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SC3 SOLDIER CREEK COAL CO.

Telephone (801) 637-6360

P.O. Box I
Price, Utah 84501

March 28, 1989

Mr. Lowell P. Braxton, Administrator
Utah Division of Oil, Gas and Mining
355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, UT 84180-1203

RE: Annual Report for 1988
Soldier Canyon Mine
ACT/007/018

Dear Mr. Braxton:

Enclosed is the 1988 annual report for the Soldier Canyon Mine.

Please contact me if you have any questions or comments concerning this submittal.

Sincerely,
Soldier Creek Coal Company

David G. Spillman
Mine Engineer

DGS/lss
Enclosure

COAL MINING AND RECLAMATION OPERATIONS FOR 1988
(Authority UMC 784)

(Must be submitted to the Division by March 31, 1989)

State of Utah
Department of Natural Resources
Division of Oil, Gas and Mining
3 Triad Centter, Suite 350
355 West North Temple
Salt Lake City, Utah 84180-1203

(801) 538-5340

Operator: *SOLDIER CREEK COAL COMPANY*

Mine Name: *SOLDIER CANYON MINE*

Mailing Address: *P.O. BOX I, PRICE, UTAH 84501*

Company Representative: *MR. R.W. OLSEN, PRESIDENT*

Permit Number: *ACT/007/018*

Date of Most Recent Permanent Program Permit: *February 3, 1987*

Quantity of Coal Mined (tonnage) 1988: *817,402*

Attach Updated Mine Sequence Map.

All monitoring activities during the report period must be submitted with this report (including, but not limited to):

A. Summarized Water Monitoring Data

B. Precipitation or Other Climatological Data

C. Subsidence Monitoring Report

D. Vegetation Data (test plots) or Revegetation Success Monitoring (includes interim and final)

E. Permit Stipulation Status

djh
AT57

WATER MONITORING INFORMATION

All water monitoring activities during 1988 were conducted in accordance with the approved Mining and Reclamation Plan. The complete summarized results for each point monitored and sample site location maps are enclosed.

The total ground water consumption for 1988 due to mining activities is estimated as follows:

1. Water added to coal produced ... 4,507,000 Gallons

   1988 coal production - 817,402 tons
   Inherent moisture - 4%
   Run-of-mine moisture - 6.3%

2. Water evaporation .....11,050,000 Gallons

   Average humidity of intake air - 40%
   Average humidity of exhaust air - 85%
   Mine ventilation - 768,000 cfm

3. Water discharged from mine 84,487,000 Gallon

   100,044,000 Gallons
   (307 acre-ft)

The areas of active mining for 1988 are shown on the enclosed mine progress maps. With the exception of the Third North Tenth East development, ground water inflow was not considered significant and typically advanced with the active development.

On April 11, 1988 a fracture zone was encountered in the Third North Tenth East section. This fracture was liberating approximately 1,000,000 cubic ft. of methane per day and in excess of 60 gpm of ground water inflow. Due to the high methane concentrations, mining operations in this area were indefinitely suspended.

Sample site UG-10E was established in May to monitor the Third North Tenth East ground water inflow. The quantity stabilized at 62.5 gpm until November, when it had decreased to 55.6 gpm. Methane liberation had also decreased significantly by years end. This decrease in both methane and water liberation is expected to continue for some time.

SUBSIDENCE MONITORING

The 1988 subsidence monitoring was carried out in accordance with the approved Mining and Reclamation Plan. This monitoring involved the resurveying of existing control points, as well as the establishment of additional control points. Visual observations were also made during

routine surface activities. These visual checks failed to identify any surface irregularities which could be attributed to subsidence.

All the 1988 subsidence monitoring was completed by Soldier Creek Coal Company personnel, utilizing the traverse method of surveying. Individual traverses were extended from existing survey monuments, located beyond the expected limits of any subsidence. The horizontal survey control has been oriented to the State Plane Coordinate System, Lambert Projection, Central Zone and all elevations were determined trigonometrically.

Four new subsidence monitoring points were established during 1988. These points (88-1 SS, 88-2 SS, 88-3 SS and 88-4 SS) were located in relationship to areas scheduled for secondary mining. Also, these points shall be incorporated into future annual monitoring surveys.

