



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

OCT 06 2008

OFFICE OF  
AIR AND RADIATION

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Dear Dr. Moody:

During the week of July 21, 2008, U.S. Environmental Protection Agency (EPA) staff performed inspections of the Waste Isolation Pilot Plant (WIPP) waste management and storage operations, emplacement, and monitoring program (Docket: A-98-49, II-B3-108). These inspections were performed under the authorities of 40 CFR 194.21 and 40 CFR Part 191, Subpart A.

As a result of the inspection, EPA determined that the activities related to emissions monitoring during waste management and storage continue to comply with the requirements of 40 CFR Part 191, Subpart A. However, to ensure proper performance of the Station A shrouded probes, DOE needs to continue to increase the probe cleaning frequency as conditions dictate. We also determined that DOE continues to adequately monitor the ten parameters that are important to the long-term containment of waste, as identified in EPA's 1998 Certification Decision. EPA also determined that waste is presently emplaced adequately, although EPA recommends, as we recommended previously in our annual inspection letter dated December 20, 2007, that DOE maintain a permanent photographic record of the RH canister number as it is removed from the transportation cask.

Copies of these inspection reports are enclosed with this letter and will be placed in the EPA public docket. If you have any questions regarding the enclosed reports, please contact Chuck Byrum at (214) 665-7555.

Sincerely,

A handwritten signature in blue ink, appearing to read "Jonathan Edwards".

Jonathan Edwards, Acting Director  
Radiation Protection Division

Enclosure

cc: Russ Patterson, DOE/CBFO  
George Basabilvaso, DOE/WIPP  
Alton Harris, DOE/HQ  
Steve Zappe, NMED  
Tom Kesterson, NMED Carlsbad  
EPA WIPP Team  
EPA Docket

**DOCKET NO: A-98-49**  
**Item: II-B3-108**

**2008 - Subpart A Inspection Report**

**INSPECTION No. EPA-WIPP-7.08-22a**  
**OF THE**  
**WASTE ISOLATION PILOT PLANT**  
**July 22 to July 24, 2008**

**U. S. ENVIRONMENTAL PROTECTION AGENCY**  
**Office of Radiation and Indoor Air**  
**Center for Waste Management and Federal Regulation**  
**1200 Pennsylvania Avenue, NW**  
**Washington, DC 20460**

**September 2008**

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## **1.0 Executive Summary**

The U.S. Environmental Protection Agency (EPA) conducted an annual inspection of the Department of Energy (DOE) Waste Isolation Pilot Plant (WIPP) July 22 to July 24, 2008 as part of our continued oversight program. This inspection was conducted under the authority of 40 CFR 191, Subpart A. The purpose of this inspection was to verify that DOE was in continued compliance with the dose release standard found at 40 CFR 191.03, Subpart A.

EPA reviewed DOE's ability to monitor radiation releases to the public due to normal waste disposal operations and any unplanned or accidental releases that might occur during disposal operations. Again this year EPA reexamined DOE's continued moisture problems and salt loading at the Station A sampling location in the air exhaust shaft. EPA also focused on instances of potential releases detected during routine composite sample measurements. EPA inspectors examined WIPP's emission control devices and methods used to estimate radiation doses to the public. In addition, EPA inspected radiation sample locations and equipment, sample processing, and reviewed the computational methods used to estimate dose. This year EPA was able to observe filter changes, probe pulls, and probe replacement at Station A.

EPA found that DOE continued to improve its air monitoring program during the past year, and responded aggressively and appropriately to Station A issues. Moisture and salt loading continues to challenge the Station A sampling location. EPA verified that DOE increased probe cleaning frequency as needed and continued to work toward a solution to this persistent problem. DOE continues to have an effective radiation sampling program because of the diligence of site staff, and can calculate both yearly and accidental dose estimates adequately. EPA had one finding that was cleared during the inspection.

## **2.0 Inspection Scope**

The scope of this inspection was to verify that WIPP continues to effectively capture, measure, and calculate radiation doses to members of the public during waste disposal operations. Inspection activities included an examination of monitoring and sampling equipment. This inspection was conducted under the authority of 40 CFR 191, Subpart A.

During this inspection the Agency focused on the impact of moisture and salt loading on the sampling location at Station A, and the routine periodic composite samples in which radioactivity was detected at just above minimum detectable concentrations.

## **3.0 Inspection Team, Observers, and Participants**

The inspection team consisted of three EPA staff. Three members of the New Mexico Environmental Department observed the inspection, Thomas Kesterson, Steve Holmes, and Cody Johnson. Jerry Fox and Chris Timm of Pecos Management Services also observed the inspection activities.

| Inspection Team Member | Position          | Affiliation |
|------------------------|-------------------|-------------|
| Chuck Byrum            | Inspection Leader | EPA         |
| Nick Stone             | Inspector         | EPA         |
| Tom Peake              | Inspector         | EPA         |

Numerous DOE staff and contractors participated in the inspection; below is a partial list.

| Participant or Observer | Participant or Observer |
|-------------------------|-------------------------|
| Bob Wade                | Art Chavez              |
| Joel Siegel             | Glenn Galloway          |
| Randy Elmore            | Curtis Chester          |
| Mansour Akbarzadeh      | Dave Speed              |
| Linda Frank-Supka       | Tom Goff                |
| Dave Kump               | Ed Flynn                |

#### 4.0 Performance of the Inspection

The inspection began on Tuesday, July 22, 2008 with an opening meeting that included presentations on changes in air monitoring and WIPP laboratory activities (COB-M2008-I3a, -I3b and -I5). Site staff discussed changes in the program since the last EPA inspection in July 2007. These presentations included the following changes to the program during the past year:

- Upgraded Station A flow controllers and enhanced preventative maintenance.
- Enhanced preventive maintenance of the air transport lines (because of indications of corrosion) and filter holders, because of corrosion and thread wear.
- Installing RADOS CAMs (continuous air monitors) in Panel 5.
- Procedures for both effluent monitoring and laboratory analysis have had minor changes.
- Changes related to the underground CAMs; upgraded RADOS CAMs in Panel 4.
- Continued to evaluate and enhance processes to study Station A shrouded probes to determine the amount of loading and techniques to predict when a probe may have salt build-up that require cleaning.

The EPA inspector observed various activities to verify effective implementation of

procedures. EPA reviewed procedures and implementation of procedures; interviewed site staff and observed activities such as filter changes and probe exchanges.

#### 4.1 Overall Inspection Activities

The inspector observed sampling filter changes and probe pulls at Stations A (Figure 4), examined photographs of the monthly shrouded probe changes (COB-A2008-S4 to -S7, Figure 1), and reviewed underground RADOS CAM locations.

#### 4.2 RADOS CAMs Appear to have Solved False Alarms

DOE has installed two RADOS CAMs using shrouded probes in the air exhaust of Panel 4; these new systems appear to have solved the false alarms recorded during 2005 and 2006. After the shake down period the RADOS CAMs have operated effectively. Site staff updated the RADOS CAMs MCA boards, CPU, and operating system. RADOS CAMs are being installed in the air exhaust of Panel 5.

#### 4.3 Continued Moisture Problems and Salt Buildup at Station A

Salt buildup on shrouded probes at Station A continues to be a challenging problem. Normally during the fall and winter seasons DOE has persistent moisture related salt buildup at Station A. However, this year DOE was surprised by unusual salt buildup on both the primary and secondary probes during the July 8<sup>th</sup> probe pull (Figure 1-State and DOE photos July 8).

Normally this period of time is not troubled with salt probe buildup and probes are usually changed on a monthly schedule. This occurrence may be due to mining near the air exhaust shaft.

**Finding:** After seeing the State and DOE photographs of the probes removed on July 8<sup>th</sup> EPA believed that it would be difficult to prove that DOE was able to verify that Station A was able to record representative samples (See Checklist item 23b). Therefore,

EPA informed the site staff at the opening meeting that the Agency had a finding. Station A may



not have been collecting representative samples for some period of time between June 10<sup>th</sup> and July 8<sup>th</sup> when the probes were changed. At this point the site went to bi-weekly probe exchanges from monthly, however at the July 22<sup>nd</sup> probe exchange one of the compliance probes, the primary Station A-3 probe, also failed because of salt buildup in the waistline of the shrouded probe (Figure 2-Primary Probe July 22). Site personnel were able to clear this finding during the inspection by increasing the probe exchange frequency to weekly and demonstrating that there were no radioactive releases during this time period and that other sampling locations, underground CAMs, and RADOS CAMs operated effectively during this period and did not record any release events (COB-A2008-S16). Subsequent probe exchanges verify that an increased (to weekly) probe exchange

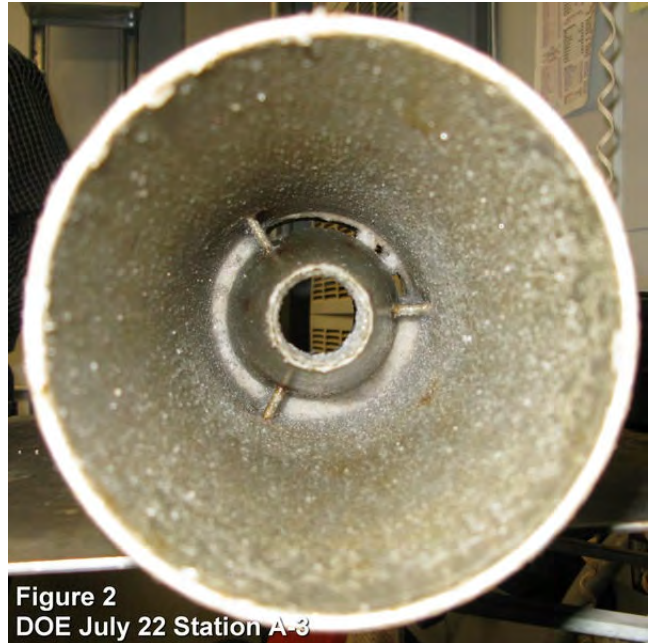


Figure 2  
DOE July 22 Station A-3

frequency has mitigated the salt problem at Station A (Figure 3-Secondary Probe July 29).



Figure 3  
DOE July 29 Station A-2

the results).

#### 4.4 Low Concentrations Found in Routine Laboratory Composite Measurements

During the past year the WIPP laboratory measured very low levels of radioactive concentrations, just above minimum detectable concentrations in several periodic composite samples during routine measurements. The WIPP laboratory confirmed the values. The EPA inspector asked for and received an explanation of the processes used by the laboratory (COB-A2008-L1) and the results of the laboratory measurements done to obtain these results (COB-A2008-L2 and -L3 are examples of



**Table 1 - Laboratory Samples With Detected Isotopes**

| <u>Date</u> | <u>Composite</u>        | <u>Location</u> | <u>Isotopes</u> | <u>Measurement*</u> | <u>MDC*</u> | <u>Source</u>    |
|-------------|-------------------------|-----------------|-----------------|---------------------|-------------|------------------|
| 2007        | 3 <sup>rd</sup> Quarter | Station B       | Pu238           | 4.41E-02            | 8.11E-03    | Reserve Fraction |
| 2007        | September               | Station A       | Pu239/240       | 4.63E-02            | 1.19E-02    | Reserve Fraction |
| 2008        | February                | Station A       | Pu239/241       | 3.36E-01            | 8.67E-03    | Original         |
| 2008        | February                | Station A       | Am241           | 1.39E-01            | 1.53E-02    | Original         |

\* in picoCurie per sample

In brief, composites of Station A are processed monthly and Stations B and C are done quarterly using these general steps (COB-A2008-L1-Process Steps):

- Tracers are added and Laboratory Control Standards are created.
- Filters are combined, the filters are mixed acid digested and completely dissolved.
- The filter solution is separated into equal fractions (parts), one saved as backup (the reserve fraction).
- The first fraction is chemically separated to retrieve individual isotopes and mounted for measurement.
- Each isotope is counted; in the Alpha Spectrometer-for U, Pu, Am; the Gas Proportional Counter for Sr; and the Gamma Spectrometer for Cs and other gamma emitters to determine concentrations.
- Quality control activities were done.
- An activity review is done to determine if any measurements are above TPU (total propagated uncertainty) and MDC (minimum detectable concentration).
- If an isotope is detected additional laboratory runs of the backups are performed to verify detection.

These steps were done as routine processing for these samples listed in Table 1, and the isotopes noted in the table were detected. The values measured are small fractions of EPA's annual dose limits stated in 40 CFR 191 Subpart A or EPA's NESHAPs regulations. There has been speculation about sources of these low concentrations; however DOE has not found any instance of a potential release during waste emplacement operations for the time periods of the composite collection and the measured values are so far below regulatory limits as to be insignificant, on the order of .0001 mrem/year dose (COB-A2008-S10). EPA believes these measurements are emblematic of the sensitivity and resolution of WIPP's laboratory techniques and EPA appreciates DOE's diligence in reporting and confirming the measurements.

#### 4.5 Other Inspection Activities

EPA observed filter changes and probe exchanges at Stations A (Figure 4 Station A Probe Pull July 22, 2008) and verified appropriate implementation of site procedures. The EPA inspector also examined the underground RADOS CAM in Panel 4 and the location being installed in Panel 5. EPA found all activities consistent with established procedures.



#### 4.6 Future Activities

DOE plans to “Implement a predictive maintenance procedure that will be conducted weekly to determine probes inspection frequency based on atmospheric conditions, mining conditions, and status of Station D availability...” (COB-A2008-S16) to attempt to prevent recurrence of Station A probe failures in the future. DOE also plans to update Stations B, C, and D flow controllers and hardware.

#### 5.0 Summary of Findings

EPA concludes that DOE adequately implements a radiological monitoring and sampling program for WIPP disposal operations and appropriately performs calculations to estimate potential releases to the public. EPA had one finding that was cleared during the course of the inspection at WIPP. EPA does not have concerns.

## Attachment A: Inspection Plan and Checklist

### WIPP Inspection Plan - 40 CFR 191, Subpart A for the year 2008

**Purpose:** EPA will verify that the Department of Energy (DOE) has been monitoring and calculating possible radiation doses to members of the public due to normal operations and any accidental releases which may have occurred during the last reporting period. This inspection is conducted under the authority of 40 CFR 191, Subpart A. This inspection is part of EPA's continued oversight to ensure that WIPP can, during the operational phase of management and storage of radioactive waste, comply with the limits expressed in Section 191.03 Standards.

**Scope:** The scope of this inspection activity is to verify that DOE at WIPP has measured and calculated any actual or potential radiation dose to members of the public during management and storage of radioactive waste during the past year of site operation. Inspection activities will include an examination of the description of monitoring and sampling equipment both on and off site, and in the underground.

The specific purpose of this inspection is to verify and confirm that DOE at WIPP has complied with the "Compliance reporting" expectations of EPA GUIDANCE FOR THE IMPLEMENTATION OF EPA'S STANDARDS FOR MANAGEMENT AND STORAGE OF TRANSURANIC WASTE (40 CFR Part 191, Subpart A) at the WASTE ISOLATION PILOT PLANT (402-R-97-001), Section 4.2, Page 15. In particular the EPA wishes to verify that DOE complies with the Subpart A standard is demonstrated by showing that the annual radiation dose to any member of the public in the general environment falls below the regulatory limits.

