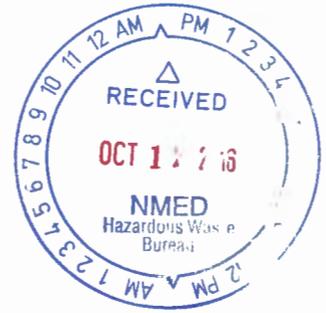




ENTERED

Department of Energy  
Carlsbad Field Office  
P. O. Box 3090  
Carlsbad, New Mexico 88221



OCT 07 2016

Mr. John E. Kieling, Bureau Chief  
Hazardous Waste Bureau  
New Mexico Environment Department  
2905 Rodeo Park Drive East, Building 1  
Santa Fe, New Mexico 87505-6303

Subject: Notification of Trend Towards Adverse Conditions

Reference: DOE Letter CBFO:EPD:GTB:MN:15-1419:UFC 5486.00 from Mr. J. R. Franco and Mr. R. L. McQuinn to Mr. John Kieling, dated February 9, 2015, subject: Transmittal of Notification of Adverse Conditions

Dear Mr. Kieling:

The purpose of this letter is to provide an update notification to the reference submitted pursuant to Permit Part 4, Section 4.6.1.3., *Notification of Adverse Conditions*; and Permit Attachment A2, Section A2-5b(2)(a), *Description of the Geomechanical Monitoring System*. This notification is being provided because although Panels three, four, five and six are filled (i.e., no longer receiving Transuranic mixed waste for disposal) they have not been closed with a final panel closure.

In the eighteen months since our first letter concerning a trend towards adverse conditions, several areas in the underground have been posted as prohibited, meaning entry is not allowed. As discussed with your staff earlier this week, two of these prohibited areas have recently experienced rock falls. These areas have been prohibited for many months so there were no personnel who were at risk during the time of the rock falls.

The notification provides information with regard to the geotechnical conditions in the Waste Isolation Pilot Plant (WIPP) underground. The Permittees continue to implement their ground control program to monitor and inspect areas in the underground in order to continue to provide a safe environment for our workers and to identify areas that should not be entered without remediation.

We certify under penalty of law that this document and all attachments were prepared under our direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on our inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of our knowledge and belief, true, accurate, and complete. We are aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.





OCT 07 2016

Mr. John E. Kieling

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If you should have any questions regarding this notification, please contact Mr. George Basabilvazo at (575) 234-7488.

