

PROBABLE HYDROLOGIC CONSEQUENCES DETERMINATION
CERTIFICATION STATEMENT

I, Keith Madison, a Professional Geologist as defined in Section 880-X-2-.06 of the Regulations of the Alabama Surface Mining Commission, hereby certify that the Probable Hydrologic Consequences Determination information included in the answers to Part II-H of this application were prepared by C & C Engineering Co., Inc., and the information included therein is correct and accurate to the best of my knowledge and belief.

McGehee Engineering Corp.

Keith Madison

Keith Madison
Geologist

1/12/95
Date

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PROBABLE HYDROLOGIC CONSEQUENCES DETERMINATION (880-X-8E-.06(1)(F))

1. PHC OF SURFACE MINING ACTIVITIES

As stated in the groundwater section, there are no known users of groundwater wells within or adjacent to the proposed permit area. As stated early in the groundwater section, the groundwater system has already been impacted due to the extensive surface mining within and adjacent to the permit area. Mining at this mine site should have no adverse effects upon the onsite and offsite groundwater aquifers.

Information provided in the Geochemistry part of this application reveals that the Acid-Base Account of the overburden samples taken from drill holes has an average Acid-Base Account of +13.745. According to overburden analysis, no toxic or acid forming material was encountered during the drilling of the overburden. The weighted average includes all intervals down to the lowest coal seam to be mined but does not include the coal seam. This evidence suggests that additional environmental impact resulting from adverse overburden chemistry is not an important consideration at this mine site. Water that infiltrates will have to pass through the spoil. This material has buffering capabilities and is not potentially toxic or acid

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forming. Acid mine drainage is not anticipated at this mine site.

Onsite groundwater quality within the proposed permit area is expected to decrease slightly in the form of increased mineralization and a lower pH due to the groundwater being in direct contact with unweathered material. Groundwater quantity is expected to increase significantly due to the fracturing of layers of shale and voids created by mining. After mining, groundwater movement is expected to remain the same as pre-mining conditions.

Groundwater movement near the permit boundary will be towards the mine site from areas adjacent to the permit area with higher topography. After mining groundwater movement within the permit area will be controlled by the dip of the pit floor, which is to the south-southwest.

Permeability and storage within the permit area should begin to increase as regrading and revegetation begins. After years of weathering, compaction and chemical breakdown of the overburden it will begin to act as a soil again. With time groundwater storage should approximate premining conditions.

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Surface water runoff should not infiltrate or mineralize the groundwater to any significant degree and the groundwater quality should not be adversely affected onsite or offsite. The pit configuration will minimize the impact on runoff quantity. All runoff from the proposed mine site will drain naturally to the basins during mining. Once reclamation is complete surface water runoff will continue to flow to the basins naturally.

Surface water within the permit area consist of runoff in direct response to rainfall. There are no perennial streams located within the permit boundary. BMMDS1 located downstream on Cane Creek drains approximately 35,648 acres or 55.70 square miles. At station BMMDS1 approximately 118 acres or 0.33 percent will be disturbed by this mining operation. BMMDS2 located on Little Frog Ague drains approximately 934.4 acres or 1.46 square miles. At station BMMDS2 approximately 80 acres or 8.56 percent will be disturbed by this mining operation. BMMUS1A located upstream on Cane Creek drains approximately 10,368 acres or 16.20 square miles. BMMUS1B located upstream on Bull Barn Creek drains approximately 2,378 acres or 3.71 square miles. BMMUS2 located upstream on Little Frog Ague drains approximately 224 acres or 0.35 square miles.

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SURFACE WATER MONITORING STATIONS

SEC 26, T14S, R7W,
SEC 21, T14S, R6W,
SEC 1, T15S, R7W,
SEC 5, 6, & 7, T14S, R7W,

BEARD MINING & MINERALS
CO., INC.
CANE CREEK MINE

PREPARED BY

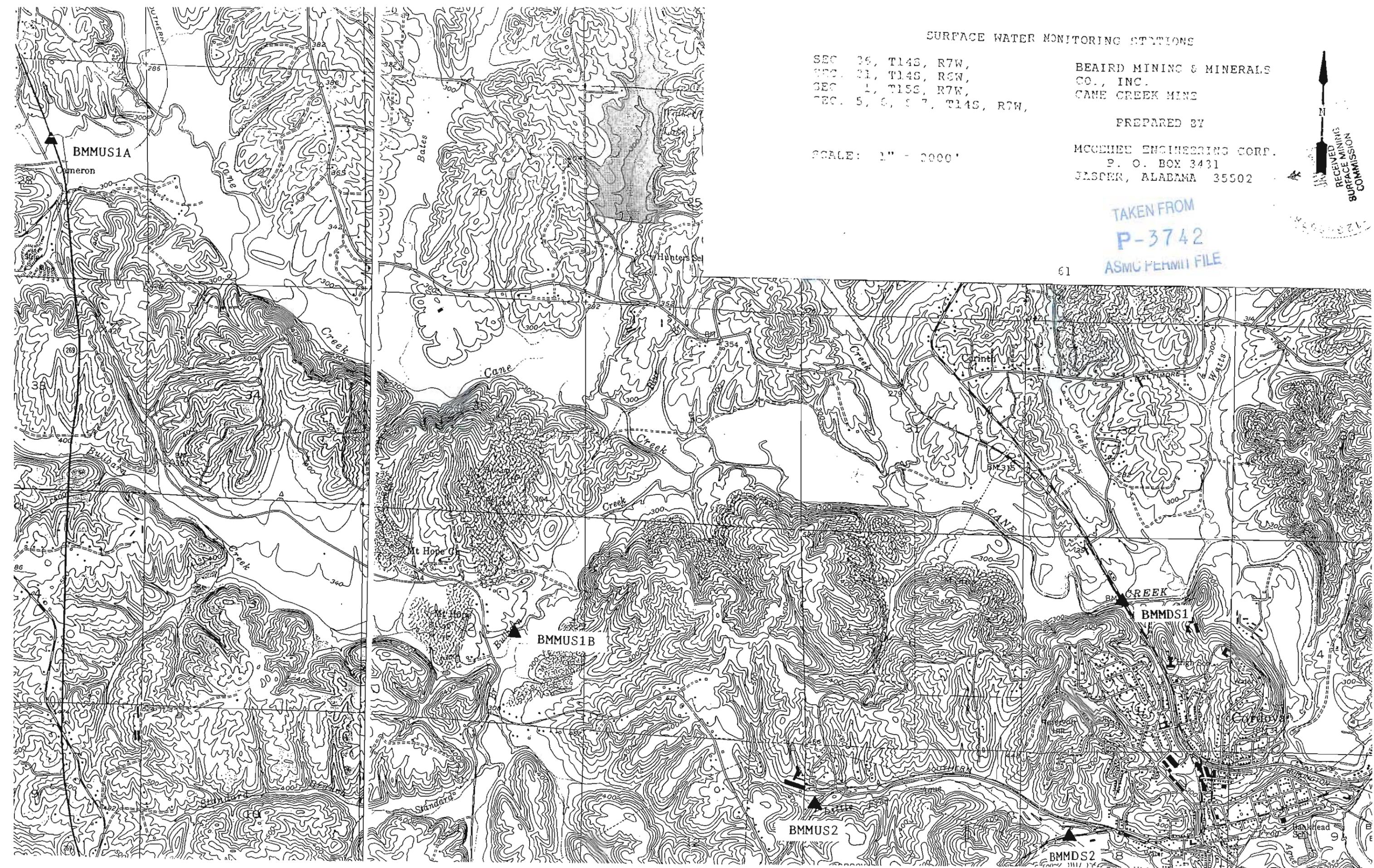
MCCHEE ENGINEERING CORP.
P. O. BOX 3431
JASPER, ALABAMA 35502

SCALE: 1" = 3000'



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method of calculating the 2 year flowrate in the receiving stream is shown in "Magnitude and frequency of Floods in Alabama", Water-Resources Investigations Report 84-411.

There are three conditions of mining that were analyzed during each storm event. These conditions are before mining, during mining, and after mining (2 years). The flow rates for the before mining are simply the above mentioned methods.

The flow rate for the during mining condition of each storm event is based on a percentage of increase of the average watershed curve number and the weighted average of the mining ratio. The increase of the average watershed curve number is estimated by dividing the during mining runoff coefficient of 0.81 by the estimated before mining runoff coefficient of 0.60.

The flow rate for the after mining condition of each storm event is based on a percentage of increase of the average watershed curve number and the weighted average of the mining ratio. The increase of the average watershed curve number is estimated by dividing the after mining runoff coefficient of 0.74 by the estimated before mining runoff coefficient of 0.60.

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Surface water quality projections at specific flow rates are given in the table entitled Surface Water Projections. It is anticipated that "During Mining" surface water leaving the mine site will meet ADEM and EPA effluent limitations but will be of the lowest quality. The pH will be 6.0 s.u., Fe 6 mg/l, Mn 4 mg/l, TSS 70 mg/l, and a SpC of 2000 umhos. Based on information revealed in the Geochemistry and Groundwater sections of this application, impacts to the receiving streams will be minimal. The parameters most likely to be affected by this mining operation will be the pH, iron, manganese, and total suspended solids. With the removal of vegetation surface water runoff will increase. Sediment levels in surface water runoff will increase due to the vegetation being removed. Removal of vegetation will allow surface runoff to transport fine grained sediment into the receiving streams. The sediment levels in surface water runoff will be controlled by sediment basins. The drainage basins of Little Frog Ague and Cane Creek have already been impacted by the previous surface mining in the area. The long term effects of mining at this site on surface water quality and quantity on Cane Creek and Little Frog Ague will be negligible. It can be concluded that based on the information from the Surface Water Projections and water quality from the adjacent previously mined areas little impact, if any should occur to the groundwater and surface water regime as a result of this mining operation.

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2. FINDINGS

The following are findings of the Determination of the Probable Hydrologic Consequences for the proposed permit area and adjacent area as determined based on baseline hydrologic, geologic and other site specific information for this permit application:

A. ADVERSE IMPACTS TO THE HYDROLOGIC BALANCE

Within the proposed permit area, water was encountered above, below and in the coal seam to be mined. This water is contained along a impermeable clay that underlies the coal seam, and is recharged by the porous and fractured overburden. Both the coal seam aquifer and the aquifer located above the coal seam will be destroyed by this mining operation. It is believed, due to the previous mining in the adjacent area, that the aquifers above and in the coal seam have been impacted. Monitoring data of the monitoring wells within the permit area indicate an elevated level of sulfates in the groundwater. However acid mine drainage is not anticipated at this mine site due to the excess neutralization potential of the strata.

A topsoil waiver is being applied for at this mine site. The overburden will be removed and re-distributed over the permit area.

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After reclamation groundwater storage should be near that of premining conditions or slightly more due to the fracturing of the overburden. Surface water runoff quality should be near premining conditions after reclamation.

B. ACID-FORMING OR TOXIC-FORMING MATERIALS

Based on the results on the overburden analysis in the Geology section, the overburden within the permit area has an average acid base account of +13.745 and the pH ranged from 4.9 near the surface and increasing to 8.9 at the bottom of the hole. The overburden had low levels of sulfur and moderate to high levels of calcium carbonate. The overburden should neutralize any adverse effects produced by the sulfur in the coal seams and coal waste material left in the pit. The coal waste material should be carefully removed and buried during final reclamation as outlined in Part III-A-5 of the operation plan.

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During the preparation of the Determination of the Probable Hydrologic Consequences for the proposed permit area and adjacent areas as determined based on baseline hydrologic, geologic and other site specific information collected for this permit application there were no zones of acid forming or toxic forming materials encountered other than the coal seams.

The only preventive or remedial measure necessary are in the handling of the coal stockpiles and immediate pit area. Coal stockpiles will be created by constructing a pad made of compacted clay or shale of acceptable permeability of desired thickness to carry the weight of loading and transportation equipment. Coal stockpiles will be graded or shaped and constructed on a mild slope in a manner to provide adequate drainage and minimize contamination of water. Coal stockpiles will be located in such a manner whereas excess drainage may be diverted from coal stockpile areas. When the coal stockpile become no longer necessary it will be reclaimed by removing the coal which makes up the pad by truck, covering the pad area with four (4) feet of the best available non-toxic, non-combustible material and revegetating in accordance with the approved Reclamation Plan (Part IV-C-5). The pit bottom, once the coal is

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DENVER, COLORADO

removed will consist of shales (See Geologic Cross-Sections). This shale material does not contain any acid or toxic forming material. At this mine site if acid or toxic forming material is encountered it will be buried in the pit, a minimum of ten (10') feet away from the highwall, a minimum of ten (10') feet up from the pit floor, and a minimum of fifty (50') feet away from a major drain and covered with a minimum of four (4') feet of the best available non-toxic, non-combustible material.

C. CONTAMINATION, DIMINUTION OR INTERRUPTION OF WATER SOURCE

There were no domestic, agricultural, or industrial uses of surface water within the proposed permit area. There were no groundwater users located within or adjacent to the proposed permit area

D. SEDIMENT YIELD

An estimate of the amount of sediment yield from the proposed permit area before, during and after mining was calculated using the Universal Soil Loss Equation ($A = R K LS CP$) as obtained from chapter five (5), pages 311-341, of Applied Hydrology and Sedimentology For Disturbed Areas by B. J. Barfield, R. C. Warner, and C. T. Haan. All "k" values for each soil type within the permit area were taken from the soil survey book from

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the appropriate county. All length slope factors were taken from slope lengths and slope steepness within the permit area.

SOIL LOSS FOR INCREMENT NO. 1

BEFORE MINING: $R = 350, K = 0.31, LS = 8.3, CP = 0.003$
DURING MINING: $R = 350, K = 0.24, LS = 8.3, CP = 0.900$
2 MONTHS AFTER REVEG.: $R = 350, K = 0.24, LS = 8.3, CP = 0.140$
12 MONTHS AFTER REVEG.: $R = 350, K = 0.24, LS = 8.3, CP = 0.050$
5 YEARS AFTER REVEG.: $R = 350, K = 0.24, LS = 8.3, CP = 0.010$

A = COMPUTED SOIL LOSS IN TONS PER ACRE PER YEAR

BEFORE MINING: $A = 2.70$
DURING MINING: $A = 627.48$
2 MONTHS AFTER REVEG.: $A = 97.61$
12 MONTHS AFTER REVEG.: $A = 34.86$
5 YEARS AFTER MINING: $A = 6.97$

A = COMPUTED SOIL LOSS IN TONS/ACRE PER YEAR * BASIN TRAP EFF.

BEFORE MINING: $A = ?$
DURING MINING: $A = ?$
2 MONTHS AFTER REVEG.: $A = ?$
12 MONTHS AFTER REVEG.: $A = ?$
5 YEARS AFTER MINING: $A = ?$

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SOIL LOSS FOR INCREMENT NO. 2

BEFORE MINING: R = 350, K = 0.28, LS = 3.8, CP = 0.003
DURING MINING: R = 350, K = 0.24, LS = 3.8, CP = 0.900
2 MONTHS AFTER REVEG.: R = 350, K = 0.24, LS = 3.8, CP = 0.140
12 MONTHS AFTER REVEG.: R = 350, K = 0.24, LS = 3.8, CP = 0.050
5 YEARS AFTER REVEG.: R = 350, K = 0.24, LS = 3.8, CP = 0.010

A = COMPUTED SOIL LOSS IN TONS PER ACRE PER YEAR

BEFORE MINING: A = 1.12
DURING MINING: A = 287.28
2 MONTHS AFTER REVEG.: A = 44.69
12 MONTHS AFTER REVEG.: A = 15.96
5 YEARS AFTER MINING: A = 3.19

A = COMPUTED SOIL LOSS IN TONS/ACRE PER YEAR * BASIN TRAP EFF.

