granted, in consultation with the OPI, by the Program Secretarial Officer or their designee, or in the case of the NNSA, by the Administrator or designee, and documented for the OPI in a memorandum. For those directives listed in Attachment 1 of DOE*

*O 410.1, CTA concurrences are required prior to the granting of Exemptions.*

[DOE O251.1C - Section 6.a.3.c.2]

In addition, HSS has a role to assist the line in effective implementation and to capture future improvements for O 420.1C.

**Q-12: What is the relationship between 10 CFR 851 and DOE O 420.1C and DOE-STD-1066-2012?**

**A:** 10 CFR 851 is focused on worker safety whereas DOE 420.1C is focused on facility safety. One area where these two topics overlap is fire safety (addressed in O 420.1C, Attachment 2, Chapter II and DOE-STD-1066-2012) because some fire safety measures are aimed at worker protection and others are aimed at property protection.

**Q-13: DOE-STD-3009 is currently being reviewed in DOE RevCom. What is the impact of revision to DOE-STD-3009 on DOE O 420.1C?**

**A:** There is no significant impact. DOE-STD-3009 is a safe harbor method to satisfy 10 CFR 830 requirements for safety analysis. DOE O 420.1C is focused on facility design rather than facility safety analysis.

**Q-14: DOE-STD-1189-2008 is committed for revision in the 2013-2014 timeframe. What is the impact of revision to DOE-STD-1189-2008 on DOE O 420.1C?**

**A:** DOE O 420.1C invokes DOE-STD-1189-2008. If this standard is revised or updated, the new version is not self-invoking. A change to DOE O 420.1C would be necessary to invoke a new version of DOE-STD-1189. The specific scope of potential changes to DOE-STD-1189 has not been established at this time, and will be addressed in the Project Justification Statement in accordance with the Technical Standards Program when the revision is initiated.

**Q-15: Are the requirements in the CRD automatically applicable to all DOE Facilities?**

**A:** No. They are not applicable until they are put in the contract.

**Q-16: DOE O 420.1C, Sec 5.c.(5) requires the DOE Head of the Filed Element to approve contractor's fire protection program. However, DOE O 420.1C, Att 2, Ch II, *Fire Protection*, does not specify the requirement.**

**A:** Contractor will need to submit the fire protection program for DOE Field Element's review and approval. DOE Field Elements should direct contractors to submit their programs.

**Q-17: Section 2.2.2 of DOE-STD-1066-2012 states:**

***"2.2.2 Building code. The acquisition and construction of new facilities and significant modifications of existing facilities shall meet the applicable parts of the latest edition of the International Building Code (IBC), NFPA standards, and other nationally recognized consensus standards for electrical, fire, and life safety."***

**Does this mean that the latest published IBC is required regardless of whether it has been adopted into law by the local state or community?**

**A:** The design authority is required to determine the applicable codes and standards for new facilities or major modifications. The general practice is to review and adopt the current version of codes and standards. In many cases, however, the design authority could select other versions, if deemed justified in view of safety and design specific requirements. Use of local and state adopted codes and standards (which in many cases are older versions) can also be justified and has been anticipated by DOE O 420.1C:

*"If approved by the responsible field element manager, state, regional, and local building codes may be used in lieu of the IBC upon contractor submission of a report that demonstrates that implementation of the substituted code for the specific application will meet or exceed the level of protection that would have been provided by the IBC."* [DOE O 420.1C, Attachment 1, Page 1, 1(c)]