2018
ANNUAL HYDROLOGIC REPORT

BOWIE RESOURCES, LLC

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BOWIE NO. 1 MINE
P.O. BOX 483
PAONIA, COLORADO 81428
PERMIT C-1981-038

PREPARED BY:

Bowie Resources, LLC
Bowie No. 1 Mine
2018 Annual Report
Table of Contents

Annual Hydrology Report

Annual Mine Inflow Report

Annual Subsidence Report

Maps

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Bowie Resources, LLC

Paonia, Colorado

Introduction

Bowie Resources Limited acquired the Orchard Valley Mine from the Cyprus Orchard Valley Coal Corporation in December 1994. Bowie Resources Limited was acquired by Bowie Resources, LLC in December 2003. The underground coal mine (renamed the Bowie No. 1 Mine) is approximately two miles north of Paonia, Colorado. The Bowie No. 1 East Mine has not operated since it was sealed in June 1986, following a mine fire. The areal extent of the East Mine workings was 1,156 acres at that time. During July 1993, rehabilitation efforts at the portal area of the East mine were completed and the mine workings of the East and West mines were connected. Only the first fifteen crosscuts of the East mine were reopened with the rest of the mine remaining sealed and inactive. Mining ceased at the Bowie No. 1 Mine on December 4, 1997.

The coal mined from both the East and West mine is in the "**B**" seam of the Mesaverde Coal Member. Hydrologic monitoring began at the mine in 1983. The area affected by mining was reduced to 2,714 acres with the approval of permit revision no. 4 since some of the East mine workings are incorporated into the Bowie No. 2 Mine permit boundary. This report presents monitoring results from the 2018 monitoring season.

The Bowie No. 1 Mine has been idle for more than 20 complete monitoring seasons (1998 - 2018). Several monitoring points are no longer available for monitoring due to a mechanical collapse of drill holes. Bowie No. 1 received permission through a revision to the permit document (TR-34) to eliminate these holes from the monitoring schedule.

The approval of permit revision no. 4 transferred a number of monitoring points from the Bowie No. 1 Mine to the Bowie No. 2 Mine. Terror Creek Monitoring stations SW-1, SW-2, SW-4 and SW-10 were transferred. Stevens Gulch ponds 81, 7-2, 7-7, 7-11, 12-1, 12-2, 12-9, 12-10, 12-11, 18-4, 82, 1-4 and 1-6 were transferred. Terror Creek ponds 1-11, 6-2, 6-5, and 8-4 were transferred. Coal Gulch ponds 17-1, 18-1 and 83 were transferred. Stevens Gulch Springs 19, 23, 7-4, 7-5 and 12-4 were transferred. Terror Creek Springs 16, 17, 18, 20, 21, 22, 1-3, 1-5, 5-1, 6-1, 6-4, 6-6, 7-1, 7-9, 7-10 and 8-5 were transferred. Groundwater monitoring wells CWI DH-58 and DH-60 were also transferred. All of the stations transferred except SW-10 and spring 20 were inactive monitoring points for the Bowie No. 1 mine

The following 2018 Annual Hydrology Report narrative is divided into ten parts. Discussion is presented by each monitoring category identified in Table 1 - Summary of Hydrologic Monitoring Stations - Required Monitoring for Annual Hydrology Report.

Table 1 (immediately following this narrative) defines the monitoring points by type and sample frequency, field parameter sampling schedule and laboratory parameter sampling schedule. Several monitoring points have been removed from the surveillance schedule and are noted on this table as such. B04 was removed as a monitoring point by technical revision number 55. Twenty-four monitoring points were permanently suspended with the approval of TR-61 (approved September 1, 2016), those points are shown on Table 1.

Table 2 contains a listing of the laboratory parameters for surface and ground water to be tested in accordance with the mining permit application. Laboratory analyses are performed by SGS Accutest Mountain States, 4036 Youngfield St., Wheat Ridge, CO 80033-3862 or by Enviro-Chem Analytical, Inc., 2493 Hwy 6 & 50, Unit 7, Grand Junction, CO 81505.

Table 3 contains local precipitation data. This data is available from the internet at www.wrcc.dri.edu/summary/Climsmco.html select Paonia 1 SW (056306), however, data is no longer being recorded at that site. The average precipitation for the period of record (1893 through 2016) was 15.39 inches. No Precipitation data was collected during 2018. Data recorded at the Bowie no. 2 mine site through September 19, 2018 is 4.51 inches, and that number does not necessarily reflect the total snowfall received at the mine, which was not a lot during the 2018 water year.

Table 4 contains a listing of all monitoring points that have been undermined by the Bowie No. 1 Mine, the date of mining, and the panel or section that undermined them.

Table 5 contains a listing of all monitoring points that are potentially impacted by the angle of draw of the underground workings of the Bowie No. 1 Mine. Since the mine has been reclaimed, no prediction of potential monitoring point impacts is presented.

Table 6 contains a listing of all actively monitored points, with descriptions of their locations and a reference to the Monitoring Point Figure that contains this year's monitoring data.

Ponds were sampled for water quality when discharging or inflows/outflows were occurring. Ponds in the permit area are typically spring-fed or seep-fed and exhibit diffuse non-concentrated areas of inflow. Often the pond outlets present the only point of concentrated flow at which flow measurements and field parameters can be obtained. Where possible, quality measurements are obtained at the pond inlet. Stagnant water in ponds is not sampled since water quality results would show the effects of evaporation and stock use and could not be used to evaluate potential mine affects. The six remaining ponds at the East Mine were reclaimed during the fall of 2018.

This report includes data collected specifically to meet requirements of the Division of Reclamation, Mining and Safety (DRMS). At the request of the DRMS, minimum, maximum and average baseline data are now presented on each monitoring point listing as well as minimum, maximum and average values for the operational period of the monitoring point and baseline periods where applicable. The baseline values are taken from all recorded sampling events until affected by the mining operation, with operational values reflecting the period following the baseline period.

OVEM Groundwater Monitoring Wells:
Wells B05, B06 and B08 were removed from the monitoring schedule by TR-61 and will no longer be monitored. Groundwater monitoring wells B01, B02, and B04 are near the East Mine facilities (see Map No. 8-1). Well B01 was destroyed by a dozer doing maintenance work during 2002 so it is no longer monitored. Well B02 was destroyed by a dozer doing reclamation work during 2008 so it is no longer monitored. Well B03 is blocked and can no longer be monitored for field parameters or water quality. It was removed from the sampling regime by TR-34. Well B04 was destroyed by construction activities late in 2012. Well B04 was removed from the monitoring schedule by TR-55. Borehole B-7, also referred to as Node 22, is located below sedimentation pond #4 and is periodically monitored for water quality to ascertain potential groundwater contamination attributable to the East Mine facilities area. Water level in B07 was lower than normal range so there wasn't enough water to obtain a sample.

OVWM Groundwater Monitoring Wells:
One piezometer (OVWM) was installed in the fill at the Orchard Valley West Mine. This well was destroyed during mine reclamation so it is no longer monitored.

North Fork Alluvium Groundwater Monitoring Wells:
Three (3) wells, MW-1, MW-2 and MW-3 (see Map No. 8-3) are completed in the North Fork of the Gunnison alluvium. During the year, the wells were monitored quarterly for water levels and showed typical seasonal fluctuations within previously established ranges. MW-1 and MW-3 were monitored quarterly for quality during the year, if water was available, to monitor potential groundwater effects stemming from the coal stockpile and load out facilities in the North Fork Valley. Well MW-3 is southwest of the coal stockpile area in a location that should see the full impact of any potential groundwater degradation. The 2018 data continues to show that the stockpile and load-out are not degrading the water in the alluvium.

East Roatcap Creek Colluvium Groundwater Monitoring Wells:
Wells SM-05, 06, 07,10 and 11 were permanently suspended with the approval of TR-61 and will no longer be part of the monitoring program.

Steven's Gulch Colluvium Groundwater Monitoring Wells:
The wells (SM-1 and SM-9) have been permanently suspended with the approval of TR-61 and will no longer be part of the monitoring program.

Surface Water Monitoring Stations - SPRINGS
East Roatcap Creek - Two springs were monitored in the East Roatcap Creek drainage (refer to Table 1 and Map No. 4-1) during the year. Spring 30 had flow during May and August and was dry the remainder of the year. Spring 30 was first undermined in April 1983. Spring 10-10 had flow during May, and then was dry during the reporting period. Spring 10-10 was encompassed by the angle-of-draw of Panel Y during October 1993. Subsidence impacts were not apparent at either of these locations during 2018.

West Roatcap Creek - Spring 32 has been permanently suspended with the approval of TR-61 and will no longer be part of the monitoring program. Two springs were monitored in the West Roatcap Creek drainage (refer to Table 1 and Map No. 4-1) during the year. Spring 14-4 was monitored quarterly and had flow during May and June, but did not have enough water available to obtain a sample. The Spring was dry the remainder of the year. No mining occurred during the year in the Spring14-4 watershed.

Stevens Gulch - One spring was monitored within the Stevens Gulch drainage (refer to Table 1 and Map No. 4-1) during the year. Spring 25 lies below an area of the East mine inactive since 1982. This site had no measurable flows during the year. Spring 25 has been identified as an adjudicated water right within the permit area.

Two springs with ponds in the Stevens Gulch drainage, Spring and Pond 13-5, Spring and Pond 13-6 were monitored quarterly during the year. Spring and Pond 13-5 was undermined during the last half of 1992. Spring and Pond 13-6 was undermined during the end of 1988. Springs 13-5 and 13-6 were dry during the year.

Surface Water Monitoring Stations: STREAMS AND DITCHES
Overall, adverse impacts attributable to mining were not evident at any of the monitored surface water stations (refer to Table 1 and Map No. 4-1). Stations SW-5 (Stevens Gulch) had average or slightly above average flow and was dry during the August through July monitoring events and was dry during the October monitoring event. SW-6 (East Roatcap Creek) had below average flows three of the four quarters however was above average during the July monitoring event. No evidence of subsidence impacts in these drainages was apparent. Mining occurred in the Stevens Gulch drainage upstream of site SW-5 during 1993 in Panel C. Panel C mining was designed and conducted to prevent the development of subsidence to protect the waterway and certain structures in the vicinity. Data collected during the year shows these protective measures were successful.

Surface Water Monitoring Stations: SMALL AREA EXEMPTIONS
The west side of the east mine fan level is defined as a small area exemption since drainage from this area is not conveyed to a sediment pond. One sample point is defined at this location and sampled for conformance with the NPDES discharge alternative limitations requirements associated with discharges occurring because of precipitation events of less than the 10-year and 24-hour magnitude. In these instances, settable solids and pH limitation must be met. No samples were collected during 2018 from this SAE point.

Coal Member of Mesaverde:
All previously monitored drill holes have now collapsed and are no longer monitored. The removal of these monitoring points is explained in TR-34.

Surface Water Monitoring Stations: PONDS
East Roatcap Creek - Ponds 1001, 1002, 1003, 1004, 1007, 1009, 1014, 1501, 8700, 8800 and 8900 were permanently suspended with the approval of TR-61 and will no longer be part of the monitoring program.

Stevens Gulch -. Ponds 1307 and 8500 were permanently suspended with the approval of TR-61 and will no longer be part of the monitoring program.

CDPS Monitoring Points
DMRs are submitted quarterly to the Colorado Department of Public Health and Environment with copies to the Division of Reclamation, Mining and Safety and are included herein by reference.

Conclusion
Hydrologic monitoring was extended into the northern portion of the East Roatcap Creek drainage during 1993 to fit newly acquired lease areas and revised mine plans. Mining operations were suspended during December 1997 and have not resumed. Hydrologic monitoring conducted during 2018 did not show mine related impacts to the local hydrology were occurring. Water quality remains good overall and no physical impacts have been noted at any of the monitored locations that would suggest adverse effects associated with the historical mining operations of the Bowie No. 1 Mine.

Summary of Hydrology Monitoring Stations

Station Number	Station Name	Elevation (ft.)	Depth (ft.)	Frequency of Measurements		Report Frequency	Report Format		Comments
				Field Par.	Lab. Par.		AHR	DMR	
OVEM Groundwater Monitoring Wells									
B05	Borehole 5	6883	32.5	N/A	N/A	Annually	Yes	No	PERMANENTLY SUSPENDED (TR-61)
B06	Borehole 6	6781	93.8	N/A	N/A	Annually	Yes	No	PERMANENTLY SUSPENDED (TR-61)
B07	Borehole 7	6602	95.3	Semi-Annually	Annually	Annually	Yes	No	PERMANENTLY SUSPENDED (TR-61)
B08	Borehole 8	6790	38.8	N/A	N/A	Annually	Yes	No	PERMANENTLY SUSPENDED (TR-61)
North Fork Alluvium Groundwater Monitoring Wells									
MW01	Monitoring Well 1	5716	25	Quarterly	Quarterly	Annually	Yes	No	Monitored for water level quarterly (Volume 7, pg 2.04-41)
MW02	Monitoring Well 2	5737	41.8	Quarterly	N/A	Annually	Yes	No	Monitored for water level quarterly (Volume 7, pg 2.04-41)
MW03	Monitoring Well 3	5727	31.9	Quarterly	Quarterly	Annually	Yes	No	Monitored for water level quarterly (Volume 7, pg 2.04-41)
Steven's Gulch Colluvium Groundwater Monitoring Wells									
SM01	Monitoring Well SM-1	7590	55	Semi-Annually	Semi-Annually	Annually	Yes	No	PERMANENTLY SUSPENDED (TR-61)
SM05	Monitoring Well SM-5	7520	40	Semi-Annually	Semi-Annually	Annually	Yes	No	PERMANENTLY SUSPENDED (TR-61)
SM06	Monitoring Well SM-6	7480	50	Semi-Annually	Semi-Annually	Annually	Yes	No	PERMANENTLY SUSPENDED (TR-61)
SM07	Monitoring Well SM-7	7800	55	Semi-Annually	Semi-Annually	Annually	Yes	No	PERMANENTLY SUSPENDED (TR-61)
SM09	Monitoring Well SM-9	7520	40	Semi-Annually	Semi-Annually	Annually	Yes	No	PERMANENTLY SUSPENDED (TR-61)
SM10	Monitoring Well SM-10	7250	48.7	Semi-Annually	Semi-Annually	Annually	Yes	No	PERMANENTLY SUSPENDED (TR-61)
SM11	Monitoring Well SM-11	7243	46.5	Semi-Annually	Semi-Annually	Annually	Yes	No	PERMANENTLY SUSPENDED (TR-61)
Surface Water Monitoring Stations - SPRINGS									
S1010	East Roatcap Creek-Spring 10-10	8650	N/A	Quarterly	Annually	Annually	Yes	No	No winter monitoring/access
S1404	West Roatcap Creek-Spring 14-4	7480	N/A	Quarterly	Annually	Annually	Yes	No	No winter monitoring/access
S2500	Steven's Gulch-Spring 25	7160	N/A	Quarterly	Annually	Annually	Yes	No	No winter monitoring/access
S3000	East Roatcap Creek-Spring 30	7840	N/A	Quarterly	Annually	Annually	Yes	No	No winter monitoring/access
S3200	West Roatcap Creek-Spring 32	7900	N/A	Monthly	Quarterly	Annually	Yes	No	PERMANENTLY SUSPENDED (TR-61)

