Red Ink Mine Waste Pile #5 Review

An onsite meeting concerning the stability of the Red Ink mine waste pile #5 occurred on October 4th, 2011. The following were in attendance,

Richard Sykora, Owner/Operator/Permittee Red Ink Mine
Mike Sykora, Co-owner Red Ink Mine
Chris Fischer, District Ranger
Rick Weaver, Forest Minerals & Geology Program Manager
Stephen Romero, P.E., Regional Geotechnical Engineer

Discussions centered on planned construction methods and the work plan on waste pile #5. Other features on the project were also inspected which included waste piles 1 through 4, the drainage upstream of waste pile #5, and the damage caused by trespassers on the project excavating the waste piles for gold fragments.

A number of reports and information supplied by Rick Weaver related to the Red Ink mine located on the Tahoe, NF were reviewed and included,

1. Proposed Stockpile 5 Plan Sheets and Stability Review, January 26, 2007, Holdrege and Kull Consulting Engineers.
2. Proposed Stockpile 5 Plan Sheets and Stability Review, January 26th, 2007 (Revised March 12, 2007), Holdrege and Kull Consulting Engineers.
3. Notice of Violation (Nov) Red Ink Maid Mine, Department of Conservation, California, August 11, 2011. ID #91-31-0020
4. McClintock Resolution, September 30th, 2011.
5. State Mining and Geology Board Executive Officers Report, October 13th, 2011
6. Big Seam-Red Ink Geotechnical Inspection Memo. Jonathan Berry P.E., July 8, 2010.
7. California Regional Water Quality Control Board, '*Wasterock Stability Evaluation and Initial Characterization Big Seam and Red Ink Main Mining Claims, Placer County*', November 8th 2006.
8. Central Valley Regional Water Quality Control Board Inspection Report, March 17th, 2010

Observations

Waste Pile #5:

The construction methodology described by the operator to achieve the required final slope was discussed. The Operator agreed to meet all recommendations outlined in the revised Holdrege and Kull Proposed Stockpile 5 Plan Sheets and Stability Review, including a maximum unreinforced slope angle of 33 degrees in the final configuration. The Forest Service suggested that other toe stabilization methods, in addition to a gabion wall forwarded by Holdrege and Kull, be considered to increase storage capacity. Suggestions included a reinforced rock gravity structure combined with mini/micropiles. The intermediate and final slope configurations discussed are depicted in Figures 1 and 2. The construction methodology – as described by the Operator – appeared adequate. The stability of the intermediate and final configuration is the responsibility of the operator and his engineering representative. General details about methods to achieve the required stability during construction of the waste pile were discussed. Specific details to achieve the required stability were deferred to the Operator and his engineering representative.

The drainage basin the waste pile is located was scoured to bedrock using hydraulic mining techniques. A small pipe was placed across the Forest Service road above the waste pile to divert water collected in the scoured basin above the road to an adjacent drainage. The pipe appears to be at least a third full of sediment. In the event of a significant precipitation event the pipe will likely plug which would cause the water to flow over the road, down the scoured drainage basin, and into waste pile #5. The crushed rock contained in waste pile #5 is highly permeable and would conduct water rapidly resulting in a depressed ground water surface near bedrock. However, long term groundwater response is uncertain and difficult to predict. To insure maximum stability and minimize discharge from the waste pile diversion/control of surface water away or around the pile should be planned. This would include establishment, maintenance and/or replacement of drainage features.

Waste Pile 2:

A small rotational slump was observed on the Northeast corner of the pile along the access road. The slump should be monitored for movement by establishing a reference point or survey marker on the slump. Monitoring of the slump should be conducted annually, after significant precipitation events, or when movement is observed.

Stabilization of the slump could be achieved through a variety of methods that could be used individually or in combination and include, but are not limited to,

1. Installing a geomembrane to encapsulate fill preventing water from infiltrating.
2. Installing geogrids while recompacting and keying in affected fill.
3. Installing micropiles to reinforce the fill.
4. Installing soil nails to reinforce the fill.
5. Installing a keyed in reinforced rock buttress on the toe of the slump if it can be identified accurately.

Drainage measures would be included with each alternative.

Waste Pile # 4:

A translational landslide was observed. The toe of the slide appears to be breaking off generating debris flows to the non-perennial creek below. The debris flows have scoured the area below the toe of the slide which is now essentially a debris shoot.

The landslide should be monitored for movement by establishing a reference point or survey marker on the landslide. Monitoring of the landslide should be conducted annually, after significant precipitation events, or when movement is observed.

Stabilization of the landslide could likely be achieved through a variety of methods that could be utilized individually or in combination and include, but are not limited to,

1. Installing a geomembrane to encapsulate fill preventing water from infiltrating.
2. Installing micropiles to reinforce the fill.
3. Installing soil nails to reinforce the fill.

