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REGRESSION ANALYSIS

SURFACE WATER MONITORING SITE

SW#5

BULL GAP MINE

CEDAR LAKE MINING, INC.

SURFACE WATER
REGRESSION SPREADSHEET
MONITORING SITE: **SW#5**
DRAINAGE AREA (Sq. Miles) : **2.135**

pH (s.u.)	Flow (cfs)	Flow (cfsm)	Flow Log	pH REGRESS
5.35	11.39	5.33	0.7271	6.5598
7.25	12.65	5.93	0.7727	6.5585
6.35	2.04	0.96	-0.0198	6.5812
6.56	1.77	0.83	-0.0814	6.5829
6.44	0.98	0.46	-0.3382	6.5903
6.78	12.44	5.83	0.7654	6.5587
6.69	11.79	5.52	0.7421	6.5594
7.15	2.33	1.09	0.0380	6.5795

SUMMARY OUTPUT

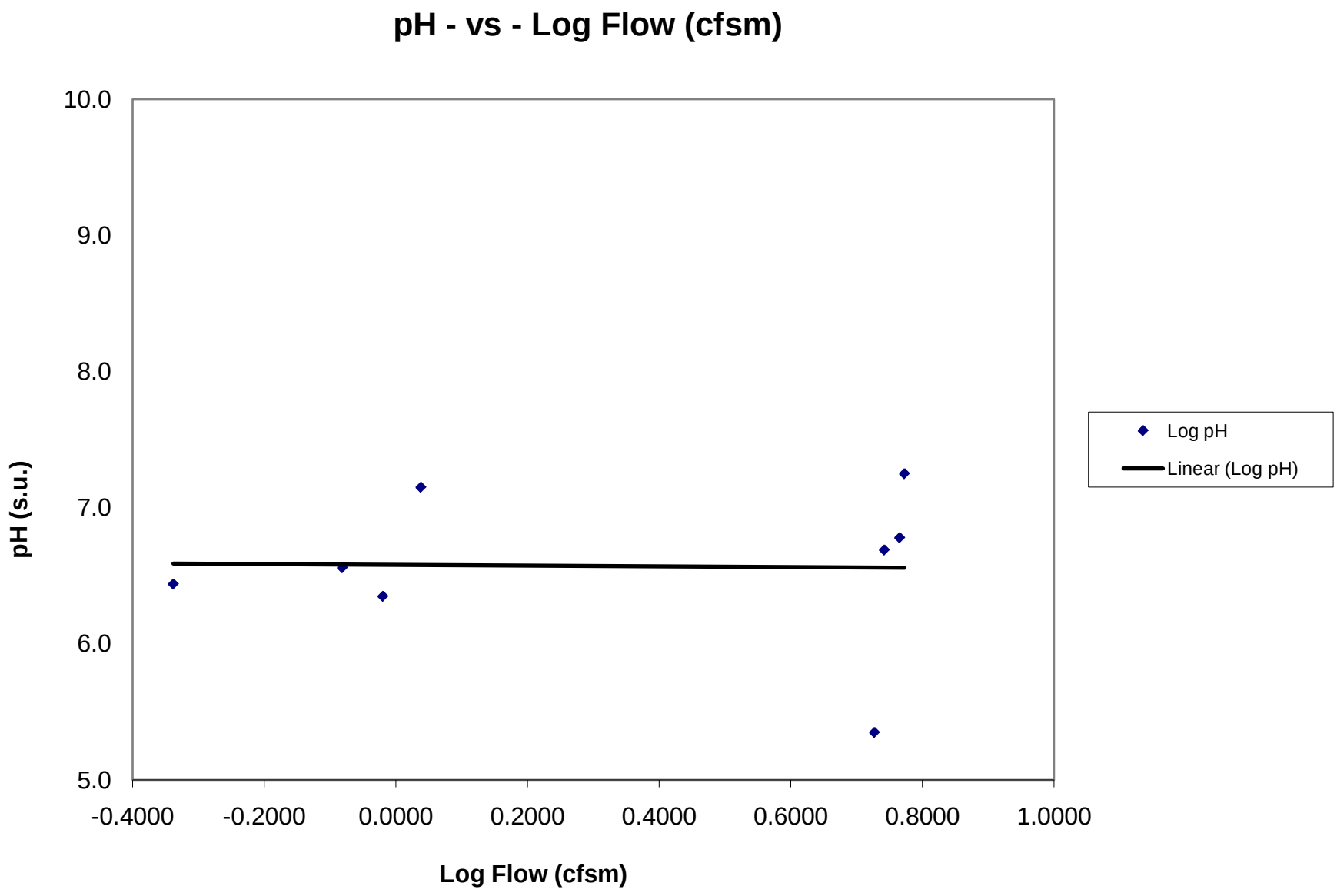
Regression Statistics	
Multiple R	0.0229
R Square	0.0005
Adjusted R Square	-0.1661
Standard Error	0.6337
Observations	8

