



April 10, 2020

Twentymile Coal Company
29515 RCR #27
Oak Creek, CO 80467

Attn: Miranda Kawcak

Job Number: 08-7915

Subject: Additional Slope Stability Analysis, Coal
Refuse Disposal Area Expansion Modifications,
Twentymile Coal-Foidel Creek Mine, Routt County,
Colorado.

Miranda,

As requested, NWCC, Inc. has prepared this report, which outlines the results of our Additional Slope Stability Analysis completed for the Coal Refuse Disposal Area Expansion (CRDA) Modifications at the Twentymile Coal-Foidel Creek Mine in Routt County, Colorado. NWCC, Inc. previously completed a Geotechnical and Hydrologic Investigation for the CRDA under this job number and dated June 16, 2009.

Additional Slope Stability Analysis: The Additional Slope Stability Analysis was completed based on the modifications to the original layout of the CRDA. The existing CRDA was rotated approximately 10 degrees to the north from the original design layout. The current layout was modified to better match the existing topography at the site. The height of each bench has been limited to 50 vertical feet, per the original design.

Additional stability analyses were conducted for the existing layout and proposed fill slopes. The new cross section for the proposed CRDA is essentially the same as the previous analysis. Soil and bedrock parameters used in our previous analysis were used in this analysis.

Stability analyses were conducted using the Slope/W 2007® computer program developed by GEO-SLOPE International, Ltd. The Slope/W 2007 computer program uses a Limit Equilibrium Analysis and various standard methodologies for slope-stability calculations. The Morgenstern-Price method was used to calculate the factors of safety (FOS) against slope failure. This slope-stability computer model compares driving forces (i.e., forces causing the slope to move) to resisting forces (i.e., soil shear strength and cohesion). The calculated ratio of these forces yields an FOS value resisting failure. Theoretical factors of safety assist in evaluating the stability of the proposed maximum embankment section. A FOS of 1.0 indicates balanced driving and resisting forces, and an FOS of less than 1.0 indicates imminent slope failure.

NWCC calculated minimum FOS using automated search function and circular failure surfaces using the entire section of CRDA under drained conditions. A FOS of 2.3 was calculated for the proposed completed CRDA fill slope. A FOS of 2.2 was calculated for the global stability of the completed CRDA fill slope and existing reclaim spoils.

Conclusions and Recommendations: NWCC, Inc. believes that the existing slopes and future slopes for the CRDA will be stable. No significant changes in the FOS for the stability of the existing and current slopes is anticipated due to the modifications to the original design layout, as long as the vertical height for each bench does not exceed 50 feet. As noted in NWCC's original report, conservative soil properties were used in our analysis.

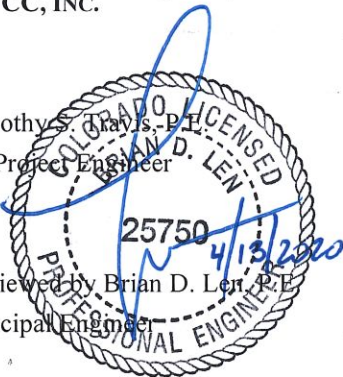
All of the other recommendations in the original report for haul road, and drain construction, coal waste placement and compaction and cover material should be followed in the construction of the CRDA.

