

*Office of Environmental Management – Grand Junction*



Moab UMTRA Project  
Moab Site Hillside Monitoring Plan

Revision 2

March 2017



U.S. Department  
of Energy

**Office of Environmental Management**

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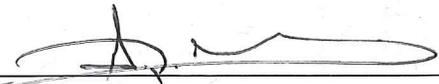
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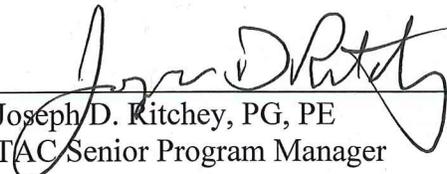
**Revision 2**

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## Revision History

<b>Revision</b>	<b>Date</b>	<b>Reason for Revision</b>
0	March 2015	Initial issue.
1	July 2015	Removed information addressed in other documents and clarified roles and responsibilities.
2	March 2017	Periodic update.

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## 1.0 Introduction

The scope of the U.S. Department of Energy (DOE) Moab Uranium Mill Tailings Remedial Action (UMTRA) Project is to relocate uranium mill tailings and other contaminated materials from the former Moab millsite in Utah to a DOE-constructed disposal facility near Crescent Junction, Utah. The tailings are transported primarily by rail via the Union Pacific Railroad Kane Creek Subdivision line. The rail bench at the Moab site is located on a hillside about 200 feet above the tailings pile. The hillside above the rail bench extends about 2,000 feet laterally and 1,000 feet vertically; in places, it has a near vertical slope. As a result of a significant rockslide that occurred on November 18, 2014, additional measures have been taken to mitigate the risk of future rockslides and rockfalls that could affect worker safety.

This *Hillside Monitoring Plan* addresses the roles and responsibilities associated with hillside monitoring activities and the types of monitoring being performed. This Plan is used in conjunction with other procedures, plans, and relevant Integrated Work Plans/Job Safety Analyses (IWPs/JSAs).

## 2.0 Roles and Responsibilities

This section identifies the roles and responsibilities of key Technical Assistance Contractor (TAC) and Remedial Action Contractor (RAC) personnel who are involved in managing and/or implementing the monitoring activities in this Plan.

Figure 1 is an organization chart specific to the Project's hillside monitoring; it does not reflect the Project as a whole. Titles used in the organization chart represent functional roles, not position titles. If a key person is unavailable, his or her responsibilities will transfer to someone with appropriate training and authority. Other than RAC operations personnel and off-site subject matter experts (SMEs), all other individuals on the organization chart are members of the Radar Team, who collaborate, as appropriate, on activities associated with the radar monitoring unit. Other organizations, such as Information Technology, Health and Safety, and Project Management provide support to the monitoring personnel and are involved in responding to the results of monitoring activities.

### 2.1 TAC Hillside Monitoring Manager

Responsibilities of the TAC Hillside Monitoring Manager include the following:

- Overall responsibility for hillside monitoring performed by TAC personnel and SMEs.
- Coordinating with RAC monitoring staff and SMEs.
- Interfacing between the Radar Team and DOE.
- Interfacing with the Moab Operations/Site Manager regarding Radar Team recommendations.
- Establishing access rights and authorities for setting radar unit thresholds and alarms.
- Ensuring TAC personnel adhere to appropriate alarm response protocols.
- Ensuring periodic briefings with site workers are performed on the status of hillside conditions.