Summary of Hydrology Monitoring Stations (Continued)

Station Number	Station Name	Elevation (ft.)	Depth (ft.)	Frequency of Measurements		Report Frequency	Report Format		Comments
				Field Par.	Lab. Par.		AHR	DMR	
Surface Water Monitoring Stations - STREAMS AND DITCHES									
SW05	Steven's Gulch	6600	N/A	Quarterly	Quarterly	Annually	Yes	No	No winter monitoring/access
SW06	East Roatcap Creek-Downstream	6740	N/A	Quarterly	Quarterly	Annually	Yes	No	No winter monitoring/access
Surface Water Monitoring Stations - PONDS									
P1001	East Roatcap Creek-Pond 10-1	8520	5	Quarterly	Annually	Annually	Yes	No	PERMANENTLY SUSPENDED (TR-61)
P1002	East Roatcap Creek-Pond 10-2	8630	3	Quarterly	Annually	Annually	Yes	No	PERMANENTLY SUSPENDED (TR-61)
P1003	East Roatcap Creek-Pond 10-3	8680	3	Quarterly	Annually	Annually	Yes	No	PERMANENTLY SUSPENDED (TR-61)
P1004	East Roatcap Creek-Pond 10-4	8780	3	Quarterly	Annually	Annually	Yes	No	PERMANENTLY SUSPENDED (TR-61)
P1007	East Roatcap Creek-Pond 10-7	8350	4	Quarterly	Annually	Annually	Yes	No	PERMANENTLY SUSPENDED (TR-61)
P1009	East Roatcap Creek-Pond 10-9	8395	3	Quarterly	Annually	Annually	Yes	No	PERMANENTLY SUSPENDED (TR-61)
P1014	East Roatcap Creek-Pond 10-14	8795	3	Quarterly	Annually	Annually	Yes	No	PERMANENTLY SUSPENDED (TR-61)
P1307	Steven's Gulch-Pond 13-7	8875	5	Quarterly	Annually	Annually	Yes	No	PERMANENTLY SUSPENDED (TR-61)
P1501	East Roatcap Creek-Pond 15-1	8055	4	Quarterly	Annually	Annually	Yes	No	PERMANENTLY SUSPENDED (TR-61)
P8500	Steven's Gulch-Pond 85	7580	4	Quarterly	Annually	Annually	Yes	No	PERMANENTLY SUSPENDED (TR-61)
P8700	East Roatcap Creek-Pond 87	7990	4	Quarterly	Annually	Annually	Yes	No	PERMANENTLY SUSPENDED (TR-61)
P8800	East Roatcap Creek-Pond 88	7790	5	Quarterly	Annually	Annually	Yes	No	PERMANENTLY SUSPENDED (TR-61)
P8900	East Roatcap Creek-Pond 89	7490	4.5	Quarterly	Annually	Annually	Yes	No	PERMANENTLY SUSPENDED (TR-61)
Surface Water Monitoring Stations - SPRINGS WITH PONDS									
SP1305	Steven's Gulch-Spring & Pond 13-5	7860	4	Quarterly	Annually	Annually	Yes	No	Monitor if spring is discharging. No winter monitoring/access
SP1306	Steven's Gulch-Spring & Pond 13-6	7590	4	Quarterly	Annually	Annually	Yes	No	Monitor if spring is discharging. No winter monitoring/access

PARAMETER LISTS

LAB PARAMETERS

Wet Chemistry
Alkalinity as CaCO (mg/l)
Bicarbonate as CaCO (mg/l)
Carbonate as CaCO (mg/l)
Chloride (mg/l)
Conductivity (umhos/cm)
pH (Lab Units)
Hardness as CaCO (mg/l)
Residue, Filterable (TDS) @ 180 C (mg/l)
Residue, NonFilterable (TSS) (mg/l)
Sodium Absorption Ratio in Water
Sulfate (mg/l)
Acidity (mg/l)

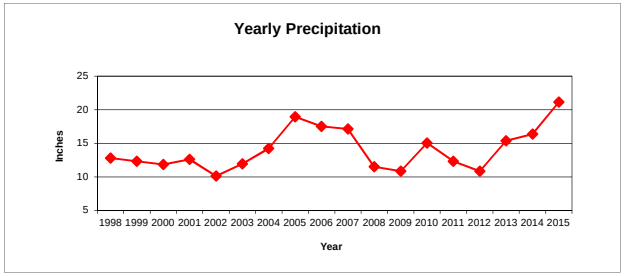
Metals
Calcium, dissolved (mg/l)
Magnesium, dissolved (mg/l)
Sodium, dissolved (mg/l)
Iron, dissolved (mg/l)
Iron, total (mg/l)
Manganese, total (mg/l)

FIELD PARAMETERS

Parameter	Unit	Wells	Ponds	Streams	Springs
Conductivity	umhos/cm	Yes	Yes	Yes	Yes
Flow Rate	CFS	No	No	Yes	Yes
pH	Standard	Yes	Yes	Yes	Yes
Temperature	C	Yes	Yes	Yes	Yes
Water Level	Feet	Yes	Yes	No	No

Monthly Precipitation Values

Month	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	**
January	1.13	1.08	1.93	0.73	0.55	0.26	1.31	2.05	0.81	0.68	1.67	0.91	0.42	0.49	1.22	1.73	0.66	1.02	0.9	
February	0.83	0.38	1.27	1.06	0.11	1.35	1.46	1.38	0.28	0.92	1.1	1.00	1.66	0.87	1.41	0.89	2.16	1.00	0.85	
March	1.43	0.42	1.03	0.42	1.03	1.17	0.14	1.93	1.58	1.39	0.54	0.89	1.2	1.22	0.3	1.14	0.77	0.76	0.3	
April	1.43	2.54	0.42	0.57	0.61	0.49	3.3	1.37	0.83	1.2	0.77	1.09	0.51	1.68	0.62	1.3	1.31	1.75	1.21	*
May	0.16	1.00	0.67	1.75	0.28	1.81	0	1.22	0.17	1.18	0.64	2.73	1.68	0.83	0.09	1.24	1.71	3.86	1.33	
June	0.47	0.94	0.86	0.39	0.04	0.48	0.34	1.64	0.5	0.99	0.67	0.63	0.55	0.32	0.05	0	0.21	1.05	0.51	
July	0.66	2.7	0.89	1.31	0.28	0.76	0.02	0.4	3.06	0.85	0.24	0.27	1.44	1.74	1.26	1.32	1.11	2.43	0.8	
August	1.18	1.42	1.27	2.35	0.66	0.46	0.48	1.71	0.87	1.16	2.07	0.33	2.09	0.46	2.35	0.78	2.13	1.96	1.81	
September	0.75	1.16	1.27	0.34	2.43	1.93	2.85	2.84	2.32	3.2	0.62	0.32	1.15	1.2	0.92	3.28	2.96	1.20	1.07	
October	1.88	0.05	0.75	0.84	2.53	0.46	1.37	2.11	5.08	1.37	0.74	0.58	1.84	1.55	0.64	2.12	1.17	1.94	0.49	
November	1.87	0.07	0.73	1.85	0.9	1.74	1.72	0.84	1.39	0	0.91	0.77	0.58	0.96	0.61	0.90	0.65	1.48	0.16	
December	1.00	0.57	0.78	0.99	0.71	1.03	1.26	1.47	0.65	4.20	1.55	1.36	1.91	1.01	1.41	0.69	1.56	2.70	2.18	
Minimum	0.16	0.05	0.42	0.34	0.04	0.26	0	0.4	0.17	0	0.24	0.27	0.42	0.32	0.05	0.00	0.21	0.76	0.16	
Average	1.07	1.03	0.99	1.05	0.84	1.00	1.19	1.58	1.46	1.43	0.96	0.91	1.25	1.03	0.91	1.28	1.37	1.76	0.97	
Maximum	1.88	2.7	1.93	2.35	2.53	1.93	3.3	2.84	5.08	4.2	2.07	2.73	2.09	1.74	2.35	3.28	2.96	3.86	2.18	
Total	12.79	12.33	11.87	12.60	10.13	11.94	14.25	18.96	17.54	17.14	11.52	10.88	15.03	12.33	10.88	15.39	16.40	21.15	11.61	



This data is obtained from the internet at www.wrcc.dri.edu/summary/Climsmco.htm select Paonia 1 SW (056306).

* 26 or more days missing from data, therefore deemed not complete. 0.97 is the average of years 1998-2016
** No data recorded during the 2017 or 2018 water year

Undermined Monitoring Points
Previously Mined Areas

ID	Panel	Advance	Advance Date	Retreat	Retreat Date	Overburden	Begin Monitoring Date	End Monitoring Date
DH580	1 West	X	12/1/1995	X	1/1/1986	1600	1/1/1983	4/1/1992
DH600	Panel H	X	1/1/1990	X	1/1/1990	1100	7/1/1983	11/1/1998
DH700	8 North	X	2/1/1984			700	1/1/1983	11/26/2006
P0707	1 North	X	10/1/1983	X	2/1/1985	1500	7/1/1983	4/1/1992
P0711	1 North	X	10/1/1983	X	2/1/1985	1500	10/1/1983	4/1/1992
P1004	1 West	X	11/1/1993			2050	10/1/1991	Note 3
P1014	1 West	X	1/1/1994			2200	10/1/1991	Note 3
P1202	N. Mains	X	1/1/1984			1300	7/1/1983	10/1/1997
P1401	III West Mains	X	10/1/1997	X	10/1/1997	950	6/1/1992	11/10/2006
P1404	II South	X	6/1/1987			400	6/1/1992	Unknown
P1701	8 North	X	1/1/1984			350	8/1/1983	5/4/1990
P1804	N. Mains	X	9/1/1982			1450	7/1/1983	Note 2
P1901	2 South	X	12/1/1982	X	1/1/1983	100	7/1/1983	4/1/1992
P2401	2 1/2 West	X	5/1/1983	X	9/1/1983	650	7/1/1985	4/1/1992
P8100	9E	X	5/1/1983			1700	6/1/1983	4/1/1992
P8300	5 North	X	6/1/1984			900	1/1/1983	10/5/1990
P8500	Panel B	X	12/1/1992	X	12/1/1992	650	2/1/1983	Note 3
P8700	2 1/2 Right	X	10/1/1995	X	10/1/1995	1250	6/1/1983	Note 3
S3000	Panel Y	X	4/1/1983	X	10/1/1997	900	5/1/1983	Note 1
SP1105	1 North	X	2/1/1996			1700	Unknown	Unknown
SP1502	II West Submains	X	2/1/1992			700	6/1/1992	Unknown
SP2300	1 East Mains	X	7/1/1984	X		1650	6/1/1983	Note 2
SW08	Farmer's Mine	X				0	2/1/1983	10/5/1990

Note 1 Currently Monitored
Note 2 Transferred to the Bowie No. 2 Mine
Note 3 Permanently suspened with TR-61, July 22, 2016

Angle of Draw Monitoring Points
Previously Mined Areas

ID	Panel	Advance	Advance Date	Retreat	Retreat Date	Overburden	Begin Monitoring Date	End Monitoring Date
DH650	1 East Mains	X	4/1/1994			1350	7/1/1993	8/1/1996
P1001	Panel Z	X	2/1/1994	X	9/1/1994	1600	10/1/1991	Note3
P1002	Panel Y	X	10/1/1993			1800	10/1/1991	Note3
P1003	Panel Y	X	11/1/1993			1950	10/1/1991	Note3
P1007	2 Right	X	2/1/1996			1500	10/1/1991	Note3
P1009	2 1/2 Right	X	9/1/1995			1650	10/1/1992	Note3
P1307	Panel A+	X	4/1/1992	X	4/1/1992	950	7/1/1983	10/11/1990
P1308	5 East	X	11/1/1980	X	6/1/1981	900	10/1/1983	4/1/1992
P1402	Panel I	X	10/1/1997	X	10/1/1997	1100	6/1/1992	11/10/2006
P1501	1 East Mains	X	8/1/1994	X	8/1/1984	1150	6/1/1992	Note 1
P8800	III West Mains	X	10/1/1997	X	10/1/1997	850	6/1/1983	Note3
S0704	N. Mains	X	3/1/1983			1400	7/1/1983	5/1/1997
S0705	N. Mains	X	2/1/1983			1500	7/1/1983	Note 2
S1010	Panel Y	X	10/1/1993			1950	6/1/1992	Note 1
S1805	7 East	X	12/1/1981	X	12/1/1981	250	Unknown	Unknown
SM07	III West Mains	X	10/1/1997	X	10/1/1997	900	8/1/1985	Note3
SM09	Panel C	X	2/1/1993	X	3/1/1993	600	8/1/1985	Note3
SP1305	Panel B	X	12/1/1992	X	12/1/1992	750	7/1/1983	Note 1
SP1306	II West Submains	X	1/1/1988			600	1/1/1983	Note 1

Note 1 Currently Monitored
Note 2 Transferred to the Bowie No. 2 Mine
Note 3 Permanently suspened with TR-61, July 22, 2016

B07
Borehole 7
Depth - 95.3'
Elevation - 6602'

Initiated	9/1/1981	9/1/1981	9/1/1981
Activated	9/1/1981	9/1/1981	9/1/1981
Date	11/28/2018	7/23/2018	6/4/2018

Field Parameters	UNITS	Summary Information Baseline Min	Baseline Ave	Baseline Max	Operation Min	Operation Ave	Operation Max			
Static Water Level	Feet				69.40	87.15	95.90	95.2	95.2	95.2
Water Elevation	Feet				6506	6515	6533	6506.8	6506.8	6506.8
Temperature	Celsius				7.0	13.7	19.6			
Conductivity	umhos/cm				152	1345	2190			
pH	su				5.8	7.5	8.9			
Field Comments								*	*	*
Lab Parameters	**UNITS**									
Bicarbonate	mg/L				226.00	423.3	601.0			
Carbonate	mg/L				<MDL	0.3	7			
Chloride	mg/L				21.80	80.36	420.00			
Conductivity	umhos/cm				600	1390	2190			
Hardness	mg/L				237.0	670.4	1170.5			
Acidity	mg/L				20.0	23.7	27.0			
pH	su				6.9	7.6	8.4			
ResidueFilterable-TDS	mg/L				244	977	1900			
ResidueNonFilterable-TSS	mg/L				<MDL	219	824			
SAR					0.62	1.33	2.96			
Sulfate	mg/L				2.41	325.14	731.00			
Calcium (Dissolved)	mg/L				1.9	141.3	269.0			
Iron (Dissolved)	mg/L				0.02	0.06	0.12			
Iron (Total)	mg/L				1.02	10.19	18.64			
Magnesium (Dissolved)	mg/L				23.0	73.5	171.0			
Manganese (Total)	mg/L				<MDL	0.574	0.763			
Sodium (Dissolved)	mg/L				22.0	86.7	408.0			
TDS Ratio (grav./calc.)	%				0.56	0.98	1.15			

