DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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April 19, 2007

The Honorable J. Clay Sell
Deputy Secretary of Energy
1000 Independence Avenue, SW
Washington, DC 20585-1000

Dear Mr. Sell:

The Defense Nuclear Facilities Safety Board (Board) conducted a review of the Department of Energy's (DOE) use of justifications for continuing operations (JCOs) at defense nuclear facilities. This review encompassed the guidance and requirements associated with JCO requests, reviews, and approvals, along with a survey of JCOs currently in effect at selected facilities. The Board compared DOE's use of JCOs with approaches used elsewhere in the nuclear industry and found them inconsistent with standard industry practice. The detailed results of the review are included as an enclosure to this letter.

The Board found that a number of weaknesses and deficiencies exist in the current JCO process. These include an unclear regulatory basis for JCOs; a lack of definitive expectations and guidance; JCOs that appear to have excessive durations; JCOs implemented for planned activities (contrary to the existing guidance); inconsistencies, from both field and headquarters perspectives, on what situations are appropriate for the use of JCOs; and the need for a robust system to track JCOs. The Board understands that JCOs provide a necessary mechanism for defense nuclear facilities to deviate from their approved safety basis under certain limited conditions. However, approval of such departures requires the same level of rigor as that used in the development, review, and approval of the original safety basis and must carefully assess the safety significance of the situation.

The Board's staff met with DOE and National Nuclear Security Administration (NNSA) personnel to discuss the use of JCOs in the DOE complex. During the meeting, DOE and NNSA personnel agreed to develop a path forward for addressing the Board's concerns. On March 20, 2007, the DOE Office of Environmental Management tasked its sites with providing information on the JCO processes to support a complex-wide review of the JCO process. On April 3, 2007, NNSA provided similar tasking to its sites.

The Board is very encouraged by this proactive response and the technical leadership being demonstrated by the Headquarters organizations and looks forward to hearing the results of these efforts.

Sincerely,

A. J. Eggenberger
Chairman

c: The Honorable Thomas P. D'Agostino
The Honorable James A. Rispoli
Mr. Glenn S. Podonsky
Mr. Mark B. Whitaker, Jr.

Enclosure

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

Staff Issue Report

February 9, 2007

MEMORANDUM FOR: J. K. Fortenberry

COPIES: Board Members

FROM: J. L. Shackelford

SUBJECT: Justification for Continuing Operations at Defense Nuclear Facilities

This report documents a review of the Department of Energy's (DOE) process for using justifications for continuing operations (JCOs) at defense nuclear facilities.

Background. DOE has a firmly established process for the preparation, review, and approval of safety bases at its defense nuclear facilities. The development and approval of a safety basis is a critical element in ensuring the safe operation of DOE facilities. However, situations may arise in which it is necessary to depart from the approved safety basis for short periods of time to account for unexpected conditions. Any such departure from the approved safety basis should be the subject of careful consideration since it is likely to involve an increased risk to the facility.

DOE has approved the use of the JCO process to accommodate the desire to continue facility operations, research, or production when certain requirements cannot be met. In general, a JCO can serve as a valuable tool for temporarily amending the approved safety basis to address emergent conditions. Other elements of the nuclear industry (e.g., nuclear reactors, gaseous diffusion plants, fuel facilities) employ an analogous approach to amend their safety bases temporarily under certain prescribed conditions. Since JCOs represent a need to depart from the safety basis, it is important that the process for their preparation, review, and approval be of a quality commensurate with that for the process used to develop and approve the original safety basis to ensure the safe and reliable operation of defense nuclear facilities.

The staff of the Defense Nuclear Facilities Safety Board (Board) conducted an assessment of the use of JCOs in the defense nuclear complex. This assessment included a review of the guidance and requirements associated with JCO requests, review, and approval, along with a survey of actual JCOs in effect at selected facilities. The staff compared DOE's use of JCOs with approaches used elsewhere in the nuclear industry.

Department of Energy Guidance. DOE guidance related to JCOs is found in DOE G 424.1-1A, *Implementation Guide for Use in Addressing Unreviewed Safety Question Requirements*. The concept of a JCO is introduced in Section 2.4 of the guide, dealing

with the discovery of potential inadequacies in the existing safety analyses. However, the guidance associated with JCOs consists of only about four paragraphs written at a very generic and conceptual level.