Regression Equation: y = (m) x + b

m= X Variable 1 Coefficient

b= Intercept Coefficient

	Coefficients	Standard Error
Intercept	6.5806	0.2792
X Variable 1	-0.0286	0.5113


pH - vs - Log Flow (cfsm)
10.0
9.0
8.0
7.0
6.0
5.0
pH (s.u.)
-0.4000
-0.2000
0.0000
0.2000
0.4000
0.6000
0.8000
1.0000
Log Flow (cfsm)
Log pH
Linear (Log pH)

SURFACE WATER
REGRESSION SPREADSHEET
MONITORING SITE: **SW#5**
DRAINAGE AREA (Sq. Miles) : **2.135**

Fe mg/l	Log Fe	Flow (CFS)	Flow (CFSM)	Flow Log (csfm)	REGRESS Fe	Regress Log Fe
0.09	-1.0458	11.39	5.33	0.7271	0.24	-0.6278
0.33	-0.4815	12.65	5.93	0.7727	0.23	-0.6308
0.28	-0.5528	2.04	0.96	-0.0198	0.26	-0.5781
0.29	-0.5376	1.77	0.83	-0.0814	0.27	-0.5740
0.22	-0.6576	0.98	0.46	-0.3382	0.28	-0.5569
0.24	-0.6198	12.44	5.83	0.7654	0.23	-0.6303
0.37	-0.4318	11.79	5.52	0.7421	0.24	-0.6288
0.33	-0.4815	2.33	1.09	0.0380	0.26	-0.5819