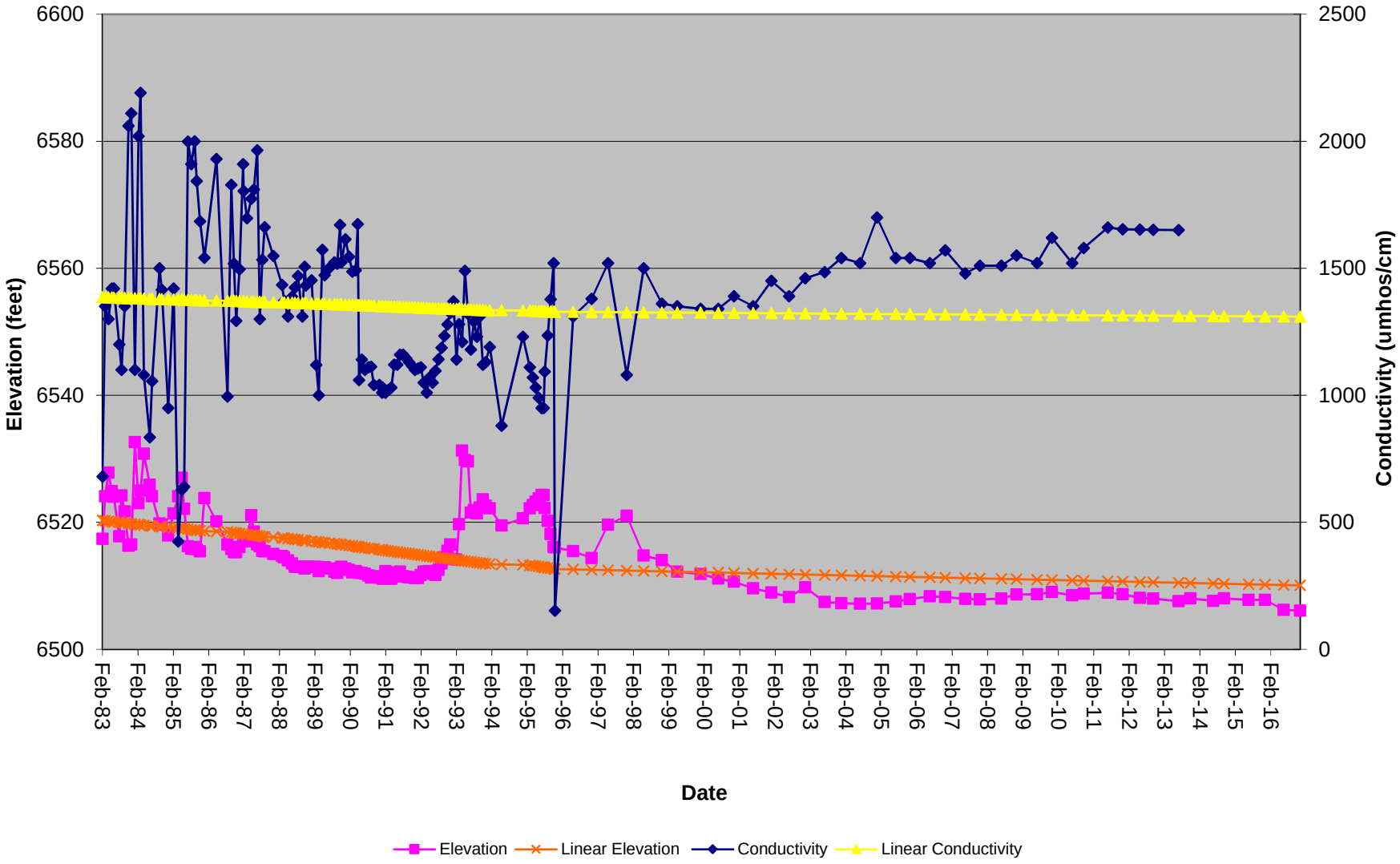
The area of concern for monitoring point B07 was affected by the mining operation before its establishment. Therefore, all recorded monitoring events are considered Operational.

**Not Enough Water for Parameters*

Borehole B-7, also referred to as Node 22, is located below sedimentation pond #4 and is periodically monitored for water quality to ascertain potential groundwater contamination attributable to the East Mine facilities area.

There is no baseline collection possible for points initiated after the influence of mining.

Plot of Conductivity and Water Level



B07 - Borehole 7

Figure 2

MW01
Monitoring Well 1
Depth - 25'
Elevation - 5716.15'

Initiated								9/1/1982	9/1/1982	9/1/1982	9/1/1982
Activated								9/1/1982	9/1/1982	9/1/1982	9/1/1982
Date								11/28/2018	7/23/2018	6/4/2018	3/14/2018
		Summary Information									
Field		Baseline			Operation						
Parameters	UNITS	Min	Ave	Max	Min	Ave	Max				
Static Water Level	Feet				4.95	12.77	25.00	15.2	14	12.25	15.1
Water Elevation	Feet				5691.1	5703.4	5711.2	5700.95	5702.15	5703.90	5701.05
Temperature	Celsius				7.4	13.0	18.5	14.4	14.8	13.4	10.8
Conductivity	umhos/cm				220	753	1820	723	467	356	1365
pH	su				6.3	7.7	8.4	8.35	8.09	7.91	8.06
Field Comments											
Lab Parameters	UNITS										
Bicarbonate	mg/L				98.5	183.9	329.4	208	169	144	246
Carbonate	mg/L				<MDL	6.7	179.0	<MDL	<MDL	<MDL	<MDL
Chloride	mg/L				<MDL	19.1	233.0	6.4	4	2	18.5
Conductivity	umhos/cm				222	689	1850	654	402	284	1210
Hardness	mg/L				107	353	1054	330	206	139	605
Acidity	mg/L				<MDL	-60.57	49.84	-210	-153	-140	-236
pH	su				6.70	7.64	8.41	7.75	7.85	8.22	8.05
ResidueFilterable-TDS	mg/L				15	565	5122	444	273	193	984
ResidueNonFilterable-TSS	mg/L				<MDL	46	540	52	18	75.4	110
SAR					0.25	0.61	1.97	0.56	0.335	0.322	0.563
Sulfate	mg/L				5.8	192.5	880.0	155	56.4	21.2	483
Calcium (Dissolved)	mg/L				1.9	91.5	273.0	94.6	60.7	40.2	174
Iron (Dissolved)	mg/L				<MDL	0.55	10.50	<MDL	<MDL	<MDL	1
Iron (Total)	mg/L				0.02	0.48	2.35	0.832	1.09	1.12	2.35
Magnesium (Dissolved)	mg/L				7.20	27.49	137.10	22.7	13.2	9.29	41.4
Manganese (Total)	mg/L				<MDL	0.045	0.193	0.107	0.0701	0.11	0.193
Sodium (Dissolved)	mg/L				0.5	25.3	102.0	19.7	11	10.3	24.3

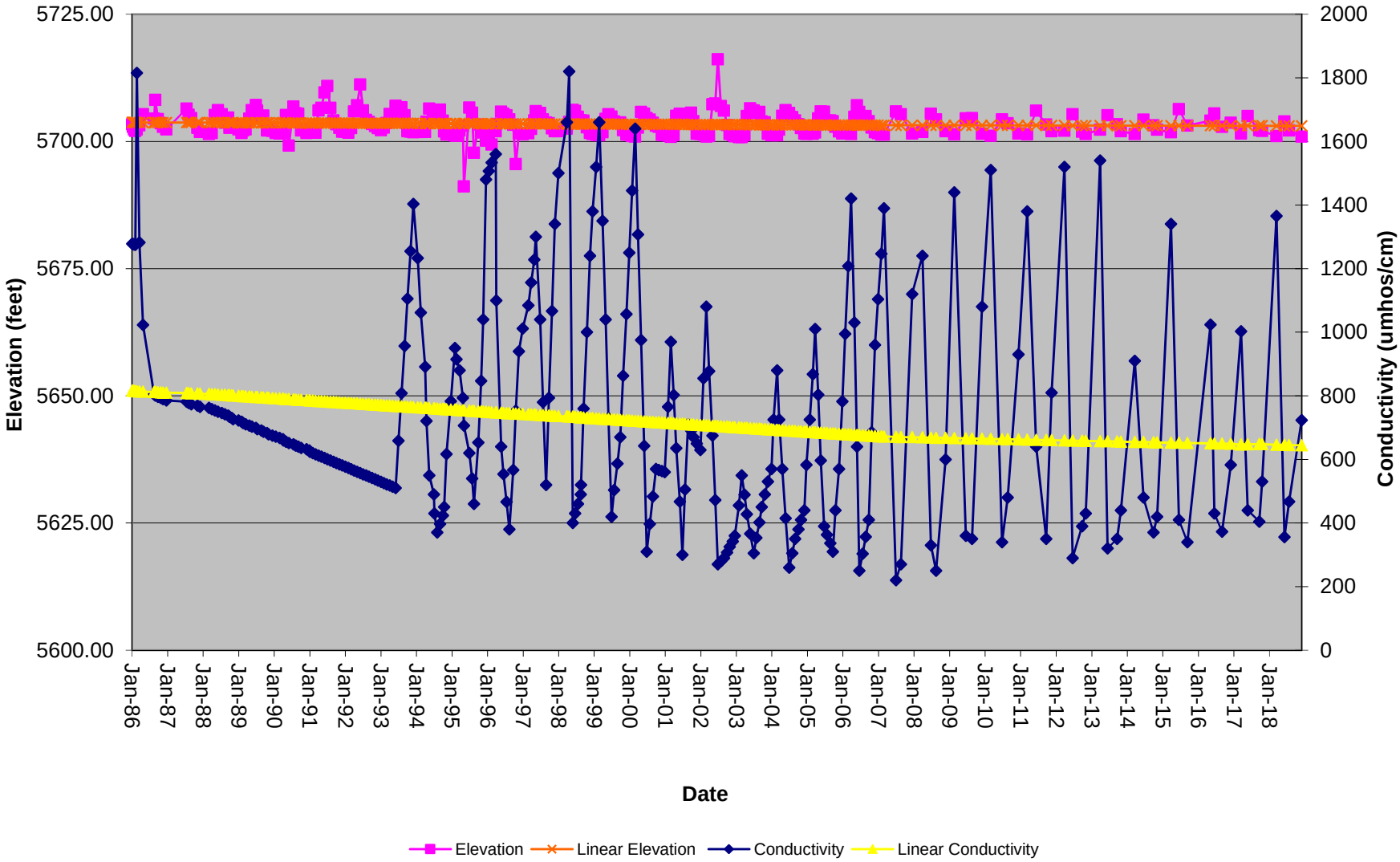
The area of concern for monitoring point MW01 was affected by the mining operation before its establishment. Therefore, all recorded monitoring events are considered Operational.

Negative acidity value indicates equivalent value of alkalinity

Monitoring Wells MW-1, MW-2 and MW-3 are located at the coal stockpile/truck dump/train loadout area and were drilled during September 1982 to determine the essential hydrologic functions of the North Fork alluvial valley floor. Two of the wells, MW-2 and MW-3, have since been determined to be installed in areas which are no longer classified as alluvial valley floor. (TR-13, See Volume 7, for AVF Map)

There is no baseline collection possible for points initiated after the influence of mining.

Plot of Conductivity and Water Level



MW01 - Monitoring Well 1

Figure 4

MW02
Monitoring Well 2
Depth - 41.8'
Elevation - 5737.4'

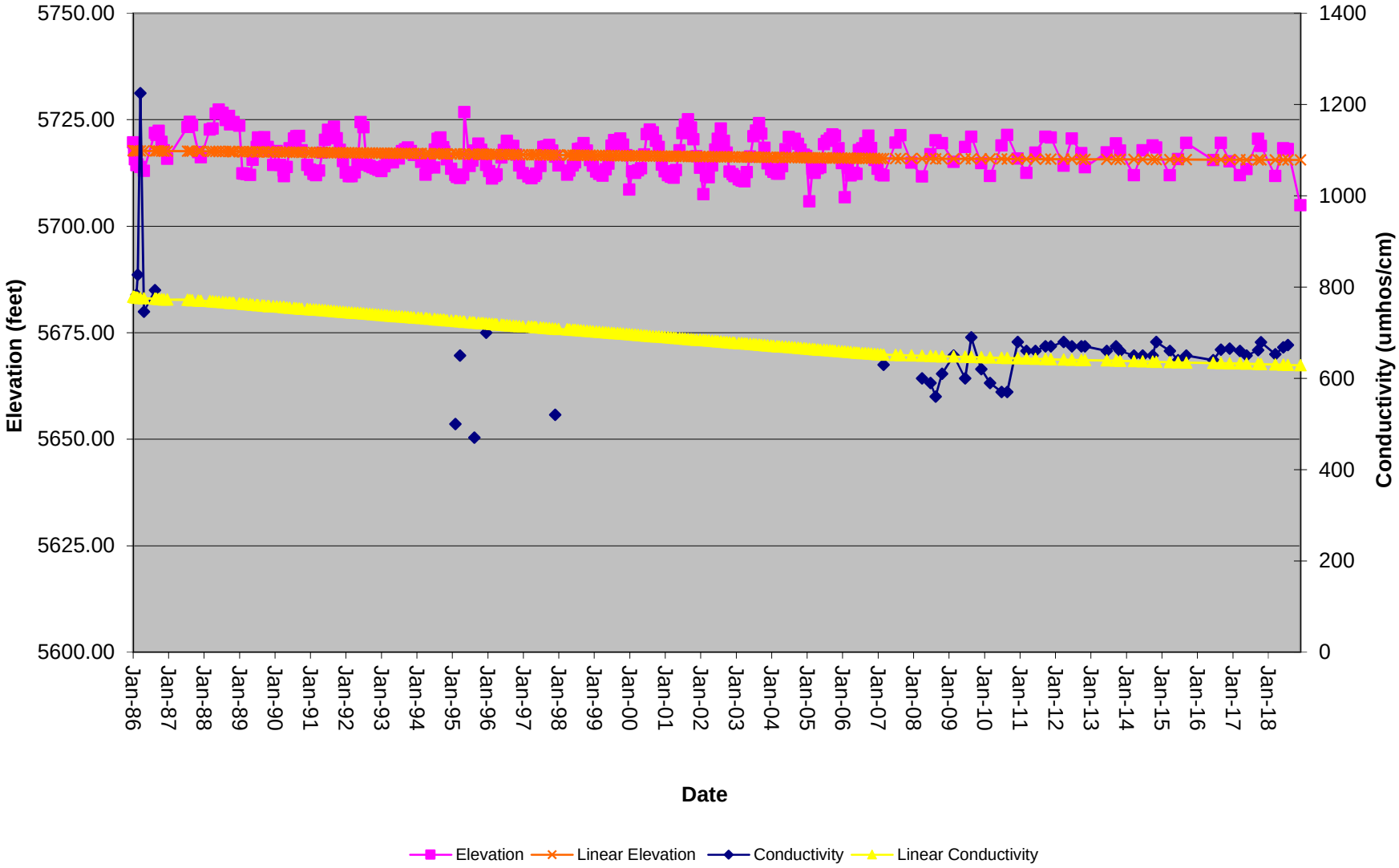
Initiated								9/1/1982	9/1/1982	9/1/1982	9/1/1982
Activated								9/1/1982	9/1/1982	9/1/1982	9/1/1982
Date								11/28/2018	7/23/2018	6/4/2018	3/14/2018
		Summary Information									
Field		Baseline			Operation						
Parameters	UNITS	Min	Ave	Max	Min	Ave	Max				
Static Water Level	Feet				10.00	21	32.50	32.5	19.3	19.1	25.6
Water Elevation	Feet				5704.9	5716.6	5727.4	5704.90	5718.10	5718.30	5711.80
Temperature	Celsius				9.9	13.4	17.0		13.9	13.4	12.5
Conductivity	umhos/cm				470	661	1225		673	668	653
pH	su				6.7	7.6	8.3		7.8	7.79	8.03
Field Comments								Dry			
Lab Parameters	UNITS										
Bicarbonate	mg/L				287.00	301	314.00	314	308	297	299
Carbonate	mg/L				<MDL	305	305.00	<MDL	<MDL	<MDL	<MDL
Chloride	mg/L				4.20	5	5.80	5.8	4.7	4.7	5
Conductivity	umhos/cm				508.00	572	623.00	623	605	554	587
Hardness	mg/L				253.00	283	303.00	291	303	268	257
Acidity					#######	-289	#######	-320	-273	-270	-295
pH	su				7.52	8	8.15	7.85	7.97	7.71	8.15
ResidueFilterable-TDS	mg/L				359.00	404	690.00	388	377	366	373
ResidueNonFilterable-TSS	mg/L				<MDL	20	59.20	59.2	7.2	5.8	29.3
SAR					0.57	1	0.66	0.661	0.582	0.566	0.566
Sulfate	mg/L				0.59	29	33.40	33.4	32.6	30.6	31.7
Calcium (Dissolved)	mg/L				52.70	59	68.70	57.8	63.1	54.6	54.1
Iron (Dissolved)					<MDL	30	61.30	<MDL	<MDL	<MDL	<MDL
Iron (Total)					0.02	0	0.64	0.491	0.172	0.131	0.325
Magnesium (Dissolved)	mg/L				29.50	34	39.20	35.5	35.2	32	29.5
Manganese (Total)					<MDL	0	0.13	0.131	0.0341	0.0338	0.0518
Sodium (Dissolved)	mg/L				20.80	24	29.50	22.9	23.4	23.4	21.9

The area of concern for monitoring point MW02 was affected by the mining operation before its establishment. Therefore, all recorded monitoring events are considered Operational.

