GEO-FOUNDATIONS
Contractors Inc.

Lonestar Cape Girardeau

Date: 2002
Technology: Hot Bitumen Grouting

Rooster tail showing a portion of the total 40,000 GPM inflow

The most distinct feature of Lonestar's Cape Girardeau property is its 300-foot deep quarry where limestone is mined and conveyed a short distance to the plant where it is used in the manufacture of cement. In April of 2002, localized ground water seepage through the rock face near the base of the quarry, which had up to that point been nothing more than a mere nuisance, quickly gained momentum to the point where 2,500L/sec (40,000 USGPM) of water was entering the quarry subterraneously, leading within a few weeks to large-scale flooding and suspension of quarrying operations.

Extensive drilling and grouting work carried out from May to July succeeded in fortifying the ground above and near the primary flow conduits, but did nothing to curb the magnitude of the inflow. The main inflow was concentrated within two 6-metre thick, stratigraphically controlled solution cavity systems – one outcropping in the quarry at 75 metres and the other at 100 metres below grade at the location of the grout curtain. Both of these systems were continuously recharged directly by the Mississippi River less than half a mile away. The sheer magnitude of the void systems and the awesome erosive power of the water raging through them made even the stiffest low mobility cement-based grouts impotent at achieving any reduction in the inflow. At the end of July, Geo-Foundations was added to the project team as hot bitumen grouting specialist contractor.

Drilling and grouting work by others prior to Geo-Foundations' arrival on site was instrumental in preparing the grout curtain for the final phase of inflow elimination – any potentially erodable features that might allow water flow after creation of a hot bitumen plug had been treated by this comprehensive drilling and grouting, and this long phase of preliminary work led to crucial knowledge of precisely where the inflow was passing through the grout curtain. Hot bitumen injection, via 11 injection wells drilled 105 metres deep, was completed the day it was commenced, successfully eliminating the entire inflow. All told, the final grouting assault on the inflow consumed 285m^3 of hot bitumen grout, 230m^3 of low-mobility cement grout, and 840m^3 of slurry cement grout.

Hot bitumen stinger pipe installation

Grouting operation as seen on day of grout injection

302 Main Street North, Acton, Ontario, Canada L7J 1W9
Toll Free: 1-888-846-7858 Phone: (519) 853-3216 Web: www.geo-foundations.com