#### **Focal Areas for this Years Inspection:**

- What has changed in air sampling since last year's inspection? During the past two years a number of potential changes were discussed, such as new methods to evaluate salt build-up on Station A probes and new air flow controller at Station A. What is the status of these activities?
- Verify that the underground CAM alarms continue to be solved and have not continued.
- What has been the performance and dependability of the air sampler at the air exhaust of Panel 4. Update and status of the RADOS CAM? Are samplers installed at Panel 5 and their status?
- Has the increased cleaning and changing of Station A Probes and transport lines had an impact on salt loading at Station A. What has changed in recent years?
- How are composite samples handled and processed, measurement accuracy, and implications of laboratory standards used?
- Evaluation and explanation of measured values in composite samples, minimum detectable limits, etc.?
- Provide a presentation of the process and procedures used to calculate off-normal potential release during operations, use flow charts, photographs, etc as needed. Provide examples of various accidental scenarios with appropriate calculations. Please wants to see, from start to finish, the steps taken to respond to off-normal situations?

**Location:** This inspection will be held at the WIPP facility located twenty-six miles south east of Carlsbad, New Mexico and the surrounding vicinity as needed.

**Duration:** The EPA expects to complete its inspection in three days. Each day will begin with an opening meeting at 8:00 a.m. and end before 5:00 p.m. with a closeout session.

**Expected Dates:** Week of July 21, 2008.

**Information Requested:** Before the inspection, provide the most recent annual Safety Analysis Report, information that describes how measurements are taken, and complete documentation that shows how compliance calculations are performed with an explanation of all input parameters and their derivation and all pertinent related to Subpart A requirements. Provide documentation and procedures related to subpart Subpart A compliance activities as in past years.

| # | CHECKLIST QUESTION   | July 2008  | 40 CFR 191.03 Subpart A<br>Sat. = Satisfactory NA = Not Applicable  |        |
|---|--|--|---|--------|
|   | <u>40 CFR 191.03 Compliance Standard</u>   | EPA Citation   | Comment (Objective Evidence)  | Result |
|   | Does DOE "...provide reasonable assurance that the combined annual dose equivalent to any member of the public in the general environment resulting from: (1) Discharges of radioactive material and direct radiation from such management and storage and (2) all operations covered by Part 190; shall not exceed 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other critical organ." 40 CFR 191.03(a) | 40 CFR 191.03 Subpart A - Environmental Standards for Management and Storage | DOE has demonstrated that they can capture, measure, and calculate releases to assure that they are and remain below these limits   | Sat.   |
|   | <u>Scope of activities considered in determining compliance</u>  |  |   |        |
| 1 | Does DOE demonstrate that all activities at the WIPP up until the point of disposal are considered in determining compliance?  | EPA 402-R-97-001 Section 2.3, Page 4   | The Annual Site Environmental Report (DOE/WIPP 07-2225:COB-A2008-C) Executive Summary documents the results of DOE's efforts to consider all activities that impact compliance.   | Sat.   |
| 2 | Does DOE demonstrate that radiation doses to the public due to<br>1) actual normal operation and<br>2) any unplanned or accidental releases are examined?  | EPA 402-R-97-001 Section 2.3, Page 5   | Section 3.0 of the Implementation Plan for Subpart A (DOE/WIPP 00-3121: COB-A2008-A), documents the plan to show how this requirement is examined. QAPP for Sampling Emissions (WP 12-RC.01:COB-A2008-F), documents the QA requirements for the sampling of emissions. Annual NESHAP report (COB-A2008-Ja,-Jb) demonstrates that normal operations are examined. CH Waste Documented Safety Analysis (DOE/WIPP 95-2065:COB-A2008-G) and RH Waste DSA (DOE/WIPP 06-3174:COB-A2008-H) documents DOE's review of potential accidents at WIPP. Procedure Emergency Radiological Control Response (WP 12-HP4000:COB-A2008-K) documents radiological emergency response activities. | Sat.   |
|   | <u>Media considered in determining compliance</u>  |  |   |        |
| 3 | Does DOE demonstrate that the air pathway is the credible release pathway?   | EPA 402-R-97-001 Section 2.4, Page 5   | DOE/WIPP 07-2225 Section 2.2.15 and DOE/WIPP 00-3121 Section 2.1 documents that the air pathway is the only credible release pathway.   | Sat.   |
| 4 | Does DOE demonstrate that other exposure mechanisms from an air release could include inhalation of contaminated air, immersion in a plume of radioactive particles, ingestion of soil on which contaminated particles have been deposited, swimming in ponds in which radionuclides have been deposited are considered?   | EPA 402-R-97-001 Section 2.4, Page 5   | Sections 2.1 and 3.5 of Implementation Plan for Subpart A (DOE/WIPP 00-3121) documents the detailed plan for measuring these potential exposure mechanisms. Annual NESHAP report (COB-A2008-Ja,-Jb) demonstrates that these exposure mechanisms are included.   | Sat.   |

| # | CHECKLIST QUESTION   | July 2008   | 40 CFR 191.03 Subpart A  |        |
|---|--|---|--|--------|
|   | <u>Media considered in determining compliance</u>  | EPA Citation  | Comments (Objective Evidence)  | Result |
| 5 | Is DOE monitoring the expected air exhaust pathway and performing environmental monitoring of other release points and exposure pathways to confirm air exhaust as the only release pathway?   | EPA 402-R-97-001 Section 2.4, Page 5 and page 6.                              | Section 2.1 of the Implementation Plan for Subpart A (DOE/WIPP 00-3121:COB-A2008-A) explains DOE's plan to fulfill this requirement. Annual Site Environmental Report (DOE/WIPP 07-2225:COB-A2008-C) Chapter 4 demonstrates that DOE implements groundwater surveillance, biota sampling and off-site air monitoring programs. | Sat.   |
|   | <u>Boundary of compliance</u>  |   |  |        |
| 6 | Does DOE demonstrate compliance at the "exclusive use area" boundary? If not, does DOE justify changing this boundary?   | EPA 402-R-97-001 Section 2.5, Page 6.<br>EPA 402-R-97-001 Section 2.5, Page 7 | Section 3.1 of DOE/WIPP 00-3121 states that the "Exclusive Use Area" will be used as the boundary for 40 CFR 191 Subpart A compliance.   | Sat.   |
|   | <u>Location of maximally exposed individual</u>  |   |  |        |
| 7 | Does DOE examine radiation doses to individuals at any offsite point where there is a residence, school, business, or office? (Such as grazing, mining, or oil drilling in the vicinity.)  | EPA 402-R-97-001 Section 2.6.1, Page 8  | DOE/WIPP 07-2225 Section 1.3.2 and the Annual NESHAP report (COB-A2008-Ja,-Jb) demonstrate that DOE considers doses at appropriate offsite points, such as Smith Ranch located 7.5 km away in the WNW sector.  | Sat.   |
| 8 | Does DOE analyze potential exposure pathways and examine demographic information and conduct field investigations to identify the location of actual individual who could be exposed via those pathways?                                   | EPA 402-R-97-001 Section 2.6.1, Page 8  | DOE/WIPP 07-2225 Section 1.3.2 and the Annual NESHAP report (COB-A2008-Ja,-Jb) demonstrate that DOE considers doses at appropriate offsite points, such as Smith Ranch located 7.5 km away in the WNW sector of WIPP.  | Sat.   |
| 9 | Does DOE conduct separate analyses of potential dose received from each exposure pathway? Then does DOE assume that a member of the public resides at the single geographic point on the surface where the maximum dose would be received? | EPA 402-R-97-001 Section 2.6.1, Page 8  | DOE/WIPP 07-2225:COB-A2008-C Section 1.3.2 and the Annual NESHAP report (COB-A2008-Ja,-Jb) demonstrate that DOE considers doses at appropriate offsite points, such as Smith Ranch located 7.5 km away in the WNW sector of WIPP.  | Sat.   |

| #  | CHECKLIST QUESTION  | July 2008                                  | 40 CFR 191.03 Subpart A   |        |
|----|---|--|---|--------|
|    | <u>Personal parameters</u>  | EPA Citation                               | Comments (Objective Evidence)   | Result |
| 10 | Does DOE assume that the individual exhibits personal characteristics of the “reference man” when evaluating radiation dose to the maximally exposed individual?  | EPA 402-R-97-001<br>Section 2.6.2, Page 8  | Section 3.2 of the Implementation Plan for Subpart A (DOE/WIPP 00-3121:COB-A2008-A) describes the “reference man” parameters as described in the CAP88-PC computer code. Annual NESHAP report (COB-A2008-Ja,-Jb,-S15) demonstrates that “reference man” is used to evaluate radiation dose. | Sat.   |
|    | <u>Calculation of dose - Modeling – Parameters</u>  |  |   |        |
| 11 | Does DOE provide both whole body radiation dose and critical organ radiation dose for the maximally exposed individual (or a hypothetical individual conservatively located at a point of higher exposure)? | EPA 402-R-97-001<br>Section 2.7.1, Page 8  | Annual NESHAP report (COB-A2008-Ja,-Jb) demonstrates that DOE appropriately fulfills this requirement.  | Sat.   |
| 12 | Does DOE calculate radiation doses including all release points and reflecting evaluation of all exposure pathways?   | EPA 402-R-97-001<br>Section 2.7.1, Page 8  | Section 2.1 of DOE/WIPP 00-3121 states that the air pathway is the most credible but other exposure pathways are monitored. Annual NESHAP report (COB-A2008-Ja,-Jb) demonstrates that all release points are evaluated.   | Sat.   |
| 13 | Does DOE use computer modeling to calculate radiation doses for compliance with the Subpart A standard?   | EPA 402-R-97-001<br>Section 2.7.2, Page 9  | Section 3.2 of DOE/WIPP 00-3121 states that a computer model will be used to calculate radiation doses. Annual NESHAP report demonstrates that DOE is using computer modeling.  | Sat.   |
| 14 | Does DOE use CAP88-PC to perform dose calculations?   | EPA 402-R-97-001<br>Section 2.7.2, Page 9  | Section 3.2 of DOE/WIPP 00-3121 states that CAP88-PC is used for dose calculations. Annual NESHAP report demonstrates that DOE is using CAP88-PC.   | Sat.   |
| 15 | Does DOE use an alternate model for calculating radiation doses? If so, does DOE justify such usage?  | EPA 402-R-97-001<br>Section 2.7.2, Page 10 | Section 3.2 of DOE/WIPP 00-3121 states that DOE uses the atmospheric dispersion code (GXQ) to determine concentrations for accidental releases. GXQ is a reasonable choice for these calculations.  | Sat.   |
| 16 | Does DOE adequately supported exposure parameters used in dose calculations?  | EPA 402-R-97-001<br>Section 2.7.3, Page 10 | Annual NESHAP report demonstrates that DOE is using appropriate parameters in dose calculations.  | Sat.   |

| #  | CHECKLIST QUESTION  | July 2008                               | 40 CFR 191.03 Subpart A  |        |
|----|---|---|--|--------|
|    | <u>Calculation of dose - Modeling - Parameters</u>  | EPA Citation                            | Comments (Objective Evidence)  | Result |
| 17 | Does DOE document that “conservative simplifying assumptions” are used in the radiation dose calculations?  | EPA 402-R-97-001 Section 2.7.3, Page 10 | Annual NESHAP report (COB-A2008-Ja,-Jb) demonstrates that DOE is using conservative simplifying assumptions in dose calculations.  | Sat.   |
| 18 | <p>Are DOE’s exposure parameters as conservative as the following?</p> <p>For a maximally exposed individual located at a residence, assumed continuous exposure (24 hours per day).</p> <p>For a maximally exposed individual located at a business, office, or school, assume exposure of 8 hours per day.</p> <p>Assume individuals consume 2 liters per day of drinking water from an underground source of drinking water.</p> <p>Assume inhalation rate for air to be <math>9 \times 10^5</math> cm<sup>3</sup>/hr.</p> <p>Assume ingestion rate of meat to be 85 kg/yr.</p> <p>Assume ingestion rate of leafy vegetables to be 18 kg/yr.</p> <p>Assume ingestion of milk to be 112 liter/yr.</p> <p>Assume ingestion rate of produce to be 176 kg/yr</p> | EPA 402-R-97-001 Section 2.7.3, Page 10 | Section 3.2 of the Implementation Plan for Subpart A (DOE/WIPP 00-3121:COB-A2008-A) states that DOE is using these values as exposure parameters. The Annual NESHAP report (COB-A2008-Ja,-Jb) demonstrates that DOE is using these parameters in dose calculations. COB-A2008-S15 shows a copy of a NESHAPs CAP 88-PC run with these parameter marked. | Sat.   |



| #  | CHECKLIST QUESTION  | July 2008                                       | 40 CFR 191.03 Subpart A   |        |
|----|---|---|---|--------|
|    | <u>Emissions and Environmental Monitoring - Air</u>   | EPA Citation                                    | Comments (Objective Evidence)   | Result |
| 19 | Does DOE demonstrate that effluent flow rate measurements are made using Reference Method 2 of Appendix A to 40 CFR Part 60 to determine velocity and volumetric flow rate for stacks and large vents?  | EPA 402-R-97-001 Section 3.1, Page 11, (1(i))   | QAPP For Sampling Emissions (WP 12-RC.01:COB-A2008-F) Section 4.1 documents that this requirement is appropriately implemented at WIPP.   | Sat.   |
| 20 | Does DOE demonstrate that effluent flow rate measurements are made using Reference Method 2a of Appendix A to 40 CFR 60 to measure flow rates through pipes and small vents?  | EPA 402-R-97-001 Section 3.1, Page 11, (1(ii))  | Not applicable at WIPP. Duct diameter associated with WIPP exhaust point exceeds the 40 CFR 60 requirements.  | NA     |
| 21 | Does DOE demonstrate that the frequency of flow rate measurements depend on the variability of the effluent flow rate?<br><br><b>Note:</b> For variable flow rates, continuous or frequent flow rate measurements are expected to be made. For relatively constant flow rates, only periodic measurements are expected. | EPA 402-R-97-001 Section 3.1, Page 11, (1(iii)) | Implementation Plan for Subpart A (DOE/WIPP 00-3121:COB-A2008-A) Section 3.3.1 states that DOE uses continuous air monitoring at WIPP and does not need to consider this requirement. | NA     |
| 22 | Does DOE demonstrate that radionuclides to be directly monitored or extracted, collected and measured using Reference Method 1 of Appendix A to 40 CFR Part 60 for selected monitoring or sampling sites?   | EPA 402-R-97-001 Section 3.1, Page 11, (2(i))   | DOE uses 40 CFR 61 Appendix B Method 114. WP 12-RC.01 documents in Section 4.1 the location of sampling sites.  | Sat.   |

