Department of Energy
Washington, DC 20585

JUL 0 9 2009

MEMORANDUM FOR SHIRLEY OLINGER
MANAGER
OFFICE OF RIVER PROTECTION

FROM: DAE Y. CHUNG
ACTING PRINCIPAL DEPUTY ASSISTANT SECRETARY
FOR ENVIRONMENTAL MANAGEMENT

SUBJECT: Approval of Supplemental System Evaluation and Associated Gaps for Active Confinement Ventilation Systems in the Waste Treatment and Immobilization Plant Pretreatment and High-Level Waste Facilities in Response to Defense Nuclear Facilities Safety Board Recommendation 2004-2

The purpose of this memorandum is to provide my endorsement of the Defense Nuclear Facilities Safety Board (DNFSB) 2004-2 supplement system evaluation and acceptance of the identified gaps forwarded by you on July 7, 2009. My endorsement and acceptance are based on an evaluation by the DNFSB 2004-2 Independent Review Panel (attached), review by the Office of Environmental Management (EM) Fire Protection subject matter expert, and input from the Office of the Chief of Nuclear Safety.

The gap identified by the Waste Treatment and Immobilization Plant (WTP) during its initial evaluation for compliance with DNFSB 2004-2 is accepted through the identified alternate approach for specific requirements of Section 14 of DOE-STD-1066. The alternate approach as defined in the supplemental ventilation system evaluation accounts for the unique configuration of the WTP and demonstrates a comparable level of safety for the specific criteria in DOE-STD-1066 supporting EM's acceptance of the gap.

I expect as the WTP ventilation design is finalized and construction is completed WTP will continue to ensure that compliance with the implementation strategy for DNFSB 2004-2 is maintained.

If you have any further questions, please contact me at (202) 586-7709.

Attachment

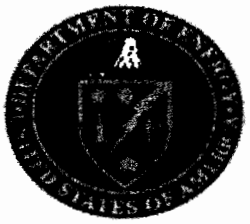
cc:
I. Triay, EM-1
J. Owendoff, EM-3
S. Krahn, EM-60

REVISED
INDEPENDENT REVIEW

OF

Office of River Protection
Waste Treatment Plant
High-Level Waste and
Pretreatment Facilities
Ventilation System Evaluation Report

July 2009



Executive Summary

In September 2007 the Department of Energy's (DOE) Independent Review Panel (IRP) for Defense Nuclear Facilities Safety Board (DNFSB)Recommendation 2004-2, *Active Confinement Systems*, reviewed the Waste Treatment Plant (WTP) High-Level Waste (HLW) and Pretreatment (PT) facilities Ventilation System Evaluation report utilizing the process and criteria outlined in the DOE's *Ventilation System Evaluation Guidance for Safety-Related and Non-Safety-Related System* (2004-2 Ventilation System Evaluation Guide).

WTP is a Hazard Category 2 nuclear facility under final design and construction. Preliminary Safety Analyses have been completed for the HLW and PT facilities which have shown that there are several unmitigated bounding accidents that have significant offsite consequences (exceeding 100 rem to the maximum exposed offsite individual).

As of June 2009 the confinement strategy for both the HLW and PT facilities is to utilize active safety class and safety significant confinement ventilation systems in accordance with the criteria established in DOE-STD-3009, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Documented Safety Analyses.* If a refined accident analysis determines that accident consequences fall below DOE evaluation guidelines, these classifications may be reduced. However, active ventilation systems will continue to be used at these facilities and will be, at a minimum, designed and reviewed against safety significant requirements established in the DNFSB 2004-2 Evaluation Guide.

In the initial September 2007 review, the IRP concluded that the WTP HLW and PT ventilation systems evaluation was performed in accordance with the criteria in the DNFSB 2004-2 Ventilation System Evaluation Guide with one exception. The exception being that the WTP evaluation did not include a cost analysis or alternatives for resolution of the one gap that was identified, i.e., a lack of fire suppression for the High Efficiency Particulate Air (HEPA) filter housing. At that time, the IRP recommended that the Program Secretarial Office and Central Technical Authority accept the WTP HLW and PT Ventilation System Evaluation with a condition that future approval of a resolution that addresses fire safety requirements for HEPA filter housings is required.

In 2009, the Office of River Protection (ORP) with the support of the Office of Environmental Management has evaluated an alternative approach to satisfy the requirements of DOE-STD-1066, *Fire Protection Design Criteria*, which includes limits on combustibles, use of fire barriers, and considers unique features of the WTP facilities. The ORP evaluation team concluded that this approach will provide an appropriate level of safety and mitigates the identified gap.