Monitoring Wells MW-1, MW-2 and MW-3 are located at the coal stockpile/truck dump/train loadout area and were drilled during September 1982 to determine the essential hydrologic functions of the North Fork alluvial valley floor. Two of the wells, MW-2 and MW-3, have since been determined to be installed in areas which are no longer classified as alluvial valley floor. (TR-13, See Volume 7, for AVF Map)

There is no baseline collection possible for points initiated after the influence of mining.

Plot of Conductivity and Water Level



MW02 - Monitoring Well 2

Figure 6

MW03
Monitoring Well 3
Depth - 31.9'
Elevation - 5726.94'

Initiated								9/1/1982	9/1/1982	9/1/1982	9/1/1982
Activated								9/1/1982	9/1/1982	9/1/1982	9/1/1982
Date								11/28/2018	7/23/2018	6/4/2018	3/14/2018
		Summary Information									
Field		Baseline			Operation						
Parameters	UNITS	Min	Ave	Max	Min	Ave	Max				
Static Water Level	Feet				4.60	22.67	35.50	15.2	17.9	22.1	32.5
Water Elevation	Feet				5691.4	5704.7	5726.9	5711.74	5709.04	5704.84	5694.44
Temperature	Celsius				8.8	14.4	19.8	14.4	15	14.1	
Conductivity	umhos/cm				340	601	750	723	689	726	
pH	su				6.7	7.8	8.4	8.35	7.86	7.7	
Field Comments											Dry
Lab											
Parameters	UNITS										
Bicarbonate	mg/L				88.8	309.1	421.0		337		
Carbonate	mg/L				<MDL	1.3	14.0		<MDL		
Chloride	mg/L				<MDL	32.3	303.1		6.2		
Conductivity	umhos/cm				366	621	1440		623		
Hardness	mg/L				159.68	291.97	550.46		308		
Acidity	mg/L				-334	-97	39		-303		
pH	su				6.9	7.8	8.6		7.81		
ResidueFilterable-TDS	mg/L				200	416	1046		367		
ResidueNonFilterable-TSS	mg/L				<MDL	31	280		11.9		
SAR					<MDL	0.60	1.90		0.501		
Sulfate	mg/L				<MDL	29.51	181.43		18.7		
Calcium (Dissolved)	mg/L				1.9	41.7	200.0		41.7		
Iron (Dissolved)	mg/L				<MDL	0.10	0.66		0.47		
Iron (Total)	mg/L				0.01	0.29	1.07		0.118		
Magnesium (Dissolved)	mg/L				12.4	52.2	503.0		49.4		
Manganese (Total)	mg/L				<MDL	0.070	0.235		0.0451		
Sodium (Dissolved)	mg/L				9.0	24.8	92.0		20.1		

The area of concern for monitoring point MW03 was affected by the mining operation before its establishment. Therefore, all recorded monitoring events are considered Operational.

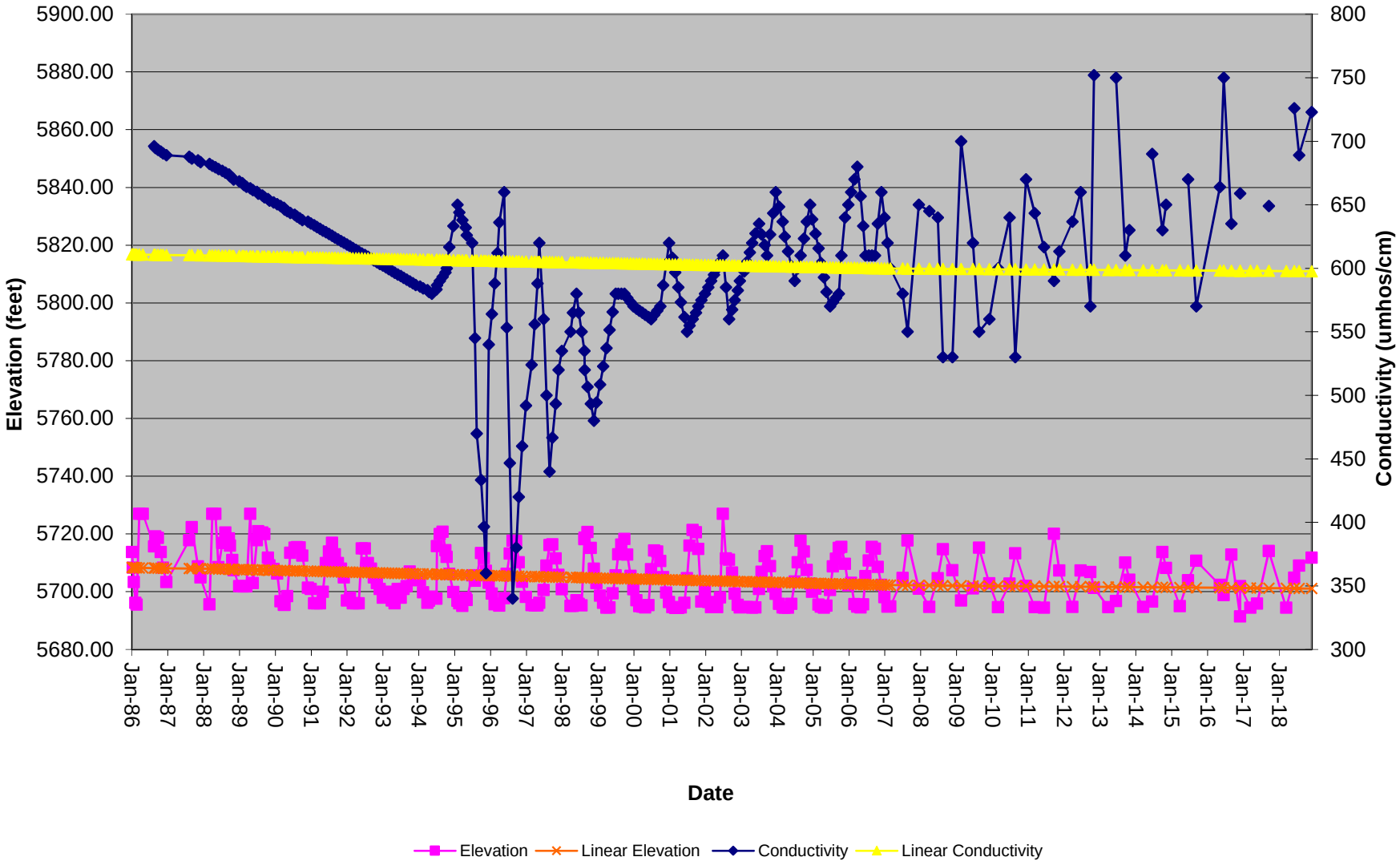
**Not enough water for parameters - no sample.*

Monitoring Wells MW-1, MW-2 and MW-3 are located at the coal stockpile/truck dump/train loadout area and were drilled during September 1982 to determine the essential hydrologic functions of the North Fork alluvial valley floor. Two of the wells, MW-2 and MW-3, have since been determined to be installed in areas which are no longer classified as alluvial valley floor. (TR-13, See Volume 7, for AVF Map)

Negative value of acidity indicates equivalent value of acidity

There is no baseline collection possible for points initiated after the influence of mining.

Plot of Conductivity and Water Level



MW03 - Monitoring Well 3

Figure 8

S1010
East Roatcap Creek - Spring 10-10
Elevation - 8650

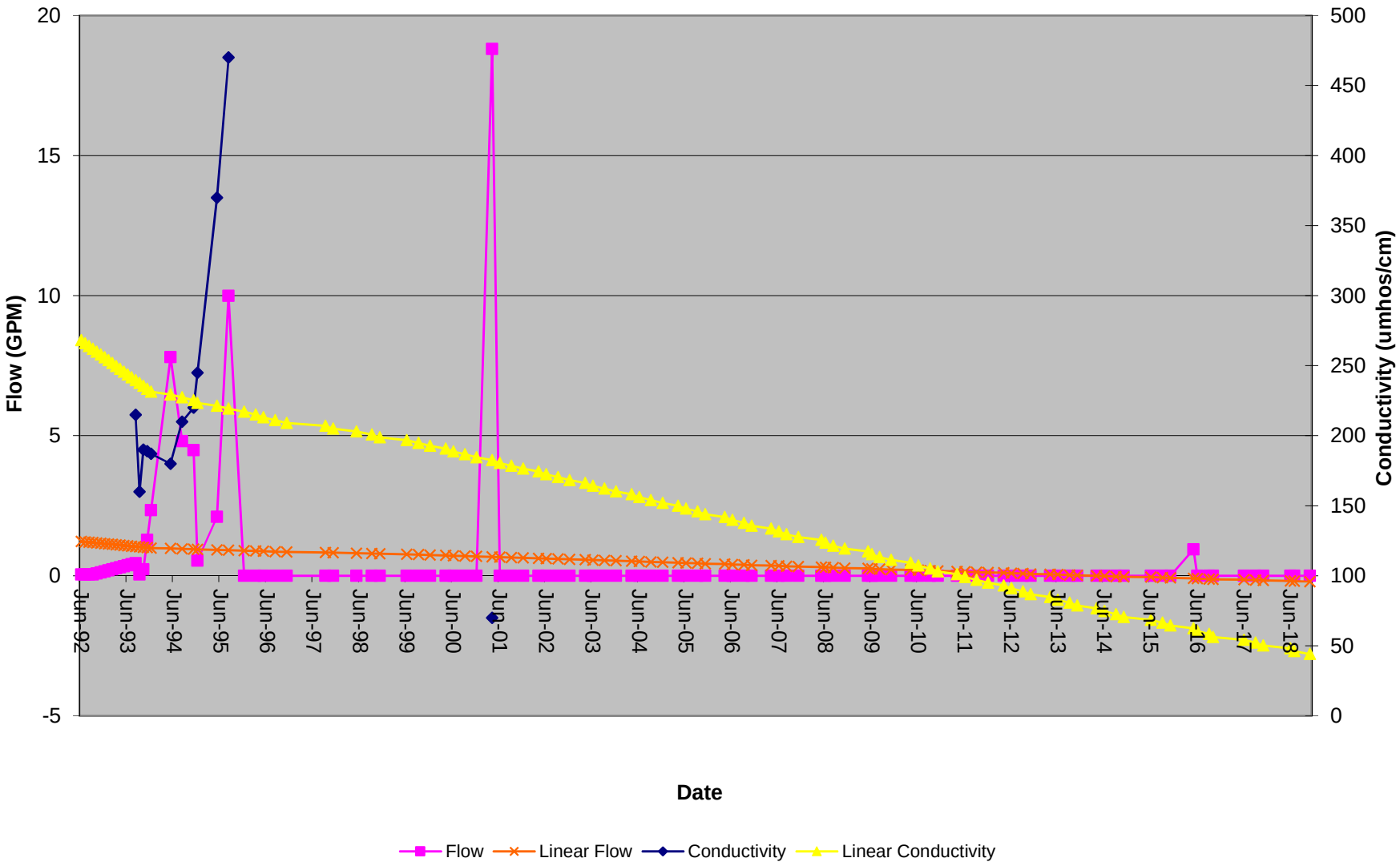
Initiated	6/1/1992	6/1/1992	6/1/1992
Activated	10/1/1993	10/1/1993	10/1/1993
Date	11/29/2018	7/25/2018	6/26/2018

		Summary Information								
		Baseline			Operation					
Field Parameters	UNITS	Min	Ave	Max	Min	Ave	Max			
Flow	GPM	0.045	0.20	0.45	0	0.62	18.80			
Temperature	Celsius				5.0	14.4	23.2			
Conductivity	umhos/cm	160	188	215	70	224	470			
pH	su				6.8	7.94	9.10			
Field Comments								Dry	Dry	Dry
Lab Parameters	UNITS									
Bicarbonate	mg/L				45	78	110			
Carbonate	mg/L				<MDL	<MDL	<MDL			
Chloride	mg/L				2	2	2			
Conductivity	umhos/cm				87	149	210			
Hardness	mg/L				43	71	99			
pH	su				7.8	7.9	8.0			
ResidueFilterable-TDS	mg/L				80	92	104			
ResidueNonFilterable-TSS	mg/L				18	18	18			
SAR					0.19	0.20	0.22			
Sulfate	mg/L				6	6	6			
Calcium (Dissolved)	mg/L				10.8	16.9	23.0			
Magnesium (Dissolved)	mg/L				3.8	6.9	10.0			
Sodium (Dissolved)	mg/L				2.9	4.0	5.0			
TDS Ratio (grav./calc.)										

Spring 10-10 is located in the NW1/4SE1/4 of Section 10, T13S, R92W. This spring was not observed to be developed.
"A small seep occurs along the jeep trail between Ponds 10-2 and Pond 10-3 at an elevation of approximately 8560 feet. Flow was observed but too low to measure or sample. Vegetation consisted of green mosses and grasses." (Simon Hydro Search, 92)

Baseline Information for Point S1010 is derived from events beginning on 6/1/92 through 11/1/93.
Point influenced by mining on 10/1/93.

