

**CONTROL FORM FOR DOE/ORO DIRECTIVE**

**PART A (To be completed by the ORO DIRECTIVES MANAGEMENT GROUP, AD-440):**

**1. DIRECTIVE NUMBER, TITLE, AND DATE:**

**ORO O 420, CHAPTER XII, CHANGE 2, NUCLEAR CRITICALITY SAFETY, dated 09/26/2006**

**2. PURPOSE OF TRANSMITTAL:** \_\_\_ New Directive    X Revised Directive    \_\_\_ Revised Control Form

**3. DOES THIS DIRECTIVE CANCEL OR EXTEND ANY OTHER DIRECTIVES?** X Yes    \_\_\_ No  
**If "Yes,"** list what action (cancel or extend) and list the Directive(s) number(s), title(s), and date(s):

This Directive cancels and replaces ORO O 420, Chapter XII, Change 1, NUCLEAR CRITICALITY SAFETY, dated 04/01/2004.

The attached Directive is forwarded for review and action. Complete Part B and forward a completed hard copy of this form to ORO DMG, AD-440, by 10/11/2006.

**PART B (To be completed by the DIVISION OF PRIMARY INTEREST [DPI]):**

**COMPLETE FOR DOE DIRECTIVES ONLY:**

**4. SUPPLEMENTAL ORO DIRECTIVE REQUIRED?**

Is a new or revised supplemental ORO Directive required? \_\_\_ Yes    \_\_\_ No

**If "Yes,"** target date for submission of supplemental ORO Directive is \_\_\_\_\_.

**COMPLETE FOR BOTH DOE AND ORO DIRECTIVES:**

**5. CONTRACTOR APPLICABILITY.**

**Does this Directive affect the work performed by ORO Contractors?** \_\_\_ Yes    X No

**If "Yes," whom?** \_\_\_ Bechtel Jacobs Company LLC    \_\_\_ ORAU

\_\_\_ UT-Battelle, LLC    \_\_\_ ISOTEK (Bldg. 3019, ORNL)

\_\_\_ Foster Wheeler (FWENC)

\_\_\_ Other Contractors (list by name)

**6. SUBJECT MATTER EXPERT:** Robert McBroom    Safety and Health Division, SE-33  
Name    Organization

*Original Signed By*

**7. APPROVED BY:** Jorge Ferrer, Dir.    Safety and Health Division    09/26/2006  
Signature    Organization    Date

**PART C (To be completed by the ORO DIRECTIVES MANAGEMENT GROUP, AD-440):**

**APPROVED FOR DISTRIBUTION IN ACCORDANCE WITH OFFICIAL DIRECTIVE DISTRIBUTION LIST:**

*Original Signed By*

Wayne H. Albaugh    09/26/2006  
DMG Team Leader, AD-440    Date

**INSTRUCTIONS TO ADDRESSEES: THIS FORM IS TO BE FILED WITH THE DIRECTIVE AND RETAINED.** (Revised 02/10/2006)

# U.S. Department of Energy

Oak Ridge Office

ORO O 420  
Chapter XII  
Change 2

DATE: 09/26/2006

## **SUBJECT: NUCLEAR CRITICALITY SAFETY**

---

1. PURPOSE. This Directive establishes Oak Ridge Office (ORO) program for nuclear criticality safety (NCS) at ORO sites. This Directive defines the roles and responsibilities of ORO organizations and provides direction on how NCS performance at the sites will be evaluated. This Chapter does not affect requirements applicable to ORO contractors. Nothing in this issuance changes any requirements in any Department of Energy (DOE) Directive.
2. CANCELLATION. This Chapter cancels and replaces ORO O 420, Chapter XII, Change 1, NUCLEAR CRITICALITY SAFETY, dated April 1, 2004.
3. APPLICABILITY. The provisions of this Chapter apply to all ORO Principal Staff responsible for, or supporting, operations that have a potential for accidental nuclear criticality.
4. RESPONSIBILITIES.
  - a. Manager, ORO.
    - (1) Carry out the responsibilities identified in DOE O 420.1B, FACILITY SAFETY.
      - (a) Review and approve any situations that could result in deviations from the double contingency principle in operations involving criticality hazards (if delegated by the Secretarial Officer [SO], may be further delegated as permitted by the SO.)
      - (b) Review and approve (may be delegated):
        - 1 Contractor Criticality Safety Program (CSP) description documents.
        - 2 The qualification program for contractor criticality safety staff (unless the qualification program complies with DOE-STD-1135-99, GUIDANCE FOR NUCLEAR CRITICALITY SAFETY ENGINEERING TRAINING AND QUALIFICATION).
        - 3 Shipping containers for off-site shipment that are used to exclude materials from the requirement for a criticality alarm system or a criticality detection system.



