



## Department of Energy

Washington, DC 20585

**DEC 07 2009**

MEMORANDUM FOR DAVID C. MOODY  
MANAGER  
CARLSBAD FIELD OFFICE

FROM: DR. STEVEN L. KRAHN   
ACTING DEPUTY ASSISTANT SECRETARY FOR  
SAFETY AND SECURITY PROGRAM  
ENVIRONMENTAL MANAGEMENT

SUBJECT: Evaluation of Waste Isolation Pilot Plant Ventilation  
Systems in Response to Defense Nuclear Facilities Safety Board  
Recommendation 2004-2, Final Reports

Based on a review of the information included in the subject reports, evaluation by the Defense Nuclear Facilities Safety Board (DNFSB) 2004-2 Independent Review Panel, the Environmental Management Technical Advisory Board, and input from the Chief of Nuclear Safety Office, the report is approved with the following considerations:

- The review concluded that the Waste Isolation Pilot Plant ventilation systems were appropriately evaluated against safety significant criteria associated with the established DNFSB 2004-2 evaluation guidelines and adequately meet them.

If you have any further questions, please contact me at (202) 586-5151.

Attachments



**Independent Review**

**of**

**Waste Isolation Pilot Plant (WIPP)  
Contact Handled Surface Confinement  
Ventilation System 411 HV01  
Ventilation System Evaluation Report**

**July 2009**



## **Executive Summary**

The Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 2004-2 Independent Review Panel (IRP) reviewed the Waste Isolation Pilot Plant (WIPP) Contact Handled Surface Confinement Ventilation System 411 HV01 Ventilation System Evaluation Report utilizing the process and criteria outlined in the Department of Energy's *Ventilation System Evaluation Guidance for Safety-Related and Non-Safety-Related System* (2004-2 Ventilation System Evaluation Guide).

The WIPP facility is classified as a Hazard Category 2 facility based upon its radioactive material inventory. The WIPP facility evaluation team (FET) performing the ventilation system review appropriately evaluated the Contact Handled Surface Confinement Ventilation System's functional classification and determined that it was properly classified as a Defense in Depth system. Furthermore, the FET appropriately evaluated the ventilation system against the 2004-2 Ventilation System Evaluation Guide performance criteria (at the Safety Significant level as specified in the 2004-2 Ventilation System Evaluation Guide for Hazard Category 2 facilities) and determined that it met all the criteria.

The IRP concludes that the WIPP Contact Handled Surface Confinement Ventilation System 411 HV01 Ventilation System Evaluation was performed in accordance with the criteria in the DNFSB 2004-2 Ventilation System Evaluation Guide.

**Results of Independent Review Panel's  
Review of the  
Waste Isolation Pilot Plant Contact Handled Surface Confinement  
Ventilation System 411 HV01  
Ventilation System Evaluation Report**

## **1.0 INTRODUCTION**

The Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 2004-2 Independent Review Panel (IRP) reviewed the Waste Isolation Pilot Plant (WIPP) Contact Handled Surface Confinement Ventilation System 411 HV01 Ventilation System Evaluation Report utilizing the process and criteria outlined in the 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 is 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.

The IRP team reviewed the WIPP Contact Handled Surface Confinement Ventilation System 411 HV01 Ventilation System Evaluation Report to determine whether it was performed in accordance with the 2004-2 Ventilation System Evaluation Guide; evaluate the appropriateness of the evaluation results and methods proposed for eliminating identified gaps, if any, between the existing ventilation system and applicable performance criteria; and provide any additional input considered appropriate to the responsible program and site offices.

## **2.0 FACILITY AND VENTILATION SYSTEM OVERVIEW**

The WIPP site is a repository for low-level radioactive waste. Waste is characterized and shipped to WIPP in packages for disposal in the repository. The container that the waste is packaged in prior to loading into transportation containers (road casks) provides primary containment. There is no planned normal operation at WIPP that allows for waste to be present external to the waste package container primary containment. The waste container packages that are used for disposal are removed from the transportation containers (road casks) in the Waste Handling Building (WHB). From the time the packages are removed until they are placed in the repository, the packages are contained within facilities and structures with active confinement ventilation systems.

Contact Handled (CH) surface handling operations are performed in the CH portion of the WHB. The CH Surface Confinement Ventilation System (CVS) 411 HV01 provides the active CVS for the CH surface waste handling operations.

