

# Case Study



The information in this case study is reprinted from the American Cyanamid AM-9 technical manual. AM-9 was American Cyanamid's acrylamide grout product. Avanti's AV-100 Chemical Grout matches the chemical formulation, usage and performance of AM-9.

## **Title:** Shutting Off Seepage at Missile Silo

**Location:** Atlas Missile Silo, York, Nebraska, U.S.A.

**Owner:** U.S. Government

**Engineer:** Soil Testing Services, Inc.

**Grouting Contractor:** Western Contracting Company

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## **PROBLEM:**

Excavation had progressed 80 feet at this missile installation when water seepage became a problem. Excess hydrostatic head pressure had caused a "quick" condition which resulted in the caving in of one of the quadrants. Deep wells were drilled in an attempt to lower the local water table, to no avail.

## **SOLUTION:**

When spilling, as well as drilling deep wells, proved ineffective, the contractor turned to grouting to get the job going again.

## **APPLICATION:**

In the caved areas, the loose, disturbed soil accepted cement grout, and this was pumped until it became obvious that most of the cement was being washed away before it set. AM-9 was then injected to fill the voids still open after cement grouting. Because the cement grout would not penetrate the fine soil in the uncaved areas, AM-9 was used alone. Chemical grout was placed through pipes driven from the surface. Two rings of pipes were used, spaced about 18 inches apart. Pipes in the inner ring were staggered with those in the outer. Spacing between pipes in both rings was about three feet. Gel time varied from 1 ½ to 3 minutes designed to leave narrow gaps between adjacent holes. Groundwater flowing through these gaps into the excavation carried the grout placed in the outer row into the gaps, thus effectively plugging them.

## **RESULTS:**

Grouting was accomplished quickly and effectively. After completion of the entire grouting pattern, work on the silo was resumed and no further caving problems occurred during excavation.