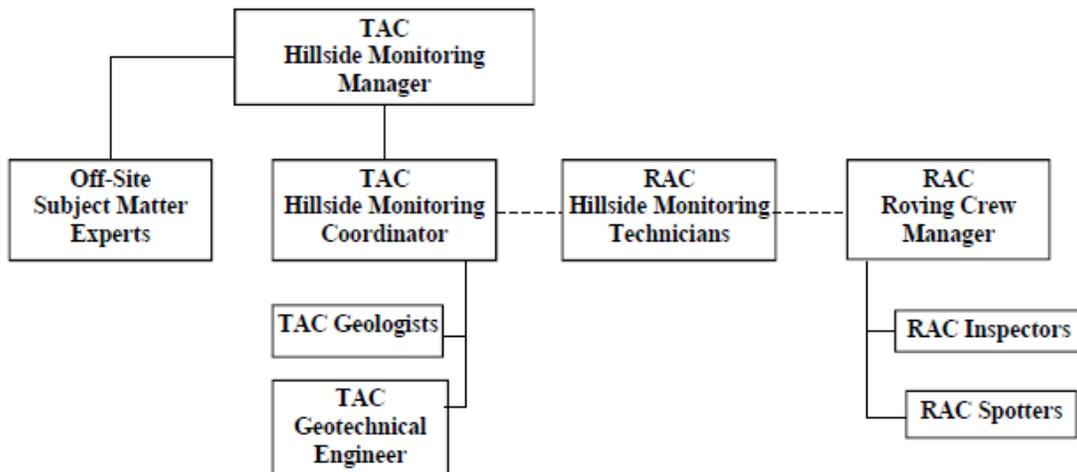


Figure 1. Hillside Monitoring Organization Chart

## 2.2 TAC Hillside Monitoring Coordinator

Responsibilities of the TAC Hillside Monitoring Coordinator include the following:

- Operating, calibrating, and maintaining the radar unit (as qualified to perform) and coordinating periodic calibration and maintenance performed by the subcontracted service provider.
- Accessing the radar unit to view the status and evaluating and interpreting monitoring data.
- Consulting other Radar Team members and SMEs, as appropriate, to evaluate radar monitoring data.
- Preparing the Radar Unit Inspection Form and Checklist (Form 1902).

## 2.3 TAC Geologists

Responsibilities of the TAC geologist include the following:

- Accessing the radar unit and assisting the TAC hillside monitoring coordinator with evaluation and interpretation of monitoring data.
- Conducting geological inspections of the hillside, as needed.

## 2.4 TAC Geotechnical Engineer

Responsibilities of the TAC geotechnical engineer include the following:

- Assisting the TAC hillside monitoring coordinator with evaluation and interpretation of monitoring data.
- Conducting geotechnical inspections of the hillside, as needed.

## 2.5 Off-site SMEs

Responsibilities of off-site SMEs include the following:

- Assisting with establishing and modifying radar unit settings, thresholds, and alarms.
- Providing monitoring training and briefings to Project staff, as requested.
- Advising the Radar Team, as requested, with interpretation of monitoring data.
- Providing periodic independent assessments of monitoring results.

## **2.6 RAC Hillside Monitoring Technicians**

Responsibilities of the RAC Hillside Monitoring Technicians include the following:

- Assisting the TAC hillside monitoring coordinator with operation of the radar unit.
- Accessing the radar unit to view status of the unit and the recorded data.
- Issuing a Morning Radar Monitoring Report (Form 1901).

## **2.7 RAC Operations Supervisor**

Responsibilities of the RAC operations supervisor include the following:

- Approving personnel to perform daily inspections of the rail bench, drainage ditches, and hillside slope.
- Interfacing with the Moab Operations/Site Manager to determine if any inspection findings warrant delay of train loading operations and communicating any work delays, suspensions, and restarts.
- Ensuring appropriate alarm response protocols are adhered to by RAC personnel.
- Completing hillside inspection portion of the Daily Radar Evaluation Report (Form 1900).
- Providing properly trained rail bench inspectors and rock spotters.

## **2.8 RAC Inspectors and Spotters**

Responsibilities of the RAC inspectors and spotters include the following:

- Performing daily inspections of the rail bench, drainage ditches, and hillside slope.
- Identifying any areas or observations of concern and communicating them to the RAC operations supervisor.

## **3.0 Types of Monitoring**

The following hillside monitoring methods have been implemented to help mitigate the risk of future rockslides and rockfalls affecting worker safety:

- Visual inspections
- Radar monitoring
- Video monitoring
- Rock spotting
- Other observational data

These monitoring methods are described in the following sections. Figure 2 shows Moab site features, including the location of the rail bench and northern laydown area.