SUMMARY OUTPUT

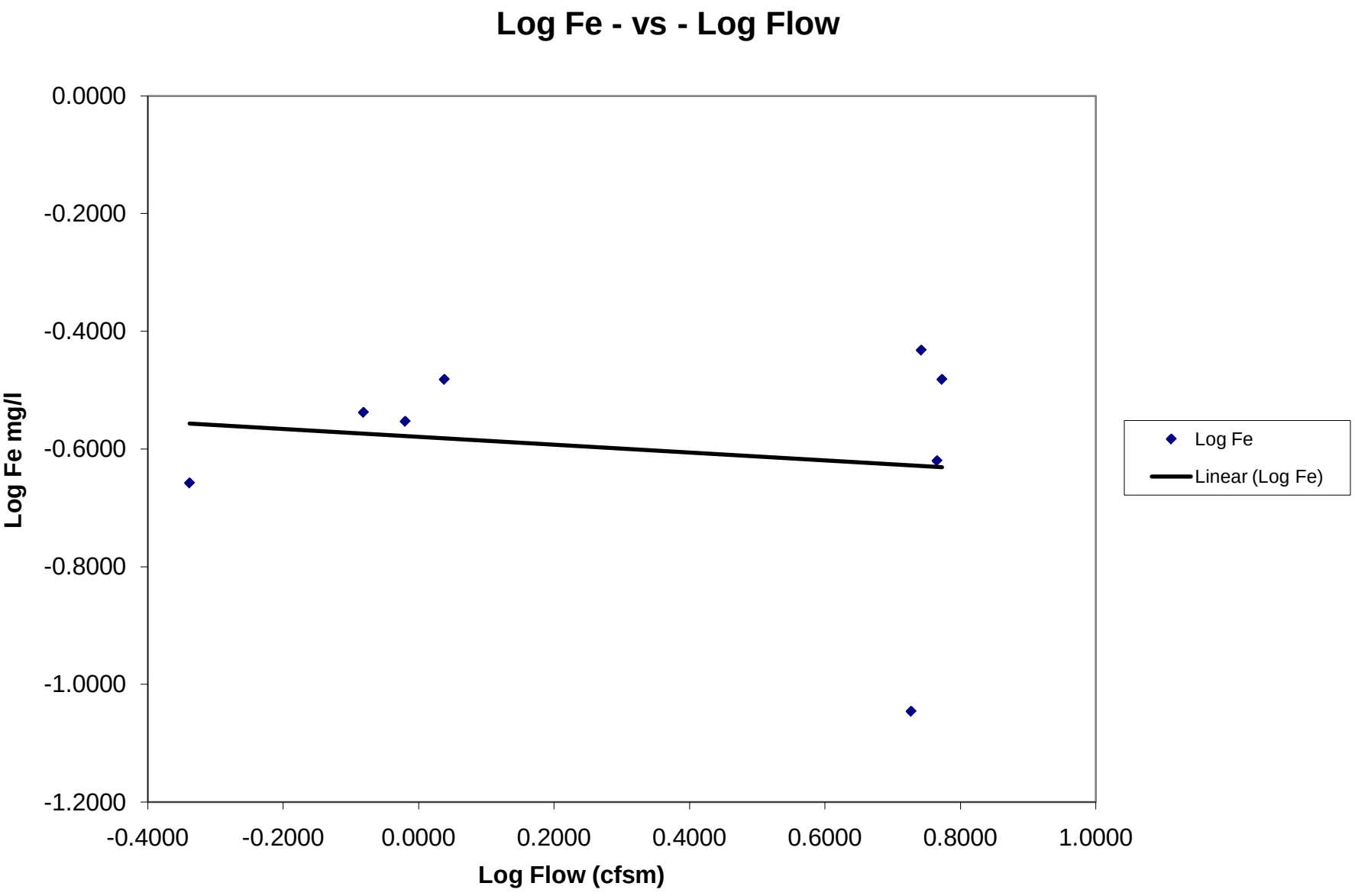
Regression Statistics	
Multiple R	0.1602
R Square	0.0257
Adjusted R Square	-0.1367
Standard Error	0.2074
Observations	8

Regression Equation: y = (m) x + b

m= X Variable 1 Coefficient

b= Intercept Coefficient

	Coefficients	Standard Error
Intercept	-0.5794	0.0914
X Variable 1	-0.0665	0.1673


Log Fe - vs - Log Flow
0.0000
-0.2000
-0.4000
-0.6000
-0.8000
-1.0000
-1.2000
Log Fe mg/l
-0.4000
-0.2000
0.0000
0.2000
0.4000
0.6000
0.8000
1.0000
Log Flow (cfsm)
Log Fe
Linear (Log Fe)

SURFACE WATER
REGRESSION SPREADSHEET
MONITORING SITE: SW#5
DRAINAGE AREA (Sq. Miles) : 2.135

Mn mg/l	Log Mn	Flow (CFS)	Flow (CFSM)	Flow Log (csfm)	REGRESS Mn	Regress Log Mn
0.60	-0.2218	11.39	5.33	0.7271	0.49	-0.3135
0.20	-0.6990	12.65	5.93	0.7727	0.49	-0.3107
0.59	-0.2291	2.04	0.96	-0.0198	0.44	-0.3599
0.45	-0.3468	1.77	0.83	-0.0814	0.43	-0.3638
0.31	-0.5086	0.98	0.46	-0.3382	0.42	-0.3797
1.03	0.0128	12.44	5.83	0.7654	0.49	-0.3112
0.41	-0.3872	11.79	5.52	0.7421	0.49	-0.3126
0.47	-0.3279	2.33	1.09	0.0380	0.44	-0.3563