Plot of Flow and Conductivity



S1010 - East Roatcap Creek Spring 10-10

Figure 10

S1404
West Roatcap Creek - Spring 14-4
Elevation - 7480

Initiated	12/2/1996	12/2/1996	12/2/1996	12/2/1996
Activated	11/22/1998	11/22/1998	11/22/1998	11/22/1998
Date	11/30/2018	7/25/2018	6/26/2018	3/8/2018

		Summary Information									
Field		Baseline			Operation						
Parameters	UNITS	Min	Ave	Max	Min	Ave	Max				
Flow	GPM	0	1.51	5.00	0	0.26	3.00	Dry	Damp	Damp	0.015
Temperature	Celsius	4.4	8.7	12.4	0.5	9.6	21.2			12.1	3.9
Conductivity	umhos/cm	760	883	1000	655	843	980			923	980
pH	su	6.8	7.3	7.6	7.0	7.4	8.21			7.66	7.54
Field Comments											
Lab											
Parameters	UNITS										
Bicarbonate	mg/L	352	354	355	289.1	355	402				
Carbonate	mg/L	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL				
Chloride	mg/L	19	20	21	3.66	46	136.5				
Conductivity	umhos/cm	780	800	819	311	822	999				
Hardness	mg/L	398	401	404	31.73	314	455				
Acidity	mg/L				6	13	30				
pH	su	8.0	8.0	8.0	6.77	7.7	8.9				
ResidueFilterable-TDS	mg/L	480	490	500	190	562	688				
ResidueNonFilterable-TSS	mg/L	6	7	8	<MDL	26	66				
SAR		0.93	0.96	0.98	0.396	1.06	1.677				
Sulfate	mg/L	80	80	80	30	74	130				
Calcium (Dissolved)	mg/L	101	104.0	107	7	73.1	114				
Iron (Dissolved)	mg/L				0.02	0.04	0.08				
Iron (Total)	mg/L				0.08	0.36	0.79				
Magnesium (Dissolved)	mg/L	33.3	34.4	35.4	3.46	31.9	45.8				
Manganese (Total)	mg/L				0.01	0.09	0.37				
Sodium (Dissolved)	mg/L	42.5	43.6	44.7	5.2	43.8	71.4				
TDS Ratio (grav./calc.)	%	1.01	1.01	1.01	0.95	1.03	1.13				

** No visible flow*

This spring is a marshlike area of about 20' x 20'. (Hanna, 99)

Baseline Information for Point S1404 is derived from events beginning on 12/2/96 through 11/22/98.
Point influenced by mining on 11/22/98.

S2500
Steven's Gulch - Spring 25
Elevation - 7160

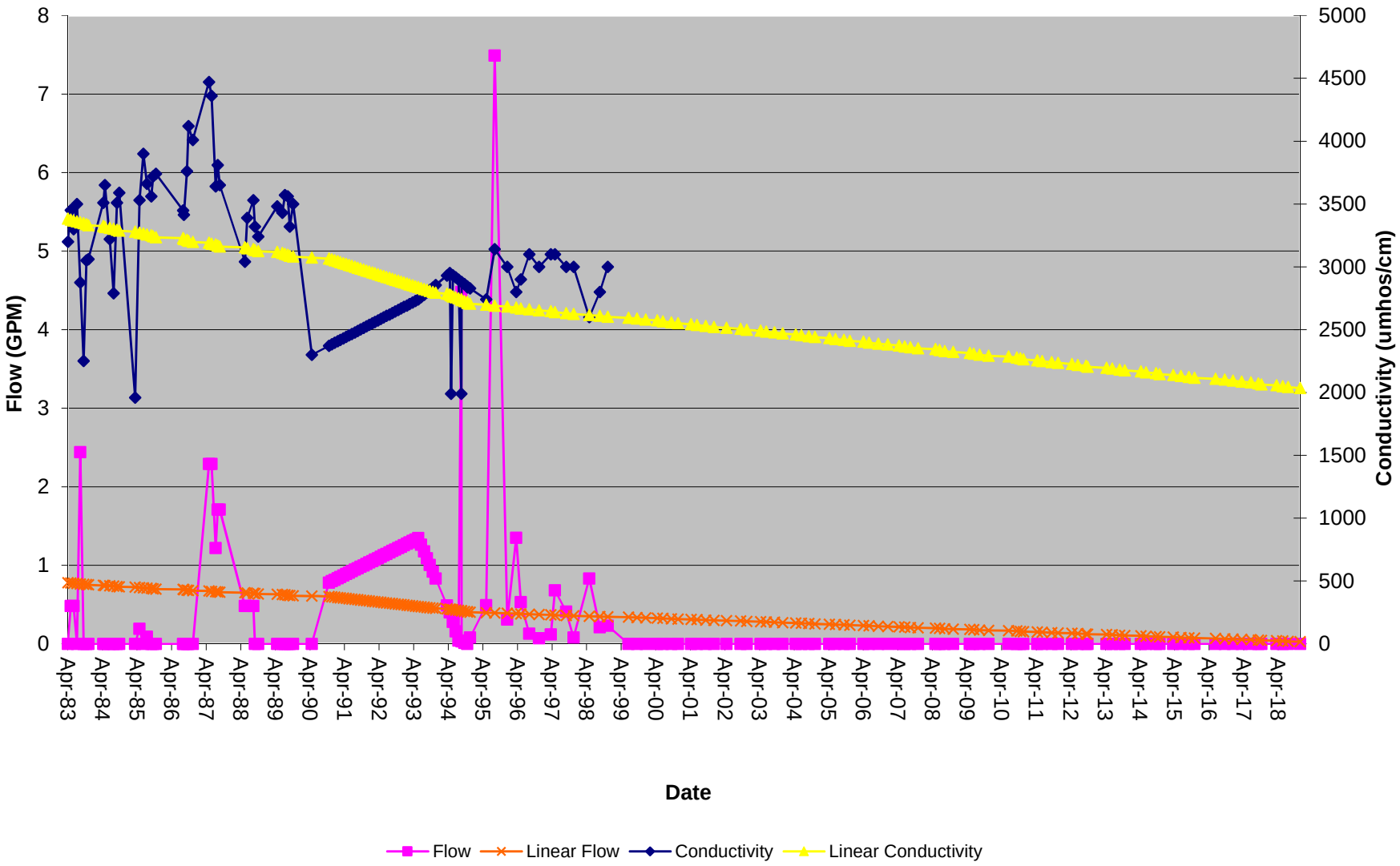
Initiated								4/14/1983	4/14/1983	4/14/1983	4/14/1983
Activated											
Date								11/30/2019	7/26/2019	5/29/2019	3/27/2019
		Summary Information									
Field		Baseline			Operation						
Parameters	UNITS	Min	Ave	Max	Min	Ave	Max				
Flow	GPM	0	0.40	7.49				0	0	0	0
Temperature	Celsius	5.0	14.1	27.9							
Conductivity	umhos/cm	1960	2992	4470							
pH	su	6.9	7.9	9.1							
Field Comments								Dry	Dry	Dry	Dry
Lab											
Parameters	UNITS										
Bicarbonate	mg/L	483	846	1040							
Carbonate	mg/L	<MDL	<MDL	<MDL							
Chloride	mg/L	22	43	58							
Conductivity	umhos/cm	1650	3062	3780							
Hardness	mg/L	679	1387	1894							
pH	su	7.4	8.02	8.4							
ResidueFilterable-TDS	mg/L	1036	2450	3398							
ResidueNonFilterable-TSS	mg/L	8	92	492							
SAR		0.98	3.84	4.76							
Sulfate	mg/L	811	1311	1827							
Calcium (Dissolved)	mg/L	73	140	208							
Magnesium (Dissolved)	mg/L	121	252	346							
Sodium (Dissolved)	mg/L	192	339	396							
Potassium	mg/L	<MDL	3.07	9.2							
TDS Ratio (grav./calc.)		1.01	1.01	1.01							

The area of concern for monitoring point S2500 has not been affected by the mining operation. Therefore, all recorded monitoring events are considered Baseline.

This spring consists of a 4' x 8' area where water comes from a coal lens or an old mine addit. (Hanna, 99)

Baseline Information Collection initiated on 4/14/83 and not yet considered complete.
Point S2500 has not been influenced by mining.

Plot of Flow and Conductivity



S2500 - Steven's Gulch Spring 25

Figure 13

S3000
East Roatcap Creek - Spring 30
Elevation - 7840

Initiated	5/16/1983	5/16/1983	5/16/1983
Activated			
Date	11/30/2018	7/25/2018	6/26/2018

Field Parameters	UNITS	Summary Information Baseline Min	Baseline Ave	Baseline Max	Operation Min	Operation Ave	Operation Max			
Flow	GPM	0	0.47	12.1						
Temperature	Celsius	0.8	9.5	22.9						
Conductivity	umhos/cm	7.6	670	900						
pH	su	6.0	14.3	650.0						
Field Comments								Dry	Damp	Damp
Lab Parameters	**UNITS**									
Bicarbonate	mg/L	107	301	381						
Carbonate	mg/L	<MDL	<MDL	<MDL						
Chloride	mg/L	1.88	12.04	81.31						
Conductivity	umhos/cm	180	652	844						
Hardness	mg/L	81.0	322.9	479.3						
Acidity	mg/L	-351	-109	82.26						
pH	su	7.1	7.8	8.3						
ResidueFilterable-TDS	mg/L	155	421	566						
ResidueNonFilterable-TSS	mg/L	<MDL	26	116						
SAR		0.24	0.80	7.3						
Sulfate	mg/L	8	66	120						
Calcium (Dissolved)	mg/L	21	86.9	145.6						
Iron (Dissolved)	mg/L	0.01	0.02	0.033						
Iron (Total)	mg/L	0.02	0.22	0.66						
Magnesium (Dissolved)	mg/L	7.0	25.3	73.0						
Manganese (Total)	mg/L	0.001	0.04	0.12						
Sodium (Dissolved)	mg/L	5	25.0	47						

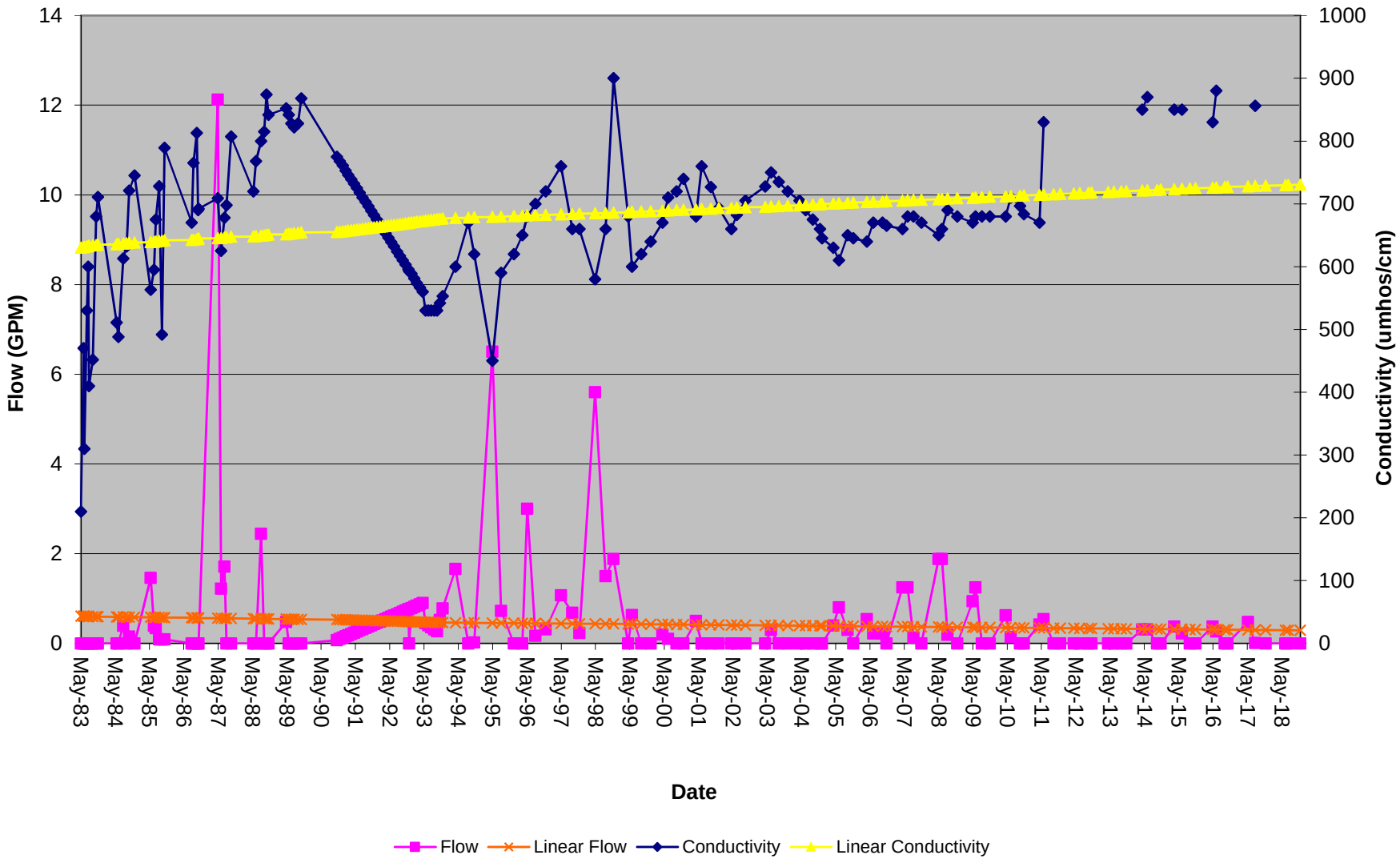
The area of concern for monitoring point S3000 has not been affected by the mining operation. Therefore, all recorded monitoring events are considered Baseline.

**No laboratory data for this parameter*

This 5' x 5' spring comes out of the toe of a side gulch. (Hanna, 99)

Baseline Information Collection initiated on 5/16/83 and not yet considered complete.
Point S3000 has not been influenced by mining.

