



Department of Energy

Washington, DC 20585

October 14, 2016

Mr. Bobby D. Smith
Paducah Program Manager
Fluor Federal Services, Inc.
Paducah Deactivation Project
5511 Hobbs Road
Kevil, Kentucky 42053

NEL-2016-02

Dear Mr. Smith:

The Office of Enterprise Assessments' Office of Enforcement has completed an evaluation of a safety event involving the loss of documented nuclear criticality safety (NCS) controls for some large-diameter piping at the Paducah Deactivation Project in Paducah, Kentucky. Inadequacies in the moisture sampling of large diameter piping led to a loss of criticality control due to loss of moderation control. Fluor Federal Services, Inc. (FFS) reported this issue into the Department of Energy's (DOE) Noncompliance Tracking System under NTS--PPPO-FFS-FPDP-2015-0001, *NCS Level 2 Violation*, dated November 18, 2015. Based on this evaluation, which included a fact-finding visit on July 25 through 27, 2016, the Office of Enforcement identified concerns that warrant FFS senior management's continued commitment to the completion of planned corrective actions and the sustainment of recently implemented process improvement initiatives.

The specific concerns relate to the loss of moderation control in some sections of non-Interstage Equipment (non-ISE) large diameter (i.e., 14 inches or greater) piping. FFS NCS control and surveillance requirements ensure moderation control in this piping by verifying the existence of a dry environment (i.e., moisture content below a set level) or fluorinating environment (i.e., fluorinating gas content above a set level) in all volumes of non-ISE piping through representative samples every 6 months. If the sample does not meet the applicable limit, then, within a set time frame, FFS must either reestablish a dry environment or establish a fluorinating environment to ensure the drying out of any fissile deposits in the piping.

FFS first observed samples that exceeded the NCS moisture limit on July 24, 2015. These sample results from a section of non-ISE piping were confirmed on August 6, 2015. A level 3 NCS violation was identified at this time because the moisture levels had exceeded the limit for over 6 months. This represented the loss of one essential element of the double contingency principle.



As a result of the level 3 NCS violation, FFS worked to determine the source of the moisture. On October 21, 2015, FFS discovered that improper configuration control had resulted in closed valves that isolated sections of non-ISE piping and prevented them from being sampled. Additional examples of this condition were identified soon thereafter. FFS determined that NCS control and surveillance requirements were also not met for these sections, because they also were not sampled within the required 6 months. Furthermore, the content of some sections of piping was unknown for an indeterminate amount of time, so FFS's conservative approach to NCS required the assumption that moisture limits were exceeded for a time frame beyond that set for either reestablishing a dry environment or establishing a fluorinating environment. This resulted in the identification of a level 2 NCS violation (i.e., loss of both essential elements of the double contingency principle) on October 27, 2015. During its extent-of-condition review, FFS identified additional examples of violations of NCS control and surveillance requirements.

The Office of Enforcement considers the loss of NCS controls to be a preventable nuclear safety matter. However, the actual safety significance of this issue is low due to a number of considerations including: low rates of moist air in-leakage, a low moisture concentration in representative samples taken after the event, and the low likelihood that these sections of piping could contain enough fissile material to pose a criticality concern. In addition, FFS is evaluating a shift in its NCS strategy for non-ISE piping from moderation control to mass control, which is a more robust NCS control strategy.

In reviewing this issue, the Office of Enforcement identified potential noncompliances with 10 C.F.R. Part 830, *Nuclear Safety Management, Subpart A, Quality Assurance Requirements*. These include: (1) procedural inadequacies and ineffective implementation of the conduct-of-operations program, including configuration control; (2) isolated training deficiencies and a training management software program that did not ensure identification and completion of required training before workers enter areas and/or conduct work; (3) deficiencies in documents and records, including log entries, valve lineup sheets, and NCS evaluations; (4) inadequate resources to perform work and maintain documented NCS controls, including issues in turnover, prioritization, and schedule pressure; and (5) lack of management oversight, including management and independent assessments of safety management programs.

The Office of Enforcement also evaluated FFS's corrective actions and has concluded that they appear to address the underlying causes of this incident and are likely to be effective in preventing recurrence of similar and related issues. The Office of Enforcement specifically notes FFS senior management attention and focus, the recent implementation of an improved training management software program, an effort to strengthen assessments of safety management programs, and improved resource and staff allocation as significant positive steps toward improved NCS performance.



The Office of Enforcement has elected to issue this Enforcement Letter to convey concerns with the safety incident involving the loss of documented NCS controls for some large-diameter piping at the Paducah Deactivation Project. Issuance of this Enforcement Letter reflects DOE's decision to not pursue further enforcement activity against FFS at this time. In coordination with the Office of Environmental Management and the Portsmouth/Paducah Project Office, the Office of Enforcement will continue to monitor FFS's efforts to improve nuclear safety performance.

This letter imposes no requirements on FFS, and no response is required. If you have any questions, please contact me at (301) 903-7707, or your staff may contact Mr. Jon Thompson, Director, Office of Nuclear Safety Enforcement, at (301) 903-1134.

Sincerely,

A handwritten signature in black ink that reads "Steven C. Simonson". The signature is written in a cursive style with a large, stylized 'S' at the beginning.

Steven C. Simonson
Director
Office of Enforcement
Office of Enterprise Assessments

cc: Robert Edwards III, PPPO
Gregory Bell, FFS