SUMMARY OUTPUT

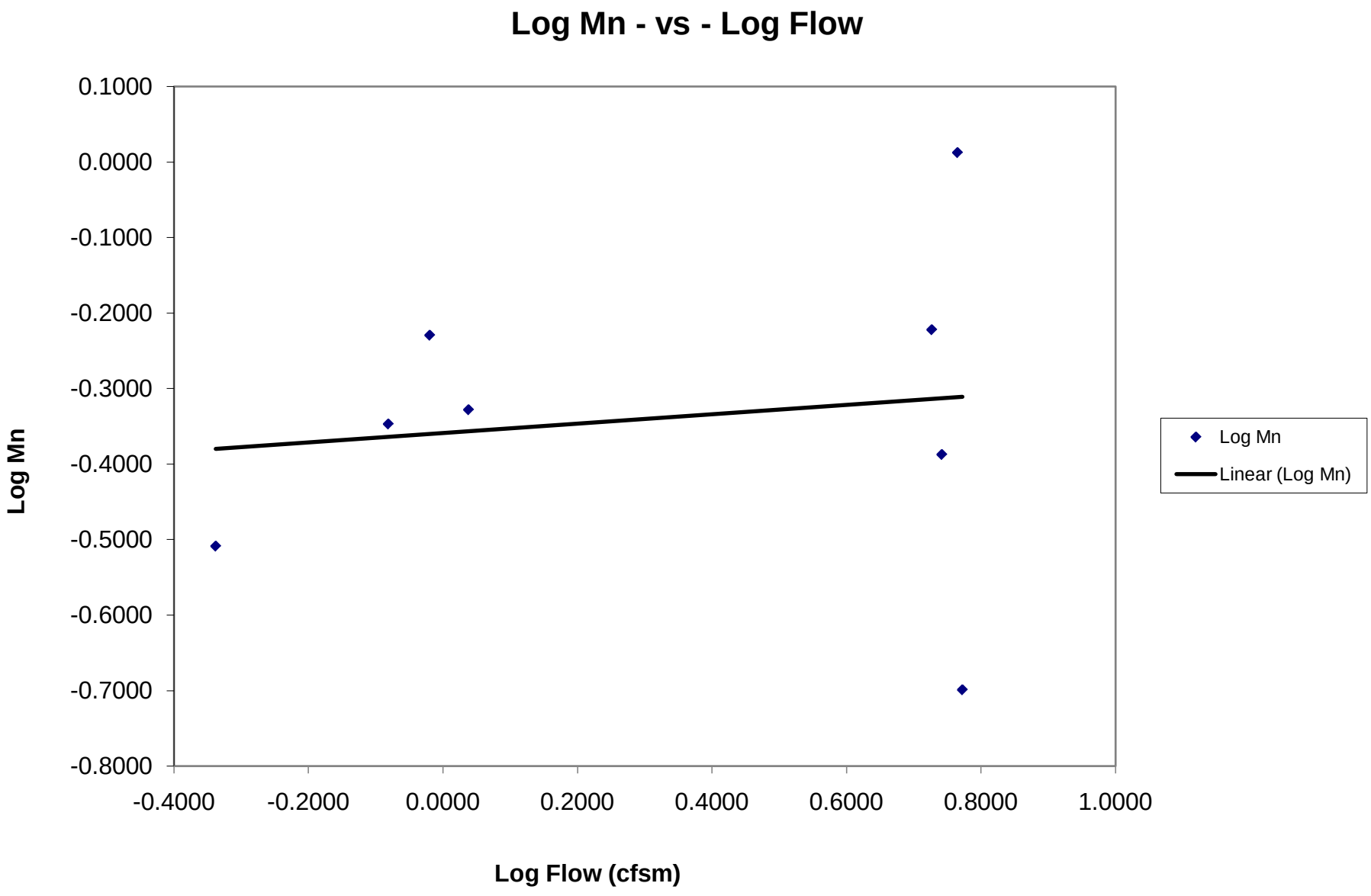
Regression Statistics	
Multiple R	0.1381
R Square	0.0191
Adjusted R Square	-0.1444
Standard Error	0.2253
Observations	8

Regression Equation: y = (m) x + b

m= X Variable 1 Coefficient

b= Intercept Coefficient

	Coefficients	Standard Error
Intercept	-0.3587	0.0992
X Variable 1	0.0621	0.1818


Log Mn - vs - Log Flow
0.1000
0.0000
-0.1000
-0.2000
-0.3000
-0.4000
-0.5000
-0.6000
-0.7000
-0.8000
Log Mn
-0.4000
-0.2000
0.0000
0.2000
0.4000
0.6000
0.8000
1.0000
Log Flow (cfsm)
Log Mn
Linear (Log Mn)

