



Natural Phenomena Hazards DOE-STD 1020-2012 & DOE Handbook

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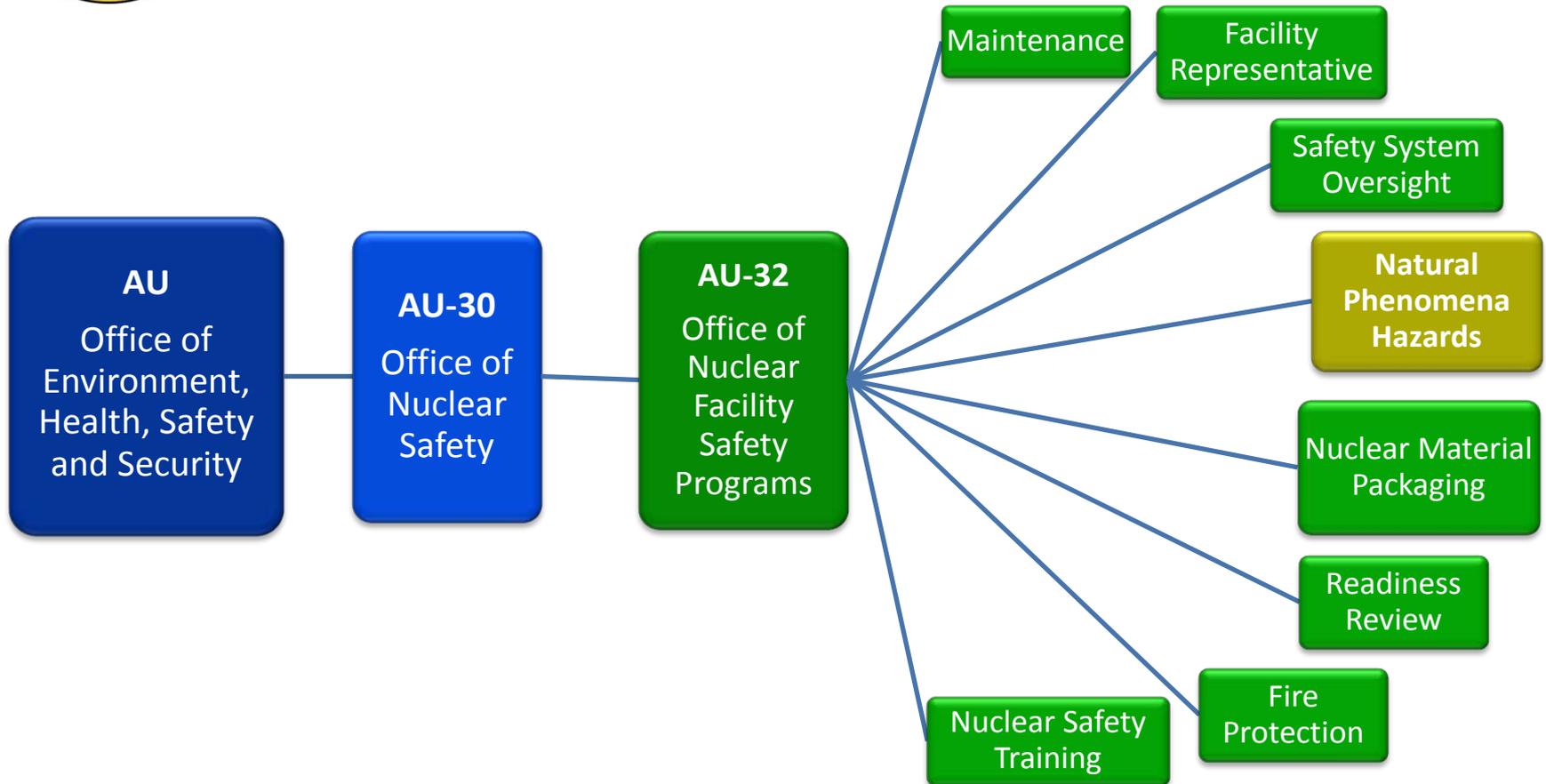


Overview

- DOE's Natural Phenomena Hazards (NPH) Program
- DOE-STD-1020-2012, *Natural Phenomena Hazards Analysis and Design Criteria for DOE Facilities*
- DOE NPH Handbook



DOE NPH Program





DOE NPH Program





DOE NPH Program

Policy

- Develop and maintain DOE Order (O) 420.1C, *Facility Safety*, DOE-STD-1020, *Natural Phenomena Hazards Analysis and Design Criteria for DOE Facilities* and DOE Handbook.

Assistance

- Provide continuing assistance to DOE sites on NPH mitigation as questions and interpretations arise.



DOE NPH Program

Communication

- Coordinate with EFCOG, CNS, NNSA, EM, SC, NE, CDNS, NRC, DNFSB, ANSI/ANS and ASCE/SEI.
- Develop DOE NPH Committee-lessons learned.

Training

- Partner with NTC and FTCP.
- Provide training on NPH requirements related to DOE O 420.1C and DOE-STD-1020.
- Training at VTCs, Oak Ridge Complex, LANL/SNL.