As allowed under the approved subsidence monitoring plan, monitored points which have shown to be stable, over time, and are not located near active mining operations may be omitted from the routine annual monitoring schedule. Therefore, points 14 SS, 43 SS, 50 SS, 54 SS, 109 SS and 110 SS, which have shown no significant change since 1979 were omitted from the 1988 subsidence monitoring activities. Future monitoring of these points shall be conducted on a random basis to verify their stability. Routine annual monitoring of any of these points would resume if a significant change were detected during random surveys or active underground mining is resumed in their vicinity.

The location of all subsidence points is shown on the enclosed 1988 Mine Progress Map. Also the 1988 Subsidence Monitoring Summary sheet is enclosed.

VEGETATION MONITORING

In accordance with the approved Mining and Reclamation Plan, there were no vegetation monitoring activities scheduled for 1988.

PERMIT STIPULATION STATUS

On February 3, 1987, the Division of Oil, Gas and Mining (DOGM) approved a new five year permit, with stipulations. Soldier Creek Coal Company has subsequently responded to all permit stipulations. DOGM has found this response adequate to meet the requirements of all permit stipulations.

1988 SUBSIDENCE MONITORING SUMMARY

ORIGINAL ESTABLISHED CONTROL					1988 SURVEY CONTROL		
Station	Date Established	Coordinates North	Coordinates East	Elevation	Date Resurveyed	Elevation	Change In Elevation
15 SS	1979	499,046.40	2,250,498.62	6,877.08	08/25/88	6,877.09	+0.01
36 SS	1979	504,721.47	2,251,483.38	6,999.88	08/26/88	6,999.81	-0.07
106 SS	1979	502,400.01	2,251,238.02	6,864.11	08/25/88	6,864.09	-0.02
3044	1983	503,050.26	2,251,423.30	6,930.90	08/25/88	6,930.92	+0.02
3046	1983	503,896.61	2,254,502.54	8,052.60	10/13/88	8,052.50	-0.10
3055	1983	505,967.71	2,248,349.81	8,095.30	10/13/88	8,094.95	-0.35
87-0 SS	1987	500,243.55	2,250,582.43	6,776.05	08/25/88	6,776.23	+0.18
87-1 SS	1987	501,367.65	2,251,073.81	6,873.89	08/25/88	6,873.70	-0.19
87-2 SS	1987	504,562.64	2,246,925.65	8,238.56	10/13/88	8,238.62	+0.06
87-47 SS	1987	502,184.61	2,254,071.70	7,480.42	10/13/88	7,480.32	-0.10
88-1 SS	08/03/88	504,829.39	2,250,202.17	7,289.91	-	-	-
88-2 SS	08/03/88	505,129.62	2,250,629.44	7,284.27	-	-	-
88-3 SS	08/03/88	505,379.31	2,251,047.87	7,149.07	-	-	-
88-4 SS	08/03/88	503,939.35	2,250,566.16	7,253.42	-	-	-

SOLDIER CREEK COAL COMPANY
HYDROLOGIC MONITORING PROGRAM
SUMMARIZED RESULTS FOR 1988

Soldier Creek Coal Company
Hydrologic Monitoring Program
Summarized Results for 1988

Sample Site ID: G-1 (Upper Soldier Creek)

Scheduled Sample Month	Feb	May	Aug	Nov
Sample Date	02/26/88	05/19/88	08/18/88	11/27/88
Field Measurements				
Flow, gpm	N/A	431	67	N/A
pH, units	8.80	9.02	9.07	9.20
Conductivity, us/cm	849	744	881	1060
Temperature, Water°F	34.8	68.8	81.0	32.0
Temperature, Air °F	50.0	63.0	80.0	30.0
Dissolved Oxygen, ppm	6.5	6.0	5.0	5.2
Laboratory Analyses, mg/l				
Total Dissolved Solids	524	414	458	656
Total Suspended Solids	828	188	6	40
Total Settleable Solids/hr	1.3	-0.1	-0.4	-0.1
Total Hardness	267	284	228	346
Carbonate (CO_3^{-2})	0	0	0	0
Bicarbonate (HCO_3-)	388	308	354	478
Calcium (Ca)	41	43	24	48
Chloride (Cl-)	16	11	18	27
Iron-Dissolved (Fe)	0.02	0.08	.09	-0.02
Magnesium (Mg)	40	43	41	55
Manganese (Mn)	-0.01	0.01	0.01	-0.01
Potassium (k)	1	2	2	1
Sodium (Na)	110	56	111	146
Sulfate (SO_4^{-2})	60	86	51	138
Oil & Grease	-1	-1	-1	-1
Cations meq/l	10.20	8.19	9.50	13.36
Anions meq/l	9.47	8.27	8.66	13.21
Cation/Anion Balance (%)	3.71	-0.49	4.63	0.56

Note: Negative Sign "-" denotes that value is less than.