### **3.0 REVIEW RESULTS**

#### **3.1 Derivation of Ventilation System Performance Criteria and Confinement Strategy**

The WIPP hazard classification category was determined in accordance with DOE Standard 1027-92, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports*. The material at risk for the determination of the categorization was defined as the maximum radiological contents of a single 55-gallon drum of CH waste which is 80 plutonium-239 equivalent curies (PE-Ci). Since this inventory exceeds the Hazard Category 2 minimum threshold of 56 Ci for Pu-239, the WIPP is categorized as a Hazard Category 2 facility.

The WIPP CVSs are designed to provide confinement barriers utilizing high efficiency particulate air (HEPA) filtration to limit releases of airborne radioactive contaminants. Exhaust stacks are designed with elevated discharges and fresh air supply intakes located away from the exhaust vents. The ventilation systems provide pressure differentials that are maintained between building interior zones and the outside environment. The WHB ventilation systems continuously filter the exhaust air from waste handling areas to reduce the potential for release of radioactive effluents to the environment. Airlocks for ventilation differential pressure control are electrically interlocked.

The CH Surface CVS is not credited in the site Documented Safety Analysis (DSA) analyzed accident scenarios to control a hazardous release. The CH Surface CVS<sup>1</sup> performs a Defense in Depth function for the WIPP site. The facility evaluation team (FET) used the site process (contained in its procedure WP 09-CN3023) to evaluate the existing site functional classification of the CH Surface CVS. The FET determined that the CH surface CVS had the proper functional classification per WP 09-CN3023.

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

#### **3.2 Evaluation of Ventilation System Against the Selected Performance Criteria**

Section 5.1 of the 2004-2 Ventilation System Evaluation Guide specifies that all Hazard Category 2 nuclear facilities that do not challenge or exceed the evaluation guideline will utilize Safety Significant performance criteria as identified in Table 5-1 Guide. In accordance with the Guide, the FET appropriately chose to evaluate the ventilation system against Safety Significant criteria.

---

<sup>1</sup> Additionally, the FET reviewed the site procedure for compliance with DOE Standard 3009-94, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Safety Analysis*, criteria for functionally classifying for site systems and found it to be appropriate.

The CH Surface CVS report included a brief description of how the system met the criteria.

The FET evaluation concluded that the 2004-2 Ventilation System Evaluation Guide Safety Significant performance criteria were adequately met by the CH Surface CVS. No performance gaps were identified.

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

#### **4.0 CONCLUSIONS**

The IRP concludes that the WIPP Contact Handled Surface Confinement Ventilation System 411 HV01 Ventilation System Evaluation was performed in accordance with the criteria in the DNFSB 2004-2 Ventilation System Evaluation Guide.

#### **5.0 RECOMMENDATIONS**

The IRP recommends that the Program Secretarial Office and Central Technical Authority accept the WIPP Contact Handled Surface Confinement Ventilation System 411 HV01 Ventilation System Evaluation Report.

#### **6.0 REVIEW TEAM MEMBERS**

James O'Brien, IRP Chairman, Office of Health, Safety and Security  
Robert Nelson, IRP Member, Office of Environmental Management

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 WIPP Contact Handled Surface Confinement Ventilation System 411 HV01 Ventilation System Evaluation Report review, a detailed IRP team review was not determined to be necessary.

**Independent Review**

**of**

**Waste Isolation Pilot Plant (WIPP)  
Contact Handled Underground  
Confinement Ventilation System VU01  
Ventilation System Evaluation Report**

**July 2009**



## **Executive Summary**

The Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 2004-2 Independent Review Panel (IRP) reviewed the Waste Isolation Pilot Plant (WIPP) Contact Handled Underground Confinement Ventilation System VU01 Ventilation System Evaluation Report utilizing the process and criteria outlined in the Department of Energy's (DOE's) *Ventilation System Evaluation Guidance for Safety-Related and Non-Safety-Related System* (2004-2 Ventilation System Evaluation Guide).

The WIPP facility is classified as a Hazard Category 2 facility based upon its radioactive material inventory. The WIPP facility evaluation team (FET) performing the ventilation system review appropriately evaluated the Contact Handled Underground Confinement Ventilation System's functional classification and determined that it was properly classified as a Safety Significant system. Furthermore, the FET appropriately evaluated the ventilation system against the 2004-2 Ventilation System Evaluation Guide Safety Significant performance criteria and determined that it met all the criteria.

