

# ORO CONTROL FORM - FINAL DIRECTIVE

PART A (To be completed by the Division of Primary Interest (DPI))

1. NUMBER AND TITLE OF DIRECTIVE: **ORO O 420, Chapter XII, Change 1, NUCLEAR CRITICALITY SAFETY**

2. PURPOSE OF TRANSMITTAL:  New Directive  Revised Directive

3. THIS DOCUMENT MAY AFFECT THE WORK PERFORMED BY THE FOLLOWING CONTRACTORS: (Check appropriate boxes)

No (all contractors)

Yes If yes, whom?  Bechtel Jacobs Co.  ORAU  UT-Battelle

Other contractors (list by type)

*Many ORO contractors have approved Standards/Requirements Identification Documents (S/RIDs) or Work Smart Standards (WSS) Sets that may affect applicability of contractor requirements from this directive. Applicability of contractor requirements must take into account the approved standards set for each particular contract.*

4. SIGNIFICANT PROVISIONS: Are there any significant changes or impacts?  No  Yes  
If yes, describe: This ORO Chapter is part of the ORO sunset review process. Changes to this Chapter were made to reflect the name change of the Deputy Manager for Operations to Chief Operating Officer in Paragraph 4b(7) and 4c(6).

5. CONTACT POINT: Jorge Ferrer Nuclear Safety Division, SE-33 576-6638  
Name Organization Telephone

PART B (To be completed by the Directives Management Group (DMG)):

6. FILING INSTRUCTIONS:

<u>Remove</u>	<u>Dated</u>	<u>Insert</u>	<u>Dated</u>
ORO Control Form	02/04/2002	ORO Control Form	04/01/2004
ORO O 420, Ch. XII	02/04/2002	ORO O 420, Ch. XII, Chg. 1	04/01/2004

*ORO Directives are available on the ORO Directives Management Group Home Page at [http://www.ornl.gov/doe/doe\\_oro\\_dmg/oro\\_dir.htm](http://www.ornl.gov/doe/doe_oro_dmg/oro_dir.htm). The ORO Directives will no longer be mailed in printed copy unless you do not have Internet capabilities.*

7. APPROVED FOR DISTRIBUTION IN ACCORDANCE WITH THE OFFICIAL DIRECTIVES DISTRIBUTION LIST:

*Original Signed By*  
Wayne H. Albaugh 04/01/2004  
Signature: DMG Team Leader, AD-440 Date

INSTRUCTIONS TO ADDRESSEES: THIS FORM IS TO BE FILED WITH THE DIRECTIVE AND RETAINED

## NNSA/YSO CONTROL FORM – FINAL DIRECTIVE

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

DIRECTIVE NUMBER, TITLE, AND DATE:

**ORO O 420, Chapter XII, Change 1, NUCLEAR CRITICALITY SAFETY, dated 04/01/2004**

PURPOSE OF TRANSMITTAL:  New Directive  Revised Directive

DOES THIS DIRECTIVE CANCEL/REPLACE OR EXTEND ANY OTHER DIRECTIVES?  Yes  No  
If "Yes," list what action (cancel/replace or extend) and list the Directive(s), including the number(s), title(s), and date(s):

This Directive cancels and replaces ORO O 420, Chapter XII, NUCLEAR CRITICALITY SAFETY, dated 02/04/2002

The attached Directive is forwarded for review and action. Complete Part B and forward this form to ORO DMG, AD-440, by 04/19/2004.

### PART B (To be completed by the NNSA Y-12 SITE OFFICE, Y12-01):

CONTRACTOR APPLICABILITY:

Does this Directive affect the work performed by BWXT Y-12, L.L.C.?  Yes  No

Does this Directive affect the work performed by BWXT Y-12, L.L.C., subcontractors?  Yes  No

If "Yes," list the subcontractors:

*Many contractors have approved Standards/Requirements Identification Documents (S/RID) or Work Smart Standards (WSS) Sets that may affect applicability of contractor requirements from this Directive. Applicability of contractor requirements must take into account the approved standards set for each particular contract.*

SIGNIFICANT PROVISIONS: Are there any significant changes or impacts?  Yes  No

List summary of Directive changes and, if "Yes" above, describe the significant changes or impacts:

IMPLEMENTATION: Does the Directive contain special implementation requirements and/or dates?  Yes  No

If "Yes," describe:

FOR DOE DIRECTIVE – SUPPLEMENTAL DIRECTIVE REQUIRED?