- (d) The method for preparing criticality safety evaluations.
  - (3) Ensure that all procurement requests for work within the scope of DOE O 420.1B, Attachment 2, Chapter III, including work requests to be performed through subcontracts, include the appropriate requirements of the associated Contractor Requirements Document.
  - (4) Define the roles and responsibilities of staff performing or supporting NCS functions for the organization.
  - (5) Establish and implement a NCS Program that meets the basic elements contained in Attachment 2 of this Chapter.
  - (6) Ensure that Federal staff overseeing activities involving fissile material have and maintain the appropriate level of NCS training to perform their assigned functions in accordance with DOE-STD-1173-2003, CRITICALITY SAFETY FUNCTIONAL AREA QUALIFICATION STANDARD or DOE-STD-1151-2002, FACILITY REPRESENTATIVE FUNCTIONAL AREA QUALIFICATION STANDARD, as appropriate.
- c. Assistant Manager for Environment, Safety, and Health.
- (1) Provides qualified NCS staff to support the line organizations in performance of their NCS responsibilities. Individuals meeting the requirements of DOE-STD-1173-2003 are deemed qualified to provide this support.
  - (2) Coordinates the ORO NCS DOE Program triennial assessment using qualified experts from outside ORO.
5. REQUIREMENTS AND PROCEDURES. None.
6. REFERENCES.
- a. DOE O 420.1B, FACILITY SAFETY, dated December 22, 2005.
  - b. DOE-STD-1134-99, REVIEW GUIDE FOR CRITICALITY SAFETY EVALUATIONS, dated September 1999.
  - c. DOE-STD-1135-99, GUIDANCE FOR NUCLEAR CRITICALITY SAFETY ENGINEERING TRAINING AND QUALIFICATION, dated September 1999.
  - d. DOE-STD-1151-2002, FACILITY REPRESENTATIVE FUNCTIONAL AREA QUALIFICATION STANDARD, dated April 2002.
  - e. DOE-STD-1158-2002, SELF-ASSESSMENT STANDARD FOR DOE CONTRACTOR CRITICALITY SAFETY PROGRAMS, dated November 2002.
  - f. DOE-STD-1173-2003, CRITICALITY SAFETY FUNCTIONAL AREA QUALIFICATION STANDARD, dated December 2003.

- g. DOE-STD-3007-93, Change Notice 1, GUIDELINES FOR PREPARING CRITICALITY SAFETY EVALUATIONS AT DEPARTMENT OF ENERGY NON-REACTOR NUCLEAR FACILITIES, dated September 1998.
- 7. DEFINITIONS. None.
- 8. CONTRACTOR REQUIREMENTS DOCUMENT. None.
- 9. ATTACHMENTS.
  - a. Attachment 1 - ORO NUCLEAR CRITICALITY SAFETY POLICY.
  - b. Attachment 2 – BASIC ELEMENTS OF AN ORO LINE ORGANIZATION NUCLEAR CRITICALITY SAFETY PROGRAMS.

## **ORO NUCLEAR CRITICALITY SAFETY POLICY**

The highest priority of the Oak Ridge Office (ORO) is to achieve daily excellence in protection of workers and the public and in the stewardship of the environment both on and off the Oak Ridge Reservation. To that end, the policy of ORO is: *“Prevention of an inadvertent nuclear criticality is paramount in all operations involving fissionable materials.”* Adequate engineered and administrative controls consistent with those described in applicable Department of Energy Directives and/or American National Standard Institute/American Nuclear Society (ANSI/ANS) Standards shall be implemented such that a nuclear criticality accident is an extremely unlikely event.

An Nuclear Criticality Safety (NCS) Program shall be established which prescribes appropriate specifications, limits, controls, design features, and procedures such that no single unlikely change in process conditions can result in a criticality event. To achieve that goal, ORO mandates that all NCS specifications, limits, controls, design features, and procedures will be strictly adhered to by ORO and all contractors and their subcontractors. ORO Line Assistant Managers have the primary responsibility for prevention of a nuclear criticality and oversight of contractor NCS Programs.

Furthermore, ORO supports a work environment that allows free and open expression of NCS concerns, where ORO or contractor staffs fear no reprisal or retaliation. Workers are the most important resource for preventing and reporting criticality hazards and potentially unsafe work practices.

The responsible ORO Line Assistant Managers supported by the Assistant Manager for Environment, Safety, and Health shall ensure that the objectives of this policy are fully met.

**BASIC ELEMENTS OF AN ORO LINE MANAGEMENT NUCLEAR CRITICALITY SAFETY PROGRAM**

1. Definition of the roles and responsibilities of staff performing or supporting nuclear criticality safety (NCS) functions for the organization.
2. Inclusion of appropriate NCS requirements (Department of Energy [DOE] Directives, DOE Standards, American National Standard Institute Standards, etc.) in the contract.
3. Verification through oversight activities (walkthroughs, surveillances, document reviews, assessments, review of contractor self-assessments, etc.) that the contractor NCS Program and its implementation satisfy contractual requirements.
4. Use of DOE-STD-1158-2002, SELF-ASSESSMENT STANDARD FOR DOE CONTRACTOR CRITICALITY SAFETY PROGRAMS, as the principal source document for oversight criteria.
5. Use of a qualified NCS expert in:
  - Oversight of contractor activities.
  - Resolution of NCS issues.
  - Recovery from and restart of facilities/processes following criticality violations.
  - Communication with the contractor NCS Program Managers.
  - Review of performance and program status information.
  - Review of contractor NCS documents.
6. Establish contractor NCS performance measures that provide feedback on the status of the NCS Program. The performance measures should be commensurate with the level of NCS Program required.