| #   | CHECKLIST QUESTION  | July 2008   | 40 CFR 191.03 Subpart A  |                        |
|-----|---|---|--|------------------------|
|     | <u>Emissions and Environmental Monitoring - Air</u>   | EPA Citation  | Comments (Objective Evidence)  | Result                 |
| 23a | Does DOE demonstrate that radionuclides to be directly monitored or extracted, collected and measured continuously with an in-line detector capable of distinguish relevant radionuclides? As an acceptable alternative to direct radiation monitoring, the effluent air stream may be continuously sampled such that analysis of filters or other collectors will provide an accurate estimate of emissions from a known flow rate during a fixed sampling time.   | EPA 402-R-97-001<br>Section 3.1,<br>Page 11, (2(ii))        | DOE uses periodic monitoring at WIPP to show compliance with 40 CFR 191 Subpart A. The Implementation Plan for Subpart A (DOE/WIPP 00-3121:COB-A2008-A) Section 3.3.3 states that DOE uses periodic confirmatory monitoring. DOE/WIPP 00-3121 Sections 3.5 and 3.3.5 document relevant radionuclides at WIPP. Annual NESHAP report (COB-A2008-Ja,-Jb) demonstrates that these radionuclides are monitored.   | NA                     |
| 23b | Does DOE demonstrate that representative samples of the effluent stream are withdrawn from the sampling site? "...The need for continuous sampling is applicable to batch processes when the unit is in operation..." The WIPP is a batch (continuous) process disposing of radioactive waste therefore continuous sample is appropriate.<br><br><b>Finding:</b> possible non-representative sampled at Station A. <b>CLEARED</b> -During the inspection. DOE committed to weekly probe cleanings until it is clear the unique conditions have changed (Corrective action report COB-A2008-S16). Subsequent probe pull photos show that weekly cleaning has mitigated salt buildup and restored representative sampling at Station A. | EPA 402-R-97-001 Section 3.1, Page 11, (2(ii))              | Environmental Monitoring Plan (DOE/WIPP 99-2194:COB-A2008-1) Section 5.2.4 and DOE/WIPP 00-3121:COB-A2008-A Section 3.3.2 states that sample sites will acquire representative samples. <b>Recent probe pull photographs at Station A (State Photos:COB-A2008-S4,-S6 and DOE Photos:COB-A2008-S5,-S7 for example) show that the probes have had salt loading and that the probe, in these cases, do not pass minimum acceptance criteria. Even though salt loading continues to be a problem at Station A DOE continues to aggressively increase the probe cleaning schedule whenever salt loading increases. However, the recent failures on July 8, 2008 demonstrates that both the primary (A-3) probe and the backup/secondary (A-2) probe can fail at the same time and that Station A may not be acquiring representative samples.</b> | Sat.<br><b>Cleared</b> |
| 24  | Does DOE demonstrate that radionuclides are collected and measured using procedures based on the principles of measurement described in Appendix B, Method 114 of 40 CFR 61? If not, does DOE demonstrate that the Administrator has approve the method used?   | EPA 402-R-97-001<br>Section 3.1,<br>Page 12,<br>(2(iii))    | The QAPP for Sampling Emissions (WP 12-RC.01:COB-A2008-F) Section 1.0 documents that DOE used these principles.  | Sat                    |
| 25  | If DOE is using the "Shrouded Probe", does DOE demonstrate that this alternative method is being used according to the guidance provide in "An Explanation of Particle Sampling in a Moving Gas Stream Within a Duct Using an Unshrouded and Shrouded Probe"?   | EPA 402-R-97-001<br>Section 3.1,<br>Page 12,<br>(2(iii)(a)) | An Assessment of the WIPP Shrouded Probe Against EPA Approval Criteria for Use of Single Point Sampling with the Shrouded Probe HA:98:0100 (Included in August 2000 Inspection Report, A-98-49, II-B3-12, EPA Approval letter (COB 191A-AO-2000: COB-A2006-3) documents DOE's evaluation of the Shrouded Probe and its compliance with the EPA criteria. Single Point Representative Sampling with Shrouded Probes (LA-12612-MS:COB-A2006-4) documents how the shrouded probe was qualified for use at WIPP.   | Sat.                   |

| #  | CHECKLIST QUESTION   | July 2008  | 40 CFR 191.03 Subpart A  |        |
|----|--|--|--|--------|
|    | <u>Emissions and Environmental Monitoring - Air</u>  | EPA Citation   | Comments (Objective Evidence)  | Result |
| 26 | Does DOE's quality assurance program meet the performance requirements described in Appendix, Method 114 of 40 CFR Part 61?  | EPA 402-R-97-001<br>Section 3.1, Page 12, (2)(iv))           | QAPP for Sampling Emissions (WP 12-RC.01:COB-A2008-F) Section 1.0 documents DOE quality assurance requirements. These meet the requirements of 40 CFR 61. Implementation Plan for Subpart A (DOE/WIPP 00-3121:COB-A2008-A) Section 4.0 states that DOE implements NQA requirements which are equivalent to Method 114. | Sat.   |
| 27 | If it is impractical to measure the effluent flow rate in accordance with the method(s) in Section 3.1(1) or to monitor or sample extraction according to methods in Section 3.1(2) has DOE demonstrated that the use of alternative effluent flow rate measurement or site selection and sample extraction are appropriate and that the alternate method are used provided the following:<br><br>(i) DOE shows that methods in Section 3.1(1) or (2) are impractical;<br>(ii) DOE shows the alternative procedure will not significantly underestimate the emissions;<br>(iii) DOE shows the alternative procedure is fully documented; and<br>(iv) DOE has received prior approval from EPA. | EPA 402-R-97-001<br>Section 3.1, Page 12, (3(i) to 3(iv))    | See question #19, DOE uses Section 3.1 (1)(i) of EPA 402-R-97-001 page 11.   | NA.    |
| 28 | Does DOE demonstrate that radionuclide emission measurements are in conformance with the methods in Section 3.1(1) and (2) to be made at all release points which have a potential to discharge radionuclides into the air in quantities which could cause a combined annual dose equivalent in excess of 1% of the dose limit in Subpart A?   | EPA 402-R-97-001<br>Section 3.1, Page 12 and page 13, (4(i)) | Section 3.3.3 of DOE/WIPP 00-3121 documents DOE's compliance with this requirement.  | Sat.   |
| 29 | Does DOE demonstrate that all radionuclides which could contribute greater than 10% of the combined annual dose equivalent for a release point are being measured?   | EPA 402-R-97-001<br>Section 3.1, Page 13, (4(i))             | Section 3.3 of DOE/WIPP 00-3121 documents DOE's compliance with this requirement. Section 2.0 of the Periodic Confirmatory Measurement Protocol (DOE/WIPP 97-2238:COB-A2008-B) discusses release points measured confirm compliance with this requirement.   | Sat.   |

| #  | CHECKLIST QUESTION  | July 2008   | 40 CFR 191.03 Subpart A  |        |
|----|---|---|--|--------|
|    | <u>Emissions and Environmental Monitoring - Air</u>   | EPA Citation                                      | Comments (Objective Evidence)  | Result |
| 30 | If DOE uses alternative procedures to determine emissions, does DOE demonstrate that they have prior EPA approval?  | EPA 402-R-97-001<br>Section 3.1, Page 13, (4(i))  | DOE uses the shrouded sampling probe as an alternative method. EPA has approved this alternative method (COB-A2006-3)  | NA     |
| 31 | Does DOE demonstrate that for other release points which have a potential to release radionuclides into the air it has performed periodic confirmatory measurements to verify the low emissions?                                  | EPA 402-R-97-001<br>Section 3.1, Page 13, (4(i))  | DOE does not have other release points which have a potential to release radionuclides. CH (DOE/WIPP-95-2065:COB-A2008-G) and RH (DOE/WIPP-06-3174:COB-A2008-H) Waste Documented Safety Analysis documents these conclusions.  | NA     |
| 32 | Does DOE demonstrate that an evaluation has been done to evaluate the potential for radionuclide emissions for a release point?   | EPA 402-R-97-001<br>Section 3.1, Page 13, (4(ii)) | Section 2.0 of the Periodic Confirmatory Measurement Protocol (DOE/WIPP-97-2238:COB-A2008-B) documents this evaluation and that WIPP has three release points.   | NA     |
| 33 | Does DOE demonstrate that estimated radionuclide release rates are based on discharge of effluent stream that would result if all pollution control equipment did not exist, but the facilities operations were otherwise normal? | EPA 402-R-97-001<br>Section 3.1, Page 13, (4(ii)) | Section 5.2.4 of the WIPP Environmental Monitoring Plan (DOE/WPP 99-2194:COB-A2008-1) states: "Station A exhausts unfiltered air from the underground repository to the atmosphere. Station B exhausts HEPA filtered air from the underground repository to the atmosphere when in Filtration Mode of operation. Station C exhausts HEPA filtered air from the Waste Handling Building to the atmosphere." Stations B and C uses pollution control equipment, therefore item 33 is not fulfilled. However, because of the nature of these sample locations and that they are filtered continuously this approach is appropriate; therefore the Agency agrees that DOE's sample methods are adequate. | Sat.   |

| #  | CHECKLIST QUESTION   | July 2008                                       | 40 CFR 191.03 Subpart A  |        |
|----|--|---|--|--------|
|    | <u>Environmental Measurements</u> (Page 1)   | EPA Citation                                    | Comments (Objective Evidence)  | Result |
| 34 | Does DOE demonstrate that environmental measurements of concentrations of radionuclides in air at the critical receptor locations are used as an alternative to air dispersion calculations in demonstrating compliance with the standard? | EPA 402-R-97-001 Section 3.1, Page 13, (5)      | DOE does not use environmental monitoring as an alternative to comply with 40 CFR 191.03 Subpart A. DOE samples at release points. | NA     |
| 35 | Does DOE demonstrate that air at the point of measurement is continuously sampled for collection of radionuclides if environmental measurements are used?  | EPA 402-R-97-001 Section 3.1, Page 13, (5(i))   |  | NA     |
| 36 | Does DOE demonstrate that the environmental measurement program is appropriately designed to collect and measure specifically those radionuclides which are major contributors to the annual radiation dose from the facility?             | EPA 402-R-97-001 Section 3.1, Page 13, (5(ii))  |  | NA     |
| 37 | Does DOE demonstrate that radionuclide concentrations which would cause an annual dose equivalent of 10% of the standard are readily detectable and distinguishable from background?   | EPA 402-R-97-001 Section 3.1, Page 13, (5(iii)) |  | NA     |
| 38 | Does DOE demonstrate that a quality assurance program that meets the performance requirements described in 40 CFR Part 61, Appendix B, Method 114 is conducted for environmental measurements?   | EPA 402-R-97-001 Section 3.1, Page 13, (5(iv))  |  | NA     |

| #  | CHECKLIST QUESTION  | July 2008                                     | 40 CFR 191.03 Subpart A   |        |
|----|---|---|---|--------|
|    | <u>Environmental Measurements</u> (Page 2)  | EPA Citation                                  | Comments (Objective Evidence)   | Result |
| 39 | Does DOE demonstrate that EPA has granted prior approval for the use of environmental measurements to demonstrate compliance with the standard?               | EPA 402-R-97-001 Section 3.1, Page 13, (5(v)) | DOE has not requested approval to use environmental measurements.   | NA     |
|    | <b><u>Emissions and Environmental Monitoring - Other Media</u></b>  |   |   |        |
| 40 | Does DOE demonstrate that environmental monitoring of other release points or critical receptor locations to confirm air exhaust as the only release pathway? | EPA 402-R-97-001 Section 3.2, Page 14.        | Implementation Plan for Subpart A (DOE/WIPP 00-3121:COB-A2008-A) Section 2.1 states; "However, to confirm that the air pathway is the only credible pathway for radiological releases, WIPP implements a radiological ground water surveillance program, biota sampling program and off-site radiological air monitoring program." Annual Site Environmental Report (DOE-WIPP 06-2225:COB-A2008-C) Chapter 4 demonstrates that DOE's environmental program monitors other release points and critical receptor locations. | Sat.   |

| #  | CHECKLIST QUESTION  | July 2008   | 40 CFR 191.03 Subpart A   |        |
|----|---|---|---|--------|
|    | <u>Compliance Reporting</u>   | EPA Citation  | Comments (Objective Evidence)   | Result |
| 41 | Does DOE demonstrate compliance with the Subpart A standard by showing that the annual radiation dose to any member of the public in the general environment falls below the regulatory limits?   | EPA 402-R-97-001<br>Section 4.2, Page 15.             | Section 5.0 of the Implementation Plan for Subpart A (DOE/WIPP 00-3121:COB-A2008-A) documents that DOE's plans to report results yearly. The Annual NESHAP (COB-A2008-Ja,-Jb) report demonstrates that DOE reports results yearly.                | Sat.   |
| 42 | Does DOE report results of monitoring and the dose calculations for each reporting period?  | EPA 402-R-97-001<br>Section 4.2, Page 15              | Section 5.0 of DOE/WIPP 00-3121 documents that DOE's plans to report results. The Annual NESHAP Report demonstrates that DOE reports results of monitoring and dose results yearly.   | Sat.   |
| 43 | Does DOE demonstrate that monitoring is performed each calendar year of facility operation, and that radiation doses are calculated after the end of each year?   | EPA 402-R-97-001<br>Section 4.2, Page 15              | Section 5.0 of DOE/WIPP 00-3121 documents that DOE's plans to report results yearly. The Annual NESHAP Report demonstrates that DOE reports results of monitoring activities and dose is calculated yearly.                                       | Sat.   |
|    | <u>Notification of construction or modification.</u>  |   |   |        |
| 44 | Does DOE demonstrate that they have provided the EPA written notification of any planned construction or modification to the WIPP facility, prior to commencing any such activity, if it results in an increase in the rate of emissions of radionuclides during operation? | EPA 402-R-97-001<br>Section 4.3, Page 16.             | Section 5.0 of DOE/WIPP 00-3121 documents that DOE's plans to report results yearly. The Annual NESHAP Report demonstrates that DOE reports planned construction and modification during the year.  | Sat.   |
| 45 | Does DOE demonstrate that advanced notification was not needed for construction and modification if the radiation dose caused by all the emissions from the new construction or modification is less than 1% of the Subpart A dose limits?                                  | EPA 402-R-97-001<br>Section 4.3, Page 16 and page 17. | Section 5.0 of DOE/WIPP 00-3121:COB-A2008-A documents that DOE's plans to report results yearly.  | Sat.   |
|    | <u>Record Keeping</u>   |   |   |        |
| 46 | Does DOE demonstrate documentation is sufficient to allow the Agency to verify the correctness of the determination made concerning the WIPP's compliance with Subpart A?   | EPA 402-R-97-001<br>Section 4.4, Page 17.             | Through its various documents, Subpart A implementation plan, its Annual NESHAP Report, and many procedures that support Subpart A activities, DOE demonstrate that documentation is sufficient to allow EPA to verify compliance with Subpart A. | Sat.   |

**Attachment B**

**Table of Documents Reviewed**



**DOCKET NO: A-98-49**  
**Item: II-B3-108**

## **2008 - Monitoring Inspection Report**

**INSPECTION No. EPA-WIPP-7.08-22b**  
**OF THE**  
**WASTE ISOLATION PILOT PLANT**  
**July 22 to July 24, 2008**

**U. S. ENVIRONMENTAL PROTECTION AGENCY**  
**Office of Radiation and Indoor Air**  
**Center for Waste Management and Federal Regulation**  
**1200 Pennsylvania Avenue, NW**  
**Washington, DC 20460**

**September 2008**

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## 1.0 Executive Summary

The U.S. Environmental Protection Agency (EPA) conducted an inspection of the Department of Energy’s (DOE) Waste Isolation Pilot Plant (WIPP) from July 22 to July 24, 2008 as part of our continuing WIPP oversight program. The purpose of this inspection was to verify that DOE continues to adequately monitor ten parameters listed in the Compliance Certification Application (CCA), Volume 1, Section 7.0, in particular Table 7-7 (See Table 1, COB-M2008-1). Attachment A contains the inspection plan and the checklist used by the EPA inspector, and Attachment B lists documents reviewed by the EPA.

The inspection examined the implementation of monitoring for geomechanical, hydrological, waste activity, drilling related, and subsidence parameters. The EPA inspector toured locations where measurements are taken, reviewed parameter databases, and reviewed documents and procedures directing these monitoring activities.