Is a new or revised supplemental Directive required?  Yes  No

If "Yes," target date for submission of YSO Directive is \_\_\_\_\_.

IDENTIFY CONTACT POINT: F. Edward Kendall 574-8647  
Name Telephone

APPROVED BY COR FOR DIRECTIVES: Diane McCarten 04/19/2004 576-9330  
Signature Date Telephone

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

*DOE Directives are available on the DOE Directives Portal at <http://www.directives.doe.gov/>. ORO Directives are available on the ORO Directives Management Group Home Page at [http://www.ornl.gov/doe/doe\\_oro\\_dmg/oro\\_dir.htm](http://www.ornl.gov/doe/doe_oro_dmg/oro_dir.htm). Directives will no longer be mailed in printed copy unless you do not have Internet capabilities.*

APPROVED FOR DISTRIBUTION IN ACCORDANCE WITH OFFICIAL DIRECTIVE DISTRIBUTION LIST:

Wayne H. Albaugh, AD-440 04/21/2004  
Name Date

**INSTRUCTIONS TO ADDRESSEES: THIS FORM IS TO BE FILED WITH THE DIRECTIVE AND RETAINED.**

(Revised 11/06/2003)

# U.S. Department of Energy

Oak Ridge Operations

ORO O 420 Chapter XII Change 1
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DATE: 04/01/2004

**SUBJECT: NUCLEAR CRITICALITY SAFETY**

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1. PURPOSE. This Directive establishes Oak Ridge Operations (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, NUCLEAR CRITICALITY SAFETY, dated February 4, 2002.
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.
    - (1) Responsible for safe operations at ORO facilities.
    - (2) Addresses issues related to NCS.
    - (3) Ensures the establishment and implementation of an ORO NCS Policy. (See Attachment 1.)
    - (4) Ensures Assistant Managers for Line Organizations with programs that have a potential for accidental nuclear criticality establish and implement ORO NCS programs to oversee the contractors' NCS program.
    - (5) Ensures assessments of the ORO line organizations NCS programs are performed at least annually using qualified NCS staff (reviews should include experts from outside ORO on a triennial basis).
  - b. Assistant Managers for Line Organizations.
    - (1) Establish and implement the ORO NCS program meeting the "Self-Assessment for DOE Criticality Safety Programs" criteria from a memorandum from T. J. Glauthier, Deputy Secretary of Energy, dated November 3, 1999. (See Attachment 2 for Assessment Criteria.)

- (2) Define the roles and responsibilities of staff performing or supporting NCS functions for the organization. (See Attachment 3 for the basic elements of an NCS program meeting the assessment criteria in Attachment 2.)
- (3) Ensure that staff overseeing activities involving fissile material have and maintain the appropriate level of NCS training to perform their assigned functions.
- (4) Perform oversight of contractor activities to ensure NCS program efficiency and effectiveness in maintaining risk as low as reasonably achievable. (See Attachment 4 for contractor NCS program expectations.)
- (5) Ensure contractor(s) correct NCS program deficiencies in a timely manner.
- (6) Establish contractor NCS performance metrics.
- (7) Report to the Manager and the Chief Operating Officer on a quarterly basis the NCS performance metrics and NCS program status.

c. Assistant Manager of Environment, Safety, Health, and Emergency Management.