The IRP concludes that the WIPP Contact Handled Underground Confinement Ventilation System VU01 Ventilation System Evaluation was performed in accordance with the criteria in the DNFSB 2004-2 Ventilation System Evaluation Guide.

**Results of Independent Review Panel's  
Review of the Waste Isolation Pilot Plant  
Contact Handled Underground Confinement Ventilation System VU01  
Ventilation System Evaluation Report**

## **1.0 INTRODUCTION**

The Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 2004-2 Independent Review Panel (IRP) reviewed the Waste Isolation Pilot Plant (WIPP) Contact Handled Underground Confinement Ventilation System VU01 Ventilation System Evaluation Report utilizing the process and criteria outlined in the 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 is 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.

The IRP team reviewed the WIPP Contact Handled Underground Confinement Ventilation System VU01 Ventilation System Evaluation Report to determine whether it was performed in accordance with the 2004-2 Ventilation System Evaluation Guide; evaluate the appropriateness of the evaluation results and methods proposed for eliminating identified gaps, if any, between the existing ventilation system and applicable performance criteria; and provide any additional input considered appropriate to the responsible program and site offices.

## **2.0 FACILITY AND VENTILATION SYSTEM OVERVIEW**

The WIPP site is a repository for low-level radioactive waste. Waste is characterized and shipped to WIPP in packages for disposal in the repository. The container that the waste is packaged in prior to loading into transportation containers (road casks) provides primary containment. There is no planned normal operation at WIPP that allows for waste to be present external to the waste package container primary containment. The waste container packages that are used for disposal are removed from the transportation containers (road casks) in the Waste Handling Building (WHB). From the time the packages are removed until they are placed underground in the repository, the packages are contained within facilities and structures with active confinement ventilation systems.

The WIPP underground (UG) consists of the waste disposal area, construction area, north area, and the waste shaft station area. The Contact Handled (CH) and Remote Handled (RH) waste disposal area is a 100 acre area on a horizon located 2,150 feet beneath the

surface in a deep, bedded salt formation. The CH Underground Confinement Ventilation System (CVS) VU01 provides the active CVS for the CH underground waste handling operations.

### **3.0 REVIEW RESULTS**

#### **3.1 Derivation of Ventilation System Performance Criteria and Confinement Strategy**

The WIPP hazard classification category was determined in accordance with DOE Standard 1027-92, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports*. The material at risk for the determination of the categorization was defined as the maximum radiological contents of a single 55-gallon drum of CH waste which is 80 plutonium-239 equivalent curies (PE-Ci). Since this inventory exceeds the Hazard Category 2 minimum threshold of 56 Ci for Pu-239, the WIPP is categorized as a Hazard Category 2 facility.

Significant accidents in the underground evaluated in the Documented Safety Analysis are prevented by use of numerous controls. The CH UG CVS is classified as a Safety Significant (SS) system that is credited for preventing prompt, significant radiological or chemical exposure to workers.<sup>1</sup> The facility evaluation team (FET) used the site process (contained in its procedure WP 09-CN3023) to evaluate the existing site functional classification of the CH Underground CVS. The FET determined that the CH underground CVS had the proper functional classification per WP 09-CN3023.

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

#### **3.2 Evaluation of Ventilation System Against the Selected Performance Criteria**

In accordance with the Guide, the FET appropriately chose to evaluate the ventilation system against SS criteria. The FET identified there were no gaps between the *Ventilation System Evaluation Guidance for Safety-Related and Non-Safety Related Systems* (VSEG) evaluation criteria and the installed system's SS functional design or performance expectations.

The CH underground CVS report included a brief description of how the system met the criteria. The evaluation verified all the VSEG established performance criteria for SS CVS systems were adequately met by the CH Underground CVS. No performance gaps were identified.

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

---

<sup>1</sup> Additionally, the FET reviewed the site procedure for compliance with DOE Standard 3009-94, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Safety Analysis*, criteria for functionally classifying the site systems and found it to be appropriate.

## **4.0 CONCLUSIONS**

The IRP concludes that the WIPP Contact Handled Underground Confinement Ventilation System VU01 Ventilation System Evaluation was performed in accordance with the criteria in the DNFSB 2004-2 System Evaluation Guide.