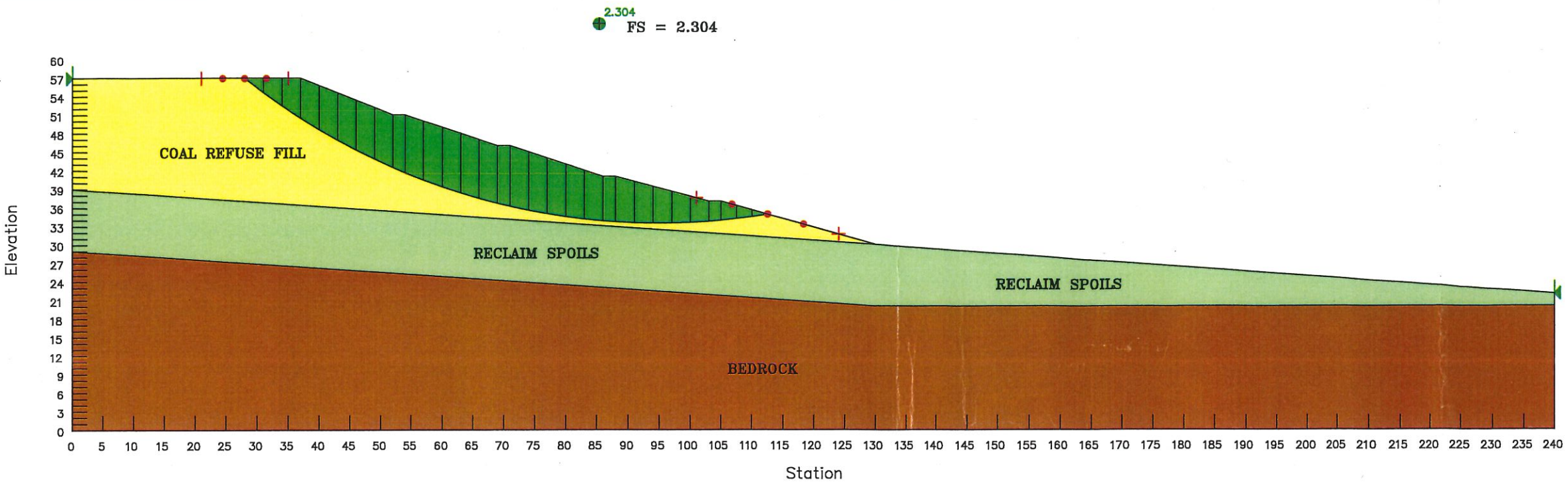
If you have any questions regarding this report or if we may be of further service, please do not hesitate to contact us.

Sincerely,
NWCC, INC.

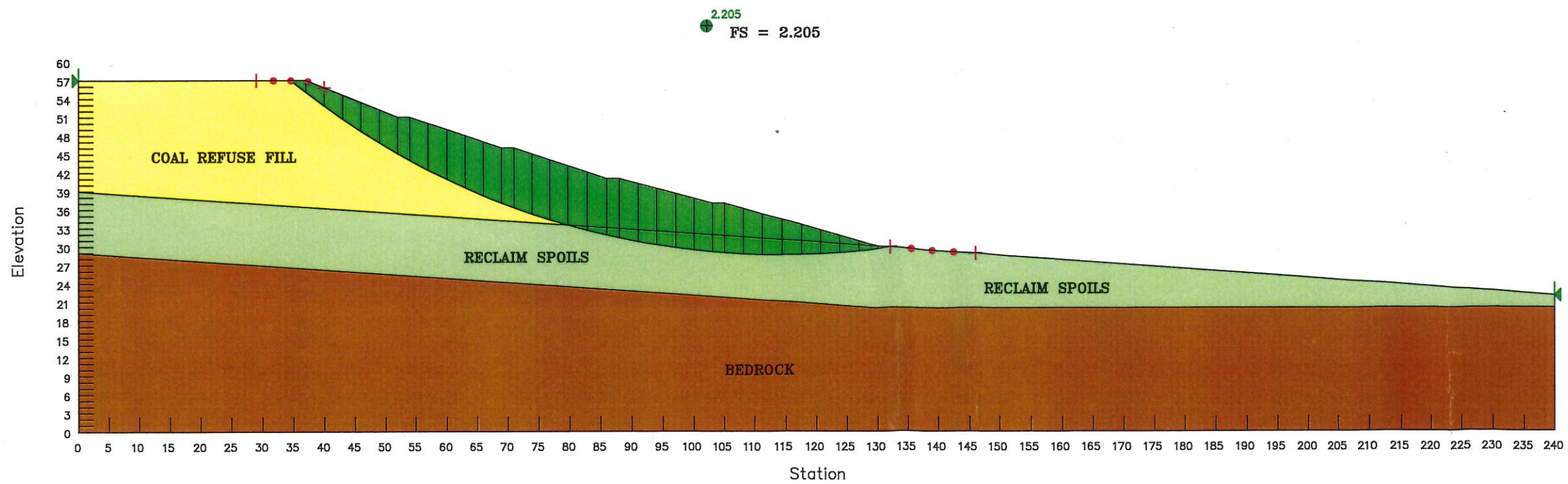
Timothy S. Gray, P.E.
Sr. Project Engineer

Reviewed by Brian D. Len, P.E.
Principal Engineer





COAL REFUSE
NOT TO SCALE



GLOBAL STABILITY
NOT TO SCALE



SLOPE STABILITY

**COAL REFUSE DISPOSAL
AREA MODIFICATION
TWENTYMILE COAL -
FOIDEL CREEK MINE
ROUTT COUNTY, CO**

REV.	REVISIONS	DATE	DRAWN BY	CHECKED BY

Job. No.	99-3983
Date:	4-9-2020
Drawn	TT
Chkd	BDL
Scale	N/A

Figure