

APPENDIX J
Longwall Mining Plan

LONGWALL MINING PLAN

1.0 Introduction

This *Longwall Mining Plan* outlines the procedures and safety measures that Columbia Gas Transmission, LLC (Columbia) will implement when areas of the proposed Leach XPress Project (Project) are affected by underground longwall mining activity.

2.0 Background Information

Longwall mining is a mining method that involves the subsurface removal of a resource; usually coal, through underground tunnels. Many underground mines can cause surface subsidence, however longwall mining subsidence is generally predictable, occurs almost immediately and the event is largely complete within one to three months. Residual subsidence can occur over a longer period, but it is generally small in nature. There are areas along the proposed pipeline route in Marshall county, WV that have been identified as potential future longwall mining panels.

3.0 Construction During Active Mining

In the event that a longwall mining panel is active between November 2016 and November 2017 along the proposed pipeline routes, Columbia will construct the pipeline within this particular panel after the subsidence period, if schedule allows. If the Project construction schedule cannot accommodate the active panel's subsidence then Columbia will lay the pipeline in the ditch on earth bags and delay backfilling the pipe until after the mining subsidence period. The spoil piles will be secured with environmental controls and seeding and mulch will be installed in the ditch as well as on the spoil piles to temporary restore the construction area.

Stream crossings and road crossings will be evaluated on a case by case basis and will involve input from agencies. Road crossings may require temporary bridges and traffic control measures. Stream crossings, depending on the stream and the location within the panel, will either be installed and backfilled as normal with monitoring on each side of the stream or the pipe will be laid across the stream with saddle sand bags on top of the pipe for buoyancy control.

In areas that have been identified as future longwall mines, the pipeline has been designed to a higher class strength of pipe as an additional precautionary measure. The monitoring of the pipeline within active panels during construction and during future operations will follow the same procedure as outlined below.

4.0 Monitoring

To relieve stress on the pipeline and mitigate damage during the subsidence period Columbia will strip out and monitor the pipeline. This mitigation measure involves removal of the overburden and trenching around the pipe to allow free movement without “pinning” the pipe. Removal of the overburden stops the transfer of load to the pipeline from soil weight. Typically the overburden will be removed from the pipeline across the panel and about halfway through the edges that separate longwall panels. The trench extends along the sides of the pipeline to the bottom of the pipe.

When the stripping is completed, monitoring of the pipeline shall begin as the mining approaches. Monitoring is typically done by installing and reading strain gages during the undermining of the pipeline and throughout the subsidence event. Strain gages are installed at locations on the pipeline where stress is expected to increase (over the edges of the panels, at overbends, near the center of the longwall panel, etc.) as a result of ground movement. A strain gage reader is used to measure strain induced upon the pipeline by the ground movement. A baseline reading and at least one additional set of strain readings shall be obtained prior to the undermining of the pipeline. This is for comparison purposes to assure that the strain gages are in working order. Pipelines may need to be realigned if calculated stress levels meet threshold limits, in this situation, air bags are used for this purpose, although excavators and side booms can also be used. In this case, the pipeline is instrumented using strain gages and verification that the realignment was effective can be accomplished quickly by analyzing readings after the re-alignment is completed.