SURFACE WATER
REGRESSION SPREADSHEET
MONITORING SITE: SW#5
DRAINAGE AREA (Sq. Miles) 2.135

Tss mg/l	Log Tss	Flow (CFS)	Flow (CFSM)	Flow Log (csfm)	REGRESS Tss	Regress Log Tss
6	0.7782	11.39	5.33	0.7271	4.94	0.6934
1	0.0000	12.65	5.93	0.7727	4.91	0.6910
3	0.4771	2.04	0.96	-0.0198	5.40	0.7325
11	1.0414	1.77	0.83	-0.0814	5.44	0.7358
5	0.6990	0.98	0.46	-0.3382	5.61	0.7492
7	0.8451	12.44	5.83	0.7654	4.91	0.6914
15	1.1761	11.79	5.52	0.7421	4.93	0.6926
5	0.6990	2.33	1.09	0.0380	5.36	0.7295

SUMMARY OUTPUT

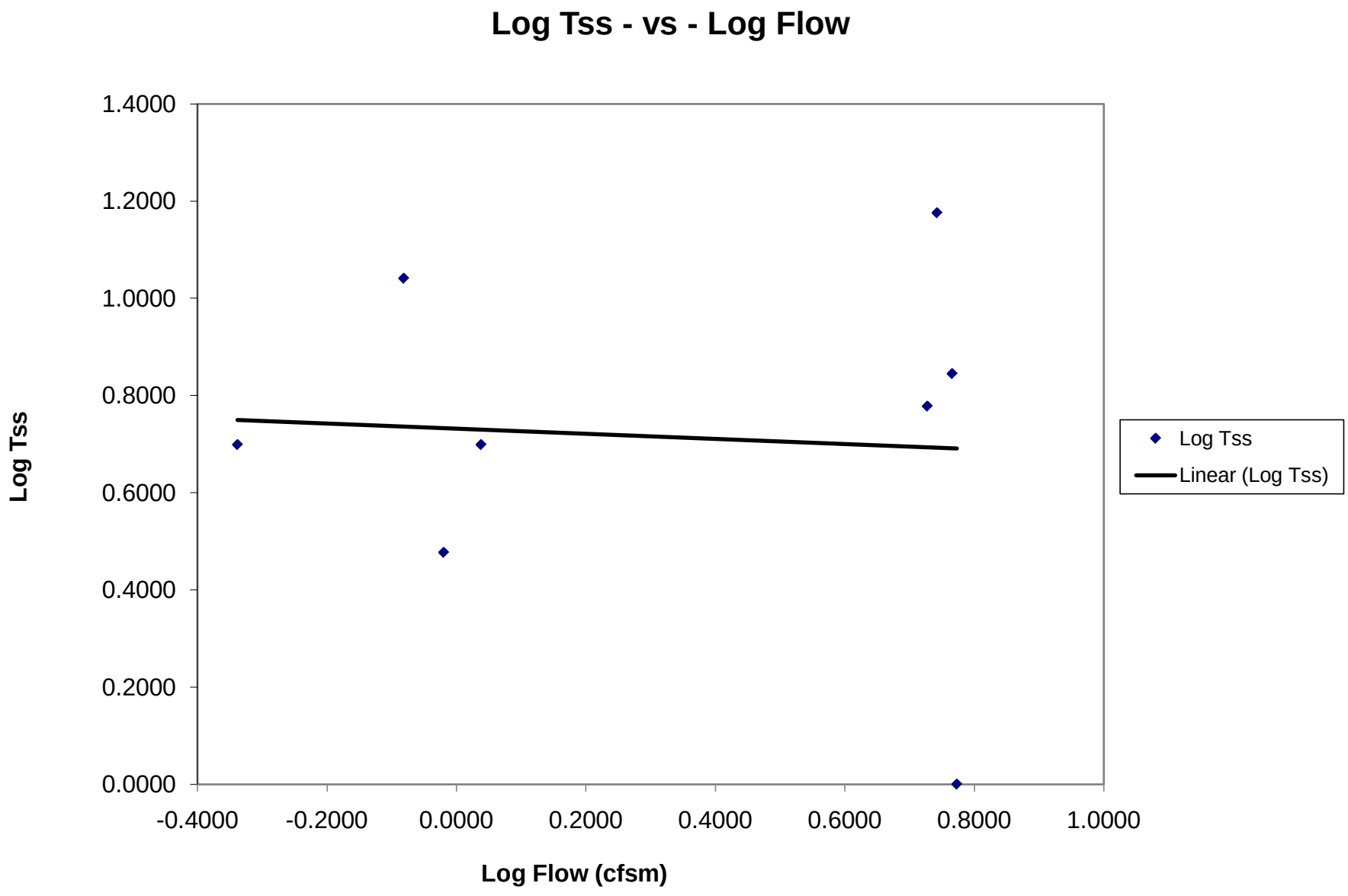
Regression Statistics	
Multiple R	0.0681
R Square	0.0046
Adjusted R Square	-0.1613
Standard Error	0.3882
Observations	8