Sincerely,



Todd Shrader, Manager  
Carlsbad Field Office

 for

Philip J. Breidenbach, Project Manager  
Nuclear Waste Partnership LLC

Enclosure

cc: w/enclosure

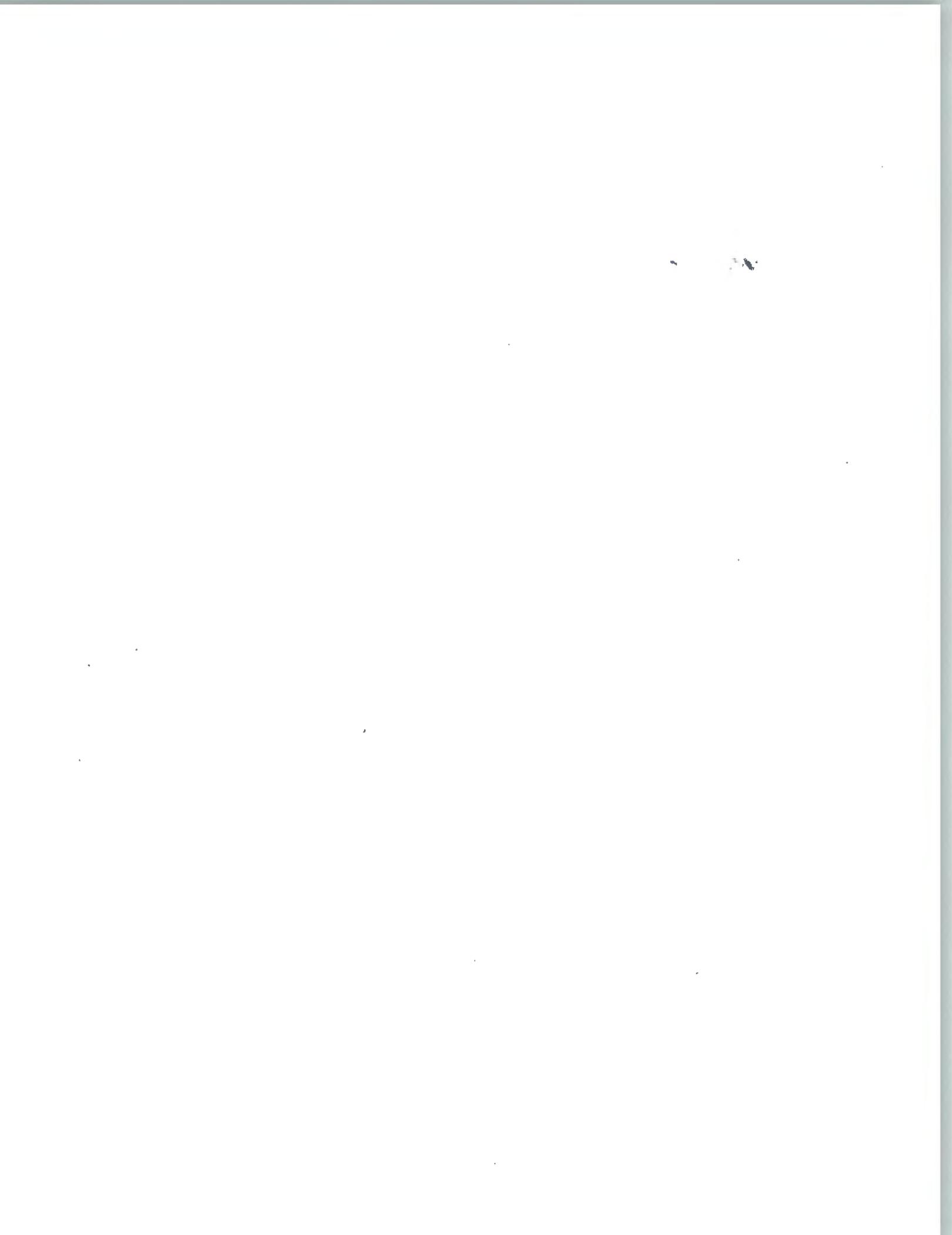
K. Roberts, NMED \*ED

R. Maestas, NMED ED

C. Smith, NMED ED

CBFO M&RC

\*ED denotes electronic distribution



## Notification of Trend Towards Adverse Ground Conditions

### 1.0 Introduction

Restrictions placed on underground activities due to the presence of radiological contamination and limited ventilation has resulted in some underground areas being unmaintained. Personnel access to unmaintained areas is either restricted or prohibited based on the specific conditions. The ongoing WIPP facility ground control program has facilitated the identification of areas that are currently restricted or prohibited in order to protect underground workers. Even though two ground falls in prohibited areas have been recently identified during routine ground control and monitoring inspections, no personnel were placed at risk because these areas were among those previously prohibited and personnel access was not allowed. Ground falls such as the ones that have recently been observed in unmaintained areas of the underground are anticipated.

The purpose of this document is to provide notification of a trend towards adverse (unstable) ground conditions at various locations south of S-2180 drift. These locations include the following:

- Panel entries into Hazardous Waste Disposal Units (HWDUs) Panel 3, Panel 4, Panel 5, and Panel 7 Room 6.
- W-170 drift between S-2180 and S-2520
- W-170 drift between S-2750 and S-3310
- W-30 drift between S-2750 and S-3080
- S-2180 cross drift between W-170 and W-30
- S-3080 cross drift between W-170 and E-140.

These areas are shown on Attachment 1.

The Hazardous Waste Facility Permit (Permit) Part 4 Section 4.6.1.3 and Attachment A2, Section A2-5b(2)(a) describe the requirements if a trend toward adverse ground conditions are observed in HWDUs.

#### *4.6.1.3. Notification of Adverse Conditions*

*When evaluation of the geomechanical monitoring system data identifies a trend towards unstable conditions which requires a decision whether to terminate waste disposal activities in any Underground HWDU, the Permittees shall provide the Secretary with the same report provided to the WIPP Operations Manager within seven calendar days of its issuance, as specified in Permit Attachment A2, Section A2-5b(2)(a),*

And,

A2-5b(2)(a)

*The stability of an open panel excavation is generally determined by the rock deformation rate. The excavation may be unstable when there is a continuous increase in the deformation rate that cannot be controlled by the installed support system. The Permittees will evaluate the performance of the excavation. These evaluations assess the effectiveness of the roof support system and estimate the stand-up time of the excavation. If an open panel shows the trend is toward adverse (unstable) conditions, the results will be reported to determine if it is necessary to terminate waste disposal activities in the open panel. This report of the trend toward adverse conditions in an open HWDU will also be provided to the Secretary of the NMED within seven (7) calendar days of issuance of the report.*

Although Panels 3, 4, 5 and 6 are filled (i.e., no longer receiving TRU mixed waste for disposal) and are not subject to a decision to terminate waste disposal activities. The final closure system has not been installed. Therefore, the Permittees have determined that it is appropriate to report on filled Panels that have not been closed.