Soldier Creek Coal Company
Hydrologic Monitoring Program
Summarized Results for 1988

Sample Site ID: G-2 (Upper Pine Creek)

Scheduled Sample Month	Feb	May	Aug	Nov
Sample Date	Site Not Accessible	05/19/88	08/17/88	Site Not Accessible
Field Measurements				
Flow, gpm		871	30	
pH, units		8.70	9.34	
Conductivity, us/cm		526	439	
Temperature, Water°F		48	67	
Temperature, Air °F		62	85	
Dissolved Oxygen, ppm		5.2	4.5	
Laboratory Analyses, mg/l				
Total Dissolved Solids		276	230	
Total Suspended Solids		94	-2	
Total Settleable Solids/hr		-0.1	-0.1	
Total Hardness		282	217	
Carbonate (CO_3^{-2})		0	0	
Bicarbonate (HCO_3-)		258	204	
Calcium (Ca)		67	41	
Chloride (Cl-)		2	3	
Iron-Dissolved (Fe)		0.06	-0.02	
Magnesium (Mg)		28	28	
Manganese (Mn)		0.01	-0.01	
Potassium (k)		1	2	
Sodium (Na)		12	14	
Sulfate (SO_4^{-2})		19	12	
Oil & Grease		-1	-1	
Cations meq/l		6.20	5.01	
Anions meq/l		5.61	4.42	
Cation/Anion Balance (%)		5.00	6.26	

Note: Negative Sign "-" denotes that value is less than.

Soldier Creek Coal Company
Hydrologic Monitoring Program
Summarized Results for 1988

Sample Site ID: G-5 (Lower Soldier Creek)

Scheduled Sample Month	Feb	May	Aug	Nov
Sample Date	02/26/88	05/20/88	08/18/88	11/27/88
Field Measurements				
Flow, gpm	N/A	3,586	206	916
pH, units	8.75	8.86	8.91	9.30
Conductivity, us/cm	1429	702	1164	1125
Temperature, Water°F	46.6	43.5	58.0	43.5
Temperature, Air °F	50.0	43	72.0	35.0
Dissolved Oxygen, ppm	8.1	9.2	5.7	5.5
Laboratory Analyses, mg/l				
Total Dissolved Solids	826	364	692	666
Total Suspended Solids	118	70	16	8
Total Settleable Solids/hr	-0.2	-0.2	-0.1	-0.2
Total Hardness	295	275	195	217
Carbonate (CO_3^{-2})	0	0	0	0
Bicarbonate (HCO_3-)	412	288	500	460
Calcium (Ca)	36	46	19	26
Chloride (Cl-)	148	16	45	31
Iron-Dissolved (Fe)	0.07	0.04	.16	0.05
Magnesium (Mg)	50	39	36	37
Manganese (Mn)	0.01	0.01	-0.01	0.01
Potassium (k)	9	3	14	15
Sodium (Na)	218	46	222	199
Sulfate (SO_4^{-2})	117	62	88	105
Oil & Grease	-1	-1	-1	-1
Cations meq/l	15.73	7.60	14.03	13.48
Anions meq/l	14.84	7.51	13.11	12.27
Cation/Anion Balance (%)	2.91	0.60	3.39	4.70

Note: Negative Sign "-" denotes that value is less than.

Soldier Creek Coal Company
Hydrologic Monitoring Program
Summarized Results for 1988

Sample Site ID: Spring #3

Scheduled Sample Month	Feb	May	Aug	Nov
Sample Date	Site Not Accessible	05/21/88	08/18/88	11/27/88
Field Measurements				
Flow, gpm		No Flow	No Flow	No Flow
pH, units				
Conductivity, us/cm				
Temperature, Water°F				
Temperature, Air °F				
Laboratory Analyses, mg/l				
Total Dissolved Solids				
Total Hardness				
Carbonate (CO_3^{-2})				
Bicarbonate (HCO_3-)				
Calcium (Ca)				
Chloride (Cl-)				
Iron-Dissolved (Fe)				
Magnesium (Mg)				
Manganese (Mn)				
Potassium (k)				
Sodium (Na)				
Sulfate (SO_4^{-2})				
Cations meq/l				
Anions meq/l				
Cation/Anion Balance (%)				

Note: Negative Sign "-" denotes that value is less than.