Regression Equation: y = (m) x + b

m= X Variable 1 Coefficient

b= Intercept Coefficient

	Coefficients	Standard Error
Intercept	0.7315	0.1710
X Variable 1	-0.0524	0.3132


Log Tss - vs - Log Flow
1.4000
1.2000
1.0000
0.8000
0.6000
0.4000
0.2000
0.0000
Log Tss
-0.4000
-0.2000
0.0000
0.2000
0.4000
0.6000
0.8000
1.0000
Log Flow (cfsm)
Log Tss
Linear (Log Tss)

SURFACE WATER
REGRESSION SPREADSHEET
MONITORING SITE: SW#5
DRAINAGE AREA (Sq. Miles) 2.135

SpC Umhos/cm	Log SpC	Flow (CFS)	Flow (CFSM)	Flow Log (csfm)	REGRESS SpC	Regress Log SpC
305	2.4843	11.39	5.33	0.7271	182	2.2597
100	2.0000	12.65	5.93	0.7727	181	2.2572
149	2.1732	2.04	0.96	-0.0198	199	2.2996
214	2.3304	1.77	0.83	-0.0814	201	2.3028
213	2.3284	0.98	0.46	-0.3382	207	2.3166
246	2.3909	12.44	5.83	0.7654	181	2.2576
148	2.1703	11.79	5.52	0.7421	181	2.2589
235	2.3711	2.33	1.09	0.0380	198	2.2965

SUMMARY OUTPUT

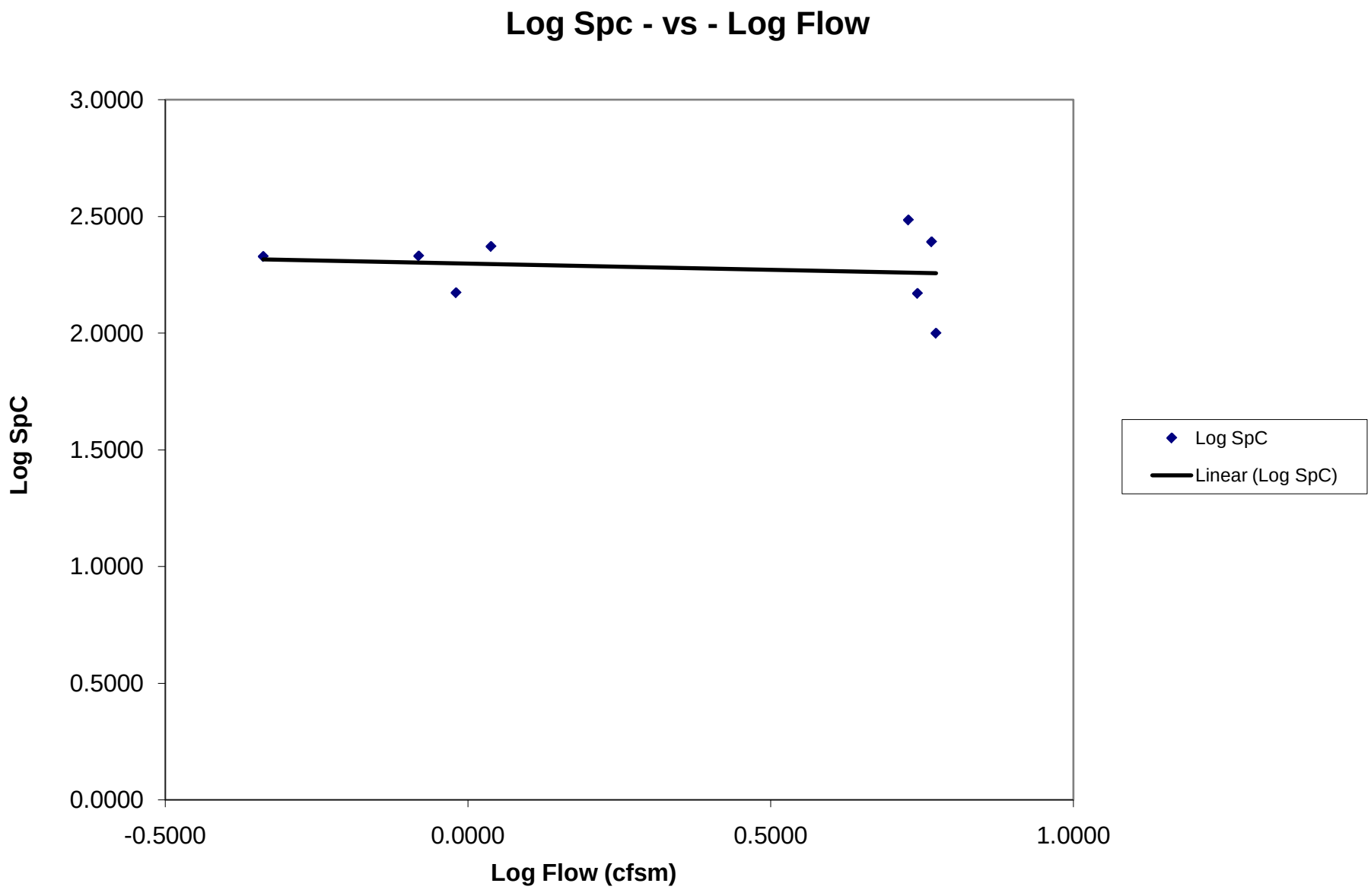
Regression Statistics	
Multiple R	0.1609
R Square	0.0259
Adjusted R Square	-0.1365
Standard Error	0.1657
Observations	8