BEFORE MINING: A = ??
DURING MINING: A = ??
2 MONTHS AFTER REVEG.: A = ??
12 MONTHS AFTER REVEG.: A = ??
5 YEARS AFTER MINING: A = ??

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CANE CREEK MINE
P-3742

SOIL LOSS FOR INCREMENT NO. 3 & NO. 4

BEFORE MINING: R = 350, K = 0.28, LS = 12.0, CP = 0.003
DURING MINING: R = 350, K = 0.24, LS = 12.0, CP = 0.900
2 MONTHS AFTER REVEG.: R = 350, K = 0.24, LS = 12.0, CP = 0.140
12 MONTHS AFTER REVEG.: R = 350, K = 0.24, LS = 12.0, CP = 0.050
5 YEARS AFTER REVEG.: R = 350, K = 0.24, LS = 12.0, CP = 0.010

A = COMPUTED SOIL LOSS IN TONS PER ACRE PER YEAR

BEFORE MINING: A = 3.53
DURING MINING: A = 907.2
2 MONTHS AFTER REVEG.: A = 141.12
12 MONTHS AFTER REVEG.: A = 50.40
5 YEARS AFTER MINING: A = 10.08

A = COMPUTED SOIL LOSS IN TONS/ACRE PER YEAR * BASIN TRAP EFF.

BEFORE MINING: A = ?.
DURING MINING: A = ?.
2 MONTHS AFTER REVEG.: A = ?.
12 MONTHS AFTER REVEG.: A = ?.
5 YEARS AFTER MINING: A = ?.

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SOIL LOSS FOR INCREMENT NO. 5

BEFORE MINING: $R = 350$, $K = 0.24$, $LS = 10.0$, $CP = 0.003$
DURING MINING: $R = 350$, $K = 0.24$, $LS = 10.0$, $CP = 0.900$
2 MONTHS AFTER REVEG.: $R = 350$; $K = 0.24$, $LS = 10.0$, $CP = 0.140$
12 MONTHS AFTER REVEG.: $R = 350$, $K = 0.24$, $LS = 10.0$, $CP = 0.050$
5 YEARS AFTER REVEG.: $R = 350$, $K = 0.24$, $LS = 10.0$, $CP = 0.010$

A = COMPUTED SOIL LOSS IN TONS PER ACRE PER YEAR

BEFORE MINING: $A = 2.52$
DURING MINING: $A = 756.00$
2 MONTHS AFTER REVEG.: $A = 117.60$
12 MONTHS AFTER REVEG.: $A = 42.00$
5 YEARS AFTER MINING: $A = 8.40$

A = COMPUTED SOIL LOSS IN TONS/ACRE PER YEAR * BASIN TRAP EFF.

BEFORE MINING: $A = ?$
DURING MINING: $A = ??$
2 MONTHS AFTER REVEG.: $A = ??$
12 MONTHS AFTER REVEG.: $A = ??$
5 YEARS AFTER MINING: $A = ?$

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E. ACIDITY, TSS, TDS, FE, MN, PH

1. Acidity

The results of the overburden analysis presented in the Geochemistry part of this permit application indicates that the overburden's Neutralization Potential is much higher than the Maximum Potential Acidity. Based on the Neutralization Potential of the overburden and that the Alkalinity of the surface water is extremely higher than the Acidity, the Acidity should not have any adverse effects onsite or offsite. Samples taken from the surrounding streams reveal that the surface water has elevated levels of sulfates, which could be a result of the previous mining within the watersheds. Samples taken from the domestic wells adjacent to the permit area shows that the Alkalinity is extremely higher than the acidity. Also, soil samples taken from previously mined areas adjacent to the proposed permit area reveals that the acidity should not pose a problem at this site.

2. TSS, TDS, Fe, Mn, and pH:

Based on samples taken from onsite water and samples taken from the existing domestic wells it is believed that the parameters most likely to be affected in the groundwater system onsite will

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CANE CREEK MINE

be higher iron, manganese, and dissolved solids during active mining. It is believed that the samples taken from the existing water onsite is characteristic of what the water quality will be once mining begins. Exposure of the overburden to oxidation during mining will release some of the neutralizing agents present in the spoil. The parameters most likely to be affected in surface water system onsite are a decrease in pH, an increase in iron, manganese, and total suspended solids. Total suspended solids will be controlled by using four (4) sediment control structures. All runoff will drain naturally to the basins for gradual release to the receiving streams. Once reclamation is complete surface water runoff should continue to flow to the basins naturally. These sediment basins will be designed to retain all settleable solids, skim and retain all floating solids and provide adequate detention volume and time to minimize the contribution of suspended solids and dissolved solids into the receiving streams. Timely recontouring and revegetation of the disturbed area will minimize contamination to the surface and groundwater systems.

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F. FLOODING AND STREAMFLOW ALTERATIONS :

During mining, sediment basins 001, 003, 004 and 006 will be constructed in the outer perimeter of the proposed mine site. These sediment basins will have storm detentions to absorb the increase of surface run-off, if it should occur. This mining operation will not alter the drainage areas of Watts Creek and Evans Creek to a significant degree. Therefore, the quantity of flow of the streams should not be adversely effected on or offsite.

G. GROUNDWATER AND SURFACE WATER AVAILABILITY

The availability of surface should not change at all due to this mining operation. The availability of groundwater should not change to a significant degree. It is believed that the residences draws water from both above and below the coal seam to be mined. The perched groundwater aquifer and coal seam aquifer will be destroyed by this operation and will be replaced by a spoil aquifer. However, water is available below the coal seam. There are no known surface water users within the proposed permit area.

Therefore surface water and groundwater availability should not be altered by this mining operation.

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WATER ANALYSIS

MINING COMPANY:

BEARD MINING AND MINERAL

DATE SAMPLED:

9/23/93

DATE ANALYZED:

9/24/93

ANALYST:

C.J.G.

ANALYSIS PERFORMED ON	MW1	MW2	MW3	MW4			
TIME SAMPLED		3:45PM	2:20PM				
pH(log)	D	7.0	7.2	D			
SPECIFIC CONDUCTIVITY	R	702	1878	R			
IRON, TOTAL(mg/l)	Y	0.05	TRACE	Y			
MANGANESE, TOTAL(mg/l)		TRACE	0.1				
SULFATE, TOTAL(mg/l)	N	+80	+80	N			
CHLORIDE, TOTAL(mg/l)	O			O			
CHROMIUM, TOTAL(mg/l)							
CADMIUM, TOTAL(mg/l)	S			S			
ARSENIC, TOTAL(mg/l)	A			A			
MERCURY, TOTAL(mg/l)	M			M			
LEAD, TOTAL(mg/l)	P			P			
SELENIUM, TOTAL(mg/l)	L			L			
ZINC, TOTAL(mg/l)	E			E			
PHENOL(mg/l)							
TOTAL SUSPENDED SOLIDS(mg/l)							
TOTAL DISSOLVED SOLIDS(mg/l)							
HARDNESS(mg/l CA CO)							
TURBIDITY(NTU)							
CHEMICAL OXYGEN DEMAND							
ACIDITY(mg/l)							
ALKALINITY(mg/l)							
BARIUM(mg/l)							
SILVER(mg/l)							
TOTAL ORGANIC CARBON(mg/l)							
WATER LEVEL ELEVATION(MSL)		58.1	35.3				
FLOW(cfs)							

B-BASIN, GW-GROUND WATER, SW-SURFACE WATER

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ANALYSIS REPORT
DATE: 9/24/93
BY: C.J.G.

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

1. Surface Water Hydrology Description:

The proposed permit area is located in the Warrior River Drainage Basin. All surface water runoff from Beaird Mining & Minerals Co., Inc.'s Cane Creek Mine site drains into Cane Creek and Little Frog Ague which flows into Mulberry Fork, which in turn will flow into the Black Warrior River.

All surface water leaving parts of the permit area which has been disturbed by mining will be routed through one of five (5) sediment basins before being discharged into state waters. All streams in Alabama are considered to be waters of the state. The Alabama Department of Environmental Management designation of streams within the surrounding area are as follows: There are no streams within the permit boundaries. Cane Creek is classified as an Agricultural and Industrial water supply, Little Frog Ague is classified as Fish and Wildlife. The Mulberry Fork's water is used for many purposes along various sections, municipale and industrial water supply, recreational, fish and wildlife as classified by the "Hydrologic Assessment, Eastern Coal Province Area 23, Alabama". The USGS Hydrologic Unit Code and SCS Sub-watershed Number for the area streams is 03160109-150 and 190.

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ATTACHMENT II-G

Baseline surface water quality and quantity for this mine site will be characterized by samples taken at stations BMMUS1A, BMMUS1B, MNNUS2 (upstream), and BMMDS1 and BMMDS2 (downstream) of the permit area. BMMDS1 located downstream on Cane Creek drains approximately 35,648 acres or 55.70 square miles. At station BMMDS1 approximately 118 acres or 0.33 percent will be disturbed by this mining operation. BMMDS2 located on Little Frog Ague drains approximately 934.4 acres or 1.46 square miles. At station BMMDS2 approximately 80 acres or 8.56 percent will be disturbed by this mining operation. BMMUS1A located upstream on Cane Creek drains approximately 10,368 acres or 16.20 square miles. BMMUS1B located upstream on Bull Barn Creek drains approximately 2,378 acres or 3.71 square miles. BMMUS2 located upstream on Little Frog Ague drains approximately 224 acres or 0.35 square miles. Stations BMMUS1A, BMMUS1B, and BMMUS2 which are located upstream from the permit area and do not receive any drainage from the mine site and will be used for performance monitoring. For water quantity, drainage area and description of each surface water monitoring station see attached Surface Water Baseline Analysis. For the locations of the surface water monitoring stations refer to the attached Hydro/Geo Map.

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2. Surface Water Bodies

A total of five (5) sediment control structures are proposed for this mining operation. Basin 002P will drain into Bull Barn Creek, basins 007P and 009P will drain into Cane Creek, and basins 010P and 011P will drain into Little Frog Ague. All basins are proposed as temporary basins. For the locations of surface water monitoring stations see the Surface Water Stations Monitoring Map and for the NPDES numbers of sediment basins see attached Hydro/Geo Map in Part II-E.

3. Surface Water Uses:

There is no known use of surface water between the mine site and the receiving streams based on visual inspection and information taken from aerial photos of the permit area. The only known use of surface water in the adjacent area is by fish and Wildlife.

4. Surface Water Quality:

For water quality see attached Surface Water Baseline Analysis.

5. Surface Water Quantity:

For water quantity, drainage area and description of each surface water monitoring station see attached Surface Water Baseline

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Analysis. For the locations of the surface water monitoring stations refer to the attached Hydro/Geo 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" or other equally valid approved methods. 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°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. N Sodium Hydroxide. All other parameters were adjusted for volume addition.

7. Precipitation Modeling:

No modeling methods are employed at this time.

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8. Surface Water Monitoring Station Location(s):

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

9. Surface Water Sampling and Analytical Information:

For Sampling and analytical information see above statement 6, Surface Water Quality Data and Analytical Dates Table.

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REGRESSION SPREADSHEET

Beard Mining and Minerals Co., Inc.

Cane Creek Mine

BMMUS1A.....pH

CANE CREEK.....upstream

16.20 sq. mi. drainage area

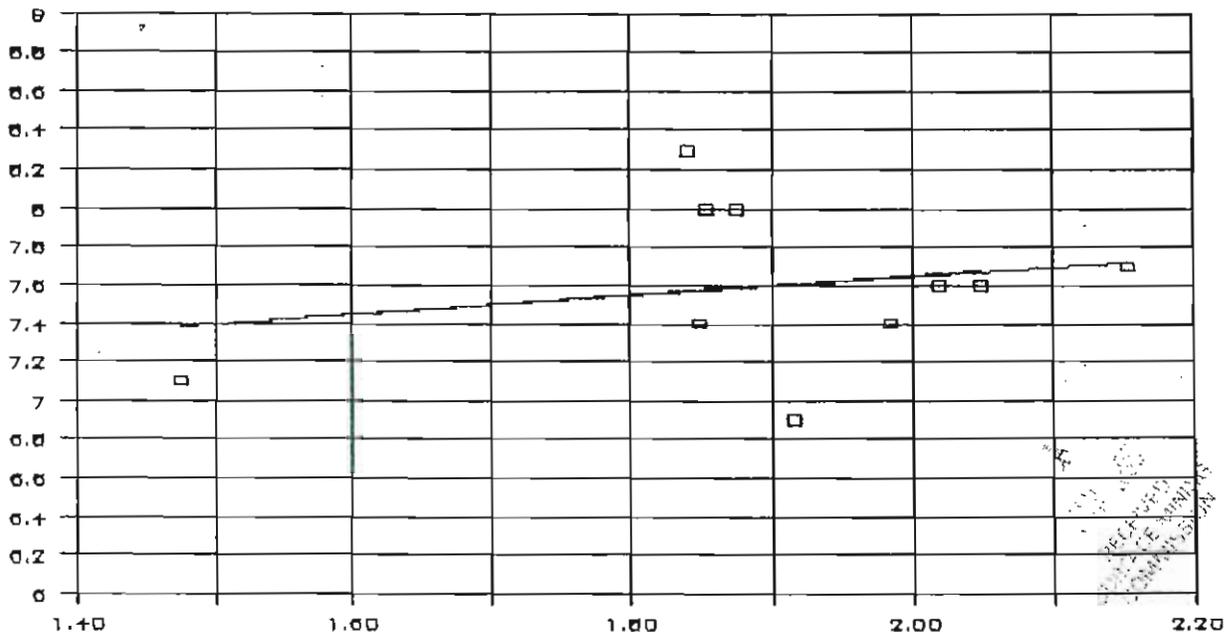
SAMPLE DATE	pH	LOG PARAMETER	FLOW	LOG FLOW	REGRESSION LINE
05-14-93	7.7		142.0	2.152288	7.727835
06-11-93	8.0		75.0	1.875061	7.586609
07-09-93	8.0		71.5	1.854306	7.576035
07-20-93	8.3		69.4	1.841359	7.569440
08-11-93	6.9		82.3	1.915400	7.607158
08-25-93	7.4		70.6	1.848805	7.573233
09-23-93	7.1		29.8	1.474216	7.382408
10-19-93	7.6		111.8	2.048442	7.674933
02-10-94	7.6		104.6	2.019532	7.660205
03-04-94	7.4		96.4	1.984077	7.642144

Regression Output:

Constant 6.6314052
 Std Err of Y Est 0.4419899
 R Squared 0.0470482
 No. of Observations 10
 Degrees of Freedom 8

X Coefficient(s) 0.5094251
 Std Err of Coef. 0.8105863

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 10/15/94

REGRESSION SPREADSHEET
Beard Mining and Minerals Co., Inc.
Cane Creek..... TSS
BMMUSTIA..... upstream
16.2 sq. mi. drainage area