Plot of Flow and Conductivity



S3000 - East Roatcap Creek Spring 30

Figure 15

SW05
Steven's Gulch
Elevation - 6600

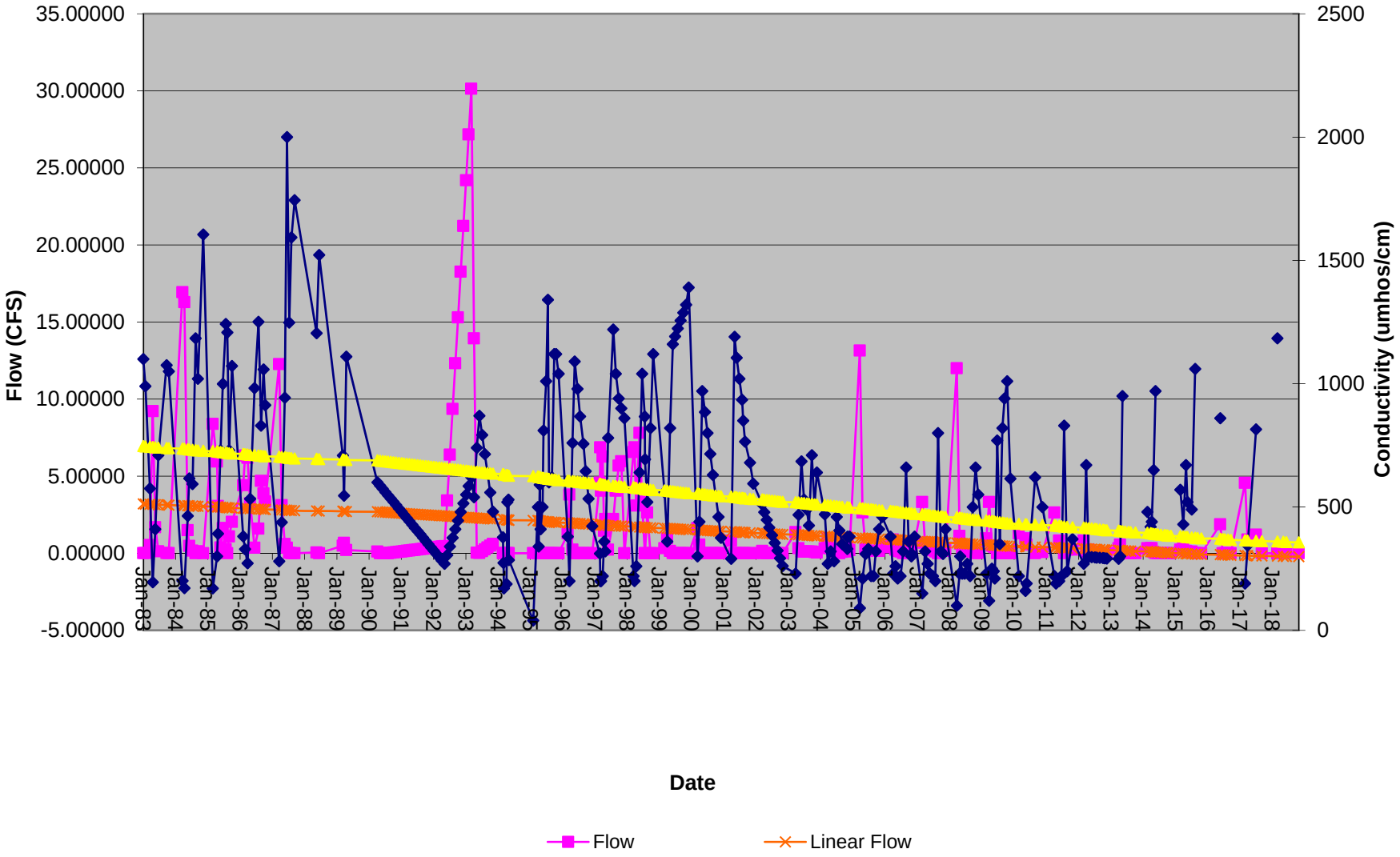
Initiated								1/1/1983	1/1/1983	1/1/1983	1/1/1983
Activated								12/21/1986	12/21/1986	12/21/1986	12/21/1986
Date								11/27/2018	7/9/2018	6/4/2018	3/29/2018
		Summary Information									
Field		Baseline			Operation						
Parameters	UNITS	Min	Ave	Max	Min	Ave	Max				
Flow	CFS	0	3.1	16.9	0.00	1.40	30.13				
Water Level in Flume	Feet				0.00	0.08	1.06				
Temperature	Celsius	-0.5	10.8	23.7	0.0	10.3	23.6				6.9
Conductivity	umhos/cm	170	746	1605	40	524	2000				1184
pH	su	7.3	8.5	9.9	6.9	8.3	9.0				8.35
Field Comments								Dry	Dry	Dry	*
Lab											
Parameters	UNITS										
Bicarbonate	mg/L	89	302	456	83	207	456				
Carbonate	mg/L	<MDL	1	7	<MDL	3.76	12.65				
Chloride	mg/L	2	16	31	<MDL	13.85	43.00				
Conductivity	umhos/cm	170	734	1290	149	561	1560				
Hardness	mg/L	72	312	534	35.6	231.6	625.7				
Acidity	mg/L				-330.0	-67.2	24.0				
pH	su	6.8	8.1	8.7	7.2	8.1	8.6				
ResidueFilterable-TDS	mg/L	120	488	794	19	380	1130				
ResidueNonFilterable-TSS	mg/L	2	77	438	<MDL	36	408				
SAR		0.56	1.14	1.60	0.23	1.05	2.06				
Sulfate	mg/L	14	131.5	338.0	<MDL	97.50	450.00				
Calcium (Dissolved)	mg/L	19	71.8	110.0	6.8	52.3	132.0				
Iron (Dissolved)	mg/L	6	32.1	66.0	<MDL	0.09	0.61				
Iron (Total)	mg/L	11.00	47.82	85.00	0.02	0.41	1.46				
Magnesium (Dissolved)	mg/L	6.0	32.1	66.0	4.5	26.1	86.2				
Sodium (Dissolved)	mg/L	11.0	47.8	85.0	0.0	40.3	115.0				
Manganese (Total)	mg/L				<MDL	2.41	35.60				

The Stevens Gulch stream gauge, SW05, is located near Bowie No. 1 mine's timber storage area in the NE1/4NW1/4, Sec 25, T13S, R92W, of the 6 was installed at this location.

** Flow not measurable*

Baseline Information for Point SW05 is derived from events beginning on 1/1/83 through 12/21/86.
Point influenced by mining on 12/21/86.

Plot of Flow and Conductivity



SW-05 - Stevens Gulch

Figure 17

SW06
East Roatcap Creek - Downstream
Elevation - 6740

							Initiated	1/1/1983	1/1/1983	1/1/1983	1/1/1983	1/1/1983	1/1/1983
							Activated	12/21/1986	12/21/1986	12/21/1986	12/21/1986	12/21/1986	12/21/1986
							Date	11/27/2018	8/20/2018	6/25/2018	3/14/2018	10/24/2017	9/19/2017
		Summary Information											
Field		Baseline			Operation								
Parameters	UNITS	Min	Ave	Max	Min	Ave	Max						
Flow	CFS	0.00	4.65	45.75	0.00	7.96	######	0.800	0.005	1902.000	0.050	0.003	0.440
Water Level in Flume	Feet				0.00	0.21	1.22						
Temperature	Celsius	0.5	10.0	21.1	0.03	9.63	25.50	0.2	12.5	10.1	1.6	2.5	13.2
Conductivity	umhos/cm	60	277	691	80	595	1650	907	713	379	342	872	779
pH	su	6.5	8.3	9.2	6.9	8.4	9.0	7.98	8.46	8.29	8.56	8.49	8.55
Field Comments													
Lab													
Parameters	UNITS												
Bicarbonate	mg/L	60	155	289	64	238	440					365	317
Carbonate	mg/L	<MDL	1	7.1	<MDL	7.02	52.00					<MDL	18.5
Chloride	mg/L	1	5	10	<MDL	14.58	68.00					8.3	7.5
Conductivity	umhos/cm	110	275	670	138.0	615.1	1430.0					771	720
Hardness	mg/L	58	158	291	63.00	277.47	697.00					366	346
Acidity	mg/L				-370	-92	62					-370	-330
pH	su	6.8	7.9	8.4	6.50	8.08	8.60					8.3	8.45
ResidueFilterable-TDS	mg/L	40	180	380	50	423	1130					507	453
ResidueNonFilterable-TSS	mg/L	18	104	524	<MDL	21	138					26.4	5.3
SAR		0.11	0.46	0.72	0.28	0.98	5.93					0.748	0.707
Sulfate	mg/L	10	32	80	4.20	91.67	410.00					73.5	71.6
Calcium (Dissolved)	mg/L	15	37	69	10.5	56.1	125.0					85.7	83.1
Iron (Dissolved)	mg/L				0.01	0.12	0.83					0.022	0.0114
Iron (Total)	mg/L				0.07	0.80	2.78					1.23	0.202
Magnesium (Dissolved)	mg/L	4	14	29	5.5	33.4	99.2					36.9	33.6
Manganese (Total)	mg/L				<MDL	0.062	0.165					0.165	0.0747
Sodium (Dissolved)	mg/L	2	14	28	5.10	41.16	196.00					32.4	29.7

SW06 is located on East Roatcap Creek in the NE1/4SW1/4 Sec 23, T13S, R92W of the 6th P.M. A 36" Parshall flume was also installed at this location.

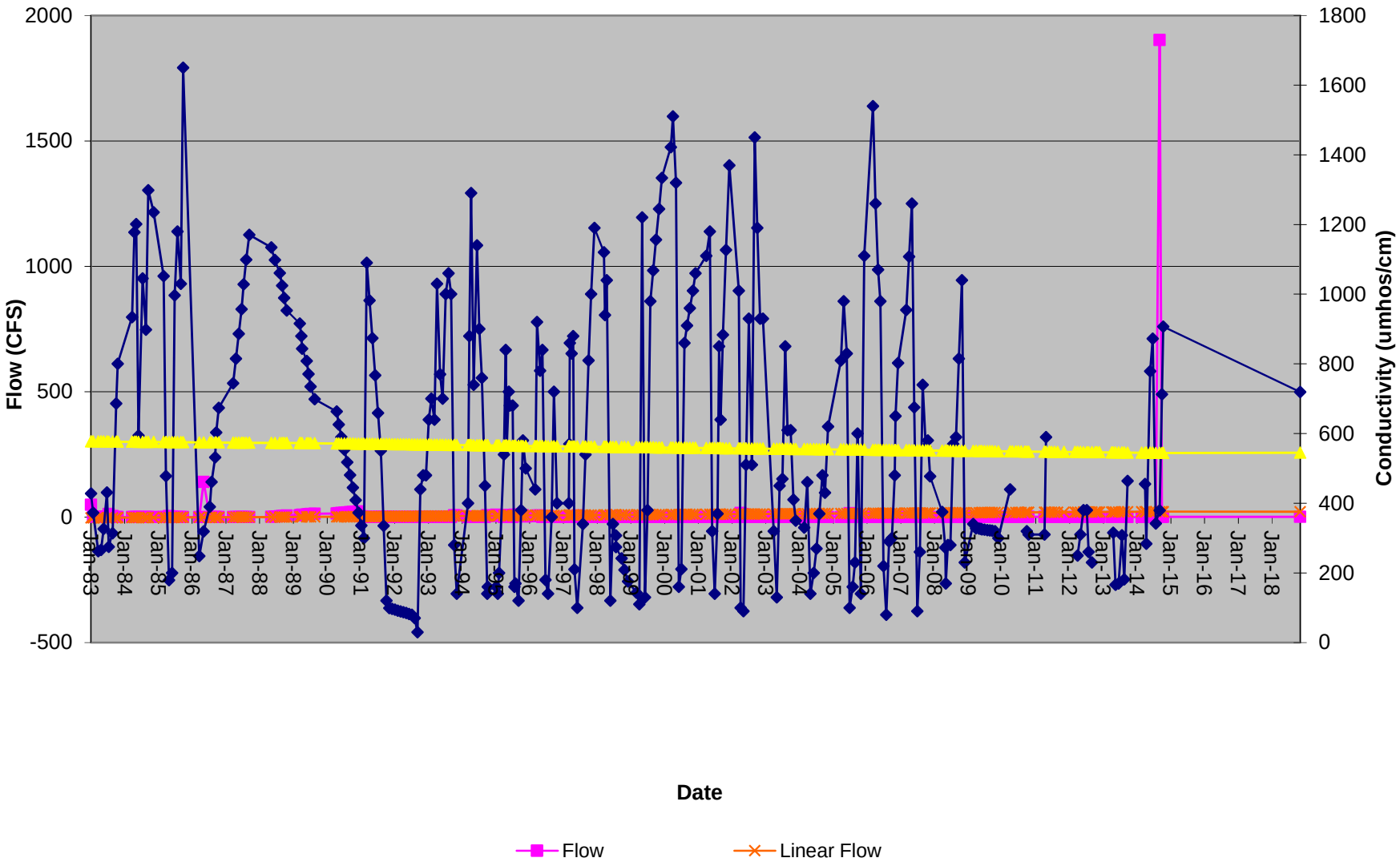
** Sample taken on 3/28/16*

11/27/2018

0.800
0.2
907

Baseline Information for Point SW06 is derived from events beginning on 1/1/83 through 12/21/86.
Point influenced by mining on 12/21/86.

Plot of Flow and Conductivity



SW06 - East Roatcap Creek - Downstream

Figure 19

SP1305
Steven's Gulch - Pond Spring 13-5
Depth 4'
Elevation - 7680

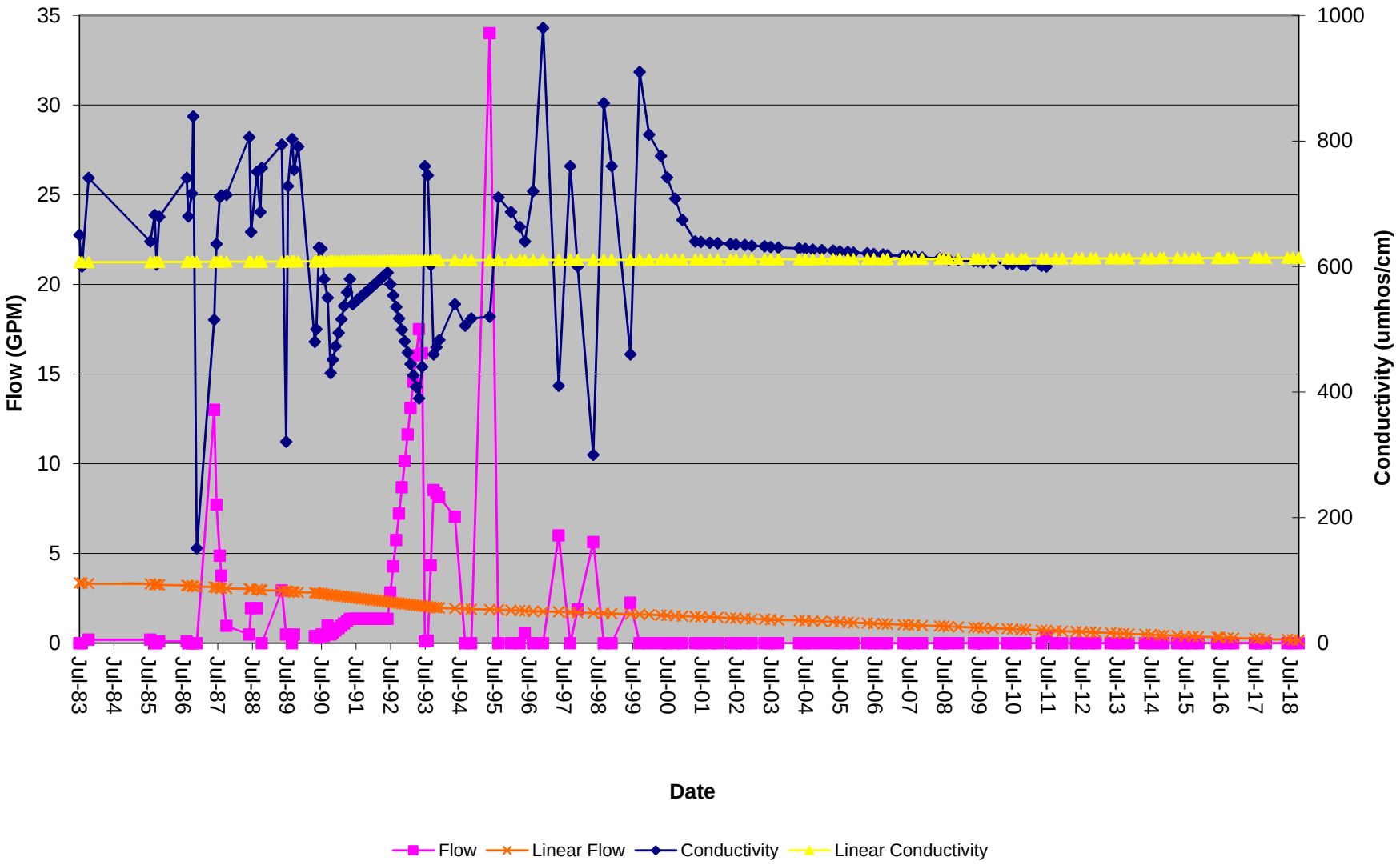
Initiated	7/6/1983	7/6/1983	7/6/1983
Activated	12/1/1992	12/1/1992	12/1/1992
Date	10/1/2018	7/25/2018	3/4/2018

