CONCLUSIONS

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Station 3 Shaw Mines Run

1. Statistically significant reductions in acid, iron and sulfate concentrations and loads are evident at Station 3 comparing data from 1967-71 to the most recent sampling done in 1982-83. The reductions are roughly on the order of 40%. Flows are unchanged over the period of record.
2. During the period 1962-72, strip mining followed the croplines of the Pittsburg and Redstone coals north of Shaw Mines Run from the village of Shaw Mines to Summit Mills. Mining during 1972-78 was on the south side of Shaw Mines Run, and from 1975-79 the Saylor's Hill area, which drains to Shaw Mines Run, was strip-mined.
3. The strip mining and daylighting operations appear to be responsible for the observed improvement since 1967-71 in the concentrations and loads of AMD discharging from Shaw Mines Run to the Casselman River.
4. Pa. DER project No. SL 118-3, the box cut and clay seal near Summit Mills, installed during 1969-71, is constructed parallel to structural dip of the coal and is located on the updip edge of the ground watershed discharging to Shaw Mines Run. Therefore, this project does not appear to have contributed to the observed water quality improvement.
5. Pa. DER Project SL 118-4, the grout curtain, includes part of the southwestern side of the structural basin draining to Shaw Mines Run. As this project was completed by mid-1973, it may have contributed to the improvement in Shaw Mines Run.

Weir No. 11

1. Statistically significant reductions in acid and sulfate concentrations and loads of about 30-40% appear between earliest sampling (1972-73) and most recent data (1980-83). Iron concentrations and loads show no change over same period. Flows are consistent over the period ofrecord .
2. Pa. DER Project SL 118-2, valley clay seal on the south end of the grout curtain, was finished in mid-1971 and the grout curtain (SL 118-4) was completed by mid-1973. Both projects lie immediately west and south of Weir 11. The earliest sampling data (1972-73) is statistically identical to the middle time group (1974-76), and the reduced acid and sulfate levels do not appear until 1980-83. Hence, the grout curtain and clay seal do not appear to be responsible for the improved discharge from Weir 11 seen after 1976.
3. Strip mining and daylighting operations done in the central uplands portion of SMC during 1972-78 (see Geologic Base map) appear to be most likely responsible for the observed improvement in Weir 11 discharges.

Station 13 Coal Run

1. During the period of record, 1972-83, acid and sulfate concentrations and loads are essentially unchanged (statistically indistinguishable). Although present iron concentrations are reduced from 1972-73 levels, iron loads are not statistically different for any of the time periods. Flows are unchanged over the period of record.
2. Strip mining activity in the Coal Run watershed, started in 1978, has been at its maximum level of intensity during 1982-83. Thus far, the

stripping has not produced any measurable change on the AMD loads discharging from Coal Run. It is quite likely that any significant improvements in Coal Run will not occur until reclamation of the presently active mine sites is completed.

3. There are no Pa. DER projects which would directly affect discharges to Coal Run.

Total AMD Loads and Casselman River

1. The sampling point on the Casselman River at Boynton (No. 6), upstream of SMC shows a general improvement in water quality from 1967 to 1983, but high variability in the data precludes quantifying this change. Since 1978 acidity is virtually zero.
2. The Casselman sampling station (No. 7) at Meyersdale downstream of SMC shows no statistically distinguishable changes in sulfate, iron and acidity concentrations and loads due to high volume and variability of flows, and for iron, variations in the techniques of filtering and acidifying samples.
3. As the only non-reactive component of mine drainage reactions, sulfate is the best indicator of total AMD production. For 1980-83 the sum of average sulfate loads from Stations 3, 11 and 13 (29,500 lbs/day) plus the upstream load at Station 6 (16,900 lbs/day) totals about 46,400 lbs/day. The actual average sulfate load for 1982 observed at Station 7 is 47,000 lbs/day, a remarkable comparison.
4. The total of the average acid loads for all three AMD input sources, Stations 3, 11 and 13 for 1980-83 is 15,300 lbs/day. The mean acid load in the Casselman downstream of SMC at Station 7 for 1982 was only 7800 lbs/day. Therefore, the difference, or some 7500 lbs/day of acid load, is apparently neutralized by natural processes in the Casselman.

5. It appears that Coal Run is the greatest source of acid load to the Casselman (44%), closely followed by Shaw Mines Run (39%), while Weir 11 contributed only about 17% of the acid load in the most recent period 1980-83.
6. The largest contributor of sulfate load from SMC is Shaw Mines Run (49%) while Coal Run provides only 36% and Weir 11, 15%. This suggests that some of the AMD generated in the watershed of Shaw Mines Run is neutralized before it is discharged, since Coal Run is the leading acid load contributor to the Casselman.