VIII. CONCLUSIONS AND RECOMMENDATIONS

Unquestionable, the B Tunnel and C Tunnel discharges are the most important pollution sources which deserve abatement measures. These two tunnels contribute the greatest volume of pollution loading to the Loyalsock Creek--far greater than any other source in the watershed. There are two approaches for handling this problem-deep mine sealing and neutralizing treatment.

1. Deep Mine Sealing is a feasible alternative which would reduce the pollution loading to Loyalsock Creek, but would not totally eliminate it. Depending on the hydraulic equilibrium obtained, additional points of seepage or direct discharge would develop on the southerly side of the Basin and eventually lead to Loyalsock Creek. Secondly, because of the potential for future strip mining within the area of the deep mines, there is a question as to acceptability of this method particularly to mineral owners. The inundation of the mines would have a limiting affect on any future mining and thus certain legal implications would have to be clarified before this could be considered. Some type of water drawdown could be implemented with the deep mine seal, to provide for access to the coal veins, but this would eliminate the benefit of the mine seal. Thirdly, active strip mine operations have been initiated within the drainage basin of the tunnel discharges. It might be unwise to attempt deep mine sealing when strip mining is in such close proximity to the sealing areas. Certain precaution would be required in regard to the limits of the stripping operations, specifically relating to the permeable nature of the boundary walls.

2. Neutralization Treatment can be a complex and very costly undertaking. However, its end result can practically eliminate the pollution potential of the tunnel dishcarge by balancing the acid loading. Because of the wide range of treatment facilities that can be included with any system, the cost of a treatment plant can be extremely high. These first costs, coupled with continuous operating and maintenance requirements, such as neutralizing reagents, power needs, and direct labor, make treatment very expensive. Based on this, a system such as the rotating limestone drums, which is simple in operation and can be constructed without power requirements, would best serve the needs of this project. Although no treatment system could be designed to accommodate peak flows from the tunnels, higher than average daily flows could certainly be treated effectively. In addition, treatment could be implemented regardless of adjacent mining operations, present or future. Based on the analysis of the continuous flow monitors at the tunnel discharges, the maximum design flow for a treatment system should be: B Tunnel Discharge - 12.9 mgd, C Tunnel Discharge - 5.2 mgd. These flows would occur during the winter and spring months, while during drier summer periods the flows would be somewhat less. Any treatment plant should be equipped with provisions for diverting of water during peak flows.

Extremely high flows would dictate that total treatment is not feasible at all times, but it is anticipated this would not produce any adverse impacts on Loyalsock Creek over an extended period of time. Alternatively, the rotating drum method of treatment lends itself well for maximum efficiency during low flows when not all components of the system are required to be used.

3. The abandoned strip mine areas outlining the Connell Deep Mine Complex provide avenues for infiltration to the deep mines and thus contribute to the flows from the tunnels. Project Areas No. 3, 4, 5 and 6 are included in this category: Abatement measures would diminish the amount of flow from the tunnels but in general would not have a major influence on the overall water quality of the Loyalsock Creek. These Project Areas should be given secondary priority.

4. All other project areas outlined in this study are not critical in terms of pollution loading and therefore deserve a low priority rating. These include (a) abandoned strip pits that are not associated with the tunnel drainage pattern, (b) refuse piles and spoil areas which eventually drain to Birch Creek and are not significant in terms of pollution loading, and (c) discharges which drain from the northerly side of the basin and have a minimal detrimental affect on Birch Creek. Because of the benefit derived from these projects versus the costs for abatement, these areas should not be given primary attention.

5. Recommendation Summary.

It is recommended that the B Vein Tunnel Discharge and the C Vein Tunnel Discharge be given major consideration for pollution abatement projects. Based on the existence of active strip mining in the immediate area, neutralization treatment should be used to abate the acid loading from those tunnels. Furthermore, in order to minimize first costs and operating expenses, the use of rotating drums with limestone should be strongly considered as a treatment alternative.

Abandoned strip mine areas, directly relating to the deep mine hydraulics, should be given a secondary priority, in order to minimize deep mine recharge.

All other abatement project areas should not be given priority status, due to their lesser impact on water quality of the basin.