DOE-STD-1020-2012

Purpose-provides criteria and guidance in NPH analysis and design of structures, systems, and components (SSCs) for:

- Implementing requirements of DOE O 420.1C, *Facility Safety*, and to ensure SSCs perform safely under effects of NPHs.
- Use of industry building codes and voluntary consensus standards encouraged by 1995 National Technology Transfer & Advancement Act:
 - ANSI/ANS 2.26-2010 (Seismic design categorization)
 - ANSI/ANS 2.27-2008 (Seismic design characterization)
 - ANSI/ANS 2.29-2008 (Probabilistic seismic hazard assessment)
 - ASCE/SEI 43-05 (Seismic design)
- Consistent with DOE-STD-1189-2008 .



DOE-STD-1020-2012

Major Changes & Key Requirements (I)

- Consolidates and streamlines the requirements from **DOE-G 420.1-2, DOE STDs 1020-02, 1021-93, 1022-94** and **1023-95** into a single document supporting implementation of DOE O 420.1C, Attachment 2, Chapter IV.
- Updates criteria and guidance for major modifications to existing Hazard Category 1, 2, and 3 nuclear facilities, and for 10-year NPH reassessments.
- Introduces NDC (NPH Design Category) terminology (in lieu of Performance Categories).



DOE-STD-1020-2012

Major Changes & Key Requirements (II)

- Revises the set of industry codes and standards that is invoked to address DOE NPH analysis and design needs.
- Provides supplemental criteria and guidance for seismic hazards.
- Provides new criteria and guidance for lightning, precipitation, and volcanic eruption events.
- Provides NPH Accident Analysis.
- Provides post-natural phenomena procedures.



DOE-STD-1020-2012

Section Outline - Provides criteria and guidance:

- NPH Design
- Seismic Design
- Wind, Tornado, and Hurricane Design
- Flood, Seiche and Tsunami Design
- Lightning Design
- Precipitation Design
- Volcanic Eruption Design
- Evaluation and Modification of SSCs in Existing Facilities
- QA and Peer Review



DOE NPH Handbook

Overview

- Companion to [DOE-STD-1020-2012](#).
- Same outline as [DOE-STD-1020-2012](#).
- Incorporates technical material contained in [DOE-STD-1020-2002](#) and [DOE G 420.1-2](#), [DOE STDs 1021-93](#), [1022-94](#) and [1023-95](#) and voluntary consensus standards ([ANSI/ANS 2.26-2010](#), [ANSI/ANS 2.27-2008](#), [ANSI/ANS 2.29-2008](#) and [ASCE/SEI 43-05](#)).
- Provides insights and good practices based on lessons learned from past NPH design experience.
- Training tool for junior NPH analyst/engineer.



DOE NPH Handbook

Section 9 - Evaluation & Modification of SSCs in Existing Facilities

- Features discussion on a study on field experience in implementing the periodic 10 year reviews of NPH assessments by sites (NNSA, EM, NE and SC).
- Two Phase study: NPH assessment review questionnaire & on-site meetings at INL, LANL, LBNL, SRS, and Hanford to capture lessons learned and recommendations.
- Draft report to be submitted to PSOs for factual accuracy.



DOE NPH Handbook

Next Steps

- PSO review (November 2014)
- DNFSB (FY2014/15 Q1)
- RevCom (60 days)



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Questions?



Frequently Asked Question

Q: To which facilities does DOE-STD-1020 apply?

A: DOE-STD-1020 has the same applicability as Chapter IV of Attachment 2 in DOE O 420.1C, i.e., it is applicable to all government-owned and government-leased nuclear and non-nuclear facilities and sites. However, the Standard applies only when new facilities are constructed or major modifications are initiated, unless triggered by periodic NPH assessment and upgrade requirements.

[DOE-STD-1020-2012, Section 1.3]



Frequently Asked Question

Q: Does DOE-STD-1020 section 9.2 apply only to existing hazard categories 1, 2 and 3 nuclear facilities with SSCs in NDC-3 or higher?

A: Yes. Section 9.0 of the Standard notes that seismic evaluation of existing nuclear radiological, and chemical hazard facilities with SDC 1-2 SSCs is done through compliance with Public Law 101-614 and Executive Order 12941, which mandates use of the ICSSC (latest RP-8) guidelines.

[DOE-STD-1020-2012, Sections 2.1.4, 9.0 and 9.2]



Frequently Asked Question

Q: Is it the intent of 1020-2012 to use table A-1 from 1189 to establish all design categories even if they are not safety class or safety significant?

A: Yes. All SSCs need to be categorized into NPH design categories according to Table A-1 in STD-1189, not just safety class (SC) or safety significant (SS) SSCs. For NPH design purpose, SSCs in all DOE facilities must be categorized to determine their NDC categories. Hazard Category 1, 2, and 3 facilities shall be categorized and designed using ASCE/SEI 7-10 provisions. The NPH design of SSCs in non-nuclear facilities with biological, chemical, or toxicological hazards is based on NDC categorization discussed in Section 2.3.9 of DOE-STD-1020-2012.

[DOE-STD-1189-2008, Table A-1]



Frequently Asked Question

Q:The standard often specifies the use of certain edition/revision of DOE and industry consensus standards. When these standards are revised in the future, would it be permissible to use the later revisions?

A: Yes, it is permissible, but subject to the two limitations given in the last paragraph of Section 1.3: (1) The use of a later version is consistent with other provisions of STD-1020; (2) When an SSC is designed by mixing the provisions of two versions of a cited reference, the resulting design shall not be less conservative than that resulting from the application of the latest version alone.

[DOE-STD-1020-2012, Section 1.3]