Drainage measures would be included with each alternative.

In addition, remediation of the debris shoot might be required after stabilization. Reseeding of the debris shoot might be all that is needed. However, given the steepness of the terrain which exceeds 75% in many locations reseeding could have limited success. Installation of a permanent turf reinforcing matt should be considered to insure the re-establishment of vegetation in a reasonable timeframe.

Figure 3 approximates the layout of waste pile #1 based on field observations.

Site Security:

Significant damage to waste pile 2 and 4 due to trespassers salvaging gold from waste rock was observed. Trenching and excavated holes was observed at both sites. The disturbance destroyed recovery efforts on waste pile 1. Security measures that might be considered for the project include, but are not limited to,

1. Satellite based remote sensing to detect intruders. Base system approximately $1000 with $29 monthly service fee. http://www.amc-wireless.com/
2. Webcam could be included to insure the intruder is actually human. http://www.commercialnetworkservices.com/streamingmedia/howtosetupawebcam.htm

INTERMEDIATE/FINAL SLOPE CONFIGURATION

Final grade shall equal stable slope angle specified in Holdrige and Kull report of 33 degrees. Final design details for alternatives depicted is the responsibility of the Operators engineering representative. The construction sequence depicted is interpretive and may not accurately represent the intermediate construction configuration(s). The Operator is responsible for stability of both intermediate and final outslope configurations.