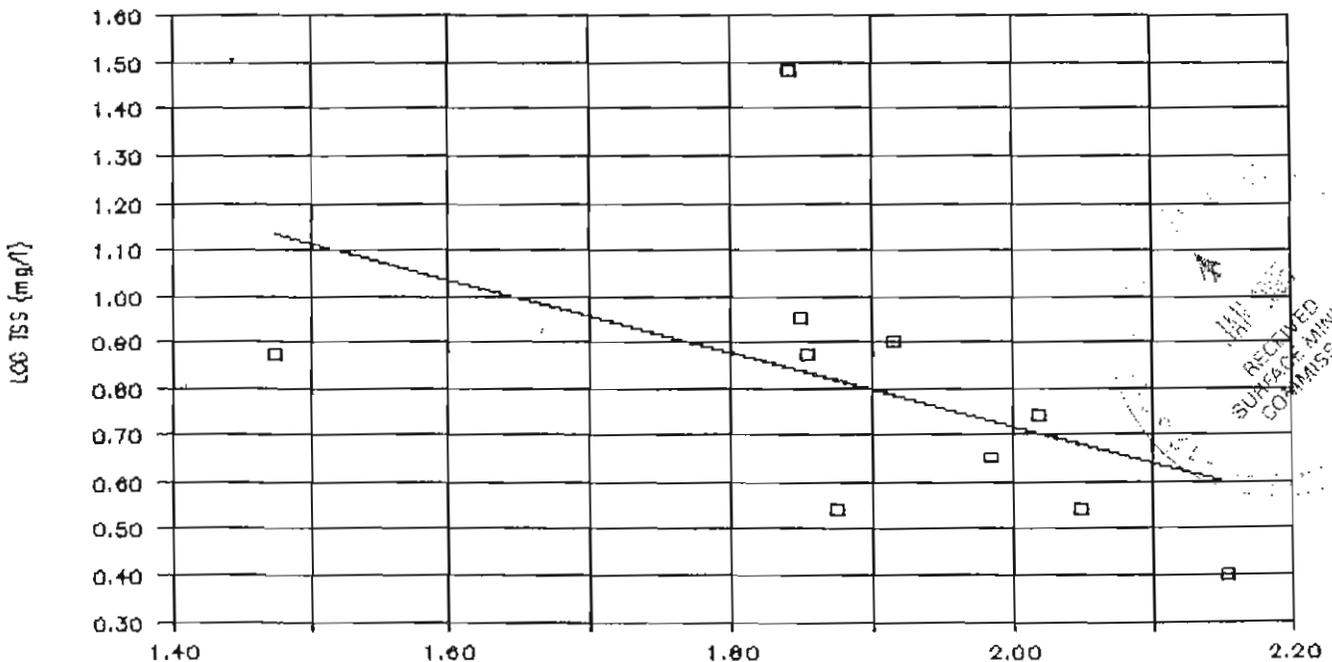
	TSS	LOG PARAMETER		FLOW	LOG FLOW		REGRESSION LINE
05-14-93	2.5	0.3979400087		142	2.152288		0.599390
06-11-93	3.5	0.5440680444		75	1.875061		0.817856
07-09-93	7.5	0.8750612634		71.5	1.854306		0.834212
07-20-93	30.5	1.4842998393		69.4	1.841359		0.844414
08-11-93	8	0.903089987		82.3	1.915400		0.786066
08-25-93	9	0.9542425094		70.6	1.848805		0.838547
09-23-93	7.5	0.8750612634		29.8	1.474216		1.133738
10-19-93	3.5	0.5440680444		111.8	2.048442		0.681225
02-10-94	5.5	0.7403626895		104.6	2.019532		0.704008
03-04-94	4.5	0.6532125138		96.4	1.984077		0.731947

Regression Output:

Constant 2.2954794
 Std Err of Y Est 0.2843831
 R Squared 0.2220205
 No. of Observations 10
 Degrees of Freedom 8

X Coefficient(s) -0.788040
 Std Err of Coef. 0.5215437

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REGRESSION SPREADSHEET
Beard Mining and Minerals Co., Inc.
Cane Creek..... Fe
BMMUSTIA..... upstream
16.2 sq. mi. drainage area

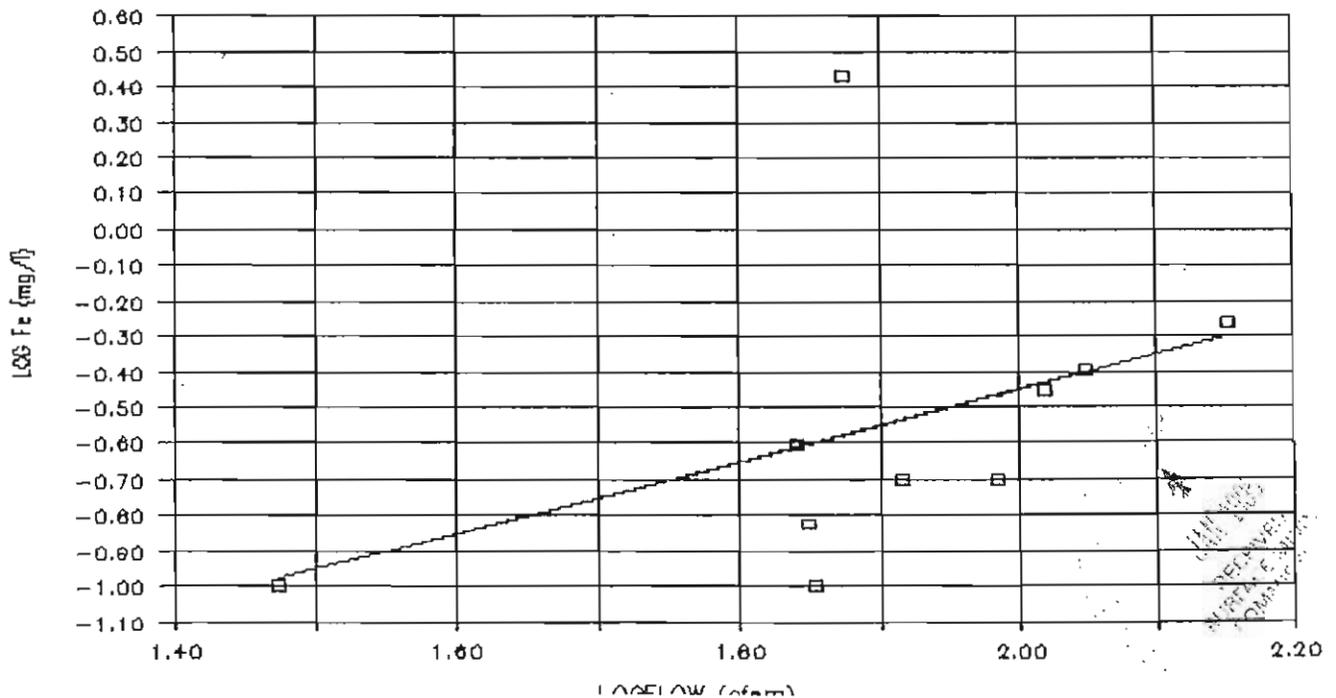
	Fe	LOG PARAMETER		FLOW	LOG FLOW		REGRESSION LINE
05-14-93	0.55	-0.2596373105		142	2.152288		-0.299914
06-11-93	2.70	0.4313637642		75	1.875061		-0.576867
07-09-93	0.10	-1.0000000000		71.5	1.854306		-0.597601
07-20-93	0.25	-0.6020599913		69.4	1.841359		-0.610535
08-11-93	0.20	-0.6989700048		82.3	1.915400		-0.536568
08-25-93	0.15	-0.8239087409		70.6	1.848805		-0.603097
09-23-93	0.10	-1.0000000000		29.8	1.474216		-0.977315
10-19-93	0.40	-0.3979400087		111.8	2.048442		-0.403658
02-10-94	0.35	-0.4559319556		104.6	2.019532		-0.432539
03-04-94	0.20	-0.6989700048		96.4	1.984077		-0.467959

Regression Output:

Constant -2.450071
 Std Err of Y Est 0.4046202
 R Squared 0.1847108
 No. of Observations 10
 Degrees of Freedom 8

X Coefficient(a) 0.9990097
 Std Err of Coef. 0.7420521

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 11:11:20 AM
 BEARD MINING AND MINERALS CO.
 CANE CREEK FE
 BMMUSTIA

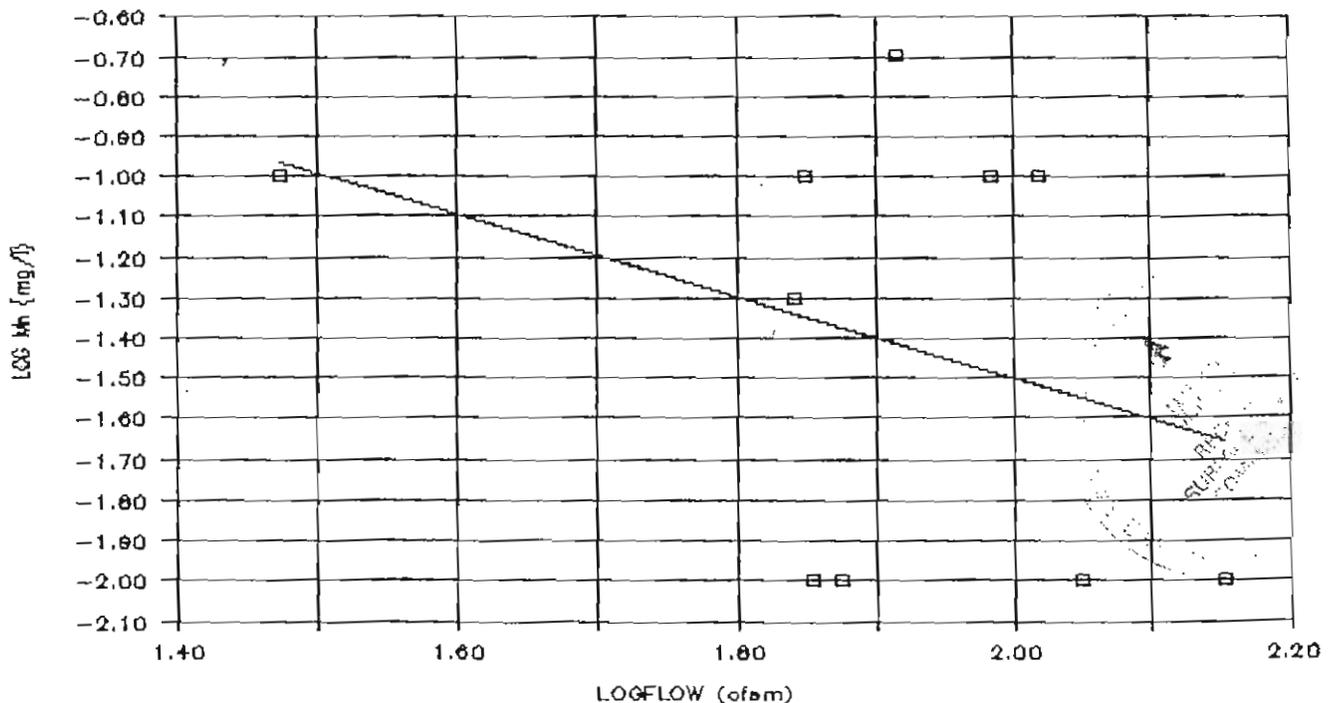
REGRESSION SPREADSHEET
Beird Mining and Minerals Co., Inc.
Cane Creek..... Mn
BMMUS1A..... upstream
16.2 sq. mi. drainage area

	Mn	LOG PARAMETER		FLOW	LOG FLOW		REGRESSION LINE
05-14-93	0.01	-2.000000		142	2.152288		-1.655238
06-11-93	0.01	-2.000000		75	1.875061		-1.373262
07-09-93	0.01	-2.000000		71.5	1.854306		-1.352152
07-20-93	0.05	-1.301030		69.4	1.841359		-1.338983
08-11-93	0.20	-0.698970		82.3	1.915400		-1.414292
08-25-93	0.10	-1.000000		70.6	1.848805		-1.346556
09-23-93	0.10	-1.000000		29.8	1.474216		-0.965551
10-19-93	0.01	-2.000000		111.8	2.048442		-1.549613
02-10-94	0.10	-1.000000		104.6	2.019532		-1.520207
03-04-94	0.10	-1.000000		96.4	1.984077		-1.484146

Regression Output:

Constant	0.5339183
Std Err of Y Est	0.5331091
R Squared	0.1191656
No. of Observations	10
Degrees of Freedom	8
X Coefficient(s)	-1.017129
Std Err of Coef.	0.9776942

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REGRESSION SPREADSHEET

Beard Mining and Minerals Co., Inc.

Cane Creek..... SpC

BMMUS1A..... upstream

16.2 sq. mi. drainage area

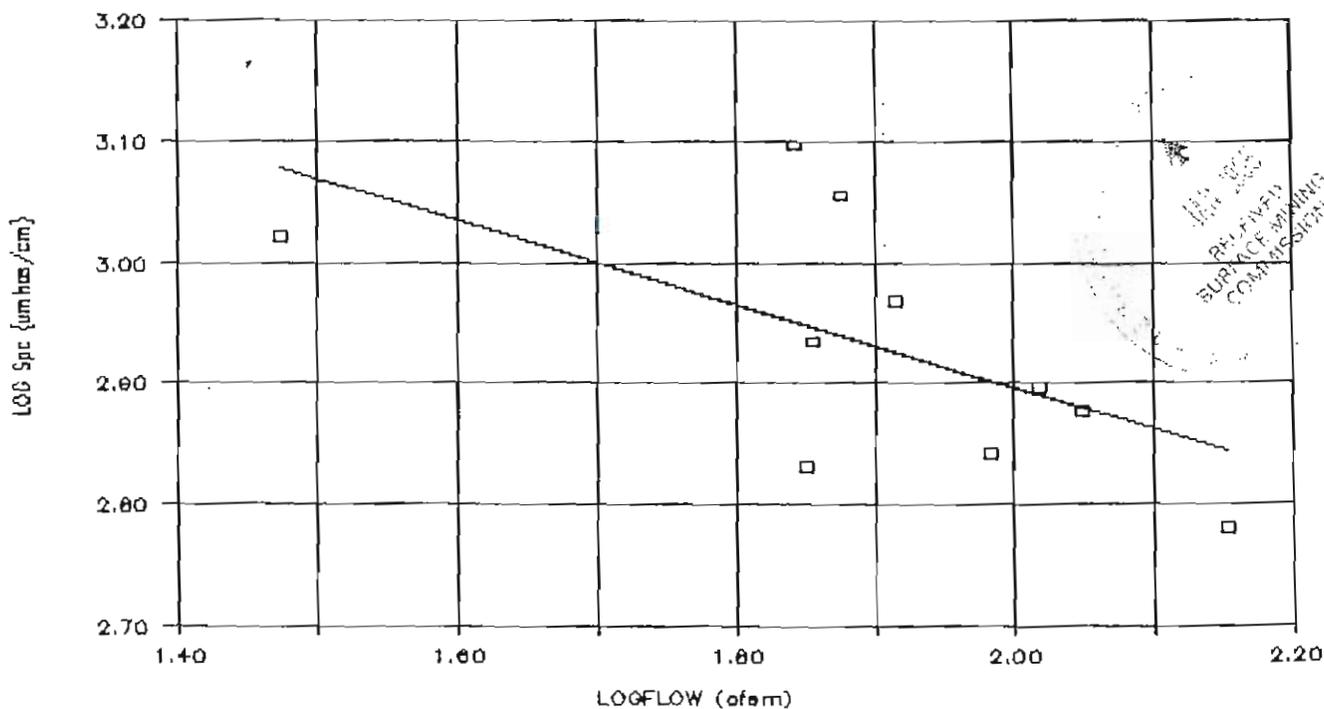
	SpC	LOG PARAMETER		FLOW	LOG FLOW		REGRESSION LINE
05-14-93	603	2.780317		142	2.152288		2.843060
06-11-93	1135	3.054996		75	1.875061		2.939465
07-09-93	860	2.934498		71.5	1.854306		2.946683
07-20-93	1250	3.096910		69.4	1.841359		2.951185
08-11-93	932	2.969416		82.3	1.915400		2.925437
08-25-93	678	2.831230		70.6	1.848805		2.948596
09-23-93	1050	3.021189		29.8	1.474216		3.078858
10-19-93	753	2.876795		111.8	2.048442		2.879172
02-10-94	788	2.896526		104.6	2.019532		2.889226
03-04-94	694	2.841359		96.4	1.984077		2.901555

Regression Output:

Constant 3.5915146
 Std Err of Y Est 0.0875966
 R Squared 0.3693725
 No. of Observations 10
 Degrees of Freedom 8

X Coefficient(s) -0.347748
 Std Err of Coef. 0.1606475

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REGRESSION SPREADSHEET

Beard Mining and Minerals Co., Inc.

