SURFACE WATER HYDROLOGY (880-X-8E-.06(1))

1. Surface Water Hydrology Description:

The proposed permit area is located in the Warrior River Basin and is drained by unnamed tributaries to Mulberry Fork and Mulberry Fork. Stream flow varies with rainfall with low flows usually occurring in the summer months and high flows occurring in January. During the periods of low precipitation, base flow tends to be low. The long-term effect of mining in this area will be calculated from data collected at Station SW-1 (upstream) on Mulberry Fork and SW-2 (downstream) on Mulberry Fork.

All surface water leaving parts of the permit area that has been disturbed by mining will be routed through ten (10) sediment basins before being discharged into state waters. All streams in Alabama are considered to be waters of the state. There are no springs located within the permit boundaries. Water will only be allowed to exit the permit area through approved sediment basins. The Alabama Department of Environmental Management designation of streams within the surrounding area is as follows: The Alabama Department of Environmental Management has classified Mulberry Fork as “Public Water Supply” and "Fish and Wildlife". The USGS Hydrologic Unit Code and SCS Sub-watershed Number for the area streams is 03160109-190. The watershed boundary acreage for this permit is 254 acres. The Alabama Department of Environmental Management NPDES Permit No. is AL0079936. Baseline surface water quality and quantity for this mine site will be characterized by data taken at Station SW-1 (upstream) on Mulberry Fork and SW-2 (downstream) on Mulberry Fork. Performance monitoring will be taken from SW-2 (downstream) on Mulberry Fork. Station SW-1 is located upstream (Mulberry Fork) of the permit area and drains approximately 1,230,715 acres or 1923 square miles. Station SW-2 is located downstream (Mulberry Fork) of the permit area and drains approximately 1,234,555 acres or 1929 square miles. Approximately 178 acres will be disturbed by this mining operation at Station SW-2. Data collected from SW-2 downstream of the mine site will be used in the

water quality projections. For the locations of the surface water monitoring stations see the attached Surface Water Monitoring Stations Map.

2. Surface Water Bodies

Ten (10) sediment control structures are proposed for this mining operation. The basins are proposed as permanent structures. For the locations of surface water monitoring stations see the Surface Water Monitoring Stations Map. For the locations and NPDES numbers of sediment basins see attached Hydro-Geo Map in Part II-E.

3. Surface Water Uses:

The known uses of surface water on Mulberry Fork are considered to be a public water supply and fish and wildlife as classified by the Alabama Department of Environmental Management.

4. Surface Water Quality:

For surface water quality see attached Surface Water Baseline Analysis. Samples taken from SW-1 and SW-2 indicate that the water in Mulberry Fork is of good quality as shown in the Attached Surface Water Baseline Analysis all parameters are within the expected EPA limits. See attached Stream Monitoring Sites Additional Metals Data.

5. Surface Water Quantity:

For water quantity and drainage areas see attached Surface Water Baseline Analysis and Surface Water Monitoring Stations Map.

6. Surface Water Sampling and Analytical Methods:

All surface water samples were taken by the grab method. Flowrate measurements of surface water samples were performed in accordance with ASTM D3858, 10.9.6, p.101 "Standard Practice for Open Channel Flow Measurement of Water by Velocity - Area Method". Specific Conductivity and pH of all samples were measured in the field. The samples were poured in a clean plastic container and stored at a temperature near 4^{o}C and all other parameters were analyzed within 24 hours. If samples were not analyzed within 24 hours, after the pH was measured, the pH was adjusted to 2.0 S.U. or less with Nitric Acid (about 2 mL per liter) which allows samples to be stored up to six months at room temperature. Prior to analyzing other parameters, the pH was re-adjusted to between 4.0 and 5.0 S.U. with 0.1N Sodium Hydroxide. Samples for TSS and sulfates that were not run within 24 hours were refrigerated near 4^{o}C and TSS analyzed within 7 days and sulfates within 28 days. Sample preservation if used was in accordance with Table 1060:I (Summary of Special Sampling or Handling Requirements) from Standard Methods for the Examination of Water and Wastewater 17th Edition 1989 (page1-37).

7. Precipitation Modeling:

No modeling methods are employed at this time.