## 2.0 Methods

The deteriorating condition of underground areas are first identified by using a series of frequent visual and mechanical observations which included:

- Identification of roof bolt failures.
- The development of tension cracks in the roof beam.
- Convergence rate monitoring.
- Identification of separations along anhydrite stringers within the adjacent roof beam.

Routine assessments and inspections of underground areas are periodically performed to observe changes in ground conditions. In addition, geomechanical monitoring with installed instruments are used to evaluate the deformation of the openings.

## 3.0 Routine Assessments and Inspections

An assessment of the ground conditions in the access drifts into Panel 3, Panel 4, and Panel 5 confirm that the ground support is not being maintained. The condition of the ground support varies; however, due to prohibited access to these areas there has not been any roof bolt reinstallations which are necessary to maintain adequate roof support. The installed ground support in Panel 7 Room 6 has undergone bolt failures; however, the roof beam continues to be self-supporting and observed deformation rates do not indicate accelerating deterioration.

An inspection of the S-3650 access to Panel 4 confirmed that a ground fall occurred approximately 50 to 80 feet east of the E-300/S-3650 intersection. The exact date of the ground fall is unknown but is thought to have occurred between September 26 and 27, 2016. The ground fall extent is rib to rib and it appears to extend up to a known anhydrite stringer. The size of the fall is estimated to be approximately 18 to 24 inches thick, 20-ft wide and approximately 20 to 30-ft long. The fall of material is estimated to exceed 150,000 pounds. The area of the ground fall did have mechanical roof bolts and mesh and a pattern of resin anchored bolts. Visual inspection of the ground support indicated a significant number of failed bolt installations. The majority of the installation failures were due to failure of the bolt plate. The bolt and nut were drawn through the roof plate.

The expectation is that similar falls will occur in the near future. This is the result of continued salt creep deformation, lateral compressional forces on the roof beam result in the roof beam bowing downward creating separations along shallow anhydrite stringers located approximately 18 to 24 inches into the roof. As the separations grow, the section of the roof beam, located below the stringers, can no longer support itself and without adequate roof support will fail and fall to the ground. These areas have been supported with chain link mesh and roof bolts. However, due to the lack of ground support maintenance the ground conditions will continue to deteriorate. Visual inspection of the Panel 3 and Panel 4 entries, from a non-prohibited location, indicate significant loss of roof support in the area. This loss of roof support will eventually result in fall of ground.

#### 4.0 Geomechanical Monitoring

##### Panel 3 and 4 Entries

Panel 3 geomechanical measurements were last taken in January 2014 in S-2750 access and June 2015 in S-3080. Access to these areas was restricted due the lack of measureable convergence data. Convergence measurements, up to this time, indicated accelerating closure rates in the Panel 3 S-3080 entry drift. Geomechanical convergence measurements, from Panel 4 S-3310, were last taken on June 2015 and in S-3650 on September 2010. Access to these areas has been restricted due the lack of measureable data and high Volatile Organic Compounds (VOC) concentrations caused by limited ventilation in the area. Due to the lack of ground support maintenance the ground conditions will continue to deteriorate. This loss of roof support will eventually result in fall of ground.

##### Panels 5 and 6 Entries

Access to the Panel 5 and Panel 6 panels was restricted due to high VOC concentrations caused by limited ventilation in this area. Geomechanical measurements were last taken in January 2016 in the Panel 5 and 6 entries. Convergence measurements, during this time, did not indicate accelerated closure rates at Panel 6 and the S-3310 entry into Panel 5. The S-3650 entry into Panel 5 exhibited

higher and accelerating closure rate. However, due to the lack of ground support maintenance the ground conditions will continue to deteriorate. This loss of roof support will eventually result in fall of ground.

## 5.0 Recommendations

Due to the areas' history, its current condition, lack of ground support, limited ventilation to these areas and the inability to access these areas to complete the installation of the additional ground support or perform Geotechnical inspections and monitoring, it is recommended that access to these areas be prohibited and be controlled by Mine Operations management.

# Attachment 1