Regression Equation: y = (m) x + b

m= X Variable 1 Coefficient

b= Intercept Coefficient

	Coefficients	Standard Error
Intercept	2.2985	0.0730
X Variable 1	-0.0534	0.1337


Log Spc - vs - Log Flow
3.0000
2.5000
2.0000
1.5000
1.0000
0.5000
0.0000
Log SpC
-0.5000
0.0000
0.5000
1.0000
Log Flow (cfsm)
Log SpC
Linear (Log SpC)

SURFACE WATER PROJECTIONS

MONITORING SITE:	**SW#5**	MINING RATIO :	**0.1347**
DRAINAGE AREA (Sq. Miles)	**2.135**	RECESSION INDEX :	**35**
MINING AREA (Acres)	**184**	PRECIPITATION :	**52**

NPDES SURFACE WATER DISCHARGE LIMITS

	pH	Fe	Mn	TSS	SpC
	s.u.	mg/l	mg/l	mg/l	umhos/cm
During Mining	6.00	6.00	4.00	70	2000
After Mining	6.00	6.00	4.00	70	2000

SURFACE WATER REGRESSION DATA

	pH	Fe	Mn	TSS	SpC
X Coefficients	-0.03	-0.07	0.06	-0.05	-0.05
Constants	6.58	-0.58	-0.36	0.73	2.30

LOW FLOW

Mining	Flow	pH	Fe	Mn	TSS	SpC
Conditon	cfsm	s.u.	mg/l	mg/l	mg/l	umhos/cm
Before	0.01	6.63	0.35	0.34	7	250
During	0.02	6.55	1.11	0.83	15	485
After	0.01	6.55	1.11	0.83	15	485

AVERAGE FLOW

Mining	Flow	pH	Fe	Mn	TSS	SpC
Conditon	cfsm	s.u.	mg/l	mg/l	mg/l	umhos/cm
Before	1.55	6.58	0.26	0.45	5	194
During	1.65	6.50	1.03	0.93	14	437
After	1.59	6.50	1.03	0.93	14	437

HIGH FLOW

Mining	Flow	pH	Fe	Mn	TSS	SpC
Conditon	cfsm	s.u.	mg/l	mg/l	mg/l	umhos/cm
Before	145.62	6.52	0.19	0.60	4	152
During	155.43	6.45	0.97	1.06	13	401
After	149.54	6.45	0.97	1.06	13	401