Cane Creek Mine

BMMUS1B..... pH

Bull Barn Creek..... upstream

3.71 sq. mi. drainage area

SAMPLE DATE	pH	LOG PARAMETER	FLOW	LOG FLOW	REGRESSION LINE
05-14-93	7.8		142.0	2.152288	7.747670
06-11-93	7.8		75.0	1.875061	7.595578
07-09-93	7.8		71.5	1.854306	7.584192
07-20-93	7.8		69.4	1.841359	7.577089
08-11-93	7.2		82.3	1.915400	7.617709
08-25-93	7.6		70.6	1.848805	7.581173
09-23-93	7.3		29.8	1.474216	7.375667
10-19-93	7.7		111.8	2.048442	7.690698
02-10-94	7.9		104.6	2.019532	7.674837
03-04-94	7.2		96.4	1.984077	7.655386

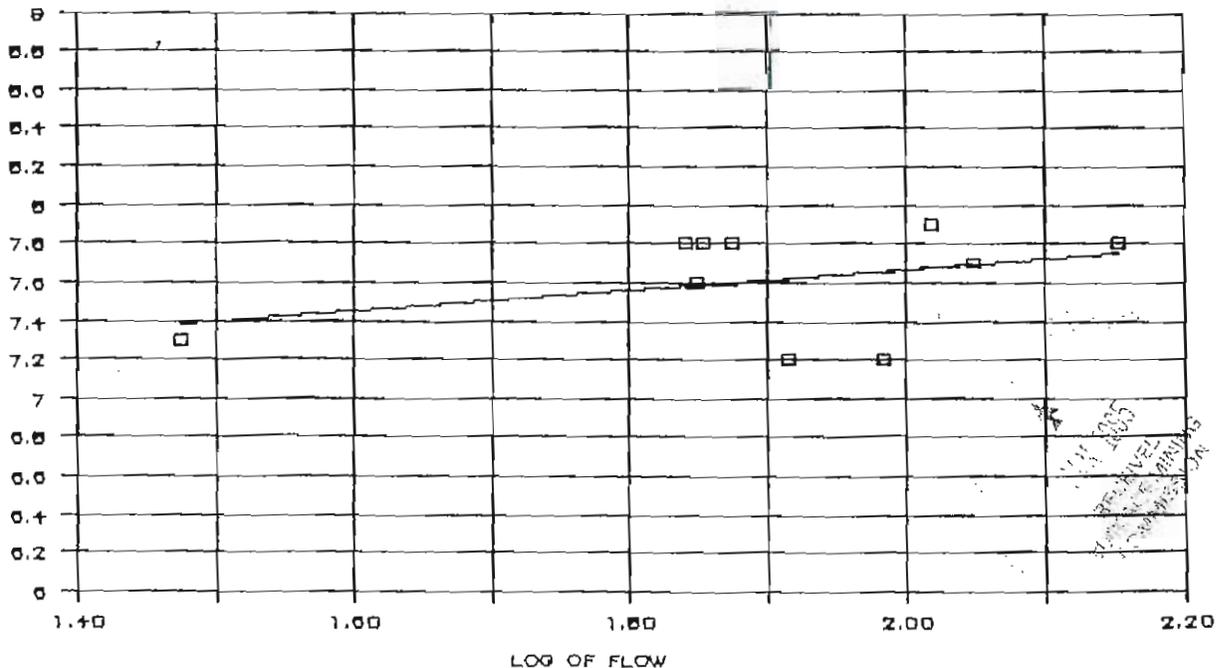
Regression Output:

Constant 6.566888
 Std Err of Y Est 0.2691447
 R Squared 0.1337648
 No. of Observations 10
 Degrees of Freedom 8

X Coefficient(s) 0.5486190
 Std Err of Coef. 0.4935978

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11.



REGRESSION SPREADSHEET

Beaird Mining and Minerals Co., Inc.

Cane Creek Mine

Bull Barn Creek..... TSS

BMMUS1B..... upstream

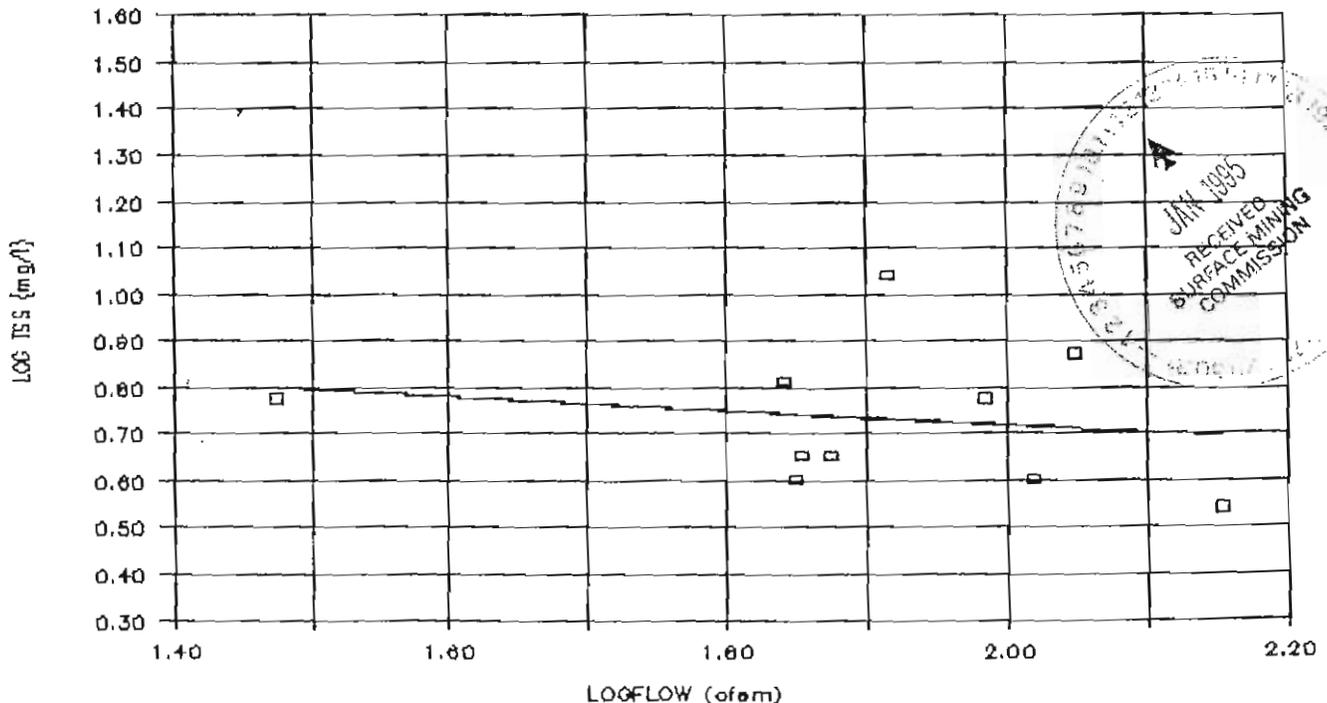
3.71 sq. mi. drainage area

	TSS	LOG PARAMETER		FLOW	LOG FLOW		REGRESSION LINE
05-14-93	3.5	0.5440680444		142	2.152288		0.695821
06-11-93	4.5	0.6532125138		75	1.875061		0.736031
07-09-93	4.5	0.6532125138		71.5	1.854306		0.741191
07-20-93	6.5	0.8129133566		69.4	1.841359		0.743162
08-11-93	11	1.0413926852		82.3	1.915400		0.731889
08-25-93	4	0.6020599913		70.6	1.848805		0.742028
09-23-93	6	0.7781512504		29.8	1.474216		0.799062
10-19-93	7.5	0.8750612634		111.8	2.048442		0.711632
02-10-94	4	0.6020599913		104.6	2.019532		0.716034
03-04-94	6	0.7781512504		96.4	1.984077		0.721432

Regression Output:

Constant	1.0235213
Std Err of Y Est	0.1587315
R Squared	0.0330643
No. of Observations	10
Degrees of Freedom	8
X Coefficient(s)	-0.152256
Std Err of Coef.	0.2911053

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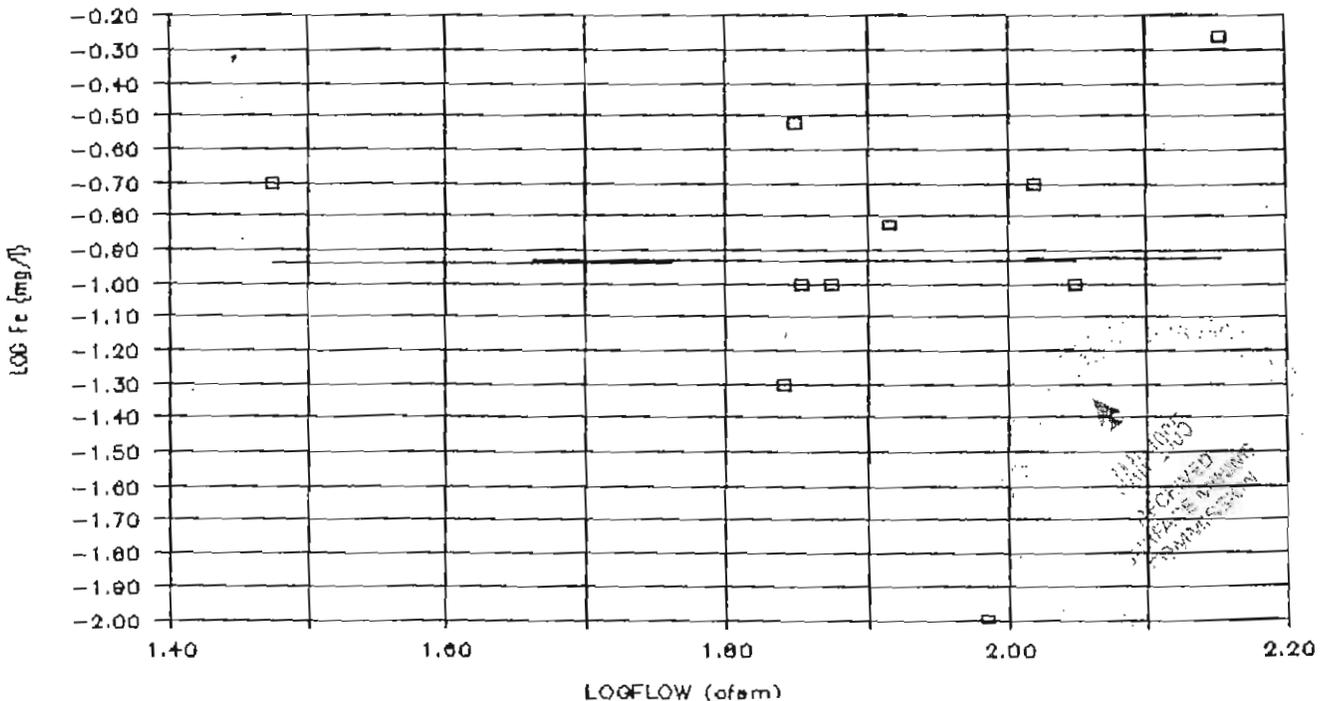
REGRESSION SPREADSHEET
Beaird Mining and Minerals Co., Inc.
Bull Barn Creek..... Fe
BMMUSTB..... upstream
3.71 sq. mi. drainage area

	Fe	LOG PARAMETER		FLOW	LOG FLOW		REGRESSION LINE
05-14-93	0.55	-0.2596373105		142	2.152288		-0.925882
06-11-93	0.10	-1.0000000000		75	1.875061		-0.931027
07-09-93	0.10	-1.0000000000		71.5	1.854306		-0.931413
07-20-93	0.05	-1.3010299957		69.4	1.841359		-0.931653
08-11-93	0.15	-0.8239087409		82.3	1.915400		-0.930279
08-25-93	0.30	-0.5228787453		70.6	1.848805		-0.931515
09-23-93	0.20	-0.6989700043		29.8	1.474216		-0.938467
10-19-93	0.10	-1.0000000000		111.8	2.048442		-0.927810
02-10-94	0.20	-0.6989700043		104.6	2.019532		-0.928346
03-04-94	0.01	-2.0000000000		96.4	1.984077		-0.929004

Regression Output:

Constant	-0.965826
Std Err of Y Est	0.5037728
R Squared	0.0000504
No. of Observations	10
Degrees of Freedom	8
X Coefficient(s)	0.0185589
Std Err of Coef.	0.9238929

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& MINERALS CO., INC.

REGRESSION SPREADSHEET

Beaird Mining and Minerals Co., Inc.