		Summary Information								
		Baseline			Operation					
Field Parameters	UNITS	Min	Ave	Max	Min	Ave	Max			
Flow	GPM	0	1.82	13	0	1.71	34	0	0	0
Freeboard	Feet	0	0.00	0	0	1.95	4.81	3.2	3.2	3.2
Temperature	Celsius	2.8	13.6	24.4	0.4	12.2	21.2			
Conductivity	umhos/cm	151	603	839	300	591	980			
pH	su	7.1	26.5	640	7	7.8	8.6			
Field Comments								Dry	Dry	Dry
Lab Parameters	UNITS									
Bicarbonate	mg/L	253	369	434	96	224	323			
Carbonate	mg/L	<MDL	1	6	<MDL	<MDL	<MDL			
Chloride	mg/L	3	12	66	2	16	62.04			
Conductivity	umhos/cm	477	651	804	231	444	635			
Hardness	mg/L	225	267	325	98	179	248			
Acidity	mg/L				24	24.00	24			
pH	su	7.4	7.83	8.2	7.46	7.86	8.1			
ResidueFilterable-TDS	mg/L	156	367	452	130	267	372			
ResidueNonFilterable-TSS	mg/L	2	103	358	8	40	108			
SAR		0.84	1.38	1.8	0.89	1.13	1.748			
Sulfate	mg/L	23	64	130	10	39	60.92			
Calcium (Dissolved)	mg/L	47	61.92	79	24.9	45.08	60			
Iron (Dissolved)	mg/L				0.04	0.04	0.04			
Iron (Total)	mg/L				0.77	0.77	0.77			
Magnesium (Dissolved)	mg/L	20	27.33	32	8.7	16.07	24			
Manganese (Total)	mg/L				0.42	0.42	0.42			
Sodium (Dissolved)	mg/L	29	51.67	64	12.8	33.60	57.8			
TDS Ratio (grav./calc.)					0.96	1.04	1.1			

Spring and Pond 13-5 is a man made stock pond with a piped spring (approximately 50' x 30'). The pond is fed from a spring and seep located above the pond. (Gordon, 83)

Baseline Information for Point SP1308 is derived from events beginning on 7/6/83 through 12/1/92.
Point influenced by mining on 12/1/92.

Plot of Flow and Conductivity



SP1305 - Steven's Gulch Spring Pond 13-5

Figure 21

SP1306
Steven's Gulch - Pond Spring 13-6
Depth 4'
Elevation - 7590

Initiated	7/5/1983	7/5/1983	7/5/1983	7/5/1983
Activated	1/1/1988	1/1/1988	1/1/1988	1/1/1988
Date	10/1/2018	7/25/2018	3/4/2018	10/20/2017

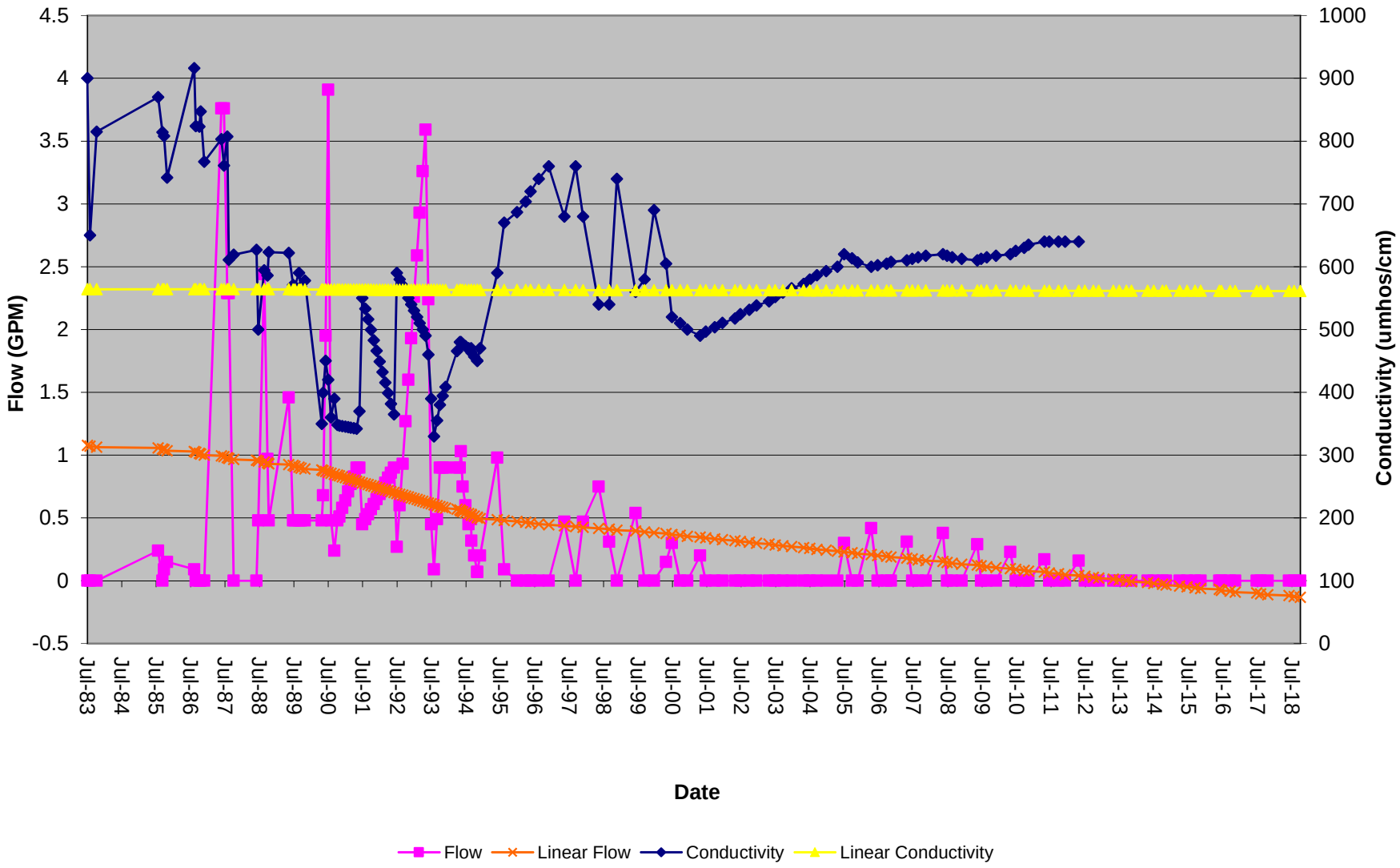
Summary Information

Field Parameters	UNITS	Baseline Min	Baseline Ave	Baseline Max	Operation Min	Operation Ave	Operation Max				
Flow	GPM	0	0.75	3.76	0	0.45	3.91	0	0	0	0
Freeboard	Feet	0	0.00	0	0	1.50	95				
Temperature	Celsius	5	14.0	24	0.3	12.8	25.6				
Conductivity	umhos/cm	611	787	916	330	510	760				
pH	su	7.2	7.8	8.4	6.9	8.0	8.9				
Field Comments								Dry	Dry	Dry	Dry
Lab Parameters	UNITS										
Bicarbonate	mg/L	407	431	470	280	340	410				
Carbonate	mg/L	<MDL	<MDL	<MDL	<MDL	3	26				
Chloride	mg/L	5	9	12	2	6	8				
Conductivity	umhos/cm	650	729	868	491	596	752				
Hardness	mg/L	325	370	423	242	305	414				
pH	su	7.6	7.98	8.3	7	7.9	8.6				
ResidueFilterable-TDS	mg/L	330	416	473	300	351	430				
ResidueNonFilterable-TSS	mg/L	4	22	40	6	26	76				
SAR		0.59	0.71	0.92	0.35	0.43	0.60				
Sulfate	mg/L	29	42	58	10	38	200				
Calcium (Dissolved)	mg/L	63	71.50	87	51.0	61.9	86.5				
Magnesium (Dissolved)	mg/L	39	46.50	50	28.0	36.7	48.0				
Sodium (Dissolved)	mg/L	27	31.50	40	13.0	17.6	23.0				
Potassium	mg/L				<MDL	1.50	6				
TDS Ratio (grav./calc.)					<MDL	0.77	1.08				

Spring and Pond 13-6 is a man made pond (approximately 25' x 25') and is fed by a spring located on the hillside above the pond. (Gordon, 83)
Pond is mostly breached, standing puddle (Hanna 4/24/14)

Baseline Information for Point SP1308 is derived from events beginning on 7/5/83 through 1/1/88.
Point influenced by mining on 1/1/88.

Plot of Flow and Conductivity



SP1306 - Steven's Gulch Spring Pond 13-6

Figure 23

2018
ANNUAL INFLOW REPORT

BOWIE RESOURCES, LLC

BOWIE RESOURCES, LLC
BOWIE NO. 1 MINE
P.O. BOX 483
PAONIA, COLORADO 81428
PERMIT C-1981-038

PREPARED BY:

J. E. STOVER & ASSOCIATES
2352 N. 7th St., Unit B
Grand Jct., CO 81501

ANNUAL MINE INFLOW REPORT

2018

Bowie No. 1 Mine

Bowie Resources, LLC

Paonia, Colorado

Introduction

According to Stipulation No. 29, Permit No. C-1981-038, the operator submits the following Annual Mine Inflow Report for the period of July 1, 2016 through June 30, 2018.

Mining Locations and Projections

Mining operations at Bowie No. 1 Mine have ceased due to market conditions and coal quality issues. It is highly unlikely mining operations will resume since the surface facilities have been reclaimed.

Mine Inflow

The underground Mine Inflow Study at the Bowie No. 1 Mine was not conducted during 2018, as the mine was inactive and inaccessible.

No water was discharged from the mine to the surface during the 2017-2018 reporting period. The operator has no plans to discharge water from within the mine to the surface during the 2018-2019 reporting period. No water has been discharged from the mine to date.

Water Importation and Balance

There was no production of coal from the Bowie No. 1 Mine from July 1, 2017 through June 30, 2018. Production estimates for the following twelve-month period remain at zero. Historically, mine water importation is estimated from recorded flows and the number on tons mined. With no coal production to base water usage upon, the operator submits only evaporative loss from ponds for the consumptive use during the water year. Evaporative loss is based upon the assumption that all of the ponds have full dead pool storage during the entire reporting period.

These water quantities are listed as:

	Acre Feet
Dust Suppression on Bowie No. 1 Roadway	0.00
Bathhouse Consumption[1]	0.00
Evaporative Loss from Ponds	4.60
Silo Usage	0.00
Total water usage	4.60

Hydrologic Impacts

Historically, there was virtually no water inflow into the mine. Therefore, the hydrologic impact caused by the mining operation is either non-existent or not measurable.

Conclusions

No mine discharge and no importation of water is anticipated during the 2018 - 2019 reporting period. Therefore, the quality and quantity of surface water adjacent to the mine will not be affected. The operator will continue to submit the Annual Subsidence and Hydrology Report which will summarize all subsidence and hydrology data.

[1]Bathhouse has been dismantled.

2018
ANNUAL SUBSIDENCE REPORT

BOWIE RESOURCES, LLC
BOWIE NO. 1 MINE
P.O. BOX 483
PAONIA, COLORADO 81428
PERMIT C-1981-038

PREPARED BY:

J. E. STOVER & ASSOCIATES
2352 N. 7th St., Unit B
Grand Jct., CO 81501

ANNUAL SUBSIDENCE REPORT

2018

Bowie No. 1 Mine

Bowie Resources, LLC

Paonia, Colorado

2018 Production and Geologic Conditions
The Bowie No. 1 Mine suspended operations during December, 1997 and remained idle throughout the calendar year. The mine has been reclaimed.

Operation Unit Descriptions
Bowie No. 1 Mine has no operating units to report on during the calendar year.

Subsidence Impacts - 2018
With the approval of technical revision number 25, no subsidence monitoring stations were surveyed during the year.

Wide-Spaced Monitoring Grid Station Summary
Through technical revision number 45, the DRMS approved a reduction in subsidence monitoring. The wide spaced subsidence monuments, Sites 6, 14, 15, 16, DH 55, DH 65, DH 66, DH 68, 81, 82, 83 and 95 were not monitored during the year.

Pitkin Mesa Pipeline
Seven subsidence monitoring stations were established at locations along the Pitkin Mesa Pipeline which overlies Panel C. Panel C development commenced in October with twenty-four crosscuts completed by January 1, 1993. Panel C was mined utilizing a partial extraction design intended to preclude the development of subsidence in order to protect the pipeline. The subsidence monitoring stations along the pipeline are depicted on Map No. 2-5. Though technical revision number 57, the DRMS approved the cessation of subsidence monitoring of the seven (7) Pitkin Mesa Pipeline monitoring locations. These monitoring stations (PL-01 through PL-07) were last surveyed during 2013.

Visual Monitoring 2018
Visual subsidence monitoring is accomplished by periodic "walkovers" of recently mined areas within the present permit area. During the 2018 monitoring season, visual monitoring consisted of visual inspections done while water monitoring.

Visual monitoring is concentrated over areas of retreat mining with particular emphasis on areas mined under low overburden. Since the mine has now been idled in excess of 10 years, there are no areas of particular emphasis on which to concentrate visual inspections.

Projected Subsidence Impacts - 2018
Subsidence impacts during 2018 are projected to be minimal based upon subsidence patterns established to date. No mining is currently projected for 2018.

Projected Subsidence Monitoring – 2018
No subsidence monitoring will be performed in 2018.