Soldier Creek Coal Company
Hydrologic Monitoring Program
Summarized Results for 1988

Sample Site ID: Spring #4

Scheduled Sample Month	Feb	May	Aug	Nov
Sample Date	Site Not Accessible	05/21/88	08/17/88	Site Not Accessible
Field Measurements				
Flow, gpm		15.0	2.5	
pH, units		8.97	8.96	
Conductivity, us/cm		522	556	
Temperature, Water°F		43.1	64.0	
Temperature, Air °F		42.0	73.0	
Laboratory Analyses, mg/l				
Total Dissolved Solids		258	272	
Total Hardness		234	234	
Carbonate (CO_3^{-2})		0	0	
Bicarbonate (HCO_3-)		229	240	
Calcium (Ca)		41	41	
Chloride (Cl-)		3	5	
Iron-Dissolved (Fe)		0.04	0.06	
Magnesium (Mg)		32	32	
Manganese (Mn)		0.01	-0.01	
Potassium (k)		1	1	
Sodium (Na)		17	25	
Sulfate (SO_4^{-2})		16	16	
Cations meq/l		5.45	5.80	
Anions meq/l		5.00	5.28	
Cation/Anion Balance (%)		4.31	4.69	

Note: Negative Sign "-" denotes that value is less than.

Soldier Creek Coal Company
Hydrologic Monitoring Program
Summarized Results for 1988

Sample Site ID: Spring #5

Scheduled Sample Month	Feb	May	Aug	Nov
Sample Date	Site Not Accessible	05/20/88	08/18/88	Site Not Accessible
Field Measurements				
Flow, gpm		265.0	15.0	
pH, units		8.80	8.55	
Conductivity, us/cm		578	549	
Temperature, Water°F		54.0	65.0	
Temperature, Air °F		59.0	80.0	
Laboratory Analyses, mg/l				
Total Dissolved Solids		308	346	
Total Hardness		299	304	
Carbonate (CO_3^{-2})		0	0	
Bicarbonate (HCO_3-)		260	274	
Calcium (Ca)		67	66	
Chloride (Cl-)		6	6	
Iron-Dissolved (Fe)		-0.02	0.02	
Magnesium (Mg)		32	34	
Manganese (Mn)		0.01	.01	
Potassium (k)		1	2	
Sodium (Na)		15	20	
Sulfate (SO_4^{-2})		35	37	
Cations meq/l		6.66	7.02	
Anions meq/l		6.10	6.43	
Cation/Anion Balance (%)		4.39	4.39	

Note: Negative Sign "-" denotes that value is less than.

Soldier Creek Coal Company
Hydrologic Monitoring Program
Summarized Results for 1988

Sample Site ID: Spring #8

Scheduled Sample Month	Feb	May	Aug	Nov
Sample Date	Site Not Accessible	05/21/88	08/17/88	Site Not Accessible
Field Measurements				
Flow, gpm		18.3	3.7	
pH, units		9.17	8.75	
Conductivity, us/cm		570	563	
Temperature, Water°F		45.0	63.0	
Temperature, Air °F		43.0	73.0	
Laboratory Analyses, mg/l				
Total Dissolved Solids		322	304	
Total Hardness		241	237	
Carbonate (CO_3^{-2})		0	0	
Bicarbonate (HCO_3-)		265	266	
Calcium (Ca)		34	34	
Chloride (Cl-)		4	2	
Iron-Dissolved (Fe)		-0.02	0.10	
Magnesium (Mg)		38	37	
Manganese (Mn)		-0.01	-0.01	
Potassium (k)		1	1	
Sodium (Na)		33	34	
Sulfate (SO_4^{-2})		25	21	
Cations meq/l		6.29	6.26	
Anions meq/l		5.94	5.82	
Cation/Anion Balance (%)		2.86	3.64	

Note: Negative Sign "-" denotes that value is less than.