The inspector found that DOE effectively implemented the monitoring programs at WIPP for all areas reviewed. EPA did not have any findings or concerns. The inspector also confirmed that the results of DOE monitoring programs are reported annually.

## 2.0 Scope

The EPA WIPP Compliance Criteria (40 CFR Part 194.42(a)) require DOE to “conduct an analysis of the effects of disposal system parameters on the containment of waste in the disposal system.” The results of these analyses were included in the 1996 Compliance Certification Application (CCA), confirmed in the 2004 Compliance Recertification Application (CRA), and were used to develop pre-closure and post-closure monitoring requirements.

Volume 1, Section 7.0, of the CCA documented DOE’s analysis of monitoring parameters. Table 7-7 of the CCA lists the ten parameters that DOE determined may affect the disposal system. These parameters are grouped into major categories and listed in Table 1. EPA accepted these ten monitoring parameters in the 1998 Certification Decision and confirmed them in the 2006 Recertification Decision.

| <b>Table 1 - Monitored Parameters</b>   |  |
|---|--|
| <p><b>Geomechanical Parameters-</b></p> <ul style="list-style-type: none"> <li>-Creep closure,</li> <li>-Extent of deformation,</li> <li>-Initiation of brittle deformation, and</li> <li>-Displacement of deformation features.</li> </ul> | <p><b>Waste Activity Parameter-</b></p> <ul style="list-style-type: none"> <li>-Waste Activity</li> </ul> <p><b>Subsidence Parameter-</b></p> <ul style="list-style-type: none"> <li>-Subsidence measurements</li> </ul> |
| <p><b>Hydrological Parameters-</b></p> <ul style="list-style-type: none"> <li>-Culebra groundwater composition and</li> <li>-Change in Culebra groundwater flow direction.</li> </ul>   | <p><b>Drilling Related Parameters-</b></p> <ul style="list-style-type: none"> <li>-Drilling rate and</li> <li>-The probability of encountering a Castile brine reservoir.</li> </ul>                                     |

This inspection was performed under authority of 40 CFR 194.21, which authorizes EPA to verify the continued effectiveness of the parameter monitoring program at WIPP. Inspection activities included an examination of monitoring and sampling equipment both on and off site, and in the underground. EPA also reviewed numerous sampling procedures and measurement techniques and verified implementation of an effective quality assurance program (see the document list in Attachment B of this report).

### 3.0 Inspection Team, Observers, and Participants

The inspection team consisted of three EPA staff. Three members of the State of New Mexico Environmental Department observed the inspection: Thomas Kesterson, Steve Holmes and Cody Johnson. Jerry Fox and Chris Timm of Pecos Management Services also observed inspection activities.

| Inspection Team Member | Position          | Affiliation |
|------------------------|-------------------|-------------|
| Chuck Byrum            | Inspection Leader | EPA         |
| Nick Stone             | Inspector         | EPA         |
| Tom Peake              | Inspector         | EPA         |

Numerous DOE staff and contractors participated in the inspection; below is a partial list.

| DOE/Contractor Participants |                    |
|-----------------------------|--------------------|
| Rick Salness                | Dave Speed         |
| Joel Siegel                 | Dave Kump          |
| Rey Carrasco                | Stan Patchet       |
| John VandeKraats            | Art Chavez         |
| David Hughes                | Mansour Akbarzadeh |
| Larry Madl                  |                    |

### 4.0 Performance of the Inspection

The inspection began on Tuesday, July 22, 2008, with an opening meeting (COB-A2008-S1a, -S1b) where changes in the parameter monitoring programs since the previous inspection were discussed by site staff (COB-M2008-I1 to -I8). On July 23, 2008 the inspection continued with interviews and demonstrations of various aspects of each parameter monitoring area. On July 24, 2008 the EPA inspector examined the database(s) used to store Delaware Basin parameters and the WIPP Waste Information System (WWIS) waste computer database system. The underground, where geomechanical measurements are taken, was also inspected. The

inspection closeout meeting was held on July 24, 2008 in Carlsbad New Mexico (Sign-in sheet COB-A2008-S1a).

The EPA inspector reviewed three fundamental areas to verify continued implementation of the DOE parameter monitoring program during the pre-closure phase: 1) written plans and procedures, 2) quality assurance procedures and records, and 3) results of the monitoring program in the form of raw data, intermediate reports, and final annual reports, if appropriate. The inspection checklist in Attachment A provides details of these inspection activities.

The EPA inspector reviewed various activities to verify effective procedure implementation. The inspector observed a demonstration of the WWIS and reviewed the Delaware Basin Drilling Surveillance Program, Groundwater Monitoring Program, and the Geomechanical Monitoring Program.

#### 4.1 Monitoring of Geomechanical Parameters

DOE committed to measure four geomechanical parameters in the CCA: creep closure, extent of deformation, initiation of brittle deformation, and displacement of deformation features (Table 2). WIPP has four programs that supply information for these four parameters: the geomechanical monitoring program, the geosciences program, the ground control program, and the rock mechanics program. These programs are documented in the WIPP Geotechnical Engineering Program Plan, WP 07-01 (COB-M2008-E). The results of the geotechnical program are reported in the Geotechnical Analysis Report for July 2006 - June 2007, DOE/WIPP-08-3177, Volumes 1 and 2 (COB-M2008-A1 and -A2).

**Table 2 - Geomechanical Parameter and Values Measured to Confirm Them**

| <u>Monitor Parameters</u>            | <u>Confirmed by Measuring</u>                      | <u>Related Procedure(s)</u>                                  |
|--------------------------------------|--|--|
| creep closure and stresses           | convergence measurements<br>borehole extensometers | WP 07-EU1301<br>WP 07-EU1303<br>WP 07-EU1304<br>WP 07-EU1308 |
| extent of deformation                | borehole extensometers<br>borehole observations    | WP 07-EU1301<br>WP 07-EU1303<br>WP 07-EU1305<br>WP 07-EU1308 |
| initiation of brittle deformation    | fracture mapping<br>borehole observation           | WP 07-EU1301<br>WP 07-EU1303<br>WP 07-EU1001                 |
| displacement of deformation features | geologic mapping<br>comparison                     | WP 07-EU1301<br>WP 07-EU1303<br>WP 07-EU1001                 |

-From DOE/WIPP 08-3177 (COB-M2008-A1), Volume 1, Section 1.4

Geomechanical staff manually measured convergence values in the underground (Figure 1, Vertical Convergence Measurement) and the inspector examined the results documented in

field data forms. After taking the measurements the inspector observed staff inputting these data into the computer database (COB-M2008-S42 to S49). The inspector found that procedures are adequate for proper measurements: procedures are implemented adequately; documents and field data forms are controlled; and data is adequately checked, using check prints when necessary, to assure adequate quality.

#### 4.2 Monitoring of Hydrological Parameters

DOE committed to measure two hydrological parameters in the CCA: Culebra groundwater composition and changes in the Culebra groundwater flow direction. Related parameters are measured and documented in the WIPP environmental monitoring program. These programs are documented in the WIPP Groundwater Monitoring Program Plan, WP 02-1 (COB-M2008-C). Results of this program are documented in the WIPP Site Environmental Report for 2006, DOE/WIPP 07-2225 (COB-A2008-C). This document describes the groundwater monitoring program and reports results for the previous year.

During the 2008 inspection the EPA inspector requested information about changes in the program since last year. The opening meeting presentation noted that two new Culebra wells were drilled and 2 wells were plugged since last year (COB-M2008-I2a). The current well monitoring network consists of 47 Culebra, 11 Magenta, 3 dual Culebra/Magenta completions, 1 Dewey Lake, 2 Bell Canyon, and 20 shallow Santa Rosa/Dewey Lake wells. Besides examining the Site Environmental Report for 2006 the inspector examined flow direction maps, well location maps, water level measurements, and water chemistry data (COB-M2008-S24, -S40, -S41, and -S51) during the 2008 inspection. The inspector found the hydrological monitoring program to be improving and adequate.

#### 4.3 Monitoring of Waste Activity Parameters

DOE committed to monitor the activity of waste emplaced in the CCA. This parameter is part of the extensive database collected for each container shipped to WIPP and is stored in the WIPP Waste Information System (WWIS). The WWIS is a software system that screens waste container data and provides reports on the Transuranic (TRU) waste sent to WIPP. The requirements for the WWIS are discussed in the WIPP Waste Information System Program and System Data Management Plan, WP 08-NT.01 (COB-M2008-H2). DOE yearly reports waste activity information in the Annual Change Report Table 3 (DOE/WIPP 07-3317; COB-M2008-Pa, -Pb).



Figure 1

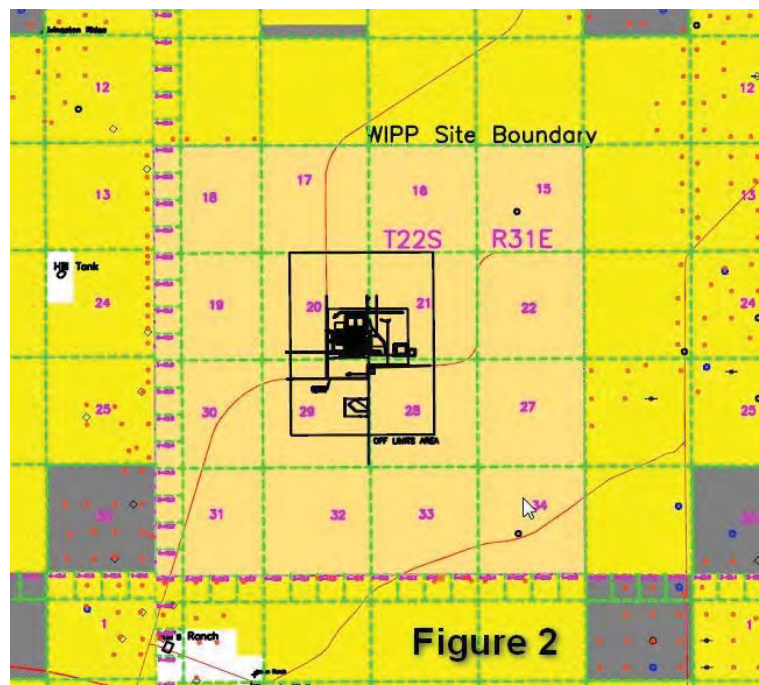
Vertical Convergence Measurement

WWIS staff demonstrated that the WWIS can receive data and that the WWIS can generate needed reports. The inspector obtained copies of the Nuclide Report (COB-M2008-W1) and WWIS Shipment Summary Reports (COB-M2008-W2 and -W3). The inspector verified that DOE tracks and annually reports the waste activity at WIPP.

#### 4.4 Monitoring of Drilling Related Parameters

DOE committed to measure two drilling related parameters in the CCA: the drilling rate and the probability of encountering a Castile brine reservoir. These parameters are measured as part of the Delaware Basin Drilling Surveillance Plan, WP 02-PC.02 (COB-M2008-G). This surveillance program measures and records many parameters related to drilling activities around the WIPP site. The results of the surveillance program are documented annually in the Delaware Basin Monitoring Annual Report, DOE/WIPP 07-2308 (COB-M2008-M).

The inspector reviewed the drilling surveillance database, examined drilling rate changes, and permitted and active injection wells while interviewing staff. The inspector received and reviewed Texas and New Mexico well database ACCESS files and maps of oil and gas wells around WIPP, (Figure 2, Oil and Gas Wells Around WIPP) (COB-M2008-D1 to -D3). The inspector verified that DOE tracks and reports the drilling rate and the number of Castile brine encounters near WIPP and reports results annually.



Oil and Gas Wells Around WIPP (Red Dots)

#### 4.5 Monitoring of Subsidence Parameters

DOE committed to measure subsidence at the WIPP site. This parameter is documented as part of the WIPP Underground and Surface Surveying Program, WP 09-ES.01 (COB-M2008-B). DOE performs subsidence surveys at the site annually during pre-closure operations. The results of this program are reported annually in the WIPP Subsidence Monument Leveling Survey – 2007, DOE/WIPP 08-2293 (COB-M2008-F).

Subsidence staff demonstrated the Office Procedure (Section 2 of WP 09-ES4001: COB-M2008-N) to the EPA inspector which describes the steps taken to process raw field survey data and to calculate final surface elevations published in their annual report (COB-M2008-S62 to -S64). The inspector examined the procedure, Subsidence Software Installation and Checkout

Form/Report (COB-M2008-S60), used to qualify computer software to support the subsidence program. The inspector confirmed that the computer code is qualified appropriately using hand calculations (COB-M2008-S61). DOE demonstrated that the subsidence parameter is measured and reported yearly.

## **5.0 Summary of finding, observation, concerns, and recommendations.**

Based on program documents, interviews, and field demonstrations during the inspection, EPA concludes that the monitoring program covers the ten monitoring parameters required by EPA's 1998 Certification Decision. This inspection determined that the monitoring, sample collection, and sample/data analysis procedures were complete and appropriate; that staff were adequately trained and implemented the procedures adequately; and that appropriate quality assurance measures are applied. EPA continues to find that DOE has maintained adequate parameter monitoring during the past year and has the procedures and requirements in place to sustain their program into the next year. EPA has no findings or concerns.



## **Attachment A: Inspection Plan and Checklist**

### **WIPP Monitoring Inspection Plan** **40 CFR 194.42 for the year 2008**

**Purpose:** Verify that the Department of Energy (DOE) can demonstrate that the Waste Isolation Pilot Plant (WIPP) is monitoring the parameter commitments made in the documentation to support the EPA's certification decision, in particular CCA, Volume 1, Section 7.2, Table 7.7 and Appendix MON. This inspection is conducted under the authority of 40 CFR 194, Section 21.

This inspection is part of EPA's continued oversight to ensure that WIPP can, in fact, monitor the performance of significant parameters of the disposal system.

**Scope:** Inspection activities will include an examination of monitoring and sampling equipment both on and off site, and in the underground. A review of sampling procedures and measurement techniques may be conducted. Quality assurance procedures and documentation for each of these activities will also be reviewed.

#### **Focal Areas of This Year's Inspection:**

- What has changed in the monitoring program this past year?
- What documentation and procedures have changes?
- Update the monitoring program and results for the past year.
- Have any monitoring parameters changed, and have any action limits been achieved?

**Location:** This inspection will be held at the WIPP facility location twenty-six miles south east of Carlsbad, New Mexico and the surrounding vicinity as needed.

**Duration:** The EPA expects to complete its inspection in two days. Each day will begin with an opening meeting at 8:00 a.m. and end before 5:00 p.m. with a closeout session.