The DOE guidance suggests that a JCO may be used as an alternative to ceasing operations when an *unplanned* (emphasis added) condition arises that would require shutting down the facility. The guidance suggests that a JCO is not an appropriate mechanism with which to seek relief from the requirements applicable to planned activities. Further, the guidance indicates that DOE approval is required for a JCO, and that once approved, the JCO becomes a part of the facility safety basis. Other high-level expectations outlined in the guidance include (1) that a JCO should have a limited life that includes a predefined termination point, (2) that the JCO should include an assessment of the safety significance of the situation, and (3) that the JCO should identify the compensatory measures to be applied. With respect to duration, the guidance suggests that the JCO should have a "predetermined, limited life only as may be necessary to perform the safety analysis of the unexpected situation, to identify and implement corrective actions, and to update the safety basis documents on a permanent basis." As noted earlier, however, the guidance is limited, and falls short of the definitive and detailed specifications expected of safety basis requirements as outlined in 10 Code of Federal Regulations (CFR) 830, *Nuclear Safety Management*, and its safe harbor guidance documents.

Site-Specific Guidance at Defense Nuclear Facilities. A number of defense nuclear facilities have developed site-specific preparation or approval guidance to address the issues associated with JCOs. The Board's staff found that the level of detail and specificity of these site guidance documents varied widely and did not always align with the general expectations outlined in DOE G 424.1-1A. Further, the staff noted that none of the processes reviewed required the degree of analysis or rigor that would be expected for an important change or revision to the approved safety basis. For example, the contractor at Pantex had developed a manual (*Pantex Plant Integrated Safety Management Authorization Basis Manual,* MNL-254543, Rev. 21, 7/21/06) governing the preparation and development of safety bases and associated documentation at the plant. Section 4.3.4 of the manual addressed the concept of JCOs. However, this section comprised only two sentences, one that briefly defined a JCO and another that indicated JCOs could be used for both discovered conditions and the conduct of temporary tests or operations. (As noted earlier, the approved DOE guidance suggests that JCOs are appropriate only for discovered or unplanned activities.) Similarly, the Savannah River Site (SRS) had developed a site-specific manual (*WSRC Facility Safety Document Manual,* 11Q, 12/8/05) for the generation, review, and approval of safety documents. Section 5 of the SRS manual provided the relevant guidance and, like the Pantex manual, also suggested that JCOs were appropriate for both discovery activities and planned "operations, tests, outages, etc." Further, the SRS guidance indicated that JCO durations of "months rather than years" are appropriate. These positions are also in conflict with the general expectations outlined in the DOE-approved guidance.

Other sites used different approaches to the JCO concept. For example, Lawrence Livermore National Laboratory (LLNL) employed "requests for temporary deviation" to obtain relief from technical safety requirements in order to perform planned maintenance. The Idaho

National Laboratory used "evaluations of the safety of the situation" in lieu of JCOs to justify noncompliance with the safety analysis requirements of 10 CFR 830 and nonconformance with an electrical code requirement. Notwithstanding that these approaches appeared to be similar to the JCO process described above, the use of JCOs (and JCO-like) processes to justify departures from regulations and code requirements is contrary to the approved guidance.

Extent of Condition. As of January 10, 2007, there were nearly 50 JCOs in effect at defense nuclear facilities of interest to the Board. The age of these JCOs ranged from a low of about 2 months to a high of more than 4 years. The average age of the existing JCOs was 434 days, and approximately 73 percent were more than 1 year old. It should be noted that these figures may not represent an accurate tally of all outstanding JCOs. As mentioned earlier, some sites have established slightly different definitions for what constitutes a JCO, and many of the sites have not employed what would be considered a robust system for tracking JCOs. As a result, additional JCOs may exist.