Soldier Creek Coal Company
Hydrologic Monitoring Program
Summarized Results for 1988

Sample Site ID: Spring #10

Scheduled Sample Month	Feb	May	Aug	Nov
Sample Date	Site Not Accessible	05/21/88	08/18/88	11/27/88
Field Measurements				
Flow, gpm			3.0	1.0
pH, units			7.85	8.62
Conductivity, us/cm			888	1068
Temperature, Water°F			63.0	40.5
Temperature, Air °F			82.0	30.0
Laboratory Analyses, mg/l				
Total Dissolved Solids			648	646
Total Hardness			190	168
Carbonate (CO_3^{-2})			0	0
Bicarbonate (HCO_3-)			414	440
Calcium (Ca)			30	26
Chloride (Cl-)			9	11
Iron-Dissolved (Fe)			-0.02	-0.02
Magnesium (Mg)			28	25
Manganese (Mn)			-0.01	-0.01
Potassium (k)			3	3
Sodium (Na)			206	209
Sulfate (SO_4^{-2})			161	140
Cations meq/l			12.94	12.62
Anions meq/l			11.91	12.05
Cation/Anion Balance (%)			4.14	2.31

Note: Negative Sign "-" denotes that value is less than.

Soldier Creek Coal Company
Hydrologic Monitoring Program
Summarized Results for 1988

Sample Site ID: Spring #15

Scheduled Sample Month	Feb	May	Aug	Nov
Sample Date	Site Not Accessible	05/21/88	08/17/88	Site Not Accessible
Field Measurements				
Flow, gpm		60.0	10.0	
pH, units		8.69	8.95	
Conductivity, us/cm		614	618	
Temperature, Water°F		50.0	63.0	
Temperature, Air °F		60.0	80.0	
Laboratory Analyses, mg/l				
Total Dissolved Solids		356	338	
Total Hardness		325	317	
Carbonate (CO_3^{-2})		0	0	
Bicarbonate (HCO_3-)		292	300	
Calcium (Ca)		71	61	
Chloride (Cl-)		3	3	
Iron-Dissolved (Fe)		-0.02	.10	
Magnesium (Mg)		36	40	
Manganese (Mn)		-0.01	-0.01	
Potassium (k)		1	2	
Sodium (Na)		16	16	
Sulfate (SO_4^{-2})		31	21	
Cations meq/l		7.23	7.09	
Anions meq/l		6.57	6.52	
Cation/Anion Balance (%)		4.78	4.19	

Note: Negative Sign "-" denotes that value is less than.

Soldier Creek Coal Company
Hydrologic Monitoring Program
Summarized Results for 1988

Sample Site ID: Spring #18

Scheduled Sample Month	Feb	May	Aug	Nov
Sample Date	Site Not Accessible	05/21/88	08/17/88	Site Not Accessible

Field Measurements

Flow, gpm	60.0	No Flow
pH, units	8.60	
Conductivity, us/cm	573	
Temperature, Water°F	62.5	
Temperature, Air °F	65.0	

Laboratory Analyses, mg/l

Total Dissolved Solids	324
Total Hardness	327
Carbonate (CO_3^{-2})	0
Bicarbonate (HCO_3-)	288
Calcium (Ca)	75
Chloride (Cl-)	3
Iron-Dissolved (Fe)	-0.02
Magnesium (Mg)	34
Manganese (Mn)	0.01
Potassium (k)	2
Sodium (Na)	9
Sulfate (SO_4^{-2})	16
Cations meq/l	6.99
Anions meq/l	6.38
Cation/Anion Balance (%)	4.56

Note: Negative Sign "-" denotes that value is less than.

Soldier Creek Coal Company
Hydrologic Monitoring Program
Summarized Results for 1988

Sample Site ID: Spring #21

Scheduled Sample Month	Feb	May	Aug	Nov
Sample Date	Site Not Accessible	05/21/88	08/17/88	Site Not Accessible
Field Measurements				
Flow, gpm		100.0	11.5	
pH, units		8.79	8.70	
Conductivity, us/cm		562	495	
Temperature, Water°F		41.5	56.0	
Temperature, Air °F		49.0	75.0	
Laboratory Analyses, mg/l				
Total Dissolved Solids		286	264	
Total Hardness		241	250	
Carbonate (CO_3^{-2})		0	0	
Bicarbonate (HCO_3-)		219	246	
Calcium (Ca)		47	49	
Chloride (Cl-)		2	1	
Iron-Dissolved (Fe)		0.02	0.02	
Magnesium (Mg)		30	31	
Manganese (Mn)		-0.01	-0.01	
Potassium (k)		1	1	
Sodium (Na)		15	17	
Sulfate (SO_4^{-2})		8	12	
Cations meq/l		5.50	5.77	
Anions meq/l		5.60	5.20	
Cation/Anion Balance (%)		-0.90	5.20	

Note: Negative Sign "-" denotes that value is less than.

