

## CSSG TASKING 2015-01

Date Issued: April 01, 2015

**Task Title:** *Support CTA Interpretation regarding the UPF SDS*

**Task Statement:**

Per the attached letter, COT-NNSA-YSO-PM-801768-A781, the CSSG is requested to support the NNSA Central Technical Authority with guidance/interpretation on the following:

- The UPF Project is using the informal interpretation of section 2.3.7 from DOE-STD-1 020-2012 *Natural Phenomena Hazards Analysis and Design Criteria for DOE Facilities* as currently documented in the project UPF Safety Design Strategy (SDS) to determine the Natural Phenomena Hazard Design Category (NDC) for each of the UPF structures. The project requests a formal NNSA CTA interpretation to DOE-STD-1020-2012 in support of the project's current design efforts.
- Attachment 2 to DOE Order 420.1C, Chapter I, Section 3(b)(11) cites the need to integrate design requirements from the various disciplines. Attachment 2, Chapter II, Section 3(c)(2)(b) requires automatic suppression throughout the facility. Attachment 2, Chapter III, Section 3(g) notes that NCS needs to provide firefighting guidance for moderation controlled areas. The UPF project intends on restricting or eliminating sprinkler coverage in certain moderation controlled areas to satisfy NCS requirements. Does this NCS control strategy meet DOE Order 420.1 C or will an exemption be required?
- Attachment 2 to DOE Order 420.1C, Chapter III, Section 3(f) requires the facility to be subcritical for all design basis events including NPH events. DOE-STD-1020-2012 states that an NDC-3 event is a credible event. However, Section 2.3.7 also states that a criticality accident is to be treated the same as any radiological event in accordance with DOE-STD-1189, Appendix A. For the UPF project, the dose consequences result in an SDC-2 design basis seismic event. The UPF project is interpreting DOE-STD-1020-2012, Section 2.3.7, to be that the "design basis event" for a NPH initiated criticality accident is defined by DOE-STD-1189-2008, Appendix A and that NCS SSCs are to be assessed against NDC-3 criteria for single contingency vulnerabilities that may necessitate a select number of SSCs to be assigned to NDC-3 (similar to a beyond design basis event except there is no cost benefit evaluation). Is the UPF project's interpretation correct or should all NCS NPH design basis events be NDC-3 events?

There is 'disconnect' in the current 'informal' NNSA CTA guidance whereby 'qualitative engineering judgement' was used in giving out the seismic grading criteria, but it's not allowed when doing criticality safety evaluations for the 8.1 and 8.19 requirements for the extreme NPH events. The regulatory relief is to allow more qualitative arguments to be made for extreme NPH events that the processes should remain subcritical and can meet the DCP based on those arguments. Evacuation could be considered as 'defense in depth' in case something much worse than expected/evaluated happens.

Format of the response will be provided.

Couch in terms of compliance with existing orders and standards.

**Resources:**

CSSG Task 2015-01 Team Members:

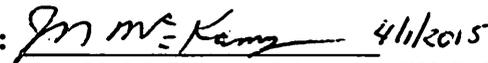
- D. Erickson (Team Leader)
- D. Hayes
- T. McLaughlin
- J. McKamy (NA-511, CSSG Emeritus)
- C. Keilers (NA-511)

Contractor CSSG members of the team will use their FY15 NCSP CSSG support funding as appropriate; DOE CSSG members of the team will utilize support from their site offices. It is up to the team members to utilize other expertise, or include other interested parties, as can be made available to support the tasking, without incurring additional CSSG expenses. No travel is anticipated to be necessary to support this tasking.