The IRP concludes that ORP has taken appropriate action to evaluate and mitigate the identified gap in accordance with the 2004-2 Ventilation System Evaluation Guide and that the WTP ventilation system evaluation complies with the 2004-2 Ventilation System Evaluation Guide.

Results of the Revised Independent Review Panel's Review of the Waste Treatment Plant Ventilation System Evaluation Report

1. INTRODUCTION

In September 2007, the Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 2004-2 Independent Review Panel (IRP) reviewed the Waste Treatment Plant (WTP) High-Level Waste (HLW) and Pretreatment (PT) facilities Ventilation System Evaluation report utilizing the process and criteria outlined in Department of Energy's (DOE's) *Ventilation System Evaluation Guidance for Safety-Related and Non-Safety-Related System* (2004-2 Ventilation System Evaluation Guide).

As stated in Revision 1 of the DNFSB Recommendation 2004-2 Implementation Plan, the focus of the ventilation system evaluation was to:

- Verify that appropriate performance criteria are derived for ventilation systems;
- Verify that these systems can meet the performance criteria, if applicable; and
- Determine if any physical modifications are necessary to enhance safety performance.

During the original evaluation, the IRP team reviewed the WTP HLW and PT Ventilation System Evaluation report to determine whether it was performed in accordance with the 2004-2 Ventilation System Evaluation Guide. The IRP evaluated the appropriateness of the evaluation results and methods proposed for eliminating identified gaps (between the existing ventilation system and applicable performance criteria). One gap was identified, that is, fire suppression features have not been provided inside High Efficiency Particulate Air (HEPA) filter housing as recommended by DOE-STD-1066, *Fire Protection Design Criteria*. DOE-STD-1066 was designated a contract requirement of the WTP by its inclusion in the project Safety Requirements Document (SRD). Section 1.0 of DOE-STD-1066 specifies that "Nothing in this Standard is intended to limit the application of other fire protection methods when unique situations or hazards warrant an alternate approach. The alternate approach should provide a comparable level of safety to that achieved by conformance with this Standard." The project has adopted the alternative approach to meeting the fire suppression criteria of DOE-STD-1066. This revised IRP review has considered the alternate approach justification provided by WTP to satisfy the criteria of DOE-STD-1066 and that are proposed to provide an appropriate level of safety for the WTP facilities.

2. FACILITY AND VENTILATION SYSTEM OVERVIEW

The PT facility is designed to contain processes for pretreatment of waste transferred from the Hanford Site underground storage tanks before it is immobilized at the Low-Activity Waste and HLW Facilities. The HLW facility is designed to immobilize pretreated waste and entrained solids in a manner that will meet waste acceptance requirements for ultimate disposal in a geologic repository by blending the waste with the appropriate glass formers.

WTP is a Hazard Category 2 nuclear facility under final design and construction. Preliminary Safety Analyses have been completed for the HLW and PT facilities which show that there are several unmitigated bounding accidents that have significant offsite consequences (exceeding 100 rem to the maximum exposed offsite individual).

As of June 2009 the confinement strategy for both the HLW and PT facilities is to utilize active safety class and safety significant confinement ventilation systems in accordance with the criteria established in DOE-STD-3009, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Documented Safety Analyses.* If a refined accident analysis determines that accident consequences fall below DOE evaluation guidelines, these classifications may be reduced, however, active ventilation systems will continue to be used at these facilities and will be, at a minimum, designed and reviewed against safety significant requirements established in the DNFSB 2004-2 evaluation guide.

3.0 REVIEW RESULTS

3.1 Derivation of Ventilation System Performance Criteria and Confinement Strategy

The HLW and PT ventilation evaluation appropriately followed the process outlined in the 2004-2 Ventilation System Evaluation Guide in developing the Data Collection Table used to identify accidents, their unmitigated consequences, and the confinement strategy based upon the Preliminary Safety Analysis Reports for the PT and HLW facilities. Furthermore, the Data Collection Table specifies the performance expectation for the ventilation systems.

For the PT facility, the main building ventilation system is designated as active safety class while several other process or area-specific ventilation systems include passive safety class and/or safety significant features. Similarly for the HLW facility, the main building ventilation system is designated as active safety class while several other process and area-specific ventilation systems include passive safety class and/or safety significant features.

The IRP concluded that the evaluation team appropriately reviewed the safety classification of the ventilation system as specified in the 2004-2 Evaluation Guide.

3.2.1 Evaluation of Ventilation System Against the Selected Performance Criteria

The WTP HLW and PT ventilation report evaluated the HLW and PT facilities building confinement ventilation systems utilizing the safety class and safety significant criteria from the 2004-2 Ventilation Evaluation Guide. The WTP HLW and PT Ventilation

System Evaluation Report provides a systematic evaluation of the ventilation systems against the 2004-2 performance criteria to identify any gaps.