## **5.0 RECOMMENDATION**

The IRP recommends that the Program Secretarial Office and Central Technical Authority accept the WIPP Contact Handled Underground Confinement Ventilation System VU01 Ventilation System Evaluation.

## **6.0 REVIEW TEAM MEMBERS**

James O'Brien, IRP Chairman, Office of Health, Safety and Security  
Robert Nelson, IRP Member, Office of Environmental Management

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 WIPP Contact Handled Underground Confinement Ventilation System VU01 Ventilation System Evaluation Report review, a detailed IRP team review was not determined to be necessary.

**Independent Review**

**of**

**Waste Isolation Pilot Plant (WIPP)**  
**Remote Handled Underground**  
**Confinement Ventilation System VU01**  
**System Evaluation Report**

**July 2009**



## Executive Summary

The DNFSB Recommendation 2004-2 Independent Review Panel (IRP) reviewed the Waste Isolation Pilot Plant (WIPP) Remote Handled Underground Confinement Ventilation System VU01 Ventilation System Evaluation Report utilizing the process and criteria outlined in DOE's *Ventilation System Evaluation Guidance for Safety-Related and Non-Safety-Related System* (2004-2 Ventilation System Evaluation Guide).

The WIPP facility is classified as a Hazard Category 2 facility based upon its radioactive material inventory. The WIPP facility evaluation team (FET) performing the ventilation system review appropriately evaluated the Remote Handled Underground Confinement Ventilation System's functional classification and determined that it was properly classified as a Defense in Depth system. Furthermore, the FET appropriately evaluated the ventilation system against the 2004-2 Ventilation System Evaluation Guide performance criteria (at the Safety Significant level as specified in the 2004-2 Ventilation System Evaluation Guide for Hazard Category 2 facilities) and determined that it met all the criteria.

The IRP concludes that the WIPP Remote Handled Underground Confinement Ventilation System VU01 Ventilation System Evaluation was performed in accordance with the DNFSB 2004-2 Ventilation System Evaluation Guide.

**Results of Independent Review Panel's  
Review of the  
Waste Isolation Pilot Plant Remote Handled Underground  
Confinement Ventilation System UV01  
Ventilation System Evaluation Report**

## **1. INTRODUCTION**

The Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 2004-2 Independent Review Panel (IRP) reviewed the Waste Isolation Pilot Plant (WIPP) Remote Handled Underground Confinement Ventilation System UV01 Ventilation System Evaluation Report utilizing the process and criteria outlined in the 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 is 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.

The IRP team reviewed the WIPP Remote Handled Underground Confinement Ventilation System UV01 Ventilation System Evaluation Report to determine whether it was performed in accordance with the 2004-2 Ventilation System Evaluation Guide; evaluate the appropriateness of the evaluation results and methods proposed for eliminating identified gaps, if any, between the existing ventilation system and applicable performance criteria; and provide any additional input considered appropriate to the responsible program and site offices.

## **2. FACILITY AND VENTILATION SYSTEM OVERVIEW**

The WIPP site is a repository for low level radioactive waste. Waste is characterized and shipped to WIPP in packages for disposal in the repository. The container that the waste is packaged in prior to loading into transportation containers (road casks) provides primary containment. There is no planned normal operation at WIPP that allows for waste to be present external to the waste package container primary containment. The waste container packages that are used for disposal are removed from the transportation containers (road casks) in the Waste Handling Building (WHB). From the time the packages are removed until they are placed underground in the repository, the packages are contained within facilities and structures with active confinement ventilation systems.

The WIPP underground (UG) consists of the waste disposal area, construction area, north area, and the waste shaft station area. The Contact Handled (CH) and Remote Handled (RH) waste disposal area is a 100 acre area on a horizon located 2,150 feet beneath the surface in a deep, bedded salt formation. The RH Underground Confinement Ventilation System (CVS) VU01 provides the active CVS for the RH underground waste handling operations.

### **3.0 REVIEW RESULTS**

#### **3.1 Derivation of Ventilation System Performance Criteria and Confinement Strategy**

The WIPP hazard classification category was determined in accordance with DOE-STD-1027-92. The material at risk for the determination of the categorization was defined as the maximum radiological contents of a single 55-gallon drum of CH waste which is at 80 plutonium-239 equivalent curies (PE-Ci). Since this inventory exceeds the Hazard Category 2 minimum threshold of 56 Ci for Pu-239, the WIPP is categorized as a Hazard Category 2 facility.

