APPENDIX G

SLOPE STABILITY TECHNICAL MEMORANDUM

TECHNICAL MEMORANDUM

CH2MHILL

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Division of Environmental Health

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DATE: May 23, 1991

SUBJECT: Slope Stability at Union Mine Disposal Site

PROJECT: SAC26423.1C

The Union Mine Disposal Site will be raised vertically and expanded horizontally over the next few years to accommodate the solid waste from the western portions of El Dorado County. I have made several site visits to observe the site conditions both from the ground and on aerial photos for both the existing slopes and the underground mine workings that are part of the expansion area. This memo provides my opinions on the stability of the slopes and areas of mine workings within the landfill expansion area.

SLOPE STABILITY

The slopes that will be covered with liners and solid waste consist of naturally vegetated slopes south of the expansion area and the existing landfill slope on the north side of the expansion area. The stability of the natural slope south of the expansion area was evaluated based on a visual reconnaissance of slopes in the area of the landfill. The south slope vegetation will be removed and a synthetic liner placed against the slope. The liner will consist of one or more layers of synthetic materials. The slope is heavily vegetated with brush and numerous oak trees which appear to be 50 to 100 years old. There is no evidence of slope instability found from either aerial photos or site reconnaissance. No cracked ground or depressions were observed. The only defects in the ground surface occur at several mine tunnel openings or vertical shafts which are discussed below. No slope failures were observed in any of the natural slopes surrounding the landfill.

Many cuts have been made in the cover soil borrow area for the existing landfill. These cuts are all in a highly weathered shale rock which breaks down rapidly under compaction. Apparently the orientation of the rock allows it to be excavated at a near vertical slope. There was no observed evidence of slope instability in the vicinity of the landfill.

Based on my observations, I do not think that any field exploration is warranted to evaluate slope stability. Although the natural slopes surrounding the Union Mine Disposal Site are quite steep, they are heavily vegetated and this will provide some increase in strength in the soil materials overlying the bedrock. We have no evidence to indicate that there are unstable conditions in the slopes surrounding the landfill.

STABILITY OF MINE OPENINGS

There are several mine openings that will be covered up by the landfill expansion area landfill. Concrete plugs will be placed over the opening of all tunnels and shafts as described in the "Closure and Postclosure Maintenance Plan." The concrete plugs will prevent movement of the overlying landfill liner from moving into any tunnel or vertical shaft. Since the weakest area of the tunnel is at its entrance, and the rock thickness over the roof increases as you move farther into the tunnel, the potential for cave-ins of any of the tunnels affected by the landfill expansion is extremely low. There is no evidence of subsidence or cracked ground on the hillsides on which the tunnels have been excavated. The tunnels are also typically quite small, being approximately 5 feet high and 5 feet wide. The openings are generally inherently stable with these small dimensions. The Springfield vertical shaft will be backfilled with onsite materials and a 10-foot-thick concrete cap placed over the opening. The soil and synthetic liner will then be placed over this area. Based on my observations of the rock in the vicinity of the shaft, the potential for subsidence of this area is extremely low.

In summary, the overall conditions of the slopes and the mine tunnels do not appear to present unusual problems to construction of the landfill expansion or the long-term maintenance of the landfill liner or top cap. The slopes in all areas appear to be stable, and there is no evidence of any ground subsidence.