### **3.1 Visual Inspections**

Each day before beginning operations on the rail bench, the RAC performs a visual inspection of the rail bench, storm water drainage ditches, and hillside slope to identify any signs of rockfall since the previous rail operations.

Any anomalies found during these inspections are reported to the RAC Operations Supervisor, who will determine if they warrant a delay of operations. The RAC Operations Supervisor will document the rail bench inspection on the Daily Radar Evaluation Report (Form 1900) and attach any associated photographs.

Monitoring personnel will conduct visual inspections when atypical slope movement is detected by the radar monitoring unit, a geotechnical or critical alarm threshold is reached, following a rockfall event, or following rainfall exceeding 0.5 inch in 24 hours. Visual inspections are documented on the Hillside Visual Inspection Form (1904).

The type of inspection should be denoted, such as “Weather Event” or “Alarm,” and the form should include details in the Observations and/or Additional Notes sections to sufficiently document the inspection. Photographs should be taken to document the current slope conditions and any observed anomalies. Attach photographs to the form. A geologist or geotechnical engineer will complete or check the form to verify observations.

The Project may also conduct periodic inspections of the mesa at the top of the hillside, as needed.

### **3.2 Radar Monitoring**

A radar monitoring unit has been set up at the Moab site in the northern laydown area. The unit is designed to detect sub-millimeter displacement of medium- to large-sized areas before a major rockfall event. The radar unit provides continuous coverage of the hillside. Training is required for all personnel operating or maintaining the radar unit. Operations of the radar unit and evaluation of the data collected are addressed in the *Moab UMTRA Project Radar Operations Procedure* (DOE-EM/GJ2165).

The *Moab UMTRA Project Baseline Radar Configuration* (DOE-EM/GJTAC2171) describes the geotechnical and geological basis used to establish the initial region boundaries and alarm thresholds for the radar unit. Threshold settings are periodically evaluated by the Radar Team to determine if adjustments are warranted. Setting changes are addressed in the *Radar Operations Procedure*.

The radar unit communicates alarms via email and text messages to select monitoring personnel and management. Radar Team member responses to alarms are addressed in the *Radar Operations Procedure*. Site operations responses to critical threshold alarms are included in the *Moab UMTRA Project Emergency/Incident Response Plan* (DOE-EM/GJ1520).

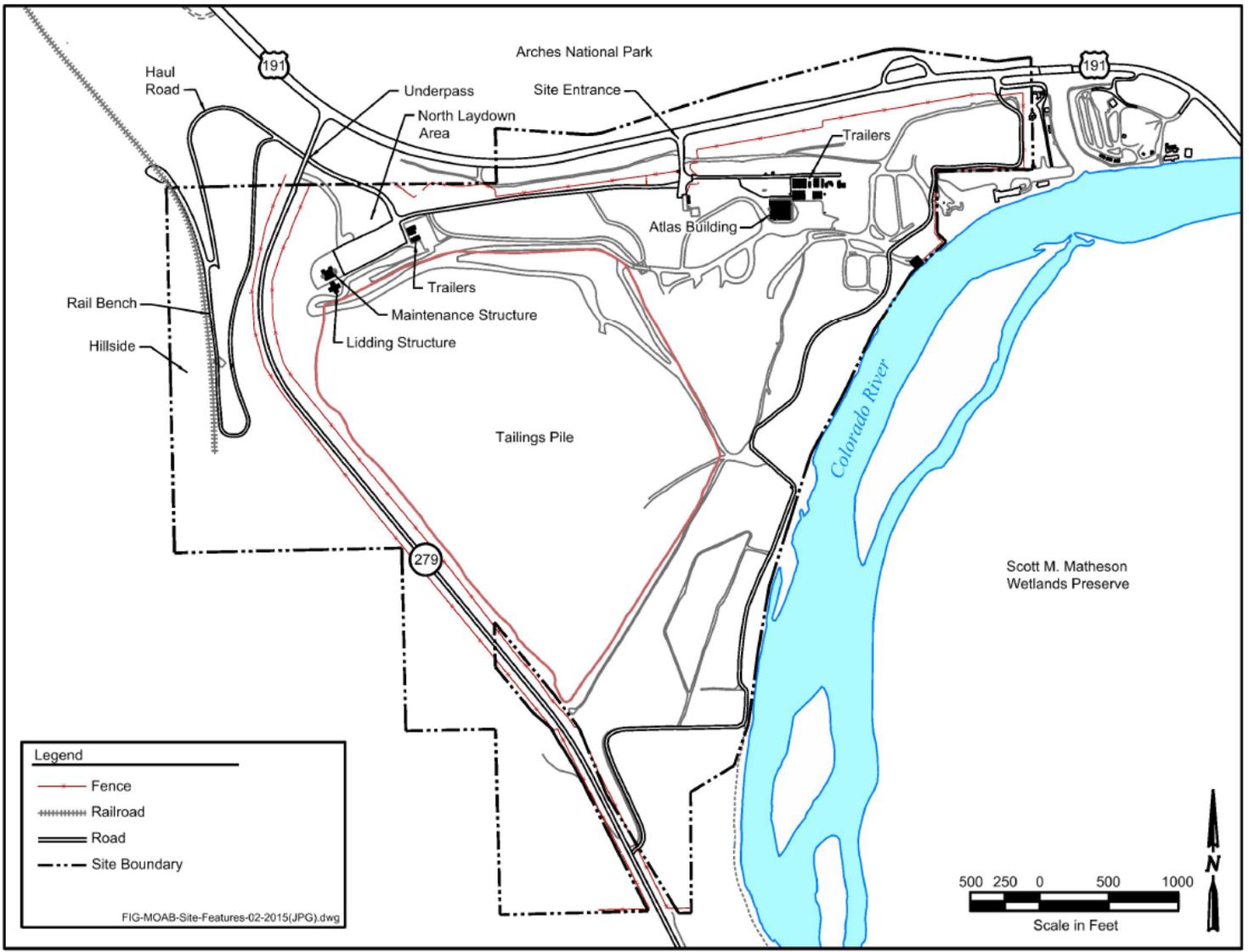


Figure 2. Moab Site Features

### **3.3 Video Monitoring**

Two video cameras have been set up to view the hillside. One is mounted on a pole located on the rail bench and the other is located near the radar unit. The camera can be remotely manipulated vertically or horizontally to change the section of the hillside being viewed; however, the steepness and curvature of the hillside prevents a complete view from a single camera. Other video cameras may be installed, as deemed appropriate, to augment these cameras.

Video monitoring is accessible to designated Project personnel. Video monitoring is limited to real-time viewing; no record of the footage is maintained.

### **3.4 Rock Spotting**

Project personnel trained to watch the hillside for movement are stationed at the site as directed by the Moab Operations Supervisor when rock spotters are deemed appropriate. The responsibilities of rock spotters are covered in the IWP/JSA relevant to the specific task. The rock spotters are trained using Project-developed, site-specific computer based training. Rock spotters shall alert the supervisor of any material movement on the hillside.

### **3.5 Other Observational Data**

The Project may periodically employ the use of other observational tools to monitor the hillside, especially if substantial movement has been identified through other means. Other data tools could include Light Detection and Ranging (LiDAR) and ground-based or aerial photography.

## **4.0 References**

DOE (U.S. Department of Energy), *Moab UMTRA Project Baseline Radar Configuration* (DOE-EM/GJTAC2171).

DOE (U.S. Department of Energy), *Moab UMTRA Project Emergency/Incident Response Plan* (DOE-EM/GJ1520).

DOE (U.S. Department of Energy), *Moab UMTRA Project Radar Operations Procedure* (DOE-EM/GJ2165).