Soldier Creek Coal Company
Hydrologic Monitoring Program
Summarized Results for 1988

Sample Site ID: UG-2N (In-Mine Ground Water)

Scheduled Sample Month	Feb	May	Aug	Nov
Sample Date	02/04/88	05/18/88	08/19/88	11/21/88
Field Measurements				
Flow, gpm	37.5	33.3	33.3	33.3
pH, units	7.11	7.09	7.50	7.50
Conductivity, us/cm	1424	1402	1348	1362
Temperature, Water°F	62.4	63.6	63.9	64.3
Temperature, Air °F	56.0	56.0	58.0	58.0

Laboratory Analyses, mg/l

Total Dissolved Solids	816
Total Hardness	374
Carbonate (CO_3^{-2})	0
Bicarbonate (HCO_3-)	642
Calcium (Ca)	71
Chloride (Cl-)	32
Iron-Dissolved (Fe)	.39
Magnesium (Mg)	48
Manganese (Mn)	.06
Potassium (k)	21
Sodium (Na)	190
Sulfate (SO_4^{-2})	84
Cations meq/l	16.39
Anions meq/l	15.50
Cation/Anion Balance (%)	2.79

Note: Negative Sign "-" denotes that value is less than.

Soldier Creek Coal Company
Hydrologic Monitoring Program
Summarized Results for 1988

Sample Site ID: UG-3N8E (In-Mine Ground Water)

Scheduled Sample Month	Feb	May	Aug	Nov
Sample Date	02/04/88	05/18/88	08/19/88	11/21/88
Field Measurements				
Flow, gpm	50.0	5.2	7.4	8.9
pH, units	8.43	7.91	8.28	8.37
Conductivity, us/cm	1093	1141	1435	1189
Temperature, Water°F	51.3	54.2	55.4	53.0
Temperature, Air °F	54.0	57.0	57.0	55.0

Laboratory Analyses, mg/l

Total Dissolved Solids	870
Total Hardness	372
Carbonate (CO_3^{-2})	0
Bicarbonate (HCO_3-)	360
Calcium (Ca)	47
Chloride (Cl-)	143
Iron-Dissolved (Fe)	.16
Magnesium (Mg)	62
Manganese (Mn)	-0.01
Potassium (k)	16
Sodium (Na)	202
Sulfate (SO_4^{-2})	185
Cations meq/l	16.74
Anions meq/l	15.09
Cation/Anion Balance (%)	5.18

Note: Negative Sign "-" denotes that value is less than.

Soldier Creek Coal Company
Hydrologic Monitoring Program
Summarized Results for 1988

Sample Site ID: UG-Shaft (In-Mine Ground Water)

Scheduled Sample Month	Feb	May	Aug	Nov
Sample Date	02/04/88	05/19/88	08/19/88	11/23/88
Field Measurements				
Flow, gpm	10.0	8.3	3.9	3.7
pH, units	6.88	6.83	6.82	6.97
Conductivity, us/cm	1566	1398	1156	1173
Temperature, Water°F	46.3	47.2	50.1	46.4
Temperature, Air °F	45.0	49.0	53.0	48.0

Laboratory Analyses, mg/l

Total Dissolved Solids	820
Total Hardness	616
Carbonate (CO_3^{-2})	0
Bicarbonate (HCO_3-)	370
Calcium (Ca)	120
Chloride (Cl-)	15
Iron-Dissolved (Fe)	.02
Magnesium (Mg)	77
Manganese (Mn)	.02
Potassium (k)	10
Sodium (Na)	73
Sulfate (SO_4^{-2})	321
Cations meq/l	15.79
Anions meq/l	14.56
Cation/Anion Balance (%)	4.05

Note: Negative Sign "-" denotes that value is less than.