**Expected Date:** Week of July 21, 2008.

**Documents For Review:** Just like past years provide latest versions of any documentation and/or procedures related to your monitoring program as soon as possible.

| Monitoring Commitments – July 2008 |   | Geomechanical Parameters  |        |
|------------------------------------|---|---|--------|
| #                                  | Question  | Comment (Objective Evidence)<br>SAT = Satisfactory  | Result |
| 1                                  | <p>Does DOE demonstrate that they have implemented plans/programs/procedures to measure -</p> <p>a) Creep Closure;</p> <p>b) Extent of Deformation;</p> <p>c) Initiation of Brittle Deformation and</p> <p>d) Displacement of Deformation Features</p> <p>during the pre-closure phase of operations as specified in the CCA part of the geomechanical monitoring system?</p> <p>(CCA, Volume 1, Table 7-7; App MON, Table MON-1) 40 CFR 194.42 (c) and (e)</p> | <p>WIPP Geotechnical Engineering Program Plan, (WP 07-01: COB-M2008-E), documents plans to measure, report, and the QA requirements related to these activities. Section 3.0 of WP 07-01 documents the geomechanical monitoring program and records the activities associated with this program. Section 4.0 of WP 07-01 documents the quality assurance requirements for these activities.</p> <p>WIPP site staff discussed changes to the program during the past year (COB-M2008-I6). Staff demonstrated the adequacy of the program and that the program produces satisfactory results (COB-M2008-S42 to S49). They showed samples of remote measurements, sample plots, and staff preformed underground manual measurements of convergence (Photos 2008-07-23_Annual Inspection 00116 to 00121). The inspector toured underground and reviewed the computer system and databases used to collect and process recorded data.</p> <p>Results of this program are documented annually in the Geotechnical Analysis Report for each reporting period (DOE/WIPP 08-3177; COB-M2008-A1 and -A2).</p> <p>The inspector verified that the geomechanical parameters continued to be appropriately monitored by DOE.</p> | SAT    |
| 2                                  | Does DOE demonstrate that they have implemented an effective quality assurance program for item 1 above? 40 CFR 194.22  | During this inspection the EPA inspector evaluated the quality assurance program and found it to be adequate.   | SAT    |
| 3                                  | Does DOE demonstrate that the results of the geotechnical investigations are reported annually? (CCA, App. MON, Page MON-10)  | WP 07-01, Section 3.2 requires that analysis be performed annually and results are published in the annual geotechnical analysis report (DOE/WIPP 08-3177).   | SAT    |

| Monitoring Commitments – July 2008 |   | Hydrological Parameters  |        |
|------------------------------------|---|--|--------|
| #                                  | Question  | Comment (Objective Evidence)   | Result |
| 1                                  | <p>Does DOE demonstrate that they have implemented plans/programs/procedures to measure -</p> <p>a) Culebra Groundwater Composition;</p> <p>b) Change in Culebra Groundwater Flow Direction</p> <p>during the pre-closure phase of operations as specified in the CCA part of WIPP's groundwater monitoring plan?</p> <p>(CCA, Volume 1, Table 7-7; App MON, Table MON-1) 40 CFR 194.42 (c) and (e)</p> | <p>WIPP Groundwater Monitoring Program Plan, WP 02-1 (COB-M2008-C) documents plans to measure, document, report, and the QA requirements for these activities. WP 02-1 records the activities associated with this program (Section 4), methods used (Sections 5 and 6), data analysis (Section 7) and reporting requirements (Section 8). Section 11.0 of WP 02-1 documents quality assurance requirements.</p> <p>WIPP site staff discussed changes to the program over the past year (COB-M2008-I2a). Staff also explained computer code contouring techniques used to develop maps to find flow direction in the Culebra and compared results for years 2003 to 2007 (COB-M2006-S40 to – S41). Site staff are developing a new procedure WP 02-EM1025 (COB-M2008-S24) that will standardize potentiometric surface development. Site staff discussed groundwater composition measurements (COB-M2008-I2c). Site staff also discussed the shallow water well program (COB-M2008-S20 to -S23).</p> | SAT    |
| 2                                  | <p>Does DOE demonstrate that they have implemented an effective quality assurance program for item 1 above? (CCA, App MON, Page MON-22) 40 CFR 194.22</p>   | <p>During this inspection the EPA inspector evaluated the quality assurance program and found it to be adequate.</p>   | SAT    |
| 3                                  | <p>Does DOE demonstrate that the results of the groundwater monitoring program are reported annually? (CCA, App. MON, Page MON-22)</p>  | <p>Results are published annually in the WIPP Annual Site Environmental Report for 2006 (DOE/WIPP 06-2225: COB-A2008-C).</p>   | SAT    |

| Monitoring Commitments – July 2008 |   | Waste Activity Parameters  |        |
|------------------------------------|---|--|--------|
| #                                  | Question  | Comment (Objective Evidence)   | Result |
| 1                                  | <p>Does DOE demonstrate that they have implemented plans/programs/procedures to measure -</p> <p>a) Waste Activity?</p> <p>(CCA, Volume 1, Table 7-7; App MON, Table MON-1) 40 CFR 194.42 (c) and (e)</p> | <p>WIPP Waste Information System Program and Data Management Plan (WP 08-NT.01: COB-M2008-H2, Section 6.0) describes how the WWIS is used to measure and store waste activity information. WWIS User’s manual (DOE/CBFO 97-2273: COB-M2008-O) documents procedures used to gather, store, and process waste activity information. Table 3 of the Annual Change Report 2006/2007, (DOE/WIPP 07-3317: COB-M2008-Pb) updates waste activity information annually.</p> <p>WWIS staff discussed changes during the past year (COB-M2008-I7) and demonstrated the use of the WWIS and generated numerous reports (COB-M2008-W1 to W3). Such as the Nuclide Report which summaries isotopes emplaced at WIPP. These activities demonstrate that waste activity is adequately monitored.</p> | SAT    |
| 2                                  | <p>Does DOE demonstrate that they have implemented an effective quality assurance program for item 1? (CCA, App WAP, page C-30) 40 CFR 194.22</p>   | <p>During this inspection the EPA inspector evaluated the quality assurance program and found it to be adequate.</p>   | SAT    |
| 3                                  | <p>Does DOE demonstrate that the results of the waste activity parameters are reported annually? (CCA Volume, Section 7.2.4 Reporting)</p>  | <p>WP 08-NT.01 Section 6, page 11 “Regulatory Reporting” documents that results are reported annually and DOE/WIPP 07-3317 verifies that results are published annually.</p>   | SAT    |

| Monitoring Commitments – July 2008 |   | Drilling Related Parameters   |        |
|------------------------------------|---|---|--------|
| #                                  | Question  | Comment (Objective Evidence)  | Result |
| 1                                  | <p>Does DOE demonstrate that they have implemented plans/programs/procedures to measure -</p> <p>a) Drilling Rate; and</p> <p>b) Probability of Encountering a Castile Brine Reservoir?</p> <p>(CCA, Volume 1, Table 7-7; App MON, Table MON-1) 40 CFR 194.42 (c) and (e)</p> | <p>The Delaware Basin Drilling Surveillance Plan, (WP 02-PC.02: COB-M2008-G), documents the program to measure, record, report, and the QA requirements for these activities. Section 7.0 of WP 02-PC.02 documents quality assurance requirements. The Delaware Basin Drilling Database Upgrade Process (WP 02-EC3002: COB-M2008-I) documents the process used to update databases with information from various commercial and state sources. Drilling rate and Castile brine encounter data are reported annually in the Delaware Basin Monitoring Annual Report (DOE/WIPP 07-2308; COB-M2008-M) in Sections 2.5 and 2.6.</p> <p>WIPP site staff discussed changes during the past year (COB-M2008-I1). They reported on brine encounters, drilling rate calculations, and provided maps of drilling activities near WIPP (COB-M2008-D1). They also provide the latest version of the Texas and New Mexico well databases (COB-M2008-D2 and -D3). They demonstrated that DOE is adequately monitoring these parameters through the Delaware Basin monitoring program.</p> | SAT    |
| 2                                  | <p>Does DOE demonstrate that they have implemented an effective quality assurance program for item 1 above? (CCA, App DMP, page DMP-9) 40 CFR 194.22</p>  | <p>During this inspection the EPA inspector evaluated the quality assurance program and found it to be adequate.</p>  | SAT    |
| 3                                  | <p>Does DOE demonstrate that the results of the drilling related parameters are reported annually? (CCA Volume, Section 7.2.4 Reporting; App DMP, page DMP-9)</p>   | <p>WP 02-PC.02 Section 6.0 documents that results are reported annually. DOE/WIPP 07-2308 verifies that these parameters are updated and reported annually.</p>   | SAT    |

| Monitoring Commitments – July 2008 |  | Subsidence Measurements   |        |
|------------------------------------|--|---|--------|
| #                                  | Question   | Comment (Objective Evidence)  | Result |
| 1                                  | <p>Does DOE demonstrate that they have implemented plans/programs/procedures to measure -</p> <p>a) Subsidence measurements?</p> <p>(CCA, Volume 1, Table 7-7; App MON, Table MON-1) 40 CFR 194.42 (c) and (e)</p> | <p>WIPP Underground and Surface Surveying Program (WP 09-ES.01: COB-M2008-B), documents the program used to measure, record, document, report, and the QA requirements for these activities. Subsidence Survey Data Acquisition Report technical procedure (WP 09-ES4001: COB-M2008-N) documents the process for acquiring subsidence data, updating the database, and publishing the annual subsidence report. The WIPP Subsidence Monument Leveling Survey - 2007 (DOE/WIPP 08-2293: COB-M2008-F) documents that DOE reports this parameter annually and the results of this program.</p> <p>Site staff demonstrated that procedures are adequately implemented when they showed how the raw field survey data collected is reduced to useful survey data and how annual results are calculated (COB-M2008-S62 to – S64). This year the inspector examined the process and procedure used to qualify the computer codes used for the subsidence program (COB-M2008-S60, -S61). Site staff demonstrated that the computer codes used are appropriately qualified for use in the subsidence program. They demonstrated that subsidence is adequately monitored at the site.</p> | SAT    |
| 2                                  | <p>Does DOE demonstrate that they have implemented an effective quality assurance program for item 1? 40 CFR 194.22</p>  | <p>During this inspection the EPA inspector evaluated the quality assurance program and found it to be adequate.</p>  | SAT    |
| 3                                  | <p>Does DOE demonstrate that the results of the subsidence measurements are reported annually? (CCA Volume, Section 7.2.4 Reporting)</p>   | <p>WP 09-ES.01 Section 3.3.2 documents that results are reported annually. DOE/WIPP 08-2293 demonstrates that results are published annually.</p>   | SAT    |

## **Attachment B: Documents Reviewed**

**DOCKET NO: A-98-49**  
**Item: II-B3-108**

## **Emplacement Inspection Report**

**EPA INSPECTION No. EPA-WIPP-7.08-22c**  
**OF THE**  
**WASTE ISOLATION PILOT PLANT**  
**July 22 – 24, 2008**

**U. S. ENVIRONMENTAL PROTECTION AGENCY**  
**Office of Radiation and Indoor Air**  
**Center for Waste Management and Regulation**  
**1200 Pennsylvania Avenue, NW**  
**Washington, DC 20460**

**September 2008**



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## 1.0 EXECUTIVE SUMMARY

The U.S. Environmental Protection Agency (EPA or the Agency) conducted an inspection of the U.S. Department of Energy's (DOE) Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico, from July 22 to July 24, 2008, in accordance with 40 CFR 194.21. The WIPP is a disposal system for defense-related transuranic (TRU) waste as defined by the WIPP Land Withdrawal Act.<sup>1</sup> EPA certified that WIPP complies with the Agency's radioactive waste disposal regulations (Subparts B and C of 40 CFR Part 191) on May 18, 1998.

The purpose of this annual inspection was to determine if waste sent to WIPP during the past year has been emplaced in the underground facility in the manner specified in DOE's Compliance Certification Application and other approvals. A specific focus of this inspection was to review the site's ability to receive, process, and emplace contact-handled and remote-handled TRU wastes within the repository, the emplacement of magnesium oxide (MgO) backfill in appropriate amounts to fulfill DOE commitments and requirements, maintenance of relevant waste packaging records, including the electronic WIPP Waste Information System (WWIS). EPA looked at selected activities, such as RH and CH waste processing, waste emplacement activities, and record keeping.

EPA concluded that DOE's emplacement activities are adequate, that CPR is appropriately tracked and recorded, that additional MgO is calculated properly, and that MgO is emplaced properly. While DOE does not necessarily maintain an MgO safety factor above 1.67 for operational efficiency while loading waste in a room, DOE does place enough MgO before room closure is completed to assure that the safety factor is maintained for each room. Though EPA has approved DOE's request to reduce the MgO safety factor to 1.2, the facility has not implemented any changes to the MgO backfill procedure.

EPA did not identify any findings or concerns during this inspection. However, EPA does repeat the recommendation made in 2007: that DOE retain a photographic record to verify the RH canister identification number of the remote-handled canister as it is transferred from the transportation cask to the facility cask and include the photographic record with the permanent record package.

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<sup>1</sup>WIPP Land Withdrawal Act, Public Law 102-579, Section 2(18), as amended by the 1996 WIPP LWA Amendments, Public Law 104-201.

## **2.0 INSPECTION PURPOSE AND SCOPE**

The purpose of this annual inspection was to determine if contact-handled (CH) and remote-handled (RH) transuranic (TRU) waste sent to WIPP during the past year has been emplaced in the underground facility in the manner specified in DOE's Compliance Certification Application and other approvals. EPA performed the inspection under authority of 40 CFR 194.21, which authorizes the Agency to inspect WIPP during its operational period to verify continued compliance with EPA's WIPP Compliance Criteria and the certification decision of May 18, 1998. Emplacement of waste and backfill, in particular, is relevant to compliance because the emplacement method supports the models that DOE used in the WIPP performance assessment. An additional purpose of this inspection was to verify that RH waste is emplaced in accordance with the plan and procedures specified in the Compliance Certification Application (CCA) and demonstrated during the WIPP RH startup inspection of January 9 – 11, 2007.

Activities within the scope of this inspection included: demonstration of the WIPP site's ability to receive, process, and emplace CH and RH TRU wastes within the repository, the use of magnesium oxide (MgO) backfill in amounts to fulfill certification requirements and other approvals, maintenance of relevant waste packaging records, including the electronic WIPP Waste Information System (WWIS) and the verification of appropriately implemented quality assurance practices. The review and examination of the documents related to these processes was an important part of the inspection.

The WIPP site is operated by Washington TRU-Solutions (WTS) under contract to DOE. The majority of waste related activities onsite are described by or controlled through WTS procedures. A list of WTS procedures examined for this inspection is provided in Attachments G.

## **3.0 INSPECTION TEAM, OBSERVERS, AND PARTICIPANTS**

The inspection team consisted of three EPA staff. Jody Johnson, Steve Holmes and Thomas Kesterson of the New Mexico Environmental Department and Jerry Fox and Chris Timm of Pecos Management Services also observed the inspection activities. A partial list of inspection participants is provided in Table A

**Table A  
Inspection Participants**

| INSPECTION TEAM MEMBER      | POSITION  | AFFILIATION  |
|-----------------------------|-----------|--------------|
| Chuck Byrum                 | Inspector | EPA ORIA     |
| Tom Peake                   | Inspector | EPA ORIA     |
| Nick Stone                  | Inspector | EPA Region 6 |
| <b>CBFO / WTS PERSONNEL</b> |           |              |
| Art Chavez                  |           | WRES         |
| Randy Britain               |           | WTS          |
| Dave Kump                   |           | WTS          |
| Dave Speed                  |           | WTS          |
| John Vandekraats            |           | WTS          |
| Mike Strum                  |           | WWIS         |
| Ed Flynn                    |           | WTS          |

**4.0 PERFORMANCE OF THE INSPECTION**

The inspection took place on July 22 - 24, 2008, at DOE’s Carlsbad Field Office (CBFO) and at the Waste Isolation Pilot Plant (WIPP) facility, which is located approximately 26 miles south east of Carlsbad, New Mexico. The opening meeting with CBFO and WTS personnel was held on the morning of July 22, 2008. Several DOE and WTS staff presented information addressing program status, updates and changes since the last EPA emplacement inspection in 2007: primarily CH-RH waste processing, MgO emplacement and waste record keeping.