Bull Barn Creek..... SpC

BMMUSTB..... upstream

3.71 sq. mi. drainage area

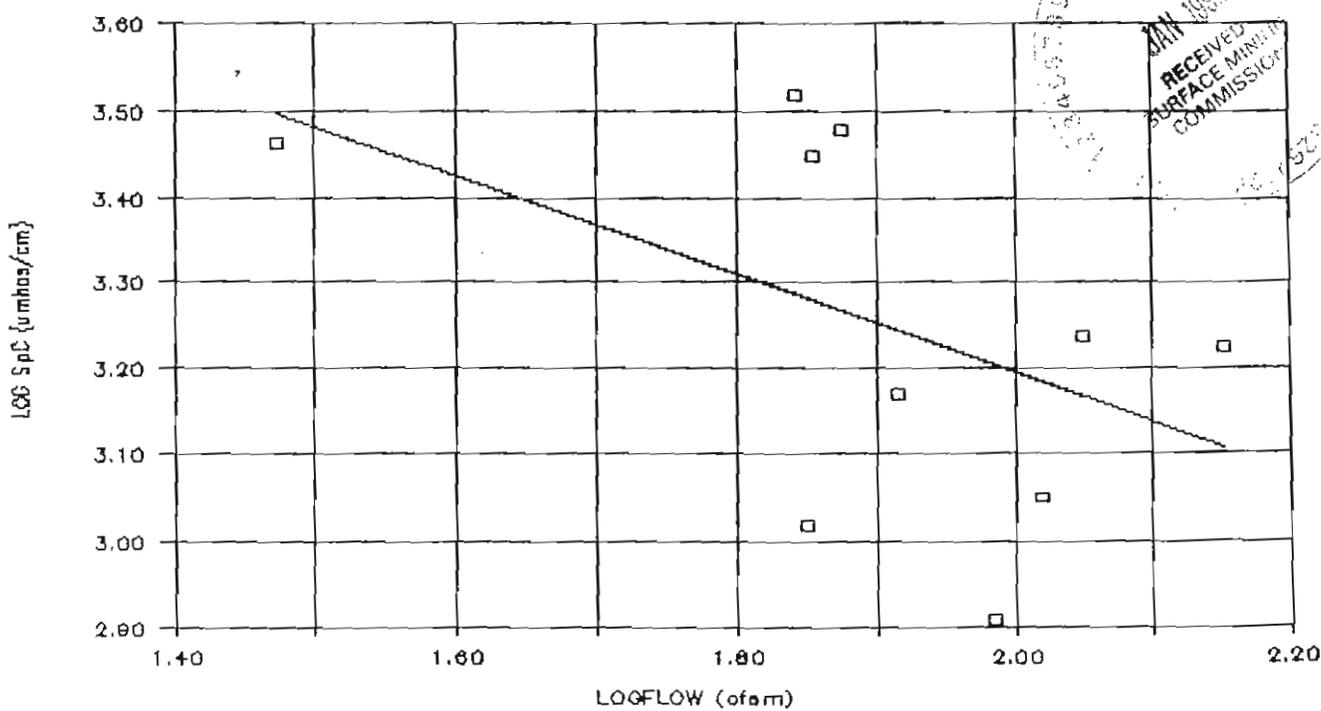
	SpC	LOG PARAMETER		FLOW	LOG FLOW		REGRESSION LINE
05-14-93	1670.00	3.2227164711		142	2.152288		3.106131
06-11-93	3000.00	3.4771212547		75	1.875061		3.266260
07-09-93	2800.00	3.4471580313		71.5	1.854306		3.278249
07-20-93	3300.00	3.5185139399		69.4	1.841359		3.285727
08-11-93	1478.00	3.1696744341		82.3	1.915400		3.242960
08-25-93	1042.00	3.0178677190		70.6	1.848805		3.281427
09-23-93	2900.00	3.4623979979		29.8	1.474216		3.497794
10-19-93	1720.00	3.2355284469		111.8	2.048442		3.166114
02-10-94	1124.00	3.0507663112		104.6	2.019532		3.182813
03-04-94	811.00	2.9090208542		96.4	1.984077		3.203292

Regression Output:

Constant 4.3493196
 Std Err of Y Est 0.2017769
 R Squared 0.2334555
 No. of Observations 10
 Degrees of Freedom 8

X Coefficient(s) -0.577612
 Std Err of Coef. 0.3700482

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REGRESSION SPREADSHEET

Beard Mining and Minerals Co., Inc.

Cane Creek Mine

BMMDS1 pH

CANE CREEK downstream

55.7 sq. mi. drainage area

SAMPLE DATE	pH	LOG PARAMETER	FLOW	LOG FLOW	REGRESSION LINE
05-14-93	7.7		1860.0	3.269513	7.455108
06-11-93	7.8		525.5	2.720573	7.736541
07-09-93	7.2		1180.3	3.071992	7.556374
07-20-93	8.1		1169.1	3.067852	7.558497
08-11-93	7.4		1231.6	3.090470	7.546901
08-25-93	7.8		894.6	2.951529	7.618082
09-23-93	7.7		2269.9	3.356007	7.410765
10-19-93	7.6		1482.6	3.171024	7.505602
02-10-94	7.0		1528.4	3.184237	7.498828
03-04-94	7.1		1432.2	3.156004	7.513303

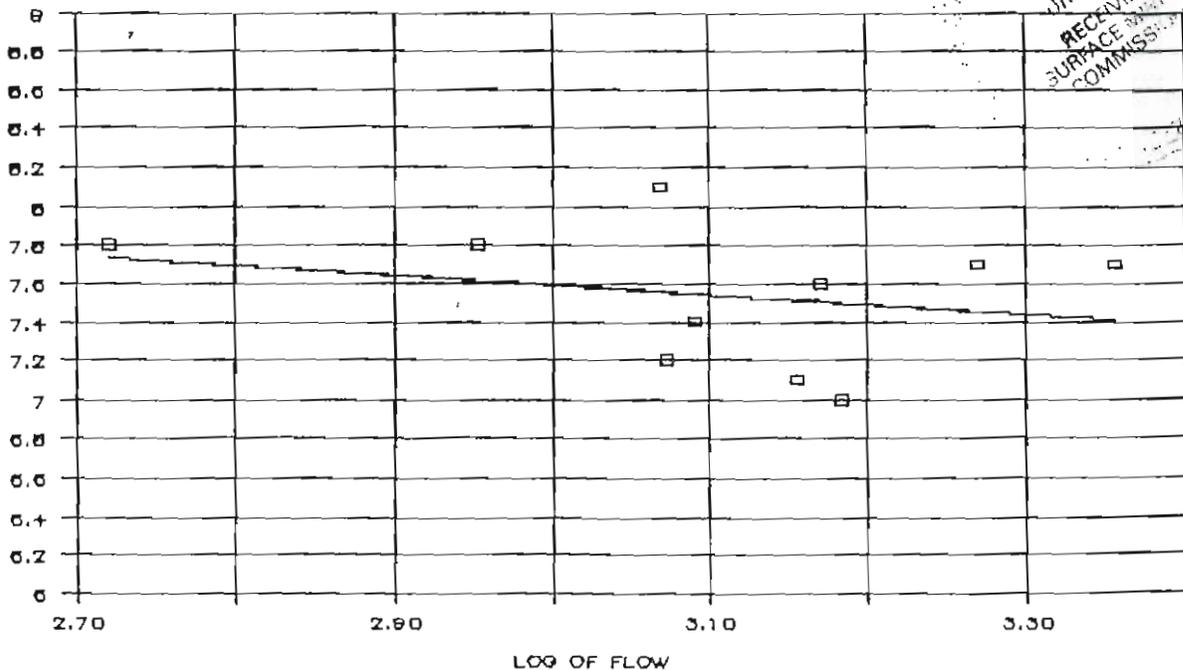
Regression Output:

Constant 9.1313319
 Std Err of Y Est 0.3624771
 R Squared 0.0648420
 No. of Observations 10
 Degrees of Freedom 8

X Coefficient(s) -0.512682
 Std Err of Coef. 0.6883639

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 P-3742
 ASMC PERMITS FILE

S.L.



REGRESSION SPREADSHEET

Beard Mining and Minerals Co., Inc.

Cane Creek Mine

Cane Creek.....TSS

BMMDS1.....downstream

55.7 sq. mi. drainage area

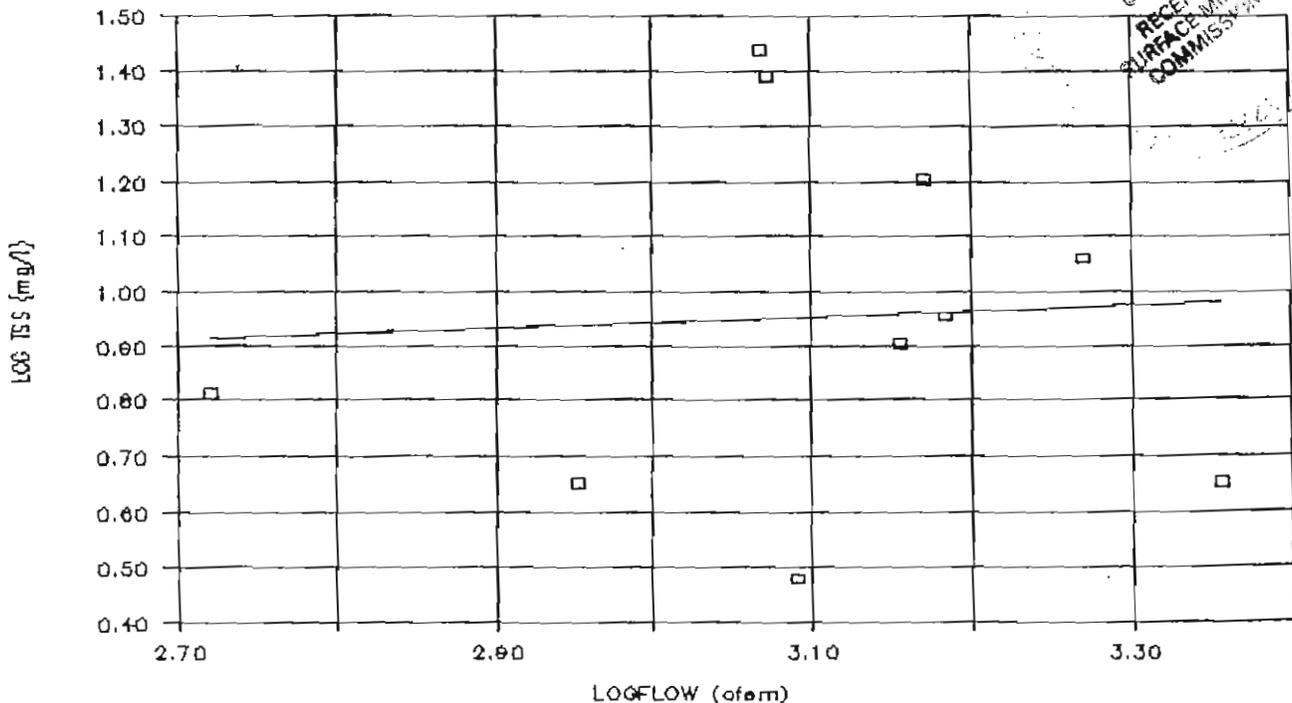
	TSS	LOG PARAMETER		FLOW	LOG FLOW		REGRESSION LINE
05-14-93	11.5	1.0606978404		1860	3.269513		0.973165
06-11-93	6.5	0.8129133566		525.5	2.720573		0.911986
07-09-93	24.5	1.3891660844		1180.3	3.071992		0.951151
07-20-93	27.5	1.4393326938		1169.10	3.067852		0.950690
08-11-93	3	0.4771212547		1231.6	3.090470		0.953211
08-25-93	4.5	0.6532125138		894.60	2.951629		0.937737
09-23-93	4.5	0.6532125138		2269.9	3.356007		0.982805
10-19-93	16	1.2041199827		1482.6	3.171024		0.962189
02-10-94	9	0.9542425094		1528.4	3.184237		0.963661
03-04-94	8	0.903089987		1432.2	3.156004		0.960515

Regression Output:

Constant 0.6087767
 Std Err of Y Est 0.3402700
 R Squared 0.0037045
 No. of Observations 10
 Degrees of Freedom 8

X Coefficient(s) 0.1114503
 Std Err of Coef. 0.6461913

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REGRESSION SPREADSHEET

Beard Mining and Minerals Co., Inc.

Cane Creek Mine

Cane Creek.....Fe

BMMDS1.....downstream

55.7 sq. mi. drainage area

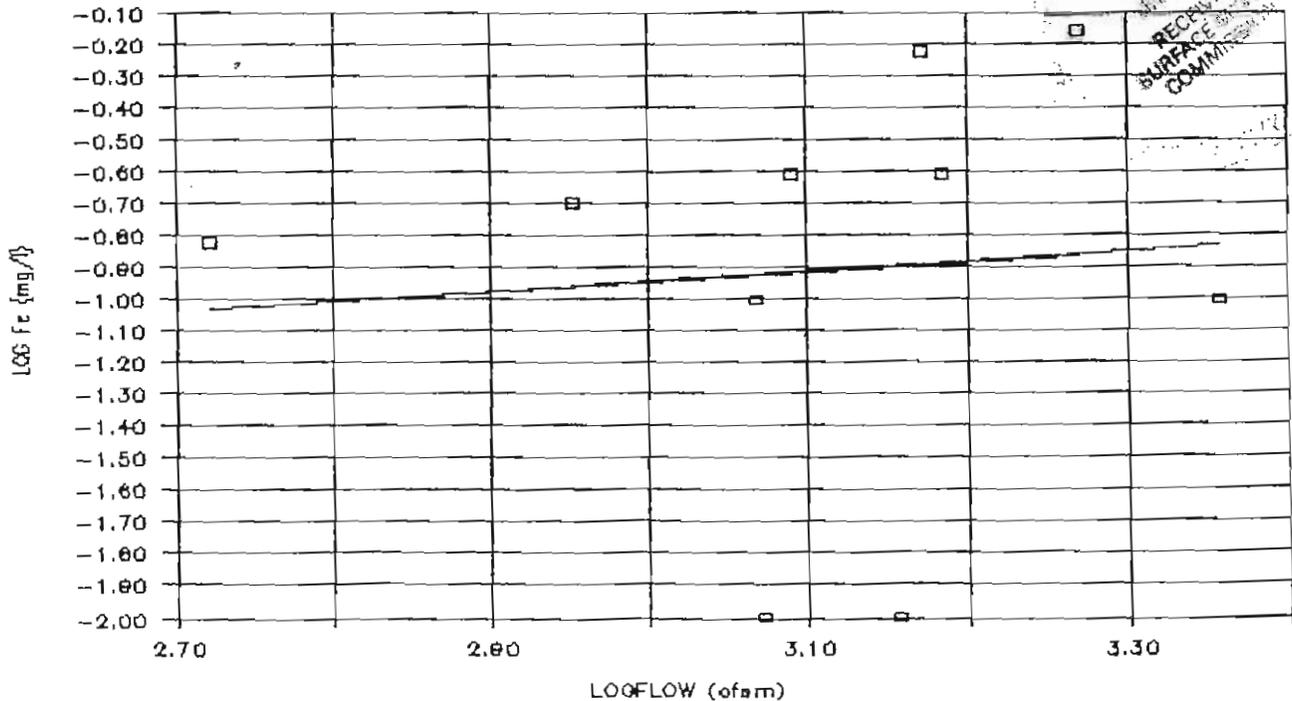
	Fe	LOG PARAMETER	FLOW	LOG FLOW	REGRESSION LINE
05-14-93	0.7	-0.15490196	1860	3.269513	-0.859464
06-11-93	0.15	-0.8239087409	525.5	2.720573	-1.028244
07-09-93	0.01	-2	1180.3	3.071992	-0.920195
07-20-93	0.1	-1	1169.10	3.067852	-0.921468
08-11-93	0.25	-0.6020599913	1231.6	3.090470	-0.914514
08-25-93	0.2	-0.6989700043	894.60	2.951629	-0.957202
09-23-93	0.1	-1	2269.9	3.356007	-0.832870
10-19-93	0.6	-0.2218487496	1482.6	3.171024	-0.889746
02-10-94	0.25	-0.6020599913	1528.4	3.184237	-0.885683
03-04-94	0.01	-2	1432.2	3.156004	-0.894364

Regression Output:

Constant -1.864722
 Std Err of Y Est 0.6756025
 R Squared 0.0071274
 No. of Observations 10
 Degrees of Freedom 8

X Coefficient(s) 0.3074642
 Std Err of Coef. 1.2830062

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REGRESSION SPREADSHEET
Beard Mining and Minerals Co., Inc.
Cane Creek Mine
Cane Creek.....Mn
BMMDS1.....downstream
55.7 sq. mi. drainage area

	Mn	LOG PARAMETER	FLOW	LOG FLOW	REGRESSION LINE
05-14-93	0.01	-2	1860	3.269513	-1.381147
06-11-93	0.1	-1	525.5	2.720573	-0.912535
07-09-93	0.05	-1.3010299957	1180.3	3.071992	-1.212530
07-20-93	0.02	-1.6989700043	1169.10	3.067852	-1.208995
08-11-93	0.1	-1	1231.6	3.090470	-1.228303
08-25-93	0.2	-0.6989700043	894.60	2.951629	-1.109780
09-23-93	0.1	-1	2269.9	3.356007	-1.454983
10-19-93	0.2	-0.6989700043	1482.6	3.171024	-1.297070
02-10-94	0.01	-2	1528.4	3.184237	-1.308349
03-04-94	0.1	-1	1432.2	3.156004	-1.284248