Soldier Creek Coal Company
Hydrologic Monitoring Program
Summarized Results for 1988

Scheduled Sample Month	Feb	May	Aug	Nov
Sample Site ID: 5-1 (Well)				
Sample Date	Site Not Accessible	05/21/88	08/17/88	Site Not Accessible
Water Level Measurement, ft.		309.0	311.5	
Sample Site ID: 10-2 (Well)				
Sample Date	Site Not Accessible	05/21/88	08/17/88	Site Not Accessible
Water Level Measurement, ft.		715.9	717.7	

Soldier Creek Coal Company
Hydrologic Monitoring Program
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Sample Site ID: UG-10E (Water First Encountered on 04/11/88)

Scheduled Sample Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Sample Date					05/18/88	06/22/88		08/14/88	09/03/88		11/21/88	
Field Measurements												
Flow, gpm					62.5	62.5		N/A	62.5		55.6	
pH, units					8.55	8.37		8.40			8.61	
Conductivity, us/cm					1464	1443		1496			1496	
Temperature, Water °F					62.2	62.8		60.7			63.3	
Temperature, Air °F					56.0	56.0		57.0			59.0	
Laboratory Analyses, mg/l												
Total Dissolved Solids					834			914				
Total Hardness					139			166				
Carbonate (CO)					46			0				
Bicarbonate (HCO)					663			720				
Calcium (Ca)					13			22				
Chloride (Cl-)					25			36				
Iron-Dissolved (Fe)					-0.02			.09				
Magnesium (Mg)					26			27				
Manganese (Mn)					-0.01			-0.01				
Potassium (k)					17			17				
Sodium (Na)					302			325				
Sulfate (SO)					39			60				
Cations meq/l					16.51			18.06				
Anions meq/l					15.70			16.67				
Cation/Anion Balance (%)					2.51			4.00				

Note: Negative sign "-" denotes that the value is less than.

Soldier Creek Coal Company
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Summarized Results for 1988

Sample Site ID: MW-2 (Mine Water Discharge)

Scheduled Sample Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Sample Date	01/22/88	02/10/88	03/17/88	04/22/88	05/19/88	06/17/88	07/27/88	08/18/88	09/14/88	10/14/88	11/27/88	12/16/88
Field Measurements												
Flow, gpm	230	620	300	300	200	200	300	300	400	300	300	300
pH, units	8.42	8.70	8.75	8.70	8.45	8.85	8.90	8.88	8.92	8.95	8.90	8.75
Conductivity, us/cm	1434	1939	1725	1521	1690	1565	1479	1403	1208	1207	1161	1316
Temperature, Water °F	46.2	51.5	50.0	59.4	59.9	59.0	60.5	61.0	58.8	60.3	57.0	55.0
Temperature, Air °F	9.0	32.0	32.0	55.0	63.0	75.0	78.0	75.0	63.0	63.0	35.0	28.0
Laboratory Analyses, mg/1												
Total Dissolved Solids	832	1126	1552	1004	1002	976	896	860	766	740	710	768
Total Suspended Solids	2	2	42	4	2	6	6	2	-2	8	8	4
Total Settleable Solids/hr	-0.1	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-.1	-0.1
Iron, Dissolved (Fe)	0.51	0.15	0.06	0.04	0.17	.11	.16	.17	.05	0.12	0.05	0.07
Iron, Total (Fe)	1.16	0.69	1.94	0.37	0.23	.13	.31	.27	.09	0.13	0.14	0.25
Manganese (Mn)	0.01	0.01	0.02	0.01	-0.01	-0.01	.01	.01	.01	-0.01	0.01	0.02
Oil & Grease	1	1	1	1	-1	-1	-1	1	2	1	1	-1

Note: Negative sign "-" denotes that the value is less than.