The EPA inspectors accompanied CBFO and WTS personnel into the underground repository on the morning of July 23, in order to examine waste packages and MgO that had been emplaced in Panel 4. Inspectors selected several containers and recorded their numbers (see Figure 5 for container locations); the records for these containers were examined later in the WWIS computer database to verify correct waste information is recorded by DOE. The WTS personnel explained how waste packages are handled, emplaced, and answered EPA questions.

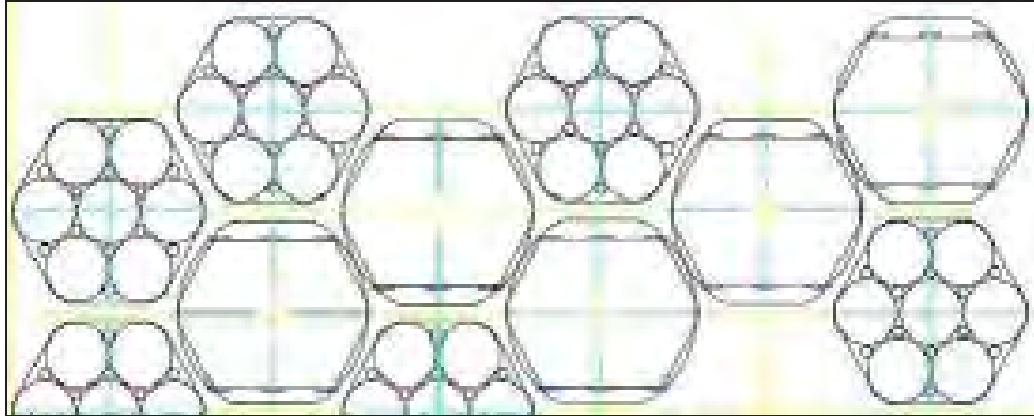


**Figure 1**  
Inspectors check pillar spacing of RH boreholes

In Room 5 Panel 4 inspectors observed the planning and arrangement of boreholes drilled (BH 044, BH 097) to emplace RH containers. Measurement of borehole spacing was checked to confirm appropriate spacing of RH waste emplacement in the pillars. (Figure 1).

The inspectors examined waste emplacement operations in the underground and waste that had been recently placed in the repository. The inspectors also reviewed records documenting that waste emplacement and MgO tracking were conducted in accordance with procedures. To date, the waste received at the repository are contact-handled (CH) transuranic wastes from Argonne National Laboratory-East (ANL-E) in Illinois, Los Alamos National Laboratory (LANL) in New Mexico, Idaho National Laboratory (INL), Hanford Site in Washington, Rocky Flats Environmental Technology Site (RFETS) in Colorado, Savannah River Site (SRS) in South Carolina, and the Nevada Test Site (NTS) in Nevada. These wastes are in several configurations: Standard Waste Boxes (SWBs), 55-gallon drums assembled in groups of seven called a Seven Pack, 100 gallon drums for supercompacted waste, and Ten Drum Overpacks (TDOP). RH wastes are currently shipped to WIPP from INL.

Inspectors reviewed the procedures with WWIS data administrators. Mike Strum (data administrator) generated various reports for the inspectors at the Carlsbad Field Office. These included Shipment Summary Reports, Waste Emplacement Reports and Waste Container Data Reports for RH and CH waste.



**Figure 2**

Figure 2 Illustrates the arrangement of disposed waste in underground. Represented are stacks of seven-packs of drums and standard waste boxes.

## **5.0 WASTE EMPLACEMENT/WWIS**

The repository is subdivided into panels, each panel consisting of seven rooms. At the time of the inspection, CH waste was being emplaced in Room 3 of Panel 4. Waste containers are stacked in columns (waste stacks) combining SWBs, drum packs, and TDOPs (see Figure 3, 4, and 5). TDOPs are always placed on the floor of the room, occupying the bottom and middle position of a waste column. SWBs and drums are emplaced in no particular order with most wastes emplaced as received. The waste columns are in a series of staggered rows, with a row consisting of three columns that span the distance of a disposal room from left to right (Figure 2 and 3). Remote-handled waste is placed in the walls on eight foot centers (Figures 1, 3, 6, and 7).

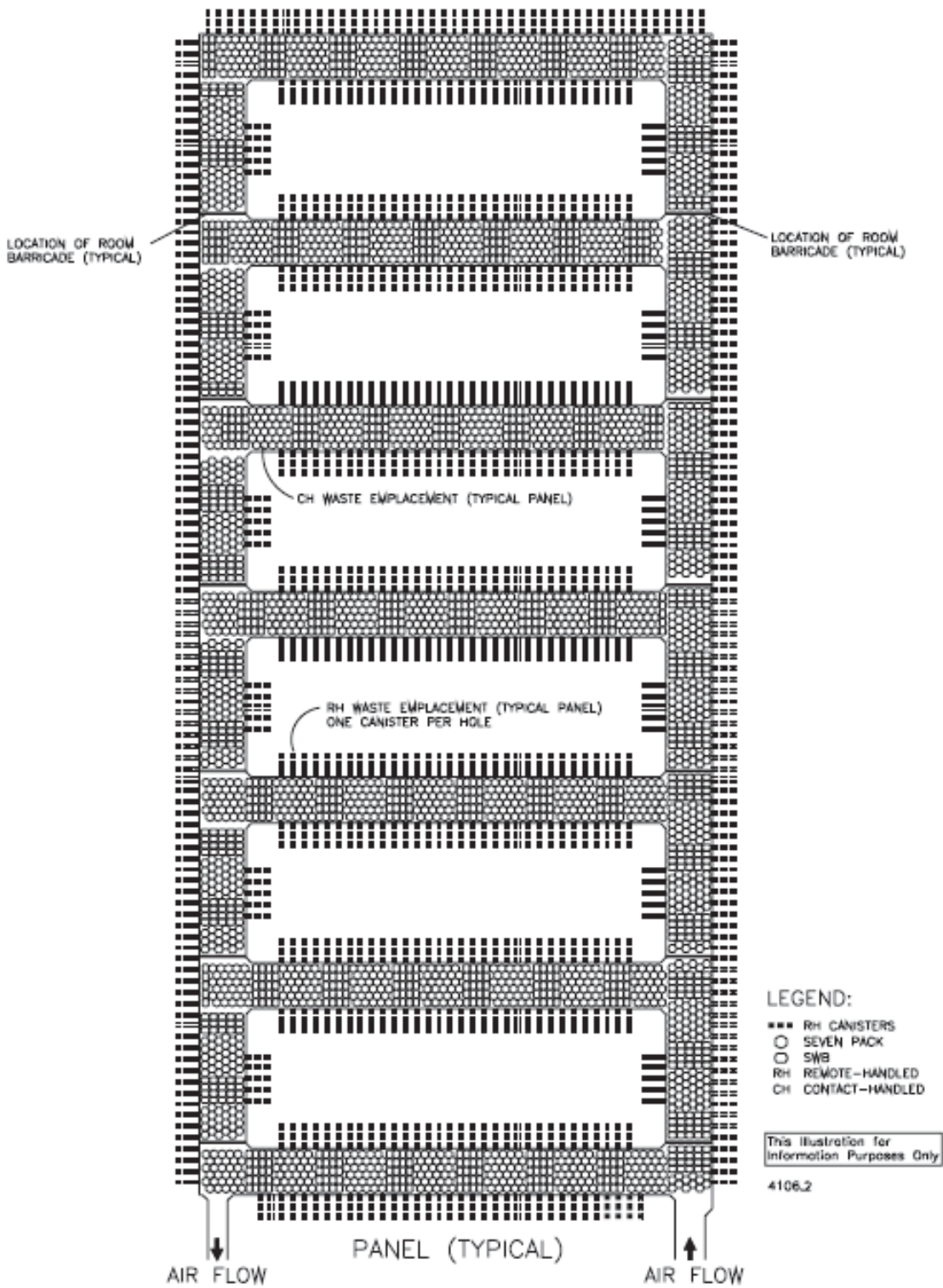


Figure 3

Typical RH and CH TRU Mixed Waste Disposal Configuration



While underground in Room 3, Panel 4, EPA inspectors selected recently emplaced waste packages for review. The inspector read the shipment identification numbers directly off the emplaced containers (See Figure 5 for CH locations). The containers selected are identified in Table B below.

**Table B**

Waste Containers Reviewed During Inspection (Panel 4, Room 3)  
CH Waste (Field verified)

| <u>Site of Origin</u> | <u>Waste Container Identifier</u> | <u>Container Type</u>    |
|-----------------------|-----------------------------------|--------------------------|
| Hanford               | RL080039                          | Ten Drum Overpack (TDOP) |
| INL                   | BN10185734                        | 55-gallon drum           |
| INL                   | BN10196388                        | 55-gallon drum           |

RH Waste (Panel 4, Room 3) Waste Emplacement Report and Container Data Report

| <u>Site of Origin</u> | <u>Waste Container Identifier</u> | <u>Borehole Number</u> |
|-----------------------|-----------------------------------|------------------------|
| ANL-E                 | ID0155                            | 083                    |
| ANL-E                 | ID0152                            | 084                    |

EPA inspectors examined reports from the following WIPP Waste Information System (WWIS) modules:

- Characterization Module, linked to the Waste Container Data Report
- Certification Module, linked to the Acceptance/Rejection Report
- Shipping Module, linked to the Shipment Summary Report
- Inventory Module, linked to the Nuclide Report, Waste Emplacement Report and the MgO safety factor calculation on the Emplace Containers Underground (Attachments G).

All records were found to contain the required information. EPA recommends that a permanent photographic record of the RH canister number be placed in the RH record package to enhance traceability and ensure that correct containers are processed.

**6.0 MAGNESIUM OXIDE BACKFILL**

Magnesium oxide (MgO) is used in the repository as backfill, as specified in DOE’s Compliance Certification Application (CCA). EPA requires DOE to maintain an MgO safety factor to assure adequate MgO to be chemically available to control the chemistry of the room. EPA approved lowering the required safety factor to 1.2 from 1.67 in a letter dated February 11, 2008. At the time of the inspection, DOE was using the old safety factor of 1.67 or greater, which means that MgO in amounts of at least 1.67 times the

amount of carbon will always be in the repository to control chemical conditions and remove carbon dioxide gas.

WTS Technical Procedure WP 05-WH1011, *CH Waste Processing*, Sections 5.0, 6.0 and Attachment 1 (CH Waste Processing Data Sheet), details steps guiding MgO placement and the required documentation to assure that MgO placement has been accomplished correctly. Section 6.2 of WP 05-WH1011 states the Waste Handling Engineer (WHE) is to verify that the safety factor is greater than or equal to 1.67. Attachments to WP 05-WH1011 record the quantity and location of emplaced MgO for later entry into the WWIS waste database.

Checklist items 4, 6, 7 and 12 specifically relate to MgO management and demonstrate that DOE has an appropriate process for ensuring that MgO is properly emplaced. In addition to the requirement in WTS Technical Procedure WP 05-WH1011, DOE addresses the addition of MgO in the WIPP Waste Handling Operations WWIS User's Manual, WP 05-WH.01, Rev. 2, Attachment 1 - Special Requirements for Additional MgO.



**Figure 4.** Photo of disposed waste in a room.

DOE is emplacing waste stacked 2-3 containers high topped with MgO Supersacks. Figure 4 shows all container types being shipped to date. Large drums are Ten Drum Overpacks (TDOPs), black barrels are 100-gallon drums with supercompacted waste, standard waste boxes, and standard 55-gallon drum 7-packs.



**Figure 5**  
Emplaced CH Waste in Room 3 Panel 4

## 7.0 RH Operation

The first shipment of RH waste was received on January 23, 2007 and was emplaced on January 28, 2007. As of our inspection, DOE has emplaced 161 RH canisters. The inspectors identified two emplacements Boreholes 83 and 84 and reviewed the WWIS documentation to confirm appropriate transfer and emplacement.

EPA reviewed various aspects of RH waste “operational MODES” (“MODES are established to provide a safe, structural approach to facility operation”, DOE /WIPP-06-3178, page 1-7). These include RH Waste handling, RH Waste Storage and RH Standby Modes. EPA’s review included surface RH processing operations conducted prior to emplacement of the RH container in the underground boreholes and underground RH processing activities. EPA reviewed the requirements associated with these processes and found them adequate.



**Figure 6**  
Equipment prepared for RH waste emplacement in Room 2 of Panel 4



**Figure 7**  
Emplaced RH Waste selected for review

## 8.0 COMPARISON WITH INVENTORY LIMITS

EPA has established limits for certain waste components at WIPP by approving performance assessment inventory estimates. Some limits, such as for iron and other metals, are minimum limits. The amount of iron and steel are now at  $5.40 \times 10^6$  kg. The minimum limit is  $2 \times 10^7$  kg iron. With total metals at  $5.7 \times 10^6$  kg, the WIPP is approaching 29% of the minimum amount stipulated in the certification.

Other waste component limits are maximum limits. Of special concern is the maximum limit on the total amount of cellulosic, plastic and rubber (CPR) materials. In the CCA, DOE estimated the limit for CPR was  $2.2 \times 10^7$  kg and this is the limit EPA has required DOE to meet. However, in the subsequent performance assessment baseline calculations, DOE added packaging materials to the calculations, and now the CPR limit for WIPP is  $2.4 \times 10^7$  kg (see Table C). CPR values are tracked on a per container basis and the current CPR values as of July 21, 2008 are listed in Table C.

As of this inspection the WIPP contained almost  $3.7 \times 10^6$  kg of CPR in waste and  $1.3 \times 10^6$  kg of CPR in packaging material. In addition emplacement CPR, such as the slipsheets used to aid the emplacement of the containers accounts for another  $0.3 \times 10^6$  kg of CPR. This is a total of nearly  $5.3 \times 10^6$  kg of cellulosic, plastic and rubber material. Most of this is split between the cellulosic and plastic materials; the mass of rubber materials now account for about 5% of the total mass of CPR, compared to 4.7% in 2007 and 7% in 2006. Thus, the WIPP has achieved 24% of the CPR limit.

**Table C**  
**Emplaced CPR Quantities as of July 21, 2008**  
 (Source: Opening Meeting Handout)

| <b>Waste CPR:</b>     |                | <b>Emplacement CPR:</b>          |              |
|-----------------------|----------------|----------------------------------|--------------|
| Type                  | Weight (kg)    | Type                             | Weight (kg)  |
| -----                 |                | -----                            |              |
| Cellulosic            | 1,313,319      | Cellulosic                       | 44,316       |
| Plastic               | 2,113,183      | Plastic                          | 256,898      |
| Rubber                | 252,777        |                                  |              |
| <hr/>                 |                | <hr/>                            |              |
| Total                 | 3,679,279 (kg) |                                  | 301,214 (kg) |
| <br>                  |                | <br>                             |              |
| <b>Packaging CPR:</b> |                | <b>Grand Totals:</b>             |              |
| Type                  | Weight (kg)    |                                  |              |
| Cellulosic            | 831,646        | Cellulosic + Plastic = 5,077,229 |              |
| Plastic               | 517,867        | Rubber = 252,777                 |              |
| <hr/>                 |                | <hr/>                            |              |
| Total                 | 1,349,513 (kg) | 5,330,006(kg)                    |              |

## **9.0 SUMMARY OF RESULTS**

The inspectors reviewed emplacement operations and associated documentation for selected containers. EPA concluded that DOE's emplacement activities are adequate, that CPR is appropriately tracked, the safety factor is calculated properly, additional MgO is added as needed, and that all MgO is emplaced properly. DOE noted that the current safety factor was above the mandated 1.67 for closed rooms since the tracking officially began with Room 1, Panel 2 and Room 7, Panel 3 at the time of the inspection (see Attachment E).