**Task Deliverables:**

1. CSSG Subgroup to hold task 'kickoff' telecom by 04/8/2015
2. CSSG Subgroup to provide draft guidance/interpretation to full CSSG for review: 04/15/2015
3. Full CSSG to provide review comments to Task Team Leader: 04/20/2015
4. CSSG Subgroup to provide finalized guidance/interpretation to NCSP Manager: 04/22/2015

**Task Completion Date:** 04/22/2015

Signed:  4/1/2015  
Jerry N. McKamy, Manager US DOE NCSP  
Office of the Chief of Defense Nuclear Safety, NA-511



**U.S. Department of Energy**  
NNSA Production Office  
Post Office Box 2050  
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March 23, 2015



MEMORANDUM FOR: JAMES J. MCCONNELL  
ASSOCIATE ADMINISTRATOR FOR  
SAFETY, INFRASTRUCTURE AND OPERATIONS

FROM: STEVEN C. ERHART  
MANAGER

SUBJECT: Request for Central Technical Authority (CTA) Interpretations

NPO requests your interpretation and positions on four specific items to support design for the Uranium Processing Facility (UPF) Project. Your interpretation will support ongoing design efforts and provide input for the next revision of the UPF Safety Design Strategy (SDS). The four items are discussed in more detail in the attached letter from Consolidated Nuclear Security, LLC (CNS). The UPF SDS was recently approved by NPO based on advice from the Chief of Defense Nuclear Safety to consider seismic design of the nuclear criticality safety structures, systems and components and, confinement ventilation system (Issues 1 and 4 in the attached letter). Issues 1, 2, and 3 were raised by the Peer Review Team for the UPF Project as items that need policy interpretation from the CTA.

If you have any questions, please contact Jim Goss of my staff at 865-574-4335.

Attachment

cc w/attachment:

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K. Loll, NA-511  
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March 16, 2015

Mr. Kenneth A. Hoar  
Assistant Manager  
Nuclear Safety and Engineering  
NNSA Production Office  
Post Office Box 2050  
Oak Ridge, Tennessee 37831-8009

Dear Mr. Hoar:

**Contract DE-NA-0001942, Request for Formal Central Technical Authority (CTA) Guidance and Interpretation**

- References: 1) *IMA-PM-801768-A316, PEER Review Uranium Processing Facility (UPF) at the Y-12 National Security Complex, October 23, 2014*  
2) *COT-NNSA-YSO-PM-A778, Contract DE-NA-0001942, Request for Formal Central Technical Authority (CTA) Guidance and Interpretation, March 4, 2015*  
3) *RP-FS-801768-A003, Safety Design Strategy for the Uranium Processing Facility, Rev. 9, September 15, 2014*  
4) *DCN-EF-801768-A040 to RP-FS-801768-A003, Safety Design Strategy for the Uranium Processing Facility, Rev. 9, September 30, 2014*

Consolidated Nuclear Security (CNS), Mission Engineering Design Authority requests NPO provide formal interpretation and guidance on the following topical areas for the Uranium Processing Facility (UPF) Project from the National Nuclear Security Administration (NNSA) Central Technical Authority (CTA). This letter supersedes COT-NNSA-YSO-PM-A778 dated March 4, 2015 (Ref. 2) to clarify requested information.

- 1 The UPF Project is using the informal interpretation of section 2.3.7 from DOE-STD-1020-2012 *Natural Phenomena Hazards Analysis and Design Criteria for DOE Facilities* as currently documented in the project UPF Safety Design Strategy (SDS) (Ref. 3 and 4) to determine the Natural Phenomena Hazard Design Category (NDC) for each of the UPF structures. The project requests a formal NNSA CTA interpretation to DOE-STD-1020-2012 in support of the project's current design efforts.
- 2 Attachment 2 to DOE Order 420.1C, Chapter I, Section 3(b)(11) cites the need to integrate design requirements from the various disciplines. Attachment 2, Chapter II, Section 3(c)(2)(b) requires automatic suppression throughout the facility. Attachment 2, Chapter III, Section 3(g) notes that NCS needs to provide firefighting guidance for moderation controlled areas. The UPF project intends on restricting or eliminating sprinkler coverage in certain moderation controlled areas to satisfy NCS requirements. Does this NCS control strategy meet DOE Order 420.1C or will an exemption be required?