Significant accidents in the underground evaluated in the DSA are prevented by use of numerous controls. The RH UG CVS is classified as a Safety Significant (SS) system that is credited for preventing prompt, significant radiological or chemical exposure to workers.<sup>1</sup> The facility evaluation team (FET) used the site process (contained in its procedure WP 09-CN3023) to evaluate the existing site functional classification of the RH Underground CVS. The FET determined that the RH underground CVS had the proper functional classification per WP 09-CN3023.

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

#### **3.2 Evaluation of Ventilation System Against the Selected Performance Criteria**

In accordance the Guide, the FET appropriately chose to evaluate the ventilation system against SS criteria. The FET identified there were no gaps between the *Ventilation System Evaluation Guidance for Safety-Related and Non-Safety Related Systems* (VSEG) evaluation criteria and the installed system's SS functional design or performance expectations.

The CH underground CVS report included a brief description of how the system met the criteria.

The FET evaluation verified all the VSEG established performance criteria for SS CVS systems were adequately met by the CVS.

---

<sup>1</sup> Additionally, the FET reviewed the site procedure for compliance with DOE Standard 3009 criteria for functionally classifying the site systems and found them to be appropriate.

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

#### **4. CONCLUSIONS**

IRP concludes that the WIPP Remote Handled Underground Confinement Ventilation System VU01 Ventilation System Evaluation was performed in accordance with the criteria in the DNFSB 2004-2 System Evaluation Guide.

#### **5. RECOMMENDATIONS**

The IRP recommends that the Program Secretarial Office and Central Technical Authority accept the WIPP Remote Handled Underground Confinement Ventilation System VU01 Ventilation System Evaluation.

#### **6. REVIEW TEAM MEMBERS**

James O'Brien, IRP Chairman, Office of Health, Safety and Security  
Robert Nelson, IRP Member, Office of Environmental Management

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 the 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 WIPP Remote Handled Underground Confinement Ventilation System VU01 Ventilation System Evaluation Report review, a detailed-full IRP team review was not determined to be necessary.

**Independent Review**

**of**

**Waste Isolation Pilot Plant (WIPP)  
Remote Handled Surface Confinement  
Ventilation System 411 HV02  
Ventilation System Evaluation Report**

**July 2009**



## **Executive Summary**

The DNFSB Recommendation 2004-2 Independent Review Panel (IRP) reviewed the Waste Isolation Pilot Plant (WIPP) Remote Handled Surface Confinement Ventilation System 411 HV02 Ventilation System Evaluation Report utilizing the process and criteria outlined in DOE's *Ventilation System Evaluation Guidance for Safety-Related and Non-Safety-Related System* (2004-2 Ventilation System Evaluation Guide).

The WIPP facility is classified as a Hazard Category 2 facility based upon its radioactive material inventory. The WIPP facility evaluation team (FET) performing the ventilation system review appropriately evaluated the Remote Handled Surface Confinement Ventilation System's functional classification and determined that it was properly classified as a Defense in Depth system. Furthermore, the FET appropriately evaluated the ventilation system against the 2004-2 Ventilation System Evaluation Guide performance criteria (at the Safety Significant level as specified in the 2004-2 Ventilation System Evaluation Guide for Hazard Category 2 facilities) and determined that it met all the criteria.

The IRP concludes that the WIPP Remote Handled Surface Confinement Ventilation System 411 HV02 Ventilation System Evaluation was performed in accordance with the criteria in the DNFSB 2004-2 Ventilation System Evaluation Guide.

**Results of Independent Review Panel's  
Review of the  
Waste Isolation Pilot Plant Remote Handled Surface Confinement  
Ventilation System 411 HV02  
Ventilation System Evaluation Report**

## **1.0 INTRODUCTION**

The Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 2004-2 Independent Review Panel (IRP) reviewed the Waste Isolation Pilot Plant (WIPP) Remote Handled Surface Confinement Ventilation System 411 HV02 Ventilation System Evaluation Report utilizing the process and criteria outlined in the 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 is 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.

The IRP team reviewed the WIPP Remote Handled Surface Confinement Ventilation System 411 HV02 Ventilation System Evaluation Report to determine whether it was performed in accordance with the 2004-2 Ventilation System Evaluation Guide; evaluate the appropriateness of the evaluation results and methods proposed for eliminating identified gaps, if any, between the existing ventilation system and applicable performance criteria; and provide any additional input considered appropriate to the responsible program and site offices.