- (1) Defines the ORO NCS program requirements.
- (2) Maintains a cadre number of trained and qualified staff to address NCS program needs which may include technical support from outside DOE.
- (3) Provides qualified NCS staff to support the line organizations in performance of their NCS responsibilities. (Qualification shall include all the requirements from the Federal NCS Qualification Standard.)
- (4) Performs independent reviews of ORO line and contractor NCS programs as requested by the Manager.
- (5) Establishes appropriate performance metrics to trend Federal role performance.
- (6) Reports results from NCS reviews, annual assessments, and analysis to the Manager, the Chief Operating Officer, and the Assistant Managers for Line Organizations.

5. REQUIREMENTS AND PROCEDURES. None.

6. REFERENCES.

- a. DOE-STD-1134-99, REVIEW GUIDE FOR CRITICALITY SAFETY EVALUATIONS, dated September 1999.
- b. DOE-STD-3007-93, Change 1, GUIDELINES FOR PREPARING CRITICALITY SAFETY EVALUATIONS AT DEPARTMENT OF ENERGY NON-REACTOR NUCLEAR FACILITIES, dated September 1998.

- c. DOE-STD-1173-2003, CRITICALITY SAFETY FUNCTIONAL AREA QUALIFICATION STANDARD, dated December 2003.
  - d. Memorandum from T. J. Glauthier, Deputy Secretary of Energy, Nuclear Criticality Self-improvement Initiative, dated November 3, 1999.
7. DEFINITIONS. None.
8. CONTRACTOR REQUIREMENTS DOCUMENT. None.
9. ATTACHMENTS.
- a. Attachment 1 - ORO NUCLEAR CRITICALITY SAFETY POLICY.
  - b. Attachment 2 - SELF-ASSESSMENT FOR DOE CRITICALITY SAFETY PROGRAMS.
  - c. Attachment 3 - BASIC ELEMENTS OF ORO NUCLEAR CRITICALITY SAFETY PROGRAMS.
  - d. Attachment 4 - EXPECTATIONS OF CONTRACTOR NUCLEAR CRITICALITY PROGRAMS SAFETY.

## **ORO NUCLEAR CRITICALITY SAFETY POLICY**

ORO's highest priority is to achieve daily excellence in protection of the worker and the public and in the stewardship of the environment both on and off the Oak Ridge Reservation. To that end, ORO's policy is that 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 DOE 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 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 Assistant Managers for Line Organizations 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 Assistant Managers for Line Organizations and the Assistant Manager for Environment, Safety, Health and Emergency Management shall jointly ensure that the objectives of this policy are fully met.

# **SELF-ASSESSMENT FOR DOE CRITICALITY SAFETY PROGRAMS**



OFFICE OF NUCLEAR AND FACILITY SAFETY, EH-3  
OFFICE OF ENVIRONMENT, SAFETY AND HEALTH

U.S. DEPARTMENT OF ENERGY

**TABLE OF CONTENTS**

I. SCOPE ..... 1

II. PURPOSE ..... 1

III. ASSESSMENT REQUIREMENTS ..... 1

    A. DOE LINE ENVIRONMENT, SAFETY AND HEALTH OVERSIGHT ..... 1

## I. SCOPE

The Department of Energy (DOE) issued DOE P 450.5, Line Environment, Safety and Health Oversight, to set forth its expectations for line management environment, safety and health (ES&H) oversight. DOE line oversight and contractor self-assessments together ensure that field elements and contractors adequately implement the DOE Safety Management System. Both DOE and contractor line managers must acquire and maintain sufficient knowledge of program activities in order to make informed decisions on safety resources for these activities. The Department's line organizations have the following responsibilities:

- A. Develop ES&H performance objectives, measures, and expectations tied to DOE's strategic goals and objectives, as well as to performance goals and objectives of the Safety Management System elements.
- B. Develop contract performance measures and performance indicators that are linked to the DOE Safety Management System.
- C. Develop a high level of performance assurance that results in improved ES&H performance.

## II. PURPOSE

The purpose of this document is to provide an assessment tool to evaluate the elements of the DOE nuclear criticality safety (NCS) oversight program. The requirements are based on the criteria outlined in DOE P 450.5.