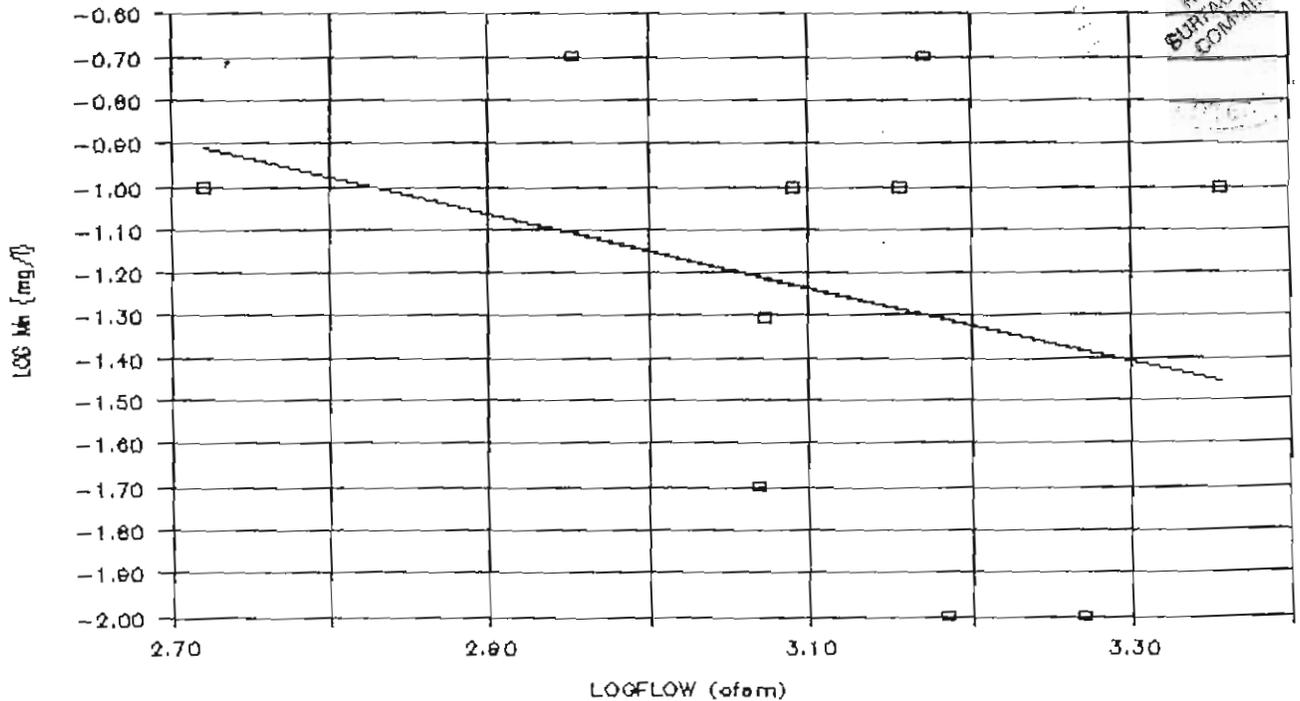
Regression Output:

Constant 1.4099259
 Std Err of Y Est 0.4979125
 R Squared 0.0924632
 No. of Observations 10
 Degrees of Freedom 8

X Coefficient(s) -0.853666
 Std Err of Coef. 0.9455631

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REGRESSION SPREADSHEET

Beard Mining and Minerals Co., Inc.
 Cane Creek Mine
 Cane Creek.....SpC
 BMDS1.....downstream
 55.7 sq. mi. drainage area

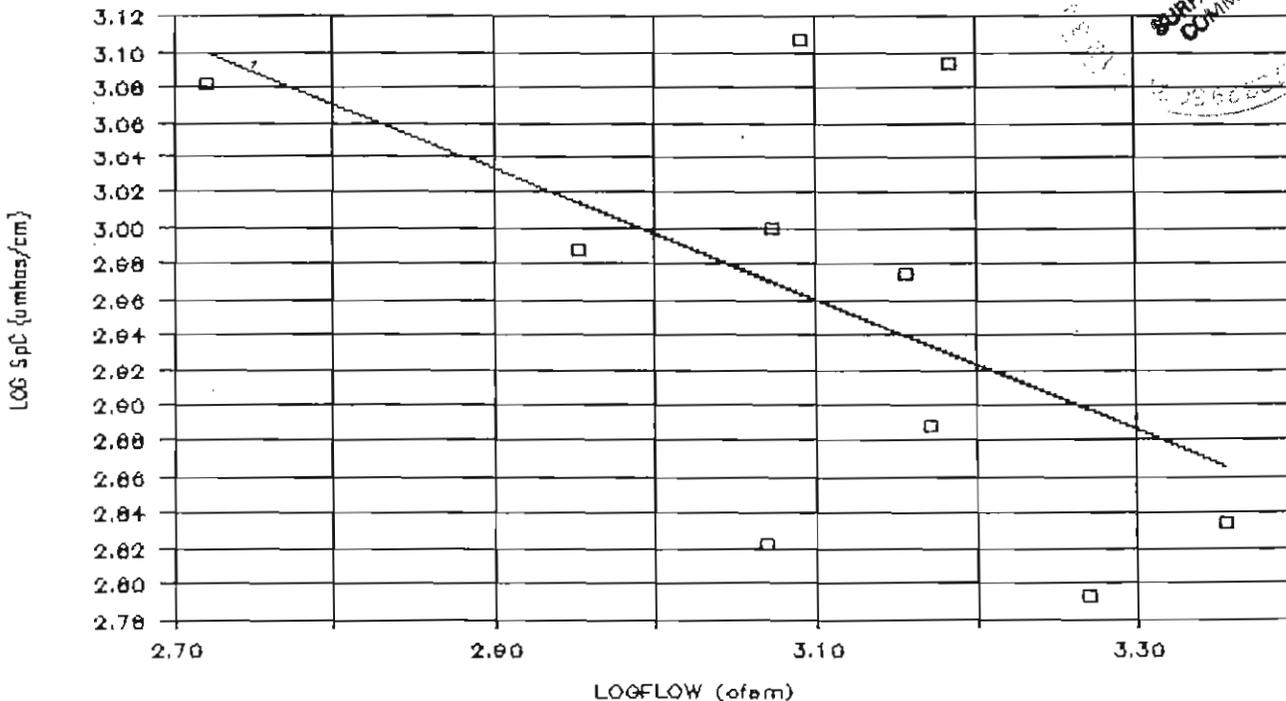
	SpC	LOG PARAMETER		FLOW	LOG FLOW		REGRESSION LINE
05-14-93	620	2.7923916895		1860	3.269513		2.897594
06-11-93	1208	3.0820669343		525.5	2.720573		3.099219
07-09-93	1000	3		1180.3	3.071992		2.970143
07-20-93	665	2.8228216453		1169.10	3.067852		2.971664
08-11-93	1280	3.1072099696		1231.6	3.090470		2.963357
08-25-93	972	2.9876662649		894.60	2.951629		3.014352
09-23-93	684	2.8350561017		2269.9	3.356007		2.865826
10-19-93	774	2.8887409607		1482.6	3.171024		2.933769
02-10-94	1242	3.0941215958		1528.4	3.184237		2.928916
03-04-94	942	2.9740509028		1432.2	3.156004		2.939286

Regression Output:

Constant 4.0984771
 Std Err of Y Est 0.1044563
 R Squared 0.2999890
 No. of Observations 10
 Degrees of Freedom 8

X Coefficient(s) -0.367297
 Std Err of Coef. 0.1983683

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REGRESSION SPREADSHEET
Beard Mining and Minerals Co., Inc.
Cane Creek Mine
BMMUS2.....pH
LITTLE FROG AGUE.....upstream
0.35 sq. mi. drainage area

SAMPLE DATE	pH	LOG PARAMETER	FLOW	LOG. FLOW	REGRESSION LINE
05-14-93	7.2		0.0	-2.000000	7.255556
06-11-93	7.4		0.0	-2.000000	7.255556
07-09-93	6.8		0.0	-2.000000	7.255556
07-20-93	7.3		0.0	-2.045757	7.300000
08-11-93	7.1		0.0	-2.000000	7.255556
08-25-93	7.1		0.0	-2.000000	7.255556
09-23-93	7.4		0.0	-2.000000	7.255556
10-19-93	7.3		0.0	-2.000000	7.255556
02-10-94	7.4		0.0	-2.000000	7.255556
03-04-94	7.6		0.0	-2.000000	7.255556

Regression Output:

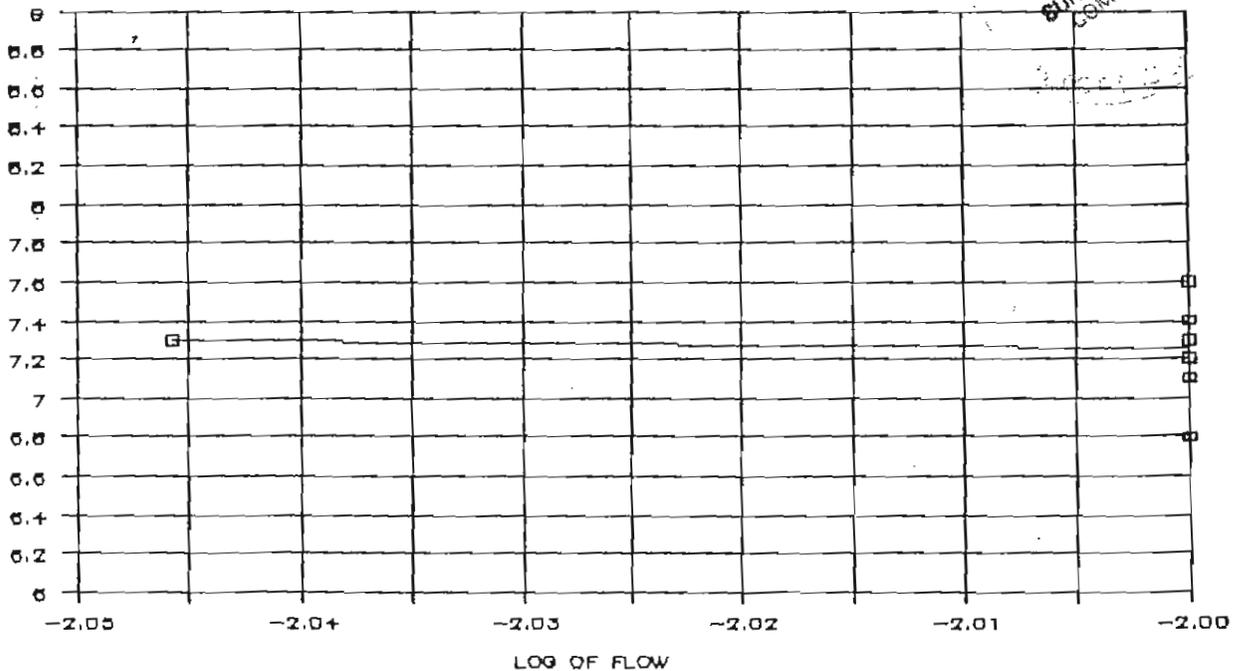
Constant 5.3129470
 Std Err of Y Est 0.2351122
 R Squared 0.0040040
 No. of Observations 10
 Degrees of Freedom 8

X Coefficient(s) -0.971304
 Std Err of Coef. 5.4161643

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S.D.



REGRESSION SPREADSHEET

Beard Mining and Minerals Co., Inc.

Cane Creek Mine

Cane Creek.....Fe

BMMUS2.....upstream

0.35 sq. mi. drainage area

	Fe	LOG PARAMETER		FLOW	LOG FLOW		REGRESSION LINE
05-14-93	2	0.3010299957		0.01	-2.000000		-0.058982
06-11-93	1.1	0.0413926852		0.01	-2.000000		-0.058982
07-09-93	0.4	-0.3979400087		0.01	-2.000000		-0.058982
07-20-93	1.8	0.2552725051		0.01	-2.000000		-0.058982
08-11-93	0.7	-0.15490196		0.01	-2.000000		-0.058982
08-25-93	0.85	-0.0705810743		0.01	-2.045757		-0.070581
09-23-93	0.7	-0.15490196		0.01	-2.000000		-0.058982
10-19-93	1.15	0.0606978404		0.01	-2.000000		-0.058982
02-10-94	0.6	-0.2218487496		0.01	-2.000000		-0.058982
03-04-94	0.55	-0.2596373105		0.01	-2.000000		-0.058982

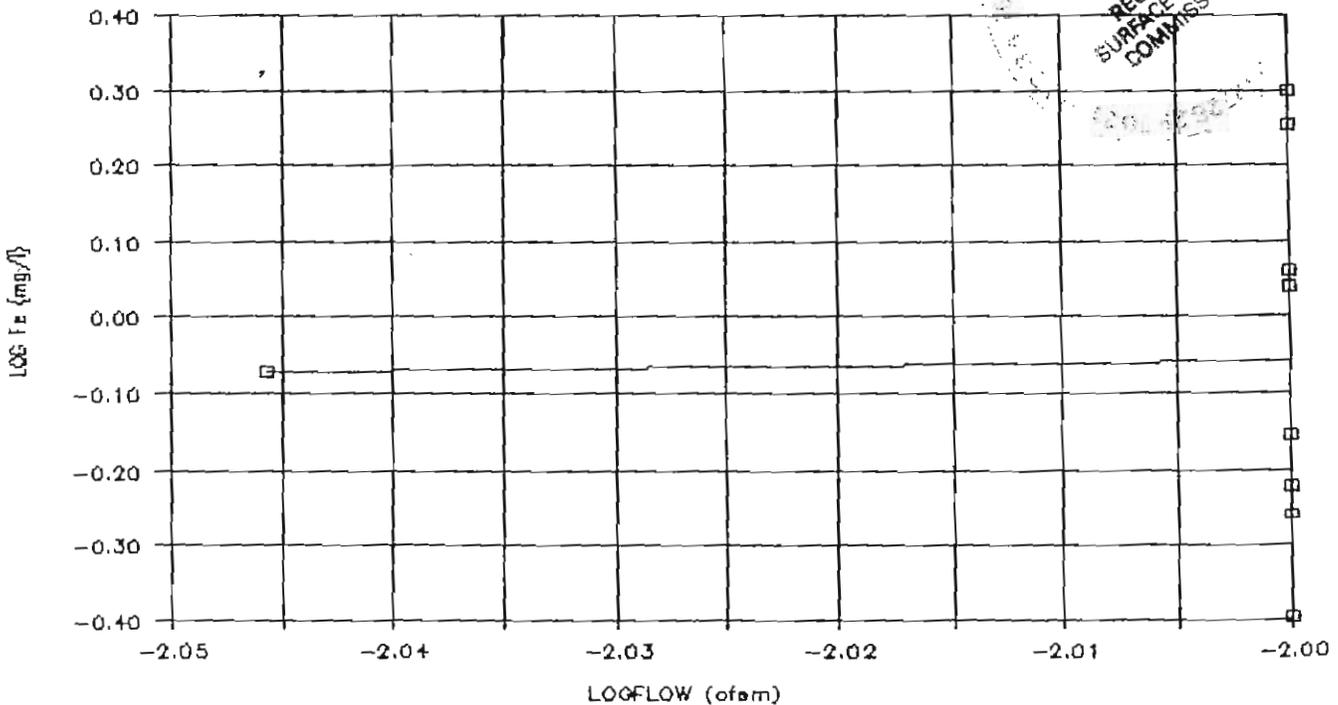
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Regression Output:

Constant 0.4480035
 Std Err of Y Est 0.2379193
 R Squared 0.0002673
 No. of Observations 10
 Degrees of Freedom 8

X Coefficient(s) 0.2534926
 Std Err of Coef. 5.4808289

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REGRESSION SPREADSHEET

Beard Mining and Minerals Co., Inc.