A large number of the outstanding JCOs appear to have been established as the result of planned activities rather than the discovery of an unexpected condition. For example, 13 of the 18 JCOs in effect at SRS and the "request for a temporary deviation" at LLNL appear to have been established and approved for planned operations or maintenance. A recent JCO at Y-12 was approved to support the completion of expired safety basis surveillances. The use of JCOs as a means to justify changes to or deviations from the approved safety basis for planned activities is clearly contrary to the intent of even the limited guidance provided by DOE G 424.1-1A. Rather, JCOs are more properly warranted for unplanned or discovered conditions that impact the facility's technical safety requirements.

The attachment to this report shows a summary of the outstanding JCOs in effect as of January 2007 at defense nuclear facilities of interest to the Board.

Other Nuclear Industry Practices and Requirements. In a process analogous to the JCO concept used by DOE and its contractors, the Nuclear Regulatory Commission (NRC) has approved the limited use of Notices of Enforcement Discretion (NOEDs) to depart from the approved safety basis for short periods of time to account for unexpected conditions. Similar to the expectations outlined for JCOs, the NRC's guidance specifies that NOEDs are to be used to address temporary noncompliance with license conditions and technical specifications. The NRC asserts that NOEDs are not appropriate for allowing planned entries into technical specification action statements to perform maintenance, troubleshooting, or other activities. Further, NOEDs are not to be used to justify nonconformances with regulations, safety analysis reports, or codes and standards.

The NRC has published detailed guidance and requirements related to the request for and approval of NOEDs. This guidance can be found in the *NRC Inspection Manual*, Part 9900, Technical Guidance, "Operations—Notices of Enforcement Discretion," dated February 7, 2005. Among the specific expectations included in the NRC manual are requirements for a detailed description of the circumstances generating the need for the NOED, including a discussion of the

likely causes and the proposed path forward for resolving the issue in a specific proposed time frame. The proposed NOED must provide a comprehensive assessment of the risk associated with the issue, along with specific compensatory measures that directly address the increased risk. NOEDs have well-defined review and approval requirements for both the reactor licensee and the NRC licensing and safety organizations. Nuclear industry NOEDs are required to be independently verified (including likely causal factors and proposed compensatory measures), preferably prior to their approval. Further, nuclear industry NOEDs are required to be closely tracked to closure to ensure timely restoration of the approved safety basis.

The NRC regulates the operation of 104 reactors in 31 states at 65 different sites. The Board's staff reviewed the prior history of NRC NOED cases for reactors; results of this review are summarized in the following table.

Year	Number of NOED Cases
2006	5
2005	3
2004	2
2003	20
2002	66
2001	12
2000	17

As shown in the table, the current NRC posture appears to be somewhat restrictive with respect to the approval of NOEDs relative to previous years. A review of the NOEDs approved in 2006 showed that most were of a duration of only 1 to 2 days. No NOEDs have been approved for gaseous diffusion plants since 2000.

Conclusions. JCOs provide a necessary vehicle for defense nuclear facilities to deviate from their approved safety bases under certain prescribed conditions. The level of rigor associated with the development, review, and approval of JCOs needs to be commensurate with that applied in developing, reviewing, and approving the original safety basis. However, DOE has not established adequate requirements, expectations and guidance for the use of JCOs at defense nuclear facilities. The current guidance is written at a very general level and does not contain sufficient detail to guide contractors in developing JCOs, nor does it contain adequate guidance for DOE review and approval of JCOs. While the existing guidance does suggest that JCOs should be of short duration and should not be used to justify planned activities and maintenance, these expectations are clearly not being met in the complex. Rather, it appears that the contrary is true in that the vast majority of JCOs currently in effect are more than 1 year old,

and a significant number of JCOs have been requested and approved to justify planned activities, planned maintenance, nonconformances with code requirements, and departures from nuclear safety rule requirements. Additionally, not all defense nuclear facilities have employed the same definition or approach to the JCO concept. In general, DOE's processes and practices with respect to JCOs are not in conformance with generally accepted nuclear industry processes, and a number of facilities appear to be in violation of even these same deficient processes and practices.

The staff believes DOE needs to take action to (1) assess the safety significance of outstanding JCOs, including considerations related to their duration, to ensure that the integrity of the approved safety basis remains intact for the affected facility; (2) implement corrective actions to disposition outstanding JCOs by either resolving the underlying technical issues or processing the appropriate permanent changes to the affected safety bases; and (3) develop and promulgate appropriate guidance and requirements to ensure that JCOs are properly developed and approved at defense nuclear facilities.