## III. ASSESSMENT REQUIREMENTS

### A. DOE LINE ENVIRONMENT, SAFETY AND HEALTH OVERSIGHT

Criteria for the review of DOE criticality safety programs were extracted from DOE P 450.5, Line Environment, Safety and Health Oversight.

**Criterion:** Elements of the DOE Criticality Safety Program must be documented.

- a. Are the responsibilities of the DOE NCS Program Manager clearly defined and understood?
- b. Are the elements of a DOE NCS surveillance plan documented?

**Criterion:** DOE must acquire and maintain sufficient knowledge of program activities in order to make informed decisions on criticality safety resources for these activities.

- a. Are routine meetings held with contractor NCS management?
- b. Are periodic meetings held with DOE contractor operations management?
- c. Does the DOE NCS Program Manager review budget requests made by contractor NCS management?
- d. Does the DOE NCS Program Manager review budget requests made by contractor operations management?
- e. Does the DOE NCS Program Manager have input to the DOE site budget process?

**Criterion:** DOE maintains operational awareness of contractor work activities, typically through DOE line managers and staff such as Facility Representatives and criticality safety subject matter experts.

- a. Do the DOE NCS Program Manager and Facility Representatives work closely on NCS-related issues in the field?
- b. Does the DOE NCS Program Manager routinely spend time in the field performing walkdowns and interacting with Operations?
- c. Does the DOE NCS Program Manager review contractor occurrence reports related to criticality safety programs?

**Criterion:** DOE reviews performance against formally established criticality safety performance measures, performance indicators, and contractor self-assessments.

- a. Have contractor NCS program performance measures been established?
- b. Is progress on the performance measures routinely reported to DOE?
- c. Are contractor NCS self-assessments reviewed by the DOE NCS Program Manager?
- d. Does the NCS Program Manager provide reports and feedback on contractor self-assessments to senior DOE site management?

**Criterion:** DOE performs criticality safety reviews and assessments in support of required readiness assessments, Operational Readiness Reviews, Safety Management System documentation and onsite verification reviews, and authorization basis documents including Criticality Safety Evaluations (CSEs).

- a. Does the DOE NCS Program Manager participate in readiness assessments, Operational Readiness Reviews, and Integrated Safety Management reviews when necessary?
- b. Does the DOE NCS Program Manager participate in the review and approval of facility NCS-related authorization basis documents (e.g., Safety Analysis Reports, Bases for Interim Operations, Unresolved Safety Questions, and Technical Safety Reports)?
- c. Does the DOE NCS Program Manager review a sample of contractor CSEs on a routine basis?

**Criterion:** DOE performs periodic appraisals of the contractor criticality safety program, including for-cause criticality safety reviews, as necessary.

- a. Have facility criticality safety surveillances been incorporated into the Field Office assessment plan?
- b. Are appraisals and reviews documented?
- c. Are corrective actions tracked to closure?
- d. Does the DOE NCS Program Manager perform assessments of the contractor criticality safety program in accordance with a documented plan?
- e. Are outside DOE NCS subject matter experts occasionally utilized to assist with reviews to provide independent feedback?

**Criterion:** DOE has a designated focal point for coordinating criticality safety oversight activities.

- a. Has the DOE Field Office designated a single NCS focal point (i.e., NCS Program Manager)?
- b. Has the DOE NCS Program Manager been qualified by completing the requirements in the Federal NCS Qualification Standard?
- c. Does the DOE NCS Program Manager routinely meet with an Assistant Field Office Manager responsible for NCS?

- d. Does the DOE NCS Program Manager represent the single authority on NCS issues to the contractor?
- e. Does the DOE NCS Program Manager represent the Field Office on the Criticality Safety Coordinating Team (CSCT)?