Cane Creek Mine

Cane Creek.....Mn

BMMUS2.....upstream

0.35 sq. mi. drainage area

	Mn	LOG PARAMETER		FLOW	LOG FLOW		REGRESSION LINE
05-14-93	1.5	0.1760912591		0.01	-2.000000		-0.450899
06-11-93	0.54	-0.2676062402		0.01	-2.000000		-0.450899
07-09-93	0.01	-2		0.01	-2.000000		-0.450899
07-20-93	1	0		0.01	-2.000000		-0.450899
08-11-93	0.4	-0.3979400087		0.01	-2.000000		-0.450899
08-25-93	0.4	-0.3979400087		0.01	-2.045757		-0.397940
09-23-93	0.6	-0.2218487496		0.01	-2.000000		-0.450899
10-19-93	0.25	-0.6020599913		0.01	-2.000000		-0.450899
02-10-94	0.3	-0.5228787453		0.01	-2.000000		-0.450899
03-04-94	0.6	-0.2218487496		0.01	-2.000000		-0.450899

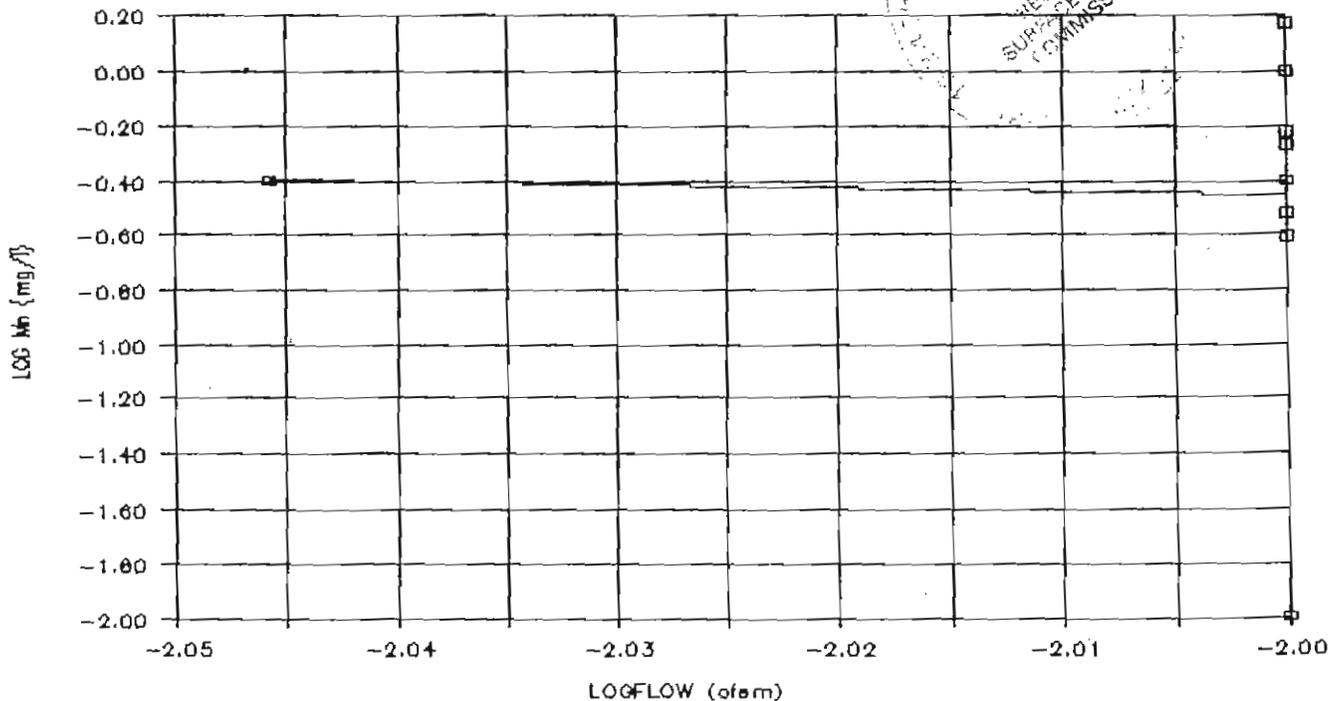
Regression Output:

Constant -2.765668
 Std Err of Y Est 0.6290369
 R Squared 0.0007967
 No. of Observations 10
 Degrees of Freedom 8

X Coefficient(s) -1.157384
 Std Err of Coef. 14.490812

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REGRESSION SPREADSHEET

Beard Mining and Minerals Co., Inc.

Cane Creek Mine

Cane Creek.....SpC

BMMUS2.....upstream

0.35 sq. mi. drainage area

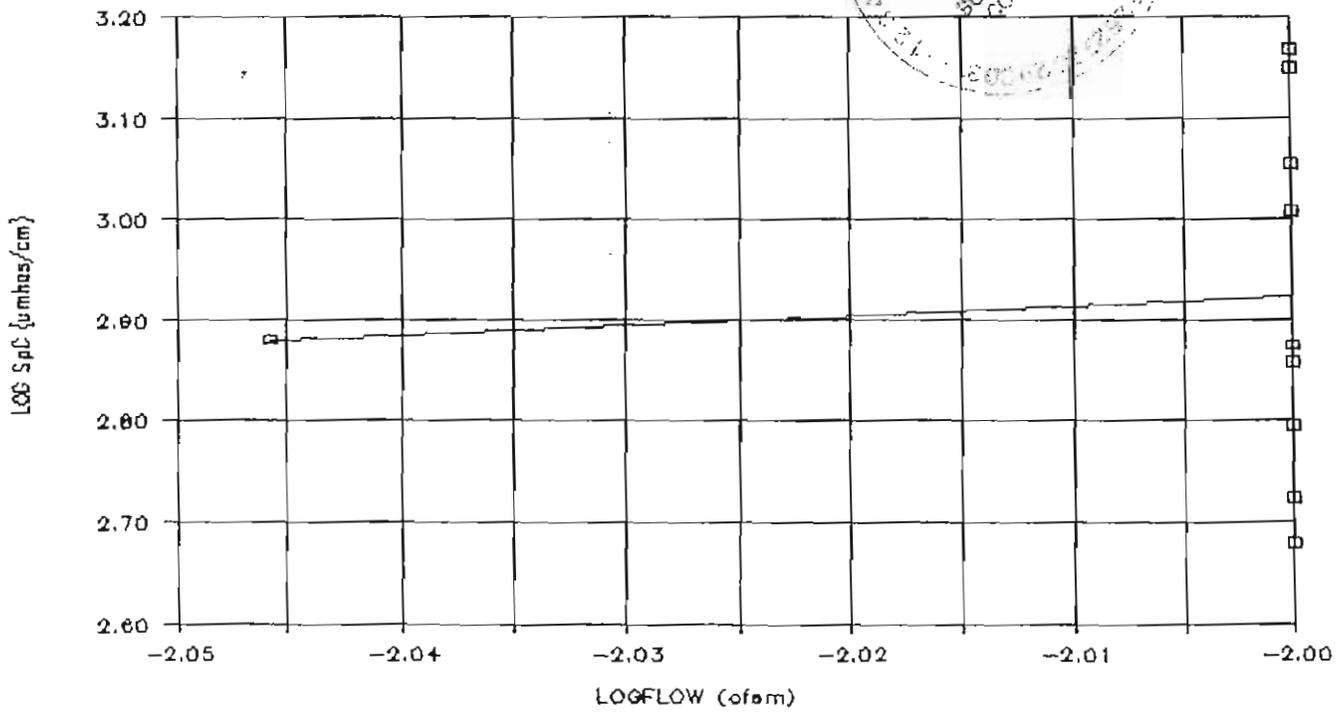
	SpC	LOG PARAMETER		FLOW	LOG FLOW		REGRESSION LINE
05-14-93	478	2.6794278966		0.01	-2.000000		2.924944
06-11-93	530	2.7242758696		0.01	-2.000000		2.924944
07-09-93	725	2.8603380066		0.01	-2.000000		2.924944
07-20-93	752	2.8762178406		0.01	-2.000000		2.924944
08-11-93	1141	3.0572856444		0.01	-2.000000		2.924944
08-25-93	1418	3.1516762308		0.01	-2.000000		2.924944
09-23-93	761	2.8813846568		0.01	-2.045757		2.881385
10-19-93	626	2.7965743332		0.01	-2.000000		2.924944
02-10-94	1478	3.1696744341		0.01	-2.000000		2.924944
03-04-94	1021	3.0090257421		0.01	-2.000000		2.924944

Regression Output:

Constant 4.8288658
 Std Err of Y Est 0.1800893
 R Squared 0.0065386
 No. of Observations 10
 Degrees of Freedom 8

X Coefficient(s) 0.9519609
 Std Err of Coef. 4.1486283

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REGRESSION SPREADSHEET
Beard Mining and Minerals Co., Inc.
Cane Creek Mine
BMMDS2..... pH
LITTLE FROG AGUE..... downstream
1.46 sq. mi. drainage area

SAMPLE DATE	pH	LOG PARAMETER	FLOW	LOG FLOW	REGRESSION LINE
05-14-93	8.2		39.6	1.597695	7.870878
06-11-93	8.1		16.8	1.225309	7.613458
07-09-93	8.2		65.2	1.814248	8.020575
07-20-93	8.1		64.5	1.809560	8.017334
08-11-93	6.8		42.8	1.631444	7.894208
08-25-93	8.1		38.2	1.582063	7.860072
09-23-93	7.2		11.3	1.053078	7.494400
10-19-93	7.8		27.4	1.437751	7.760313
02-10-94	8.1		72.3	1.859138	8.051606
03-04-94	7.9		46.2	1.664642	7.917157

Regression Output:

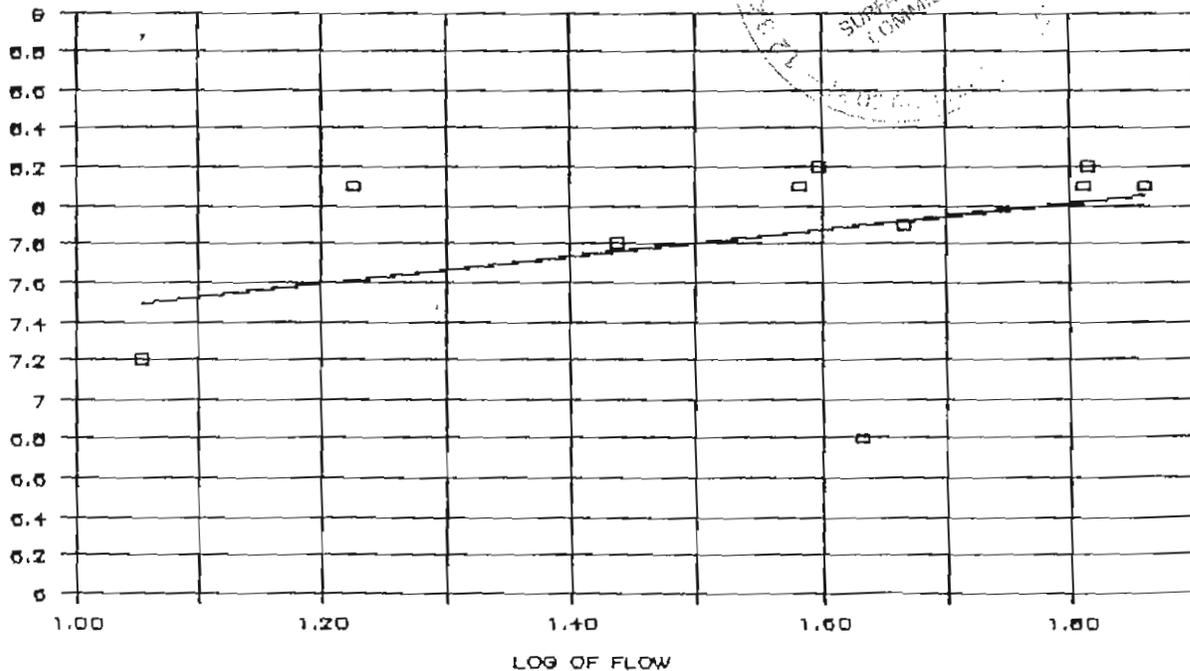
Constant 6.7664359
 Std Err of Y Est 0.4650012
 R Squared 0.1457731
 No. of Observations 10
 Degrees of Freedom 8

X Coefficient(s) 0.6912720
 Std Err of Coef. 0.5916322

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S.H.



REGRESSION SPREADSHEET

Beard Mining and Minerals Co., Inc.

Cane Creek Mine

Little Frog Ague.....TSS

BMMDS2.....downstream

1.46 sq. mi. drainage area

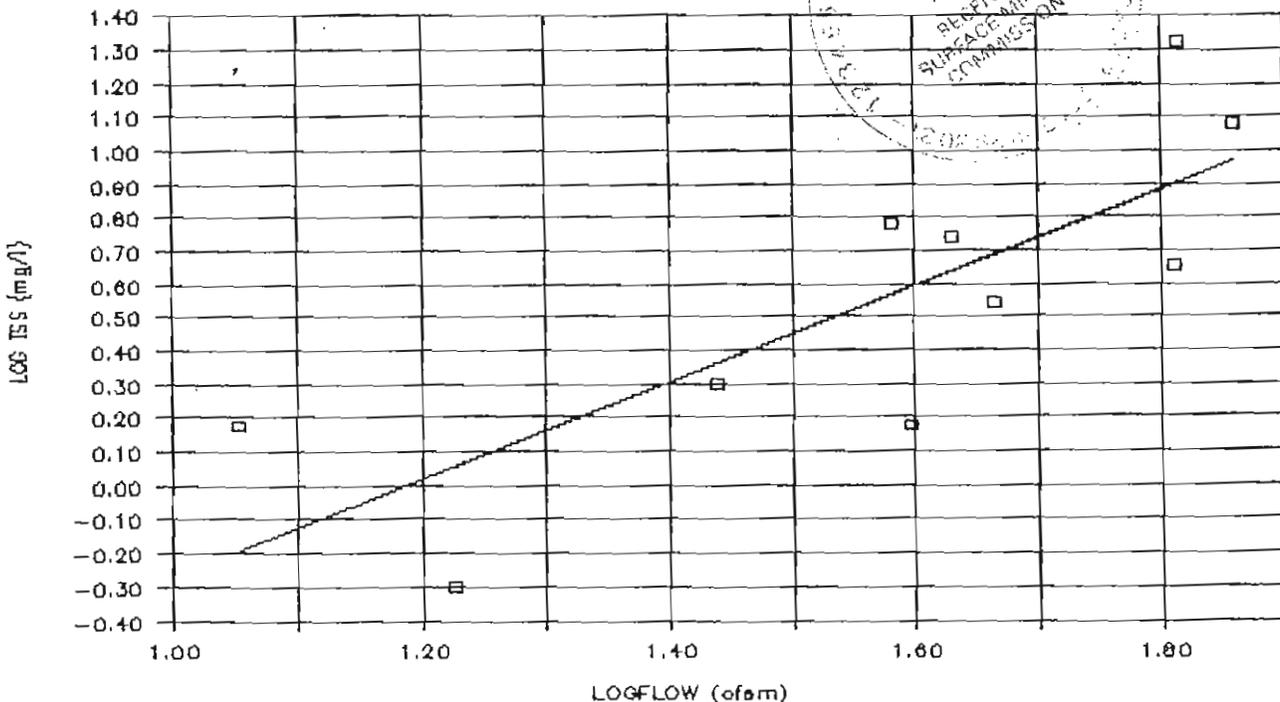
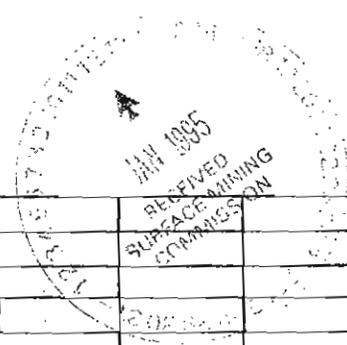
	TSS	LOG PARAMETER		FLOW	LOG FLOW		REGRESSION LINE
05-14-93	1.5	0.1760912591		39.6	1.597695		0.590420
06-11-93	0.5	-0.3010299957		16.8	1.225309		0.054301
07-09-93	21	1.3222192947		65.2	1.814248		0.902187
07-20-93	4.5	0.6532125138		64.50	1.809560		0.895438
08-11-93	5.5	0.7403626895		42.8	1.631444		0.639007
08-25-93	6	0.7781512504		38.20	1.582063		0.567915
09-23-93	1.5	0.1760912591		11.3	1.053078		-0.193658
10-19-93	2	0.3010299957		27.4	1.437751		0.360150
02-10-94	12	1.079181246		72.3	1.859138		0.966816
03-04-94	3.5	0.5440680444		46.2	1.664642		0.686802