The surface processing of RH and the underground operation of RH container emplacement were reviewed and found to be adequate according to specified plans documented in the CCA. EPA did not identify any findings or concerns during this inspection. However, EPA recommends again that DOE maintain a permanent photographic record of the RH canister number as it is removed from the transportation cask.

**Attachment A**  
**July 22-24, 2008 Emplacement Inspection Plan**

**Purpose:**

The purpose of this inspection is to determine if waste sent to WIPP during the past year has been emplaced in the underground facility in the manner specified in DOE's Compliance Certification Application and other approvals. The objective evidence is the documentation that EPA can use to verify that DOE is conducting its operation appropriately.

EPA is performing this inspection under the authority of 40 CFR 194.21, which authorizes the Agency to inspect the WIPP during its operational period to verify continued compliance with EPA's WIPP Compliance Criteria and the certification decision of May 18, 1998.

**Scope:**

The scope of this inspection includes: demonstration of the site's ability to receive, process, and emplace contact-handled and remote-handled TRU wastes within the repository, the use of magnesium oxide (MgO) backfill in appropriate amounts to fulfill DOE commitments and requirements, maintenance of relevant waste packaging records, including the electronic WIPP Waste Information system (WWIS) and the verification of appropriately implemented quality assurance practices. The availability of documentation of these processes and activities will be a major source of review.

**Focal Areas for this Year's Inspection:**

- What changes have taken place to emplacement activities and documentation since last year's inspection.
- What changes have taken place to MgO emplacement since EPA's approval of decreased MgO.

**Location:**

The inspection will be held at the DOE's WIPP facility located twenty-six miles southeast of Carlsbad, New Mexico and the Carlsbad Field Office (CBFO). Inspection activities will include examination of the underground facilities, review of records related to waste emplacement, and other information as needed.

**Duration:**

The EPA expects to complete its inspection in about two days plus an initial meeting. Each full day will begin with an opening meeting at 8:00 a.m. and end no later than 5:00 p.m. with a closeout session.

**Expected Date:** Week of July 21, 2008

**Documents For Review:**

Electronically provide for this inspection the latest version of pertinent documentation and/or procedures related to CH and RH waste emplacement, MgO, WWIS, training, etc.

**Attachment B**

Number of TRU Waste Containers Emplaced at WIPP as of 07/22/2008

Contact Handled Waste

| Site<br>Container<br>Type | 100<br>gallon | 55<br>gallon | Pipe<br>overpack | S100       | Std<br>Waste<br>Box | TDOP        | 85 gallon<br>overpack | 2008<br>total | 2007<br>total | 2006<br>total |
|---------------------------|---------------|--------------|------------------|------------|---------------------|-------------|-----------------------|---------------|---------------|---------------|
| ANL-E                     | 0             | 318          | 0                | 0          | 0                   | 12          | 0                     | 330           | 334           | 334           |
| RL                        | 0             | 6712         | 2163             | 0          | 350                 | 249         | 0                     | 9474          | 7390          | 6159          |
| INL                       | 13434         | 17785        | 0                | 0          | 1845                | 2207        | 0                     | 35271         | 30722         | 23564         |
| LANL                      | 0             | 7409         | 314              | 104        | 577                 | 1           | 0                     | 8405          | 7046          | 5040          |
| LLNL                      | 0             | 678          | 0                | 0          | 2                   | 0           | 0                     | 680           | 688           | 688           |
| NTS                       | 0             | 1805         | 0                | 0          | 14                  | 0           | 0                     | 1819          | 1827          | 1827          |
| RFETS                     | 0             | 15460        | 21174            | 0          | 3910                | 4           | 0                     | 40548         | 40548         | 40548         |
| SRS                       | 0             | 3171         | 0                | 0          | 587                 | 2127        | 0                     | 5885          | 4755          | 4173          |
| WIPP                      | 0             | 2            | 0                | 0          | 0                   | 0           | 2                     | 4             | 3090          | 3006          |
| <b>TOTAL</b>              | <b>13434</b>  | <b>53340</b> | <b>23651</b>     | <b>104</b> | <b>7285</b>         | <b>4600</b> | <b>2</b>              | <b>102416</b> | <b>96929</b>  | <b>85868</b>  |



**Attachment B (continued)**

Number of TRU Waste Containers Emplaced at WIPP as of 07/22/2008

Remote Handled Waste

| Site         |  |            |  |  |  | <b>2008<br/>Total</b> |
|--------------|--|------------|--|--|--|-----------------------|
| ANL-E        |  |            |  |  |  |                       |
| RL           |  |            |  |  |  |                       |
| INL          |  | 161        |  |  |  | 161                   |
| LANL         |  |            |  |  |  |                       |
| NTS          |  |            |  |  |  |                       |
| RFETS        |  |            |  |  |  |                       |
| SRS          |  |            |  |  |  |                       |
| WIPP         |  |            |  |  |  |                       |
| <b>TOTAL</b> |  | <b>161</b> |  |  |  | <b>161</b>            |

NOTE: The drums listed for WIPP consist of two drums of site generated waste, two drums from RFETS that were overpacked on site, with primarily empty dunnage drums but with some salt-filled dunnage drums.

Argonne National Laboratory - East (ANL-E)  
 Idaho National Engineering and Environmental Laboratory (INEEL)  
 Lawrence Livermore National Laboratory (LLNL)  
 (RFETS)  
 Nevada Test Site (NTS)  
 Waste Isolation Pilot Plant (WIPP)

Hanford Site (Hanford)  
 Los Alamos National Laboratory (LANL)  
 Rocky Flats Environmental Technology Site  
 Savannah River Site (SRS)

Drums = 55 gallon (208 liter or 0.208 m<sup>3</sup>) steel drums  
 overpack except for the S100  
 SWB = Standard Waste Box  
 Dunnage = inert drums used to complete waste assemblies

Pipe Overpack = 55 gallon drum pipe  
 TDOP = ten drum overpack

**Attachment C**

Materials Emplaced in WIPP as of July 22, 2008  
(Table configuration modified for simplification)

CH WASTE:

| MP | Material Type             | Material Description                   | Material Weight (kg) |
|----|---------------------------|--|----------------------|
| 1  | Waste                     | Iron base Metal Alloys                 | 5,403,886.18         |
| 2  | Waste                     | Aluminum Based Metal /Alloys           | 38,821.48            |
| 3  | Waste                     | Other Metal/ Alloys                    | 280,348.12           |
| 4  | Waste                     | Other Inorganic Materials              | 1,167,015.90         |
| 6  | Waste                     | Cellulosics                            | 1,314,563.94         |
| 7  | Waste                     | Rubber                                 | 252,959.37           |
| 8  | Waste                     | Plastics                               | 2,100,247.72         |
| 9  | Waste                     | Solidified Inorganic Material          | 5,857,381.26         |
| 10 | Waste                     | Solidified Organic Material            | 393,205.16           |
| 12 | Waste                     | Soils                                  | 19,270.68            |
| 13 | Steel -<br>Packaging      | Steel Container Materials              | 10,420,254.93        |
| 14 | Plastic -<br>Packaging    | Plastic /Liners Container<br>Materials | 518,142.96           |
| 15 | Cellulosic -<br>Packaging | Cellulosic Packaging<br>Materials      | 831,641.58           |
| 18 | Emplacement               | Cellulosic Emplacement<br>Material     | 44,331.05            |
| 20 | Emplacement               | Plastic Emplacement<br>Material        | 1,507,490.30         |

RH Waste

|    |                         |  |           |
|----|-------------------------|--|-----------|
| 1  | Waste                   | Iron Base Metal Alloys                 | 12,785.19 |
| 6  | Waste                   | Cellulosics                            | 1.90      |
| 8  | Waste                   | Plastics                               | 14,427.00 |
| 13 | Steel<br>Packaging      | Steel Container Materials              | 83,237.00 |
| 14 | Plastic<br>Packaging    | Plastic/ Liners Container<br>Materials | 173.14    |
| 15 | Cellulosic<br>Packaging | Cellulosics Packaging<br>Materials     | 4.26      |

MgO

|    |             |                              |               |
|----|-------------|------------------------------|---------------|
| 16 | Emplacement | Magnesium Oxide              | 19,078,590.11 |
| 18 | Emplacement | Cellulosic Emplacement Mat'l | 39,185.10     |
| 20 | Emplacement | Plastic Emplacement Mat'l    | 44,832.60     |

Attachment D

Status of Waste Containers  
August 25, 2008

| 08/25/2008                       | WIPP Waste Information System |              |                |              |               |               |              |      |               |               | 01:39 PM       |       |
|----------------------------------|-------------------------------|--------------|----------------|--------------|---------------|---------------|--------------|------|---------------|---------------|----------------|-------|
| Refresh 269                      | Administration Status Display |              |                |              |               |               |              |      |               |               | Print          | Close |
| Waste Container Status           | (bnf)<br>AMWTP                | (ccp)<br>SRS | (ccp)<br>ANL-E | (ccp)<br>NTS | (ccp)<br>LANL | (ccp)<br>LLNL | (ccp)<br>INL | ORNL | Hanford       | Other         | Totals         |       |
| Data Transfer In Progress:       |                               |              |                |              |               |               |              |      |               |               |                |       |
| Pending Charz Data Submittal:    | 5                             | 5            |                |              |               |               |              |      | 5             |               | 15             |       |
| Pending Charz Data Approval:     |                               | 5            |                |              |               |               |              |      |               |               | 5              |       |
| On Hold For Charz Data Approval: |                               |              |                |              |               |               |              |      |               |               |                |       |
| Charz Data Approved:             | 10                            | 7            |                |              |               |               |              |      | 32            |               | 49             |       |
| Pending Cert Data Submittal:     | 611                           | 37           | 13             |              | 8             |               | 14           |      | 5             |               | 688            |       |
| Pending Cert Data Approval:      | 1                             |              |                |              |               |               |              |      |               |               | 1              |       |
| On Hold For Cert Data Approval:  |                               |              |                |              |               |               |              |      |               |               |                |       |
| Cert Data Approved:              | 2,886                         | 401          | 1              |              | 401           |               | 3            |      | 915           |               | 4,607          |       |
| Pending Shipment Data Approval:  |                               |              |                |              |               |               |              |      |               |               |                |       |
| Shipment Data Approved:          | 128                           | 75           | 5              |              | 120           |               | 9            |      | 373           |               | 710            |       |
| Shipment Received:               | 249                           | 12           | 2              |              | 58            |               | 5            |      | 59            |               | 385            |       |
| Emplaced Underground:            | 21,521                        | 5,286        | 330            | 1,819        | 6,890         | 680           | 162          |      | 9,560         | 57,883        | 104,131        |       |
| <b>Waste Container Totals:</b>   | <b>25,411</b>                 | <b>5,828</b> | <b>354</b>     | <b>1,819</b> | <b>7,477</b>  | <b>680</b>    | <b>193</b>   |      | <b>10,949</b> | <b>57,883</b> | <b>168,562</b> |       |
| Shipment Status                  | (bnf)<br>AMWTP                | (ccp)<br>SRS | (ccp)<br>ANL-E | (ccp)<br>NTS | (ccp)<br>LANL | (ccp)<br>LLNL | (ccp)<br>INL | ORNL | Hanford       | Other         | Totals         |       |
| Pending Submittal:               | 6                             |              |                |              | 9             |               |              |      | 5             |               | 20             |       |
| Pending Approval:                |                               |              |                |              |               |               |              |      |               |               |                |       |
| Approved:                        | 7                             | 3            | 5              |              | 4             |               | 9            |      | 11            |               | 39             |       |
| Complete (Ready To Ship):        |                               |              |                |              |               |               |              |      |               |               |                |       |
| Received:                        | 2,213                         | 913          | 16             | 48           | 325           | 18            | 167          |      | 425           | 2,726         | 6,851          |       |
| <b>Shipment Totals:</b>          | <b>2,226</b>                  | <b>916</b>   | <b>21</b>      | <b>48</b>    | <b>338</b>    | <b>18</b>     | <b>176</b>   |      | <b>441</b>    | <b>2,726</b>  | <b>6,910</b>   |       |

**Attachment E**  
**Summary of MgO Safety Factor Calculations**

| Panel | Room | MgO<br>(kg) | Waste<br>(kg) | CPR<br>(kg) | Safety<br>Factor |
|-------|------|-------------|---------------|-------------|------------------|
| 1     | 7    | 1,127,526   | 508,254       | 276,990     | 2.01             |
|       | 6    | 222,885     | 101,210       | 86,116      | 1.44             |
|       | 5    | 222,885     | 160,047       | 79,213      | 1.56             |
|       | 4    | 228,600     | 128,597       | 85,525      | 1.51             |
|       | 3    | 1,034,415   | 749,764       | 342,069     | 1.67             |
|       | 2    | 1,028,825   | 948,002       | 229,442     | 2.17             |
|       | 1    | 617,220     | 311,843       | 138,330     | 2.14             |
| 2     | 7    | 1,028,700   | 571,001       | 236,830     | 2.09             |
|       | 6    | 982,980     | 461,528       | 209,305     | 2.20             |
|       | 5    | 988,820     | 498,970       | 197,609     | 2.29             |
|       | 4    | 977,265     | 518,555       | 220,912     | 2.17             |
|       | 3    | 1,028,700   | 667,662       | 211,841     | 2.27             |
|       | 2    | 965,835     | 733,025       | 165,412     | 2.62             |
|       | 1    | 691,515     | 416,679       | 186,200     | 1.71             |
| 3     | 7    | 960,120     | 711,188       | 104,831     | 4.03             |
|       | 6    | 954,405     | 876,558       | 228,033     | 1.95             |
|       | 5    | 1,022,985   | 808,693       | 284,651     | 1.70             |
|       | 4    | 960,120     | 899,470       | 255,054     | 1.79             |
|       | 3    | 931,545     | 1,000,561     | 243,860     | 1.89             |
|       | 2    | 944,880     | 1,004,479     | 227,889     | 2.03             |
|       | 1    | 662,940     | 722,043       | 183,072     | 1.76             |
| 4     | 7    | 942,975     | 1,051,062     | 248,903     | 1.90             |
|       | 6    | 925,830     | 945,599       | 267,494     | 1.71             |
|       | 5    | 946,785     | 890,039       | 265,295     | 1.71             |
|       | 4    | 1,013,460   | 830,990       | 290,608     | 1.70             |
|       | 3    | 363,855     | 334,452       | 150,581     | 1.16             |
|       | 2    | 0           | 4,642         | 1,523       | .00              |

