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State of Utah

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

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May 8, 1997

TO: File

THRU: Daron Haddock, Permit Supervisor and Pamela Grubaugh-Littig, Permit Coordinator

FROM: Sharon Falvey, Senior Reclamation Specialist SMF

RE: Phase III Bond Release, Huntington Canyon No. 4 Mine, INA/015/004-96A. Folder #2, Emery County, Utah

SYNOPSIS:

The Mountain Coal Company has submitted a request for Phase III bond release and have submitted an application with documentation to demonstrate that the regulatory requirements for bond release have been met. This application was received on 3/20/97. Hydrologic requirements for bond release are reviewed and summarized herein. Using the available data, no pollution of surface and subsurface water has been determined to be occurring and, future occurrence of pollution from this site is expected to have a low probability. Earlier findings regarding adequate erosion control were made at Phase II bond release and are not covered in this memo.

ANALYSIS:

All applicable data collected by the mine was tabulated. However, no summary statistics were conducted by the applicant. This information should be supplied by the applicant; however, because there is a small amount of data and because there have been no agency or public issues raised concerning water quality and quantity at this site, the Division has conducted some data analysis and constructed some data graphs to support the following findings for issues raised in the CHIA:

- Little Bear Spring flows do not appear to be impacted by mining that occurred at the Huntington #4 mine;
- no exceedence in water quality standards for the Mill Fork Drainage were observed for the data analyzed;
- no water is being discharged from the Huntington #4 mine. Regulatory requirements of 40 CFR 434.50 for alkaline underground mine drainage does not apply. A pre-SMACRA portal discharge in the adjacent area is not associated with the Huntington #4 mine.

Little Bear Springs Analysis

Data for Little Bear Springs flow was presented in the Bond Release application, a technical analysis for this permit indicated that mining from the Huntington #4 Mine ceased in order to prevent impacts to Little Bear Springs. Little Bear Spring flows do not appear to be impacted by mining that occurred at the Huntington #4 Mine. This station was formally identified and monitored as site 4-1-W under the Huntington #4 mining permit and is currently monitored by the Castle Valley Special Services District. Data presented provide information for Little Bear Spring Flows for the last three years of mining and through 1996 for the reclamation period.

No obvious changes to seasonal variation have occurred due to mining. The influence of monthly flow patterns are best illustrated in Figures 1, 3, and 4. Figure 1, presents the mean monthly flows for the period of record, during mining, and following reclamation. Figure 3 illustrates spring discharges for selected years during a dry climatic period and figure 4, shows discharge for selected years during wet climatic periods. Mean annual flows are illustrated in figure 2.

Figure 1

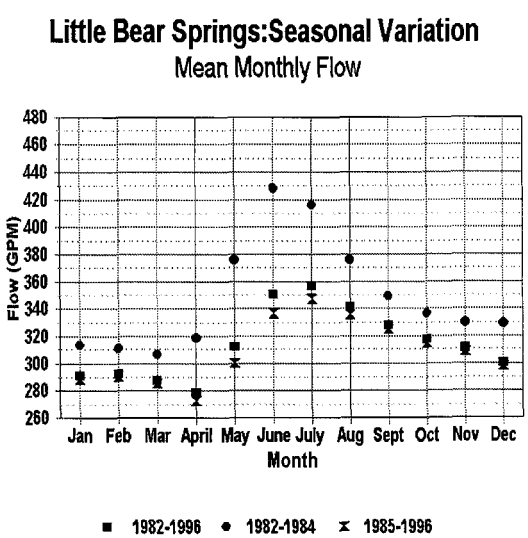


Figure 2

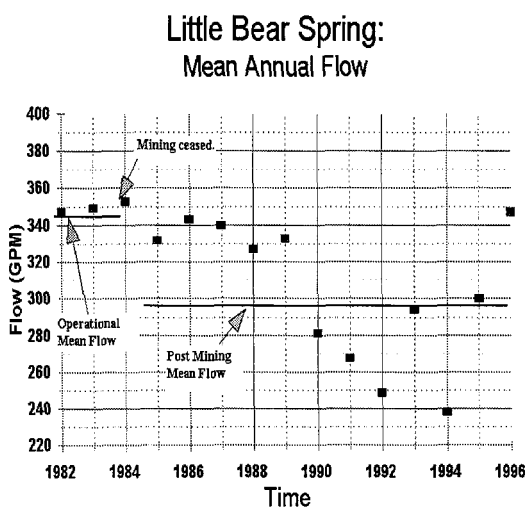


Figure 3

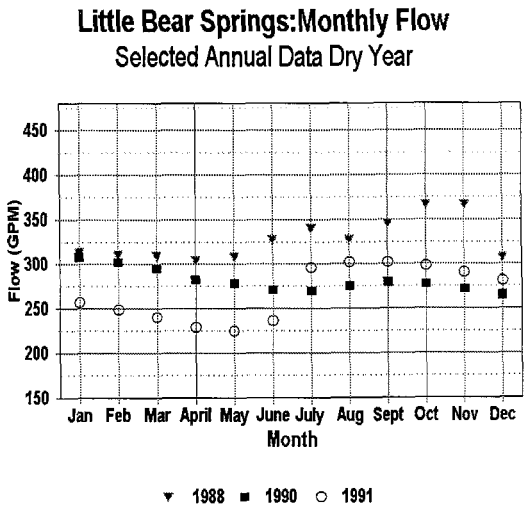
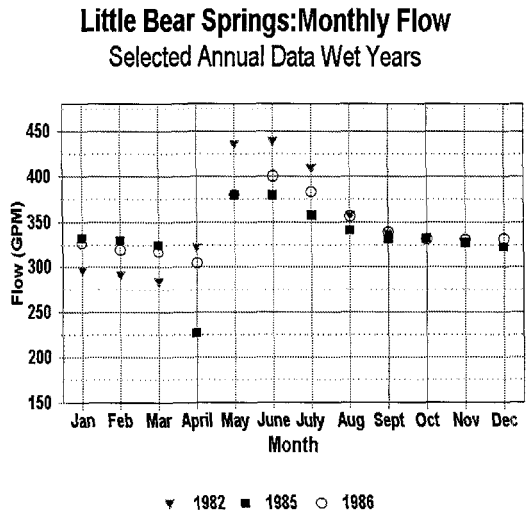


Figure 4



These figures were developed to assess whether changes in water quantity may have occurred due to mining. No obvious changes in flow rate can be tied to mining at the Huntington # 4 mine. The variation in flow rate appears to be tied to climatic factors. Average monthly trends for the 1982-1996 flows followed a similar discharge pattern during mining and following reclamation of the Huntington #4 Mine as can be observed on figure 2. Although the data for the operational period is limited to a short period of record within a wet cycle, the figure showing the postmining data suggests the response for wet and dry cycles has required pre-mining pre-drought characteristic flow.

Figure 5