2018
MAPS

BOWIE RESOURCES, LLC

BOWIE RESOURCES, LLC
BOWIE NO. 1 MINE
P.O. BOX 483
PAONIA, COLORADO 81428
PERMIT C-1981-038

PREPARED BY:

J. E. STOVER & ASSOCIATES
2352 N. 7th St., Unit B
Grand Jct., CO 81501

DRILL HOLE ROAD DISTURBANCE					
ACTION/ SEGMENT	ROAD NAME	DIST. TYPE	YEAR	ACRES	MILES
TR-38					
001	METHANE HOLE ROAD	NEW	2001	1.0	0.4
		TOTAL		1.0	0.4
TR-50					
007	BV-1 North Road	New	2008	0.2	0.1
007	BV-1 North Road	Upgraded	2008	0.5	0.4
008	BV-2 South Road	Upgraded	2008	1.1	0.7
		TOTAL		1.8	1.2
MR-127					
011	2011-1 Road	NEW	2011	0.12	0.04
012	2011-2 Road	NEW	2011	0.23	0.08
013	2011-3 Road	NEW	2011	1.00	0.34
		TOTAL		1.35	0.46

DRILL HOLE PAD DISTURBANCE				
ACTION/ SEGMENT	ROAD NAME	DIST. TYPE	YEAR	ACRES
TR-38				
002	BRL1-GMW-01	NEW	2001	0.2
		TOTAL		0.2
TR-50				
009	BV-1	NEW	2008	0.5
010	BV-2	NEW	2008	0.0
		TOTAL		0.5
MR-127				
014	2010-1	NEW	2011	1.0
015	2010-2	NEW	2011	1.0
016	2010-3	NEW	2011	1.0
		TOTAL		3.0

Prepared By: J. R. STOVER & ASSOCIATES, INC. 8352 N 7th ST UNIT B Grand Jct., CO 81501

REFERENCES

REVISIONS

No.	DESCRIPTION:	BY	DATE
7.	AHR, REVISED PERMIT BOUNDARY	D.A.L.	03/20/01
8.	ADDED CAS MONITORING WELL, BRL1-GMW-01	D.A.L.	08/01/01
9.	ADDED EXPLORATION HOLE, P-BRL-1-03-01	D.A.L.	03/10/03
10.	TR-44 EXPLORATION HOLES & ROADS	L.E.S.	04/19/04
11.	TR-50 TWO EXP. HOLES & ROADS	L.E.S.	09/10/08
12.	PR-04, Revised Permit Bndry, monitoring points	T.K.B.	08/30/10
13.	MR-127 3 Exploration Holes	L.E.S.	06/01/11
14.	TR-55 Remove B-4 from Monitoring Program	L.E.S.	08/20/13
15.	TR-60 REDUCE SIZE OF PERMIT BOUNDARY	L.E.S.	12/01/15

LEGEND

- PERMIT BOUNDARY – Bowie No. 1
- PERMIT BOUNDARY – Bowie No. 2
- DRAINAGE BASIN PERIMETER
- POND OR SPRING & POND
- SHALLOW MONITORING WELL
- SPRING
- SW-1 F — SURFACE WATER MONITORING POINT FLUME, STILLING WELL, RECORDER
- SW-1 C — SURFACE WATER MONITORING POINT CREST STAGE GUAGE
- DRILL HOLE
- DRILL HOLE AND PAD
- NEW LIGHT USE ROAD
- UPGRADED UNPAVED ROAD
- TR-REVISION CLOUD

DRAINAGE KEY

1 – EAST ROATCAP CREEK DRAINAGE
2 – STEVENS GULCH DRAINAGE
3 – TERROR CREEK DRAINAGE
4 – COAL GULCH DRAINAGE
5 – WEST ROATCAP CREEK DRAINAGE

NOTE:
SEE MAP 8-3 FOR THE LOCATION OF TRAIN LOADOUT MONITORING WELLS MW-1, MW-2, AND MW-3.

NOTE:
CURRENTLY MONITORED LOCATIONS ARE SHOWN IN BLUE.

ENGINEER'S CERTIFICATION

I hereby certify that this drawing was done by me or under my direct supervision and that all of the information presented on this drawing is true and correct to the best of my knowledge and belief.

James E. Stover
Colorado P.E. 19230
Date

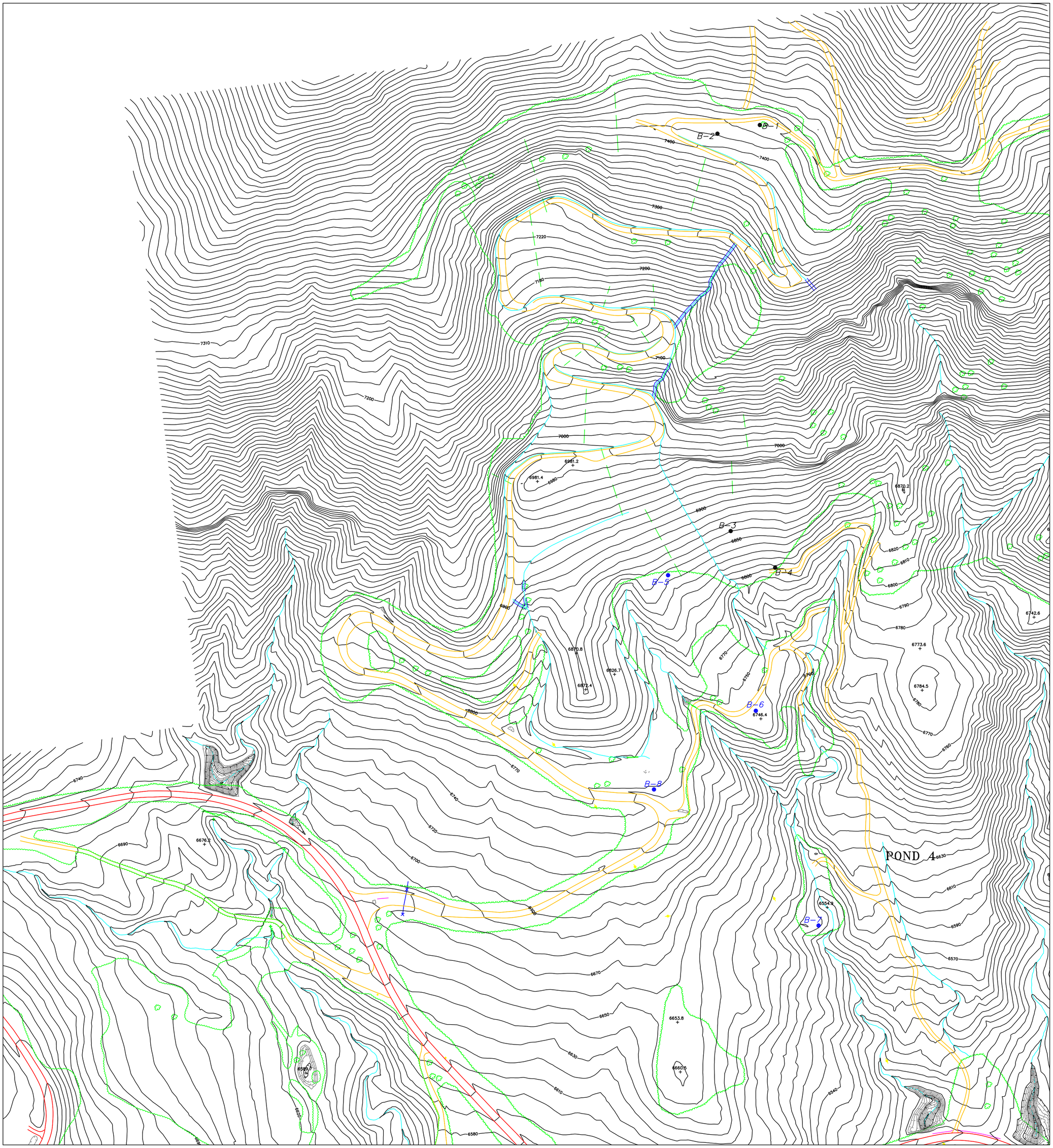
DESIGNED:
DRAWN: T.K.B. 03/2010
CHECKED:
PREPARED FOR:

BOWIE RESOURCES, LLC
BOWIE NO. 1 MINE
P.O. BOX 1488
PAONIA, COLORADO 81428

PROJECT: BOWIE NO. 1 MINE

TITLE: HYDROLOGIC RECONNAISSANCE
SPRINGS, PONDS, DRILL HOLES AND STREAM GUAGES

DRMS I.D. No. C – 1981 – 038
DWG. NAME: MAP 4 - 1
SCALE: 1" = 1000'



J. E. STOVER & ASSOCIATES
2352 N 7th ST UNIT B
Grand Jct., CO 81501

REFERENCES

REVISIONS

No.	DESCRIPTION:	BY	DATE
1.	2009 AHR	J.E.S.	2/11/10
2.	2010 AHR	J.E.S.	4/20/11
3.	2011 AHR	J.E.S.	4/10/12
4.	2012 AHR	J.E.S.	02/18/13
5.	2013 AHR	J.E.S.	04/30/13
6.	2014 AHR	J.E.S.	03/18/15
7.	2015 AHR	J.E.S.	05/27/16
8.	2016 AHR	T.K.B.	04/17/17

N
W E
S
HALF INCH

DESIGNED:
DRAWN: D.A.J. 03/15/01
CHECKED:

ENGINEER'S CERTIFICATION

I hereby certify that this drawing was done by me or under my direct supervision and that all of the information presented on this drawing is true and correct to the best of my knowledge and belief.

James E. Stover
Colorado P.E. 19230
Date

PREPARED FOR:

BRL
BOWIE RESOURCES, LLC

BOWIE RESOURCES, LLC
BOWIE NO. 1 MINE
P.O. BOX 483
PAONIA, COLORADO 81428

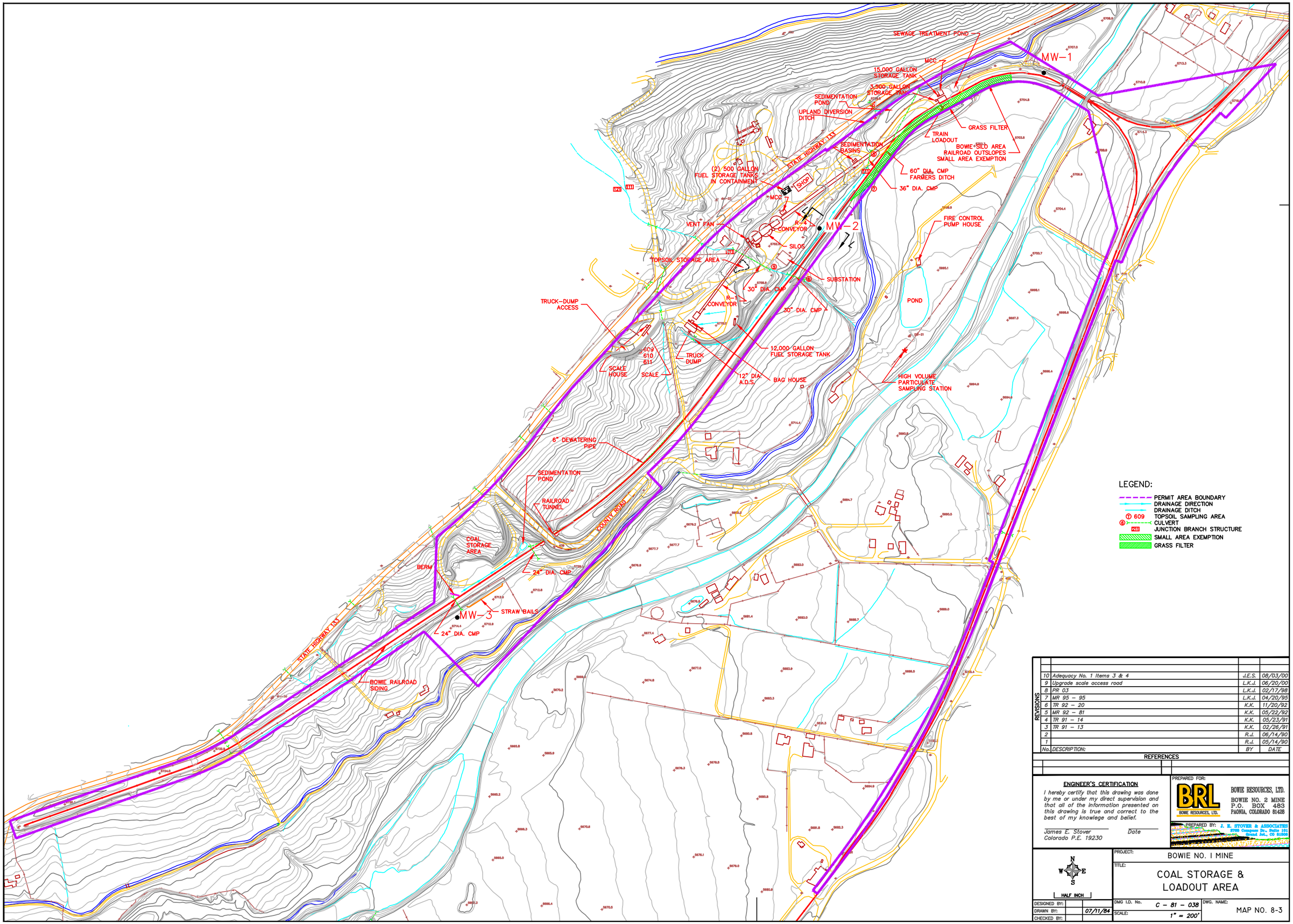
PROJECT: BOWIE NO. 1 MINE

TITLE: RECLAMATION MAP

DRMS I.D. No. C - 1981 - 038

SCALE: 1" = 200'

DWG. NAME: MAP 8-1



LEGEND:

- PERMIT AREA BOUNDARY
- DRAINAGE DIRECTION
- DRAINAGE DITCH
- (T) 609 TOPSOIL SAMPLING AREA
- (6) CULVERT
- (211) JUNCTION BRANCH STRUCTURE
- SMALL AREA EXEMPTION
- GRASS FILTER

REVISIONS			
10	Adequacy No. 1 Items 3 & 4	J.E.S.	08/03/00
9	Upgrade scale access road	L.K.J.	06/20/00
8	PR 03	L.K.J.	02/17/98
7	MR 95 – 95	L.K.J.	04/20/95
6	TR 92 – 20	K.K.	11/20/92
5	MR 92 – 81	K.K.	05/22/92
4	TR 91 – 14	K.K.	05/23/91
3	TR 91 – 13	K.K.	02/26/91
2		R.J.	06/14/90
1		R.J.	05/14/90
No.	DESCRIPTION:	BY	DATE

REFERENCES

ENGINEER'S CERTIFICATION

I hereby certify that this drawing was done by me or under my direct supervision and that all of the information presented on this drawing is true and correct to the best of my knowlege and belief.

James E. Stover *Date*
Colorado P.E. 19230

PREPARED FOR:
BRL BOWIE RESOURCES, LTD.

BOWIE RESOURCES, LTD.
BOWIE NO. 2 MINE
P.O. BOX 483
PAONIA, COLORADO 81428

PREPARED BY: J. E. STOVER & ASSOCIATES
3708 Compass Dr., Suite 101
Grand Jct., CO 81506

N W E S

HALF INCH

PROJECT: BOWIE NO. 1 MINE

TITLE: COAL STORAGE & LOADOUT AREA

DESIGNED BY:			
DRAWN BY:		07/11/84	
CHECKED BY:			

DWG I.D. No. C – 81 – 038
SCALE: 1" = 200'
DWG. NAME: MAP NO. 8-3