8. Surface Water Monitoring Station Location(s):

For locations of surface water monitoring stations see the attached Surface Water Monitoring Stations Map.

9. Surface Water Sampling and Analytical Information:

For Sampling and analytical information see above statement 6 and attached Surface Water Baseline Analysis. All surface water samples collected by McGehee Engineering Corp. were analyzed for the pH, Total Iron, Total Manganese, Total Suspended Solids, Acidity, Alkalinity, and Sulfates. The vast majority of the chemical analyses are completed within 24 hours of sample collection.

SURFACE WATER BASELINE ANALYSIS

SAMPLE I.D.: SW-1
MONITORING SOURCE: MULBERRY FORK
DRAINAGE AREA: 1923 SQ. MI.
LOCATION FROM MINE: UPSTREAM

DATE	DISH. cfs	pH s.u.	SpC u-mhos/cm	TSS Mg/l	Fe Mg/l	Mn Mg/l	SO_4 Mg/l	ACID Mg/l	ALKA Mg/l
09-17-08	661	7.51	50	2	0.16	0.14	9	7	28
10-03-08	937	6.60	63	1	0.04	0.04	23	23	68
11-01-08	641	7.37	83	11	0.13	0.04	37	27	118
12-02-08	3060	6.41	237	7	0.09	0.04	129	0	24
01-09-09	5170	6.49	95	11	0.77	0.08	20	17	37
02-20-09	8770	6.76	107	1	0.23	0.11	16	0	53
04-08-09	3384	6.82	63	3	0.48	0.18	12	18	27

SURFACE WATER BASELINE ANALYSIS

SAMPLE I.D.: SW-2
MONITORING SOURCE: MULBERRY FORK
DRAINAGE AREA: 1929 SQ. MI.
LOCATION FROM MINE: DOWNSTREAM

DATE	DISH. cfs	pH s.u.	SpC u-mhos/cm	TSS Mg/l	Fe Mg/l	Mn Mg/l	SO_4 Mg/l	ACID Mg/l	ALKA Mg/l
09-17-08	661	8.23	93	4	0.19	0.12	9	15	18
10-03-08	937	6.89	59	1	0.04	0.04	22	17	51
11-01-08	641	7.29	89	7	0.10	0.03	39	29	123
12-02-08	3060	6.63	246	17	0.14	0.05	109	0	8
01-09-09	5170	6.47	96	9	0.69	0.08	21	45	24
02-20-09	8770	6.96	97	0	0.19	0.09	12	7	64
04-08-09	3384	6.36	83	2	0.19	0.06	13	47	34

Note: All samples taken were sampled and analyzed by McGehee Engineering Corp. within the same calendar day. Additional samples will be submitted when they are received.

SEASONAL DATA

SAMPLE I.D.: SW-1
MONITORING SOURCE: MULBERRY FORK
DRAINAGE AREA: 1923 SQ. MI.
LOCATION FROM MINE: UPSTREAM

SEASON	DISH. cfs	pH s.u.	SpC u-mhos/cm	TSS Mg/l	Fe Mg/l	Mn Mg/l	SO_4 Mg/l	ACID Mg/l	ALKA Mg/l
SPRING	3384	6.82	63	3	0.48	0.18	12	18	27
SUMMER									
FALL	746	6.97	65	5	0.11	0.07	23	19	71
WINTER	5667	6.53	146	6	0.36	0.08	55	6	38
AVERAGE	3266	6.73	106	6	0.24	0.08	39	12	55

SAMPLE I.D.: SW-2
MONITORING SOURCE: MULBERRY FORK
DRAINAGE AREA: 1929 SQ. MI.
LOCATION FROM MINE: DOWNSTREAM

SEASON	DISH. cfs	pH s.u.	SpC u-mhos/cm	TSS Mg/l	Fe Mg/l	Mn Mg/l	SO_4 Mg/l	ACID Mg/l	ALKA Mg/l
SPRING	3384	6.36	83	2	0.19	0.06	13	47	34
SUMMER									
FALL	746	7.21	80	4.0	0.11	0.06	23	20	64
WINTER	5667	6.64	146	9	0.34	0.07	47	17	32
AVERAGE	3266	6.62	113	6	0.23	0.07	35	19	48