Pen & Ink Change Made on 3/17/15  
Reason For Change: Corrected Document Number on  
Pg 2, 3 and 4  
Janice Smith  
Janice Smith  
3/17/15  
Date

This document has been reviewed by a Y-12 DC/UCNI-RO and has been determined to be UNCLASSIFIED and contains no UCNL. This review does not constitute clearance for Public Release.

Name: Kevin H. Reynolds Date: 3/16/2015

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RC-UPF DMC

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- 3 Attachment 2 to DOE Order 420.1C, Chapter III, Section 3(f) requires the facility to be subcritical for all design basis events including NPH events. DOE-STD-1020-2012 states that an NDC-3 event is a credible event. However, Section 2.3.7 also states that a criticality accident is to be treated the same as any radiological event in accordance with DOE-STD-1189, Appendix A. For the UPF project, the dose consequences result in a SDC-2 design basis seismic event. The UPF project is interpreting DOE-STD-1020-2012, Section 2.3.7, to be that the "design basis event" for a NPH initiated criticality accident is defined by DOE-STD-1189-2008, Appendix A and that NCS SSCs are to be assessed against NDC-3 criteria for single contingency vulnerabilities that may necessitate a select number of SSCs to be assigned to NDC-3 (similar to a beyond design basis event except there is no cost benefit evaluation). Is the UPF project's interpretation correct or should all NCS NPH design basis events be NDC-3 events?
- 4 UPF follows the design objective that multiple layers of protection are used, as appropriate or necessary, according to the requirements of DOE O 420.1C, and DOE-STD-1189 to prevent or mitigate the unintended release of significant quantities of hazardous materials to the environment, including releases due to natural phenomena events. The UPF confinement strategy involves a series of DID physical barriers to prevent or mitigate the unintended release of radioactive materials to the environment. These barriers include some, or all, of the following:
  - Storage containers and racks containing fissile material
  - Process systems including tank systems containing uranium-bearing solutions
  - Gloveboxes and hoods
  - All building structural walls
  - A multi-zone active confinement ventilation system (CVS) with high-efficiency particulate air (HEPA) filtration

Table A-1 in DOE G 420.1-1A, Appendix A contains "Ventilation System – General Criteria". One of the general design/performance criteria states that the "exhaust system should withstand anticipated normal, abnormal and accident system conditions and maintain confinement integrity". This criterion is shown as being applicable to both Safety Class and Safety Significant CVSs, and to active CVSs that only provide Defense-in-Depth (DID). However, additional CVS design/performance criteria contained in Table A-1 that specifically address "Resistance to Internal Events – Fire" and "Resistance to External Events – Natural Phenomena – Seismic" are shown as not applying to DID systems. The project's current interpretation of Table A.1 is that the general criterion is only applicable "as required to prevent accident release", and that the additional, more specific criteria qualify the degree of applicability. Is the UPF interpretation that the specific criteria in Table A.1 amplify the general criteria, correct?

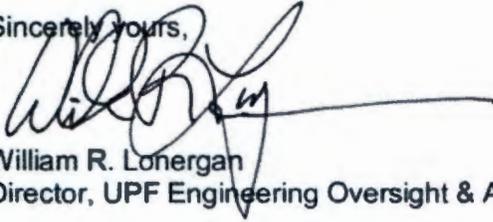
The UPF interpretations noted above are considered consistent with the DOE Orders and Standards. However, the CTA confirmations of these positions are necessary to avoid time consuming debate about the UPF design. Therefore, the UPF project will continue developing the design using these interpretations until confirmation or clarification is received from the CTA.

Mr. Kenneth A. Hoar  
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I can assist you with coordination of the requested CTA interpretations. I can be reached at (865) 576-4209.

Sincerely yours,



William R. Lonergan  
Director, UPF Engineering Oversight & Authorization

WRL:jfs

c: S. C. Erhart, NPO Y-12  
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J. E. Goss, NPO Y-12  
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