ATTACHMENT

Justifications for Continuing Operations in Effect at Defense Nuclear Facilities as of January 10, 2007

Site	Justifications for Continuing Operations (JCOs)	Effective Date
Hanford	RL: 1) Suspect material in K-West basin	10/14/04
	2) Shipment of material to 325	03/24/06
	3) Leaking process valve in CVDF	07/23/04
	4) Building 327 radium source	01/17/06
	5) Buildings 324 and 327 new seismic information	04/28/06
	6) PFP HNF-28387 new seismic information	08/28/06
	7) PFP HEPA filter bypass	09/19/06
	8) SWOC flammable gas/VOC deflagration in TRU drum	04/28/06
	ORP: 9) Building C-200 vacuum retrieval system	11/14/05
INEL	1) Leak path factor (<1.0) at AMWTP	11/06/in review
	2) Propane system code noncompliance at AMTWP	11/06/in review
LANL	1) CMR-JCO-06-001, Rev. 1, CMR fire barrier inadequacies	11/8/06
LLNL	1) NMTP request for "temporary deviation" for fan operability in Building 332	08/08/06
NTS	1) DAF Building 331 ventilation duct penetration	12/1/05
	2) DAF fire suppression system	06/1/06
ORNL	None	
Pantex	1) PX-JCO-02-03	09/20/02
	2) PX-JCO-03-03	09/04/02
	3) PX-JCO-04-02	03/12/04
	4) PX-JCO-04-05	05/13/04
	5) PX-JCO-04-06	05/21/04
	6) PX-JCO-05-08	06/24/05
	7) PX-JCO-05-10	12/12/05
	8) PX-JCO-06-04	05/10/06
	9) PX-JCO-06-05	06/01/06
SNL	None	

Site	Justifications for Continuing Operations (JCOs)	Effective Date
SRS	1) CST WSRC-TR-2003-00083	
	a) Tank 50 organic solids	05/03
	b) 2H/2F evaporator	05/06
	2) FAMS WSRC-RP-2004-00432 R1, Upgrade interim control posture Building 235F	07/27/06
	3) FAMS WSRC-RP-2005-0174 R0, Pu alloy repackaging in Building 235F	06/12/06 06/04
	4) FB-Line WSRC-RP-2004-00147 R0, Deactivation activities in wet chemistry	12/21/05
	5) F-Canyon WSRC-RP-2005-01745 R1, F-Canyon 800 underground tanks	06/13/06
	6) F-Canyon WSRC-RP-2005-01785 R1, Deactivation of F-Canyon 800 tanks	09/05 05/06
	7 F/H Labs WSRC-TR-2004-00310 R2, TRU drum repackaging	07/13/05
	8) F/H Labs WSRC-TR-2006-0064 R0, Combustibles in gloveboxes	11/18/05
	9) HB-Line WSRC-RP–2002-00615 R3, Alternate scrap H2 control	08/17/05
	10) H-Canyon WSRC-RP-2004-00283 R2, Pu contaminated scrap	10/28/05
	11) H-Canyon WSRC-RP-2005-01627 R0, F area Pu/Be residues	06/5/06
	12) H-Canyon WSRC-RP-2005-01843 R0, Processing 1CU solution	
	13) SRNL WSRC-TR-2005-00452 R0, TRU drum operations in Building 773-A	06/22/06
	14) SRNL WSRC-TR-2006-00152 R0, Gas generation rate change for cell operations	06/06 09/06
	15) SWMF WSRC-TR-2005-00217 R1, Modular repackaging on TRU pad	
	16) SWMF WSRC-TR-2004-00618 R9, Handling/processing flammable drums	12/19/05
	17) Tritium WSRC-TR-2005-00520 R0, Loading line 2	
WIPP	None	
Y-12	1) Y-12 JCO-1	12/16/05
	2) Y-12 JCO-2	08/17/05
	3) Y-12 JCO-3	09/23/05
	4) Y-12 JCO-4	06/26/06
	5) Y-12 JCO-5	03/14/06