Regression Output:

Constant -1.709761
 Std Err of Y Est 0.3083644
 R Squared 0.6273033
 No. of Observations 10
 Degrees of Freedom 8

X Coefficient(s) 1.4396869
 Std Err. of Coef. 0.3923394

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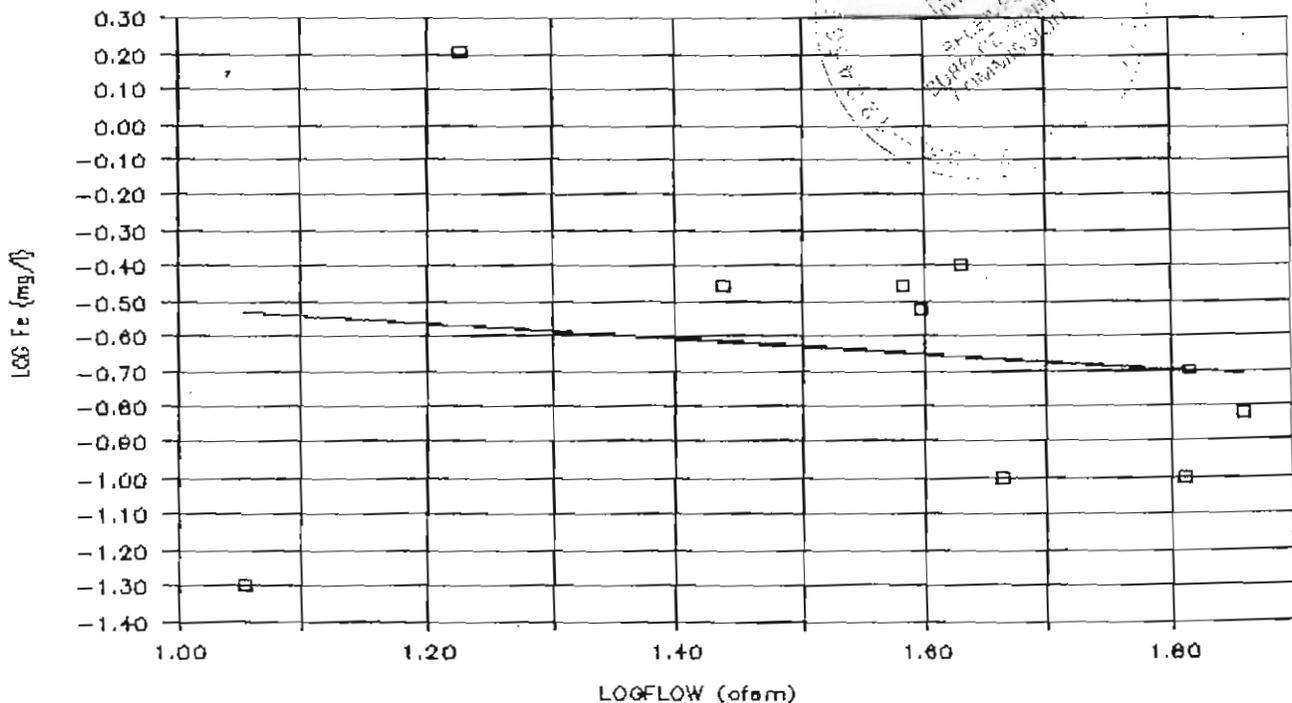
REGRESSION SPREADSHEET
Beird Mining and Minerals Co., Inc.
Cane Creek Mine
Little Frog Ague.....Fe
BMMDS2.....downstream
1.46 sq. mi. drainage area

	Fe	LOG PARAMETER		FLOW	LOG FLOW		REGRESSION LINE
05-14-93	0.3	-0.5228787453		39.6	1.597695		-0.652155
06-11-93	1.6	0.2041199827		16.8	1.225309		-0.566984
07-09-93	0.2	-0.6989700043		65.2	1.814248		-0.701684
07-20-93	0.1	-1		64.50	1.809560		-0.700612
08-11-93	0.4	-0.3979400087		42.8	1.631444		-0.659874
08-25-93	0.35	-0.4559319556		38.20	1.582063		-0.648580
09-23-93	0.05	-1.3010299957		11.3	1.053078		-0.527591
10-19-93	0.35	-0.4559319556		27.4	1.437751		-0.615573
02-10-94	0.15	-0.8239087409		72.3	1.859138		-0.711952
03-04-94	0.1	-1		46.2	1.664642		-0.667467

Regression Output:

Constant	-0.286733
Std Err of Y Est	0.4406644
R Squared	0.0203778
No. of Observations	10
Degrees of Freedom	8
X Coefficient(s)	-0.228717
Std Err of Coef.	0.5606679

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REGRESSION SPREADSHEET

Beard Mining and Minerals Co., Inc.

Cane Creek Mine

Little Frog Ague..... Mn

BMMS2.....downstream

1.46 sq. mi. drainage area

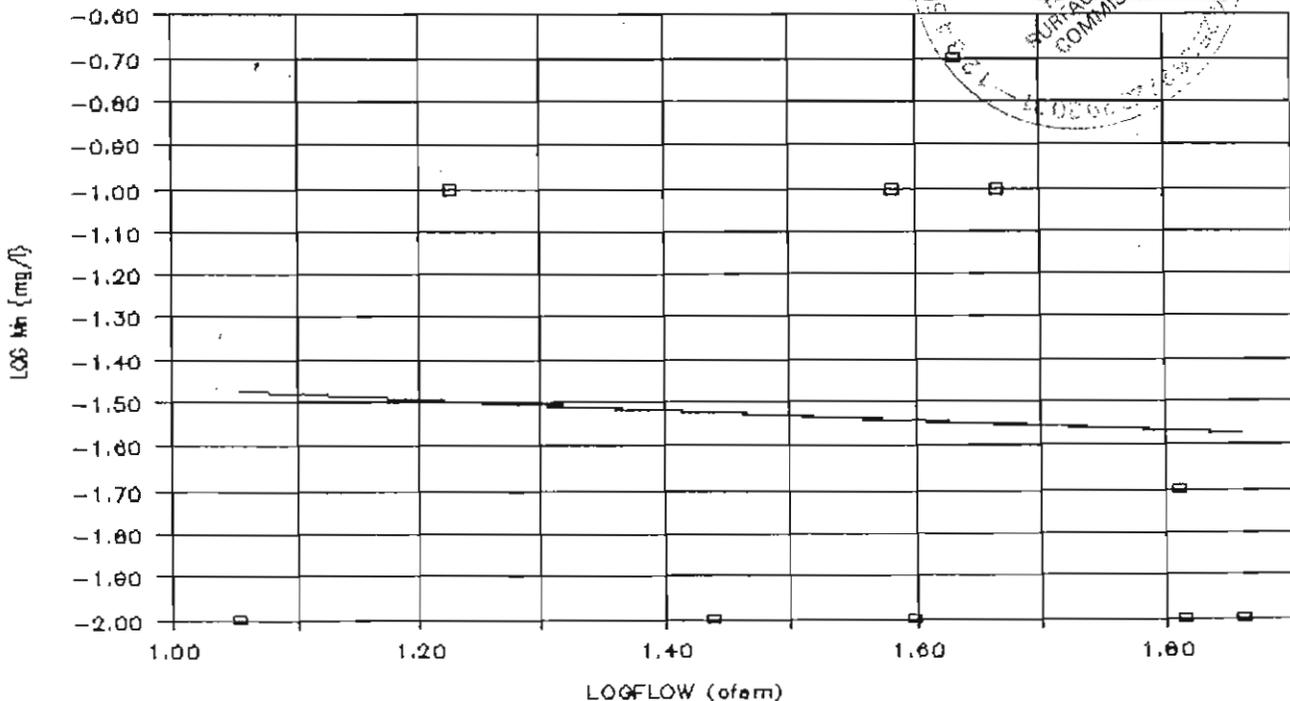
	Mn	LOG PARAMETER		FLOW	LOG FLOW		REGRESSION LINE
05-14-93	0.01	-2		39.6	1.597695		-1.543431
06-11-93	0.1	-1		16.8	1.225309		-1.498586
07-09-93	0.01	-2		65.2	1.814248		-1.569510
07-20-93	0.02	-1.6989700043		64.50	1.809560		-1.568945
08-11-93	0.2	-0.6989700043		42.8	1.631444		-1.547495
08-25-93	0.1	-1		38.20	1.582063		-1.541549
09-23-93	0.01	-2		11.3	1.053076		-1.477845
10-19-93	0.01	-2		27.4	1.437751		-1.524170
02-10-94	0.01	-2		72.3	1.859138		-1.574916
03-04-94	0.1	-1		46.2	1.664642		-1.551493

Regression Output:

Constant -1.351025
 Std Err of Y Est 0.5762425
 R Squared 0.0033611
 No. of Observations 10
 Degrees of Freedom 8

X Coefficient(s) -0.120426
 Std Err of Coef. 0.7331672

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REGRESSION SPREADSHEET
Beaird Mining and Minerals Co., Inc.
Cane Creek Mine
Little Frog Ague.....SpC
BMMDS2.....downstream
1.46 sq. mi. drainage area

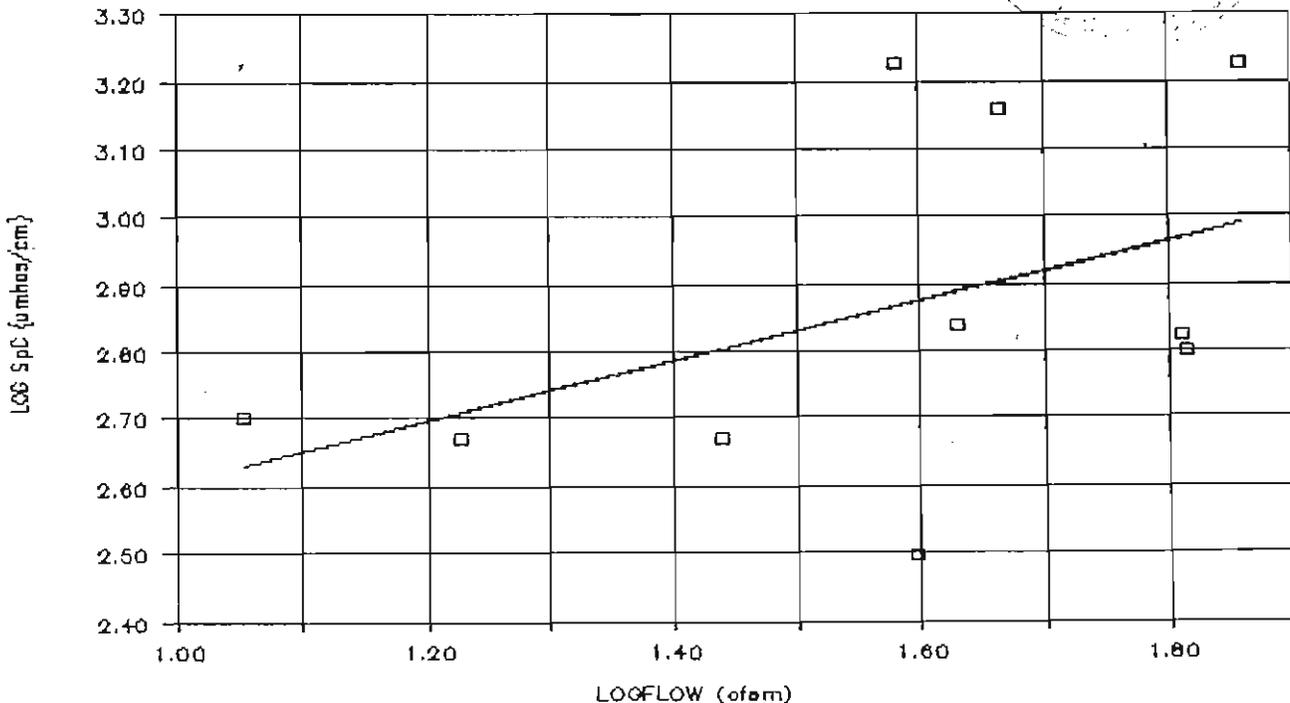
	SpC	LOG PARAMETER		FLOW	LOG FLOW		REGRESSION LINE
05-14-93	314	2.4969296481		39.6	1.597695		2.874762
06-11-93	470	2.6720978579		16.8	1.225309		2.708564
07-09-93	631	2.8000293592		65.2	1.814248		2.971410
07-20-93	665	2.8228216453		64.50	1.809560		2.969318
08-11-93	694	2.8413594705		42.8	1.631444		2.889824
08-25-93	1681	3.2255677134		38.20	1.582063		2.867785
09-23-93	502	2.7007037171		11.3	1.053078		2.631697
10-19-93	468	2.6702458531		27.4	1.437751		2.803378
02-10-94	1680	3.2253092817		72.3	1.859138		2.991445
03-04-94	1438	3.157758886		46.2	1.664642		2.904640

Regression Output:

Constant 2.1617031
Std Err of Y Est 0.2414860
R Squared 0.2087045
No. of Observations 10
Degrees of Freedom 8

X Coefficient(s) 0.4463045
Std Err of Coef. 0.3072484

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HYDROLOGIC RECLAMATION PLAN
CERTIFICATION STATEMENT

I, Keith Madison, a Professional Geologist as defined in Section 880-X-2-.06 of the Regulations of the Alabama Surface Mining Commission, hereby certify that the following Hydrologic Reclamation Plan information included in this application as defined in Section 880-X-2-.06(H) was prepared by C & C Engineering Co., Inc., and the information included therein is correct and accurate to the best of my knowledge and belief.

McGehee Engineering Corp.

Keith Madison

Keith Madison
Geologist

1/12/95
Date

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