than solid (slurry). NaOH costs $60/ton f.o.b. NaOH reacts with mine water constituents to form metallic hydroxides and Na_2SO_4. The resulting water is soft as compared to the water resulting from lime neutralization. The relative merits of soft versus hard water discharged into a stream must be evaluated on the basis of end use of the water.

Only one full-scale (49) evaluation of NaOH treatment of mine water has been reported. A large midwest coal producer has been treating water impounded in abandoned coal strip mining pits for use as the water supply for its coal preparation plant. The resulting treated water was of such character as to affect the operation of the froth flotation operation in the plant. It is believed that the water treated with NaOH adversely affected the formation of the froth. The NaOH treatment was stopped.

E. Ammonium Hydroxide Systems:--NH_4OH reacts with acid mine water similarly to NaOH and $Ca(OH)_2$. Widespread uses of NH_4OH is not expected due to high cost $92/ton and to the potentially hazardous affect on fish.(50)

One full-scale treatment plant using anhydrous NH_3 for treating strip pit water is known.(51) The plant operates on a closed loop cycle.

F. Sodium Sulfide System:--The reactions involved in the treatment of mine water with sodium sulfide include the following:

$$S^{=} + Fe^{+2} \rightarrow FeS$$

$$3S^{=} + 2Fe^{+3} \rightarrow Fe_2S_3$$

Both ferrous and ferric sulfides are insoluble and can be separated from water. In addition, the use of sodium sulfide will simultaneously neutralize the treated water. Bituminous Coal Research, Inc., under a grant from the Appalachian Commission, issued June 26, 1967, has initiated an evaluation of the use of sulfides as a potential mine water treatment. No data are available as yet.