=====



## **Attachment G**

### **Procedures Examined**

- > NS-E2008-1: *CH Waste Processing*, Technical Procedure WP 05-WH1011, Revision 26; Effective Date: March 28, 2007
- > NS-E2008-2: *Waste Stream Profile Form Review and Approval Program*, WP 08-NT.03, Revision 8, October 18, 2006
- > NS-E2008-3 : *TRU Waste Receipt, Management Control Procedure*, WP 08-NT3020, Revision 16, Effective Date: November 5, 2007
- > NS-M2008-O : *WIPP Waste Information System User's Manual WWIS Version 5.4a*, DOE/CBFO 97-2273, Rev. 15, May, 2008
- > NS-E2008-4: *WIPP Waste Handling Operations WWIS User's Manual*, WP 05-WH1-01 Revision 3; Effective Date: February 11, 2008
- > NS-A2008-G: *WIPP Contact Handled (CH) Waste Documented Safety Analysis* DOE/WIPP-95-2065, Revision 10, November 2006
- > NS-A2008-H: *WIPP RH Waste Documented Safety Analysis* DOE/WIPP-06-3174, Revision 0, March 2006
- > NS-E2008-5: *WIPP RH Technical Safety Requirement* DOE/WIPP-06-3178, Revision 0, March 2006
- > NS-E2008-6: *Specification for Prepackaged MgO Backfill*, Specification, D-0101, Revision 7, Revision Date: May 12, 2005
- > NS-E2008-7 : *Conduct of Operations* WP 04-CO, Revision 8, Effective Date: March 11, 2008
- > NS-E2008-8 : *Horizontal Emplacement and Retrieval Equipment Assembly, Technical Procedure*, WP05-WH1700, Revision 6, Effective Date: April 30, 2008
- > NS-E2008-9 : *Road Cask Transfer Car Operation, Technical Procedure*, WP 05-WH1701, Revision 9, Effective Date: October 31, 2006
- > NS-E2008-10 : *Facility Cask Transfer Car 41-H-003 Operation, Technical Procedure*, WP 05-WH1704, Revision 6, Effective Date: January 19. 2006
- > NS-E2008-11: *RH Canister Transfer System, Technical Procedure*, WP 05-WH1705, Revision 6, Effective Date: June 27, 2006
- > NS-E2008-12: *RH-TRU 72-B Trailer Unloading, Technical Procedure*, WP 05-WH1709, Revision 10, Effective Date: May 16, 2007
- > NS-E2008-13: *RH Processing 72-B, Technical Procedure*, WP 05-WH1710, Revision 10, Effective Date: May 16, 2007

- > NS-E2008-14: *RH-TRU 72-B Cask Operation, Technical Procedure*, WP 05-WH1712, Revision 2, Effective Date: August 1, 2006
- > NS-E2008-15: *Facility Cask and Facility Cask Rotating Device, Technical Procedure*, WP 05-WH1713, Revision 7, Effective Date: August 29, 2007
- > NS-E2008-16: *RH Cask Preparation Station 41-Z-076, Technical Procedure*, WP 05-WH1714, Revision 1, Effective Date: June 21, 2006
- > NS-E2008-17: *Cask Unloading Room Shield Door Operation, Technical procedure*, WP 05-WH1717, Revision 6, Effective Date: August 23, 2006
- > NS-E2008-18: *CNS 10-160 B Trailer Unloading, Technical Procedure*, WP 05-WH1718, Revision 5, Effective Date: February 27, 2007
- > NS-E2008-19: *10-160 B RH Processing, Technical Procedure*, WP 05-WH1722, Revision 9, Effective Date: January 14, 2008
- > NS-E2008-20: *CNS 10-160B Cask Operation, Technical Procedure*, WP 05-WH1716, Revision 3, Effective Date: November 2, 2006
- > NS-E2008-21: *Surface RH Transuranic Mixed Waste Handling Area Inspections, Technical Procedure*, WP 05-WH1744, Revision 8, Effective Date: February 28, 2007
- > NS-E2008-22: *10-160B Shielded Insert Installation and Removal, Technical Procedure*, WP 05-WH1752, Revision 3, Effective Date: July 10, 2006
- > NS-E2008-23: *RH Waste Handling Abnormal Operations, Technical Procedure*, WP 05-WH1758, Revision 4, Effective Date: May 17, 2007
- > NS-E2008-24: *Categorization and Classification of Operational Emergencies for RH Waste, Management Control Procedure*, WP 12-ER3905, Revision 2, Effective Date: June 25, 2007
- > NS-A2008-BA: *Contamination Control*, WP 12-HP3400, Revision 5, Effective Date: December 17, 2003
- > NS-E2008-25: *Hazardous Material Spill and Release Response, Emergency Response Procedure*, WP12-ER 4902, Revision 11, Effective Date: June 25, 2007
- > NS-A2008-R: *Consequence Assessment Dose Projection*, WP 12-ER4916, Revision 11, Effective Date: February 27, 2008
- > NS-E2008-26: *Radiological Surveys, Technical Procedure*, WP12-HP1100, Revision 11, Effective Date: July 12, 2007
- > NS-E2008-27: *Contact Handled (CH) Technical Safety Requirements*, DOE/WIPP-95-2125, Revision 10, Effective Date: November 2006

> NS-E2008-28: *Radiological Posting and Access Control*, WP 12-HP1500, Revision 12, Effective Date: December 14, 2006

> NS-E2008-29: *Abnormal Radiological Conditions*, WP 12-HP2001, Revision 3, Effective Date: August 23, 2006



**Attachment H**  
**2007 EPA Emplacement Inspection Checklist**

| # | Questions:   | Comments and Objective Evidence  | Results      |
|---|--|--|--------------|
|   | <b>Question: Waste Emplacement</b>   |  |              |
| 1 | Is waste being emplaced in the underground facility in the manner specified in DOE's Compliance Certification/ Re-Certification or other relevant documentation?       | Yes for CH. Procedure WP 05-WH1011, Rev. 26, CH Waste Processing, Steps 4 to 7, pages 25 through 29 describe the waste emplacement process. Visual verification of the emplaced waste in Row 65 of Panel 4, Room 3 was conducted.<br>Yes for RH. RH processing procedures for 72-B (WP 05-WH1710) and 10-160-B (WP 05-WH1722) containers are consistent with the approach discussed in the CCA documentation.  | Satisfactory |
| 2 | Are CH waste containers stacked in columns appropriately given the type of container?  | Yes, waste is being emplaced appropriately. Procedure WP 05-WH1011, Attachment 4, Waste Emplacement Report Data Sheet. The waste stacking arrangement was verified during the inspection in Room 3 Panel 4.  | Satisfactory |
| 3 | Are records adequate? Randomly select three CH and two RH waste containers to verify records for waste approval, shipment, and receipt.                                | Yes. TRU Waste Receipt WP 08-NT3020, Rev.16 describes the process. Records produced are Uniform Hazardous Waste Manifest, TRU Waste Receipt Checklist, Shipment Summary Report, RH waste Processing Data Sheet, Radiological Survey Report, and Waste Emplacement Report. CH waste produces comparable records. EPA reviewed records and found the records to be adequate and traceable.<br>Selected Containers:<br>CH Waste - TDOP from Richland: RL080039, 55 gal drum from INL: BN10185734, 55 gal drum from INL: BN10196388<br>RH Waste – Borehole 83: ID0155 from ANL-E, Borehole 84: ID0152 from ANL-E | Satisfactory |
| 4 | Is DOE properly emplacing backfill material (magnesium oxide [MgO]) with the waste packages? That supersacks are placed on top of waste stacks according to procedure? | Yes. Procedure WP 05-WH1011, Rev. 26, CH Waste Processing, Section 5.0, requires MgO to be placed on each waste column. While underground the inspectors observed that each waste column had a MgO supersack emplaced.   | Satisfactory |
| 5 | Are RH boreholes closed properly?<br>(Note also see #9 for tracking of RH in the U/G)  | Yes, Correct borehole plug emplacement is described in 72-B RH Processing, WP 05-WH1710, Sections 19 and 20. Monitoring of smears is also described in this document (Section 20.37). The inspector observed emplaced plugs.   | Satisfactory |

|    |  |   |              |
|----|--|---|--------------|
| 6  | Verify documentation for the containers listed in item 3 - waste generator site transmittal of waste to WIPP, WIPP approval, shipment certification for transport to WIPP, shipment initiation documentation, shipment received at WIPP records, waste emplaced in the underground, and placement of backfill [MgO]. | The inspector examined documentation related to selected containers. Inspectors verified that these records exist for these containers and determined that the documentation is adequate.   | Satisfactory |
| 7  | Is the acceptance of the MgO backfill material from the supplier documented?   | Yes. Record of MgO specification from the supplier is available (see ???). The inspectors examined these documents and found them to be adequate.   | Satisfactory |
|    | <b>RH Waste Emplacement Questions</b>  |   |              |
| 8  | Are RH containers approved for receipt, received, processed, and emplaced properly?  | Yes. RH processing procedures for 72-B (WP 05-WH1710) and 10-160-B (WP 05-WH1722) containers documents the WIPP requirements for processing RH containers.  | Satisfactory |
| 9  | Are RH containers appropriately tracked?<br><br>Where is the information?<br>--In the WWIS, what report<br>--During the receipt/transfer process where is it recorded?<br>--In the underground?  | Yes. Container Numbers ID0152, and ID 0155 (Boreholes 083 and 084) were tracked for verification. The Waste Container Data Report was generated from the WWIS. Container disposal was posted on the underground disposal map. The container data report was generated by WWIS. WP 05-WH1710, Section 20.45 says to record RH emplacement location on underground map. 72-B Cask serial number, 72-B Cask shipment numbers were verified and concur with WWIS. | Satisfactory |
| 10 | Content of RH canisters<br>--pick 1 to 3 canisters   | Borehole 083, container number ID0152,<br>Borehole 084, container number ID0155<br>Waste Container Data Reports for these were generated by WWIS and EPA verified them.   | Satisfactory |
| 11 | Volume and mass and/or concentration of important waste components and radionuclides (RH and CH)?<br><br>Are they within statutory and regulatory limits?  | Waste Container Data Report showing detailed description of nuclide information for the selected containers were generated and verified by the inspectors.<br><br>Yes   | Satisfactory |

|    | <b>Question: Procedure</b>  |   |              |
|----|---|---|--------------|
| 12 | For the MgO needed for high CPR, are there procedures or documentation for the WHE or WHM (or other appropriate personnel) identifying <b>when</b> and <b>where</b> additional MgO is needed?                               | In the WIPP Waste Handling Operation WWIS User's Manual, WP 05-WH.01, Revision 3, 2/11/08, Attachment 1 – special requirements for additional MgO are discussed and CH Waste Processing, WP 05-WH1011 Section 5.0-NOTE, states that the WHE will calculate the safety factor (SF) at the end of each shift and that the WHM must be notified if the SF is below 1.67. EPA verified that this process is performed.          | Satisfactory |
| 13 | Is there documentation that identifies <b>how</b> the MgO should be placed with high CPR waste?   | Yes. Section 5.2 of WP 05-WH1011 requires that additional supersacks are to be placed in the waste stack if the WHM determines that it is required.   | Satisfactory |
| #  | <b>Question: Records/WWIS</b>   |   |              |
| 14 | Does the WWIS adequately document waste shipment and emplacements information for waste containers selected item 3 above? CH, RH  | Yes. In the Waste Emplacement Report, the WWIS adequately documents waste shipment and emplacement information. WWIS Waste Emplacement Reports, WWIS Waste Container Data Report contain container number, shipment number, emplacement information in the underground. These data were verified for waste containers by the inspectors.  | Satisfactory |
| 15 | Is DOE maintaining records of waste shipments and emplacement properly? CH, RH  | Yes, WWIS Reports (Waste Container Data Report, Emplacement Report, RH Receipt) and underground maps verify that records are properly maintained for both CH and RH waste containers.   | Satisfactory |
| 16 | Do the characterization module, certification module, shipping module, and inventory module adequately record the required information?   | Yes. DOE staff queried the WWIS for this information and demonstrated (via Waste Container Data Reports, and Shipment Summary Reports) that they adequately recorded the required information. WP 05-WH.01, WP 05-WH1729, WP 08-NT3020 describe the procedures for recording of data. The inspectors examined five waste containers, three CH and two RH, documents to verify that this information is adequately recorded. | Satisfactory |
| 17 | Characterization Module - Review a WWIS Waste Container Data Report. Does this report adequately record the Waste Stream Profile Form information?  | Yes. WWIS staff generated the Waste Container Data Reports for the selected containers. These reports contain Waste Stream Profile information for each container. The inspectors verified that this module contains this information.  | Satisfactory |
| 18 | Characterization Module - Does the data administrator verify that DOE/CBFO has granted certification and transportation authority to the generator/shipper site prior to review of generator/shipper characterization data? | Yes. The Waste Stream Profile Form Review and Approval Program, WP 08-NT.03, Section 8.4 documents that "...allows DA (data administrator) approval of certified container data prior to shipment of containers...". The inspectors verified these approvals.   | Satisfactory |

|    |   |   |              |
|----|---|---|--------------|
| 19 | Shipping Module - Review the Shipment Summary Report. Does the report correctly record the containers shipped? CH, RH   | Yes. The inspectors examined the Shipment Summary Reports for the selected containers and verified that each report contained the correct containers.   | Satisfactory |
| 20 | Inventory Module - Review the Waste Emplacement Report. Does this report adequately record the date of receipt, and disposal locations of containers? CH, RH                          | Yes. The Waste Emplacement Report (WER) records contain the container number, shipment number, emplacement data and underground location. The inspectors verified that the WER recorded the information adequately.   | Satisfactory |
| 21 | Is MgO implementation appropriately documented?<br><br>Where is it described?<br><br>Does the WWIS properly track MgO emplaced quantity and location?<br><br>Where is this described? | Yes. Procedures WIPP Waste Handling Operations WWIS User's Manual, WP 05-WH.01, Section 6.2.5 and CH Waste Processing, WP 05-WH1011, Section 5.0 and Attachment 6 describe and documents the process. MgO information is input by the WHE into the WWIS computer database in the Emplace Containers Underground screen as documented in WP 05-WH.01, Section 6.1. Processing of released shipments, emplacement of processed containers and emplacement of MgO on completed stacks are done as described in WP 05-WH1011. The inspectors verified that MgO emplacement is appropriately implemented and tracked properly. | Satisfactory |
| 22 | Is DOE properly tracking the MgO backfill so that the MgO safety factor can be accurately calculated?   | Yes. As noted in Q-21, above, procedures WP05-WH.01, Attachment 1 and WP 05-WH1011 show that MgO tracking is adequate.  | Satisfactory |
| 23 | Is DOE assuring that the 1.67 safety factor being maintained on a room basis?<br><br>What methodology (equations) are being used to calculate the safety factor?                      | Yes. Procedure WP 05-WH1011, Rev 26, CH Waste Processing Section 5.0 states that the safety factor of 1.67 must be maintained. In a letter dated February 11, 2008, EPA altered the safety factor requirement to 1.2. DOE has not altered its procedures to reflect the new safety factor and maintains a safety factor of 1.67 at the time of the inspection.  | Satisfactory |
| 24 | Does the WWIS accurately calculate the 1.67 safety factor and recommend the proper amount of MgO to emplace?<br><br>Where has this been verified?                                     | Yes. This is performed on a regular basis. WIPP Waste Handling Operations WWIS User's Manual, WP 05-WH.01, Section 6.2.5 and Attachment 1 describes the steps. The Software Validation Test, MgO Emplacement process and Safety Factor Calculation Revision 0, March 2, 2005 documents the testing of the new modules added to WWIS to track MgO and calculate the safety factor on an ongoing basis room by room. The inspector verified that this approach has not changed.   | Satisfactory |
| 25 | Is there documentation that describes how the site will use and implement the MgO module of the WWIS?   | Yes. WIPP Waste Handling Operations WWIS User's Manual, WP 05-WH.01, Section 6.2.5 notes that the waste handling engineer is to input MgO data into the WWIS. The MgO safety factor calculation is done routinely as described in WP 05-WH.01, Attachment 1. The inspector verified this activity.  | Satisfactory |