## **BASIC ELEMENTS OF ORO LINE MANAGEMENT NUCLEAR CRITICALITY SAFETY PROGRAMS**

- Support ORO NCS engineering and analysis capability.
- Evaluate the quality and technical adequacy of NCS documents produced by contractors.
- Review the implementation of NCS requirements by the contractor by periodic observation of field operations.
- Evaluate the frequency and quality of audits and assessments of individual contractor operations.
- Evaluate adequacy of resources devoted to NCS.
- Include a qualified NCS expert:
  - In resolving NCS issues.
  - In recovery from and restart of facilities/processes following criticality violations or emergency situations.
  - In communication with the contractor NCS program managers.
  - In periodic reviews of performance and status information.
  - In reviewing a sample of contractor documents for technical adequacy.
- Review the implementation of NCS requirements by the contractor:
  - Assess the integration of contractor line and NCS functional support.
  - Monitor contractor line management involvement in operations.
  - Monitor contractor NCS engineer training and qualification programs.
- Identify programmatic and operational resource needs in a timely manner.
- Coordinate the fulfillment of identified needs and resolution of criticality issues.
- Formally delineate the roles and responsibilities of staff and/or organizations providing criticality safety functional support to the line organization.
- Ensure through periodic assessments of the contractor by qualified personnel, that:
  - the NCS program is fully documented.
  - the NCS program satisfies the requirements in DOE directives and/or ANSI/ANS Standards, and/or other contractually required documents.
  - the NCS program is provided commensurate with the criticality hazard.
  - the program is effective in achieving the objectives of feedback and continuous improvement.
  - formal oversight of fissionable materials operations (surveillances, audits, reviews, assessments) are performed as needed utilizing qualified NCS staff.
  - planning, development, review and approval of NCS documents receive adequate and timely review.
  - adequate qualified NCS staff is available to support their NCS responsibilities.
  - adequate budget is provided in the contractor programs for NCS.
  - adequate attention is given by contractor senior management to NCS.

- Require contractors to develop performance measures that provide feedback on the status of the NCS program, for example:
  - The operating organization self-identifies and self reports criticality nonconformances, infractions and violations (e.g., 90% self-identification is a reasonable objective).
  - NCS nonconformances, infractions and violations are closed in a timely manner (e.g., 90% within 30 days).
  - Root causes of NCS nonconformances, infractions and violations are correctly identified.
  - Appropriate corrective actions are identified.
  - NCS nonconformances, infractions, violations and other deficiencies are tracked and trended to determine if systemic or programmatic weaknesses are present.
  - Repeat NCS nonconformances, infractions and violations are avoided.
  - NCS evaluations, NCS authorizations, postings, and procedures are consistent.
  - NCS professionals spend an appropriate amount of time on the floor.
  - NCS professionals are formally trained and qualified appropriately for their assignment.
  - Opportunities are provided for NCS professionals to periodically attend professional and technical conferences.

## **EXPECTATIONS OF CONTRACTOR NUCLEAR CRITICALITY SAFETY PROGRAMS**

### **THAT:**

There is a fully documented NCS program which is kept current by periodic reviews and updates.

There is acceptance by each supervisor of responsibility for the safety of operations under his/her control.

There is a high level of self-identification of problems, proper identification of root causes, identification of appropriate corrective actions, and proper categorization of all NCS incidents, including nonconformances, infractions, violations, and reportable occurrences.

There is timely completion and closure of the identified problems.

There is reliance on a competent NCS engineering and analysis capability that results in the development, approval, and proper use of high quality NCS documents that implement DOE Directives and/or applicable ANSI/ANS Standards for all fissile material operations.

There is adequate participation of properly trained and qualified NCS engineers or specialists in supporting operational aspects, such as, periodically auditing operations areas, reviewing NCS documents, providing training assistance, and developing corrective actions.

There is proper integration of the line management and the NCS functions with clear roles and responsibilities with line management maintaining primary responsibility for NCS. The NCS function shall be organizationally independent of line management.

There is an adequate degree of management involvement and support in developing operational safety controls and soliciting worker assistance, and in using feedback to engineer improved methods of accomplishing work.

Independent reviews of NCS analyses, evaluations and authorizations are performed.

Controls for NCS are included in procedures, documented in briefings, and demonstrated in field observation of workers and activities.

There are periodic self-assessments and independent reviews of the effectiveness of NCS programs using qualified NCS subject matter experts.