## **2.0 FACILITY AND VENTILATION SYSTEM OVERVIEW**

The WIPP site is a repository for low-level radioactive waste. Waste is characterized and shipped to WIPP in packages for disposal in the repository. The container that the waste is packaged in prior to loading into transportation containers (road casks) provides primary containment. There is no planned normal operation at WIPP that allows for waste to be present external to the waste package container primary containment. The waste container packages that are used for disposal are removed from the transportation containers (road casks) in the Waste Handling Building (WHB). From the time the packages are removed until they are placed in the repository, the packages are contained within facilities and structures with active confinement ventilation systems.

Remote Handled (RH) surface handling operations are performed in the RH portion of the WHB. The RH Surface Confinement Ventilation System (CVS) 411 HV02 provides the active CVS for the RH surface waste handling operations.

### **3.0 REVIEW RESULTS**

#### **3.1 Derivation of Ventilation System Performance Criteria and Confinement Strategy**

The WIPP hazard classification category was determined in accordance with DOE Standard 1027-92, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports*. The material at risk for the determination of the categorization was defined as the maximum radiological contents of a single 55-gallon drum of CH waste, which is 80 plutonium-239 equivalent curies (PE-Ci). Since this inventory exceeds the Hazard Category 2 minimum threshold of 56 Ci for Pu-239, the WIPP is categorized as a Hazard Category 2 facility.

The WIPP CVSs are designed to provide confinement barriers utilizing high efficiency particulate (HEPA) filtration to limit releases of airborne radioactive contaminants. Exhaust stacks are designed with elevated discharges and fresh air supply intakes located away from the exhaust vents. The RH portion of the WHB has two ventilation systems, one for the RH bay and the other for the hot cell complex. Each system maintains pressure differential between areas of low potential for airborne radioactive material and those of higher potential. The WHB ventilation systems continuously filter the exhaust air from waste handling areas to reduce the potential for release of radioactive effluents to the environment. Airlocks for ventilation differential pressure control are electrically interlocked.

The RH Surface CVS is not credited in the site Documented Safety Analysis (DSA) analyzed accident scenarios to control hazardous release. The RH Surface CVS<sup>1</sup> performs a Defense in Depth function for the WIPP site. The facility evaluation team (FET) used the site process (contained in its procedure WP 09-CN3023) to evaluate the existing site functional classification of the RH Surface CVS. The FET determined that the RH surface CVS had the proper functional classification per CP 09-CN3023.

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

#### **3.2 Evaluation of Ventilation System Against the Selected Performance Criteria**

Section 5.1 of the 2004-2 Ventilation System Evaluation Guide specifies that all Hazard Category 2 nuclear facilities that do not challenge or exceed the evaluation guideline will utilize Safety Significant performance criteria as identified in Table 5-1 Guide. In

---

<sup>1</sup> Additionally, the FET reviewed the site procedure for compliance with DOE Standard 3009, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Safety Analysis*, criteria for functionally classifying for site systems and found it to be appropriate.

accordance with the Guide, the FET appropriately chose to evaluate the ventilation system against Safety Significant criteria.

The RH Surface CVS report included a brief description of how the system met the criteria. The FET evaluation concluded that the 2004-2 Ventilation System Evaluation Guide Safety Significant performance criteria were adequately met by the RH Surface CVS.

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

## **4.0 CONCLUSIONS**

The IRP concludes that the WIPP Remote Handled Surface Confinement Ventilation System 411 HV02 Ventilation System Evaluation was performed in accordance with the criteria in the DNFSB 2004-2 Ventilation System Evaluation Guide.

## **5.0 RECOMMENDATIONS**

The IRP recommends that the Program Secretarial Office and Central Technical Authority accept the WIPP Remote Handled Surface Confinement Ventilation System 411 HV02 Ventilation System Evaluation.

## **6.0 REVIEW TEAM MEMBERS**

James O'Brien, IRP Chairman, Office of Health, Safety and Security  
Robert Nelson, IRP Member, Office of Environmental Management

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 WIPP Remote Handled Surface Confinement Ventilation System 411 HV02 Ventilation System Evaluation Report review, a detailed IRP team review was not determined to be necessary.