Soldier Creek Coal Company
Hydrologic Monitoring Program
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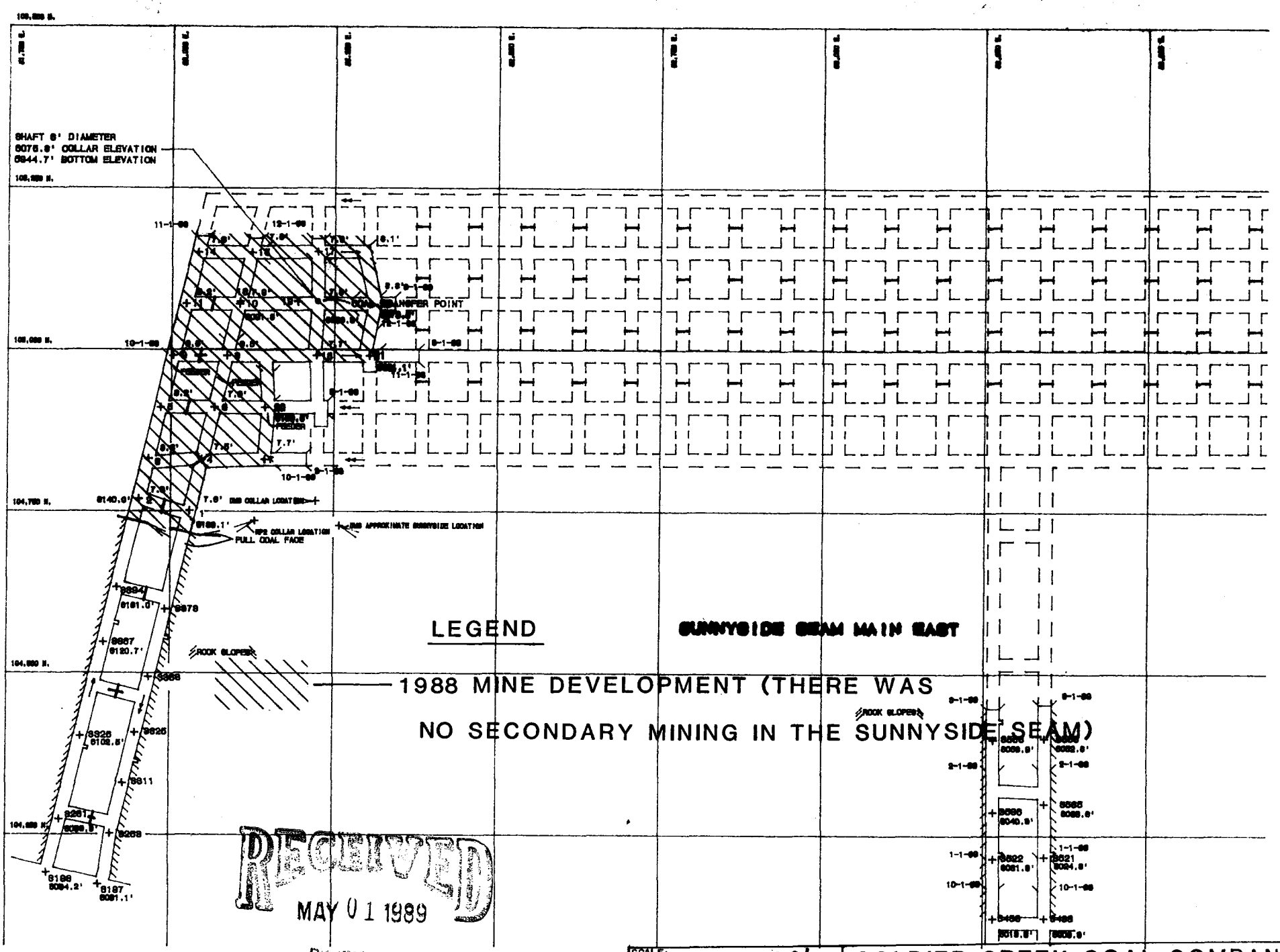
Sample Site ID: MW-1 (Mine Water Discharge)

Scheduled Sample Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Sample Date	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
Field Measurements												
Flow, gpm												
pH, units												
Conductivity, us/cm												
Temperature, Water °F												
Temperature, Air °F												
Laboratory Analyses, mg/l												
Total Dissolved Solids												
Total Suspended Solids												
Total Settleable Solids/hr												
Iron, Dissolved (Fe)												
Iron, Total (Fe)												
Manganese (Mn)												
Oil & Grease												

Note: Negative sign "-" denotes that the value is less than.



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OIL, GAS & MINING

SCALE: 1" - 200'	SOLDIER CREEK COAL COMPANY
DRAWN BY: K. TEW	SOLDIER CANYON MINE
DATE: 3/27/89	TITLE: 1988 MINE PROGRESS MAP SUNNYSIDE SEAM