One gap was identified, that is, fire suppression features have not been provided inside HEPA filter housing as recommended by Chapter 14 of DOE-STD-1066, *Fire Protection Design Criteria*. DOE-STD-1066 was designated a contract requirement of the WTP by its inclusion in the project Safety Requirements Document (SRD). The revised ventilation report provides rationale and justification for an alternate approach to satisfying the criteria of Chapter 14 of DOE-STD-1066 and recommends that the Program Secretarial Officer utilize this rationale and justification to accept the gap originally identified.

The IRP concluded that evaluation of the ventilation systems against the 2004-2 Ventilation System Evaluation performance criteria was appropriately performed.

3.3 Evaluation of Physical Modifications to Enhance Safety Performance

DOE-STD-1066 states in its scope paragraph, "Nothing in this Standard is intended to limit the application of other fire protection methods when unique situations or hazards warrant an alternate approach. The alternate approach *should* provide a comparable level of safety of that achieved by conformance with this Standard."

This revised review has considered an alternative approach to satisfy the criteria of DOE-STD-1066, presented as part of a recent Authorization Basis Amendment Request submitted to the Office of River Protection to mitigate impacts from the gap identified in the initial review report. The alternative approach is characterized by providing fire control capabilities at the source of incipient plant fires by the installation of automatic fire suppression throughout the majority of the WTP facilities (with exception of low combustibility and non accessible high radiation areas specifically identified in the WTP Safety Requirements Document, Appendix K), and in all areas where combustible material could potentially be a fire hazard (e.g., filter cave cranes), such that heat, embers, and soot will not threaten final plant HEPA filters. Other features include location of HEPA filters in separate fire areas protected by NFPA-compliant fire barriers with protection of openings and penetrations from the rest of the plant, installation of fire screens upstream from all safe-change filter housings, and in-bleed dampers to retard smoke and fire movement from threatening the filters. In addition WTP will invoke a robust combustible control program during operation.

The Office of River Protection with the support of fire protection engineers from the Office of Environmental Management evaluated the alternative approach to satisfy the requirements of DOE-STD-1066, *Fire Protection Design Criteria*, and concludes that this approach will provide an appropriate level of safety and adequately mitigates impacts from the identified gap. The IRP concludes that Office of River Protection has taken appropriate action to evaluate and resolve the identified gap in accordance with the 2004-2 Ventilation System Evaluation Guide. With these actions, the IRP finds that the WTP complies with the evaluation guidelines established for DNFSB 2004-2.

4. CONCLUSIONS

In the initial September 2007 review, the IRP concluded that the WTP HLW and PT ventilation systems evaluation was performed in accordance with the criteria in the DNFSB 2004-2 Ventilation System Evaluation Guide with one exception. The exception being that the WTP evaluation did not include a cost analysis or alternatives for resolution of the one gap that was identified, i.e., compliance with Chapter 14 of DOE-STD-1066. At that time, the IRP recommended that the Program Secretarial Office and Central Technical Authority accept the WTP HLW and PT Ventilation System Evaluation with a condition that future approval of a resolution that addresses fire safety requirements for HEPA filter housings is required.

The revised DNFSB 2004-2 evaluation and review considered an alternative approach to satisfy the criteria of DOE-STD-1066 and allow the PSO to accept the gap identified in the initial review report. With this identification of an alternate approach to satisfy the requirements of DOE-STD-1066, the IRP finds that the WTP complies with the evaluation guidelines established for DNFSB 2004-2.

5. RECOMMENDATION

The IRP recommends that the Program Secretarial Office and Central Technical Authority accept the WTP HLW and PT Ventilation System Evaluation as compliant with the evaluation guidelines established for DNFSB 2004-2.

6. REVIEW TEAM MEMBERS

James O'Brien, IRP Chairman
Robert Nelson, IRP Member EM

Note: The IRP has established a review process that includes an initial review by two members of the IRP to determine whether the evaluation: (1) is consistent with the implementation plan methodology and expectations (including choice of evaluation criteria); and (2) was performed and documented with an appropriate level of detail and rigor.

A detailed-full IRP team review will be performed if the ventilation evaluation report is not consistent with the implementation plan, was not performed with an appropriate level of detail or rigor (after consultation with the report developers), or has unique ventilation strategies, gap analysis, or corrective actions that warrant full IRP review.

For the WTP evaluation, a detailed-full IRP team review was not determined to be necessary; however, the team coordinated its review with a Fire Protection Professional.