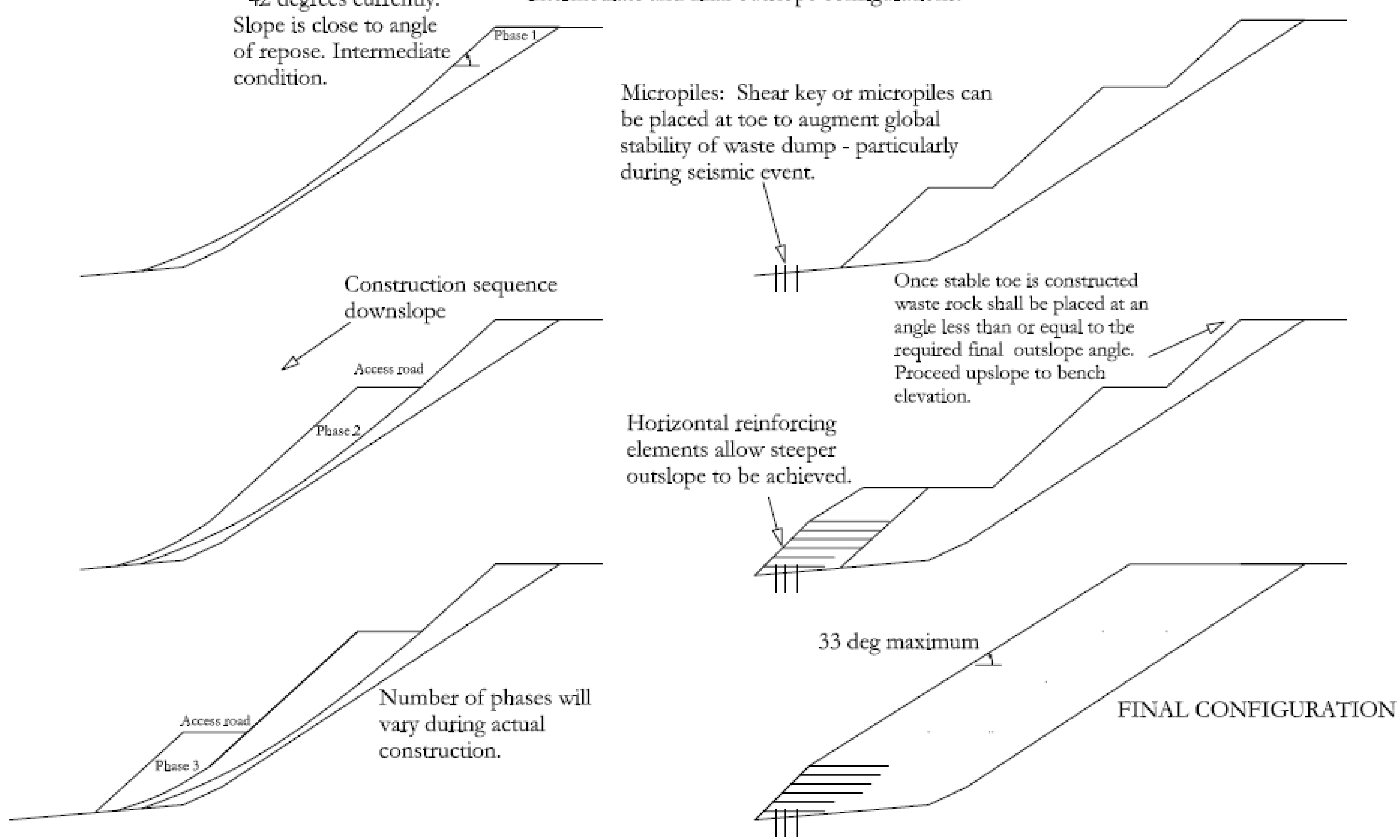


FIGURE 1

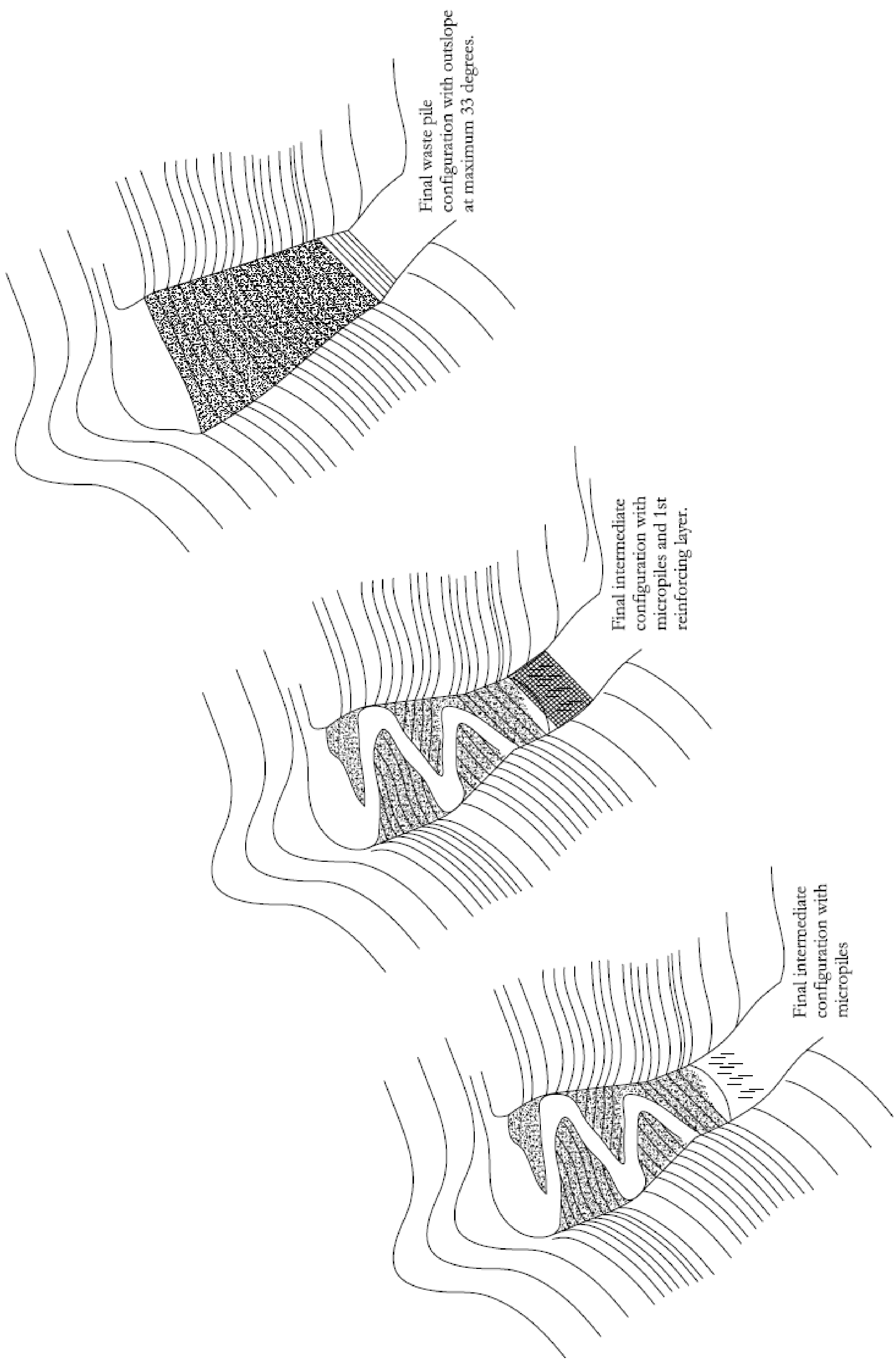
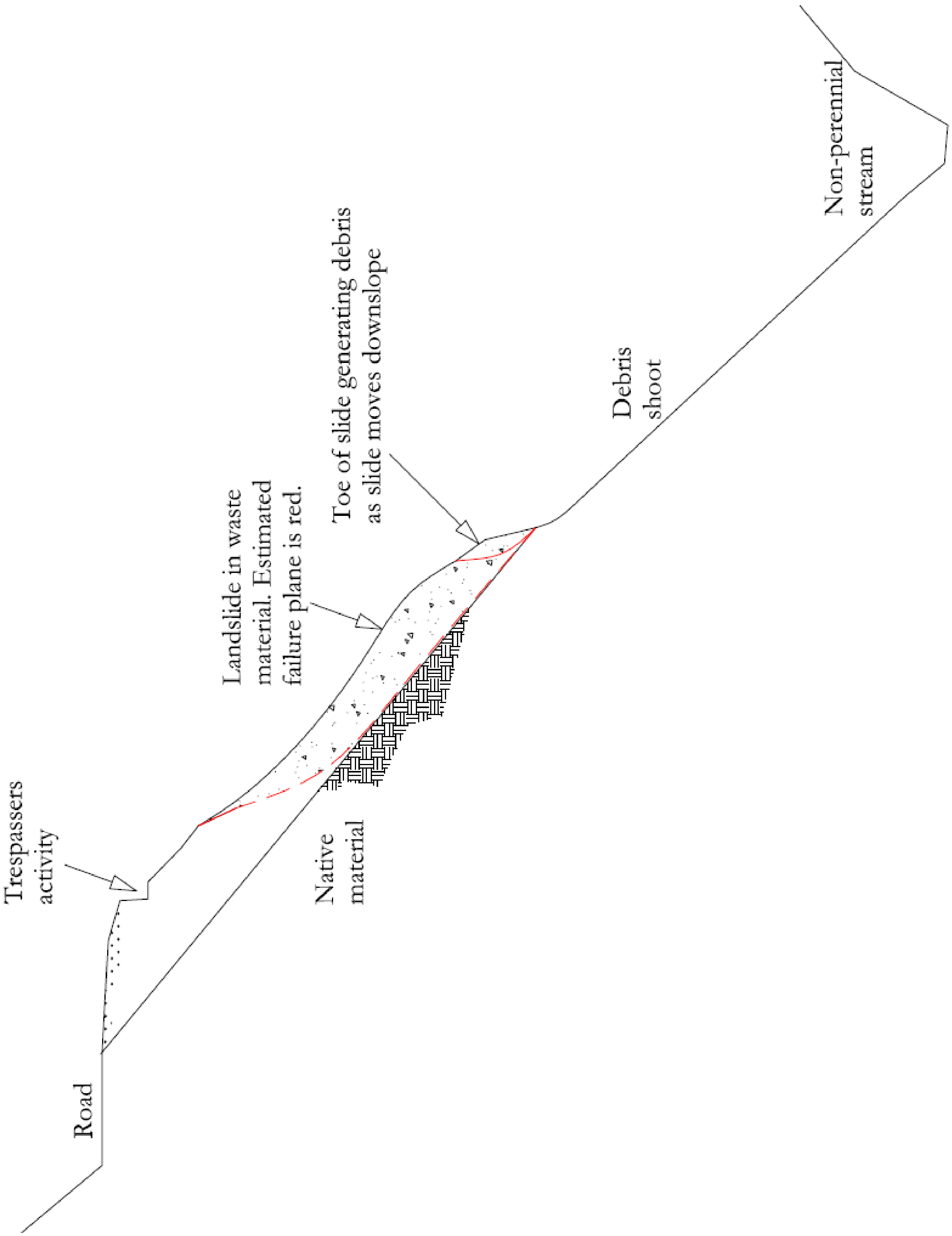

Final waste pile configuration with outslope at maximum 33 degrees.
Final intermediate configuration with micropiles and 1st reinforcing layer.
Final intermediate configuration with micropiles

FIGURE 2



Non-perennial stream
Debris shoot
Toe of slide generating debris as slide moves downslope
Landslide in waste material. Estimated failure plane is red.
Trespassers activity
Native material
Road

FIGURE 3

Conclusions

Intermediate configurations of waste pile #5 proposed by the operator have marginal static stability. Though the construction methods proposed to achieve the required final outslope grade (Figures 1 and 2) appear feasible it is the responsibility of the operator and his engineering representative to insure stability during all phases of construction on waste pile #5. Storage on waste pile #5 can be increased with the inclusion of a gravity structure at the toe of the fill – gabion wall, reinforced rock buttress, or similar structure. Global stability of waste pile #5 can be improved by keying in the gravity structure or installing mini/micro piles. Surface water management needs to occur on waste pile #5. A monitoring program on waste piles 2 and 4 needs to be established to develop a functional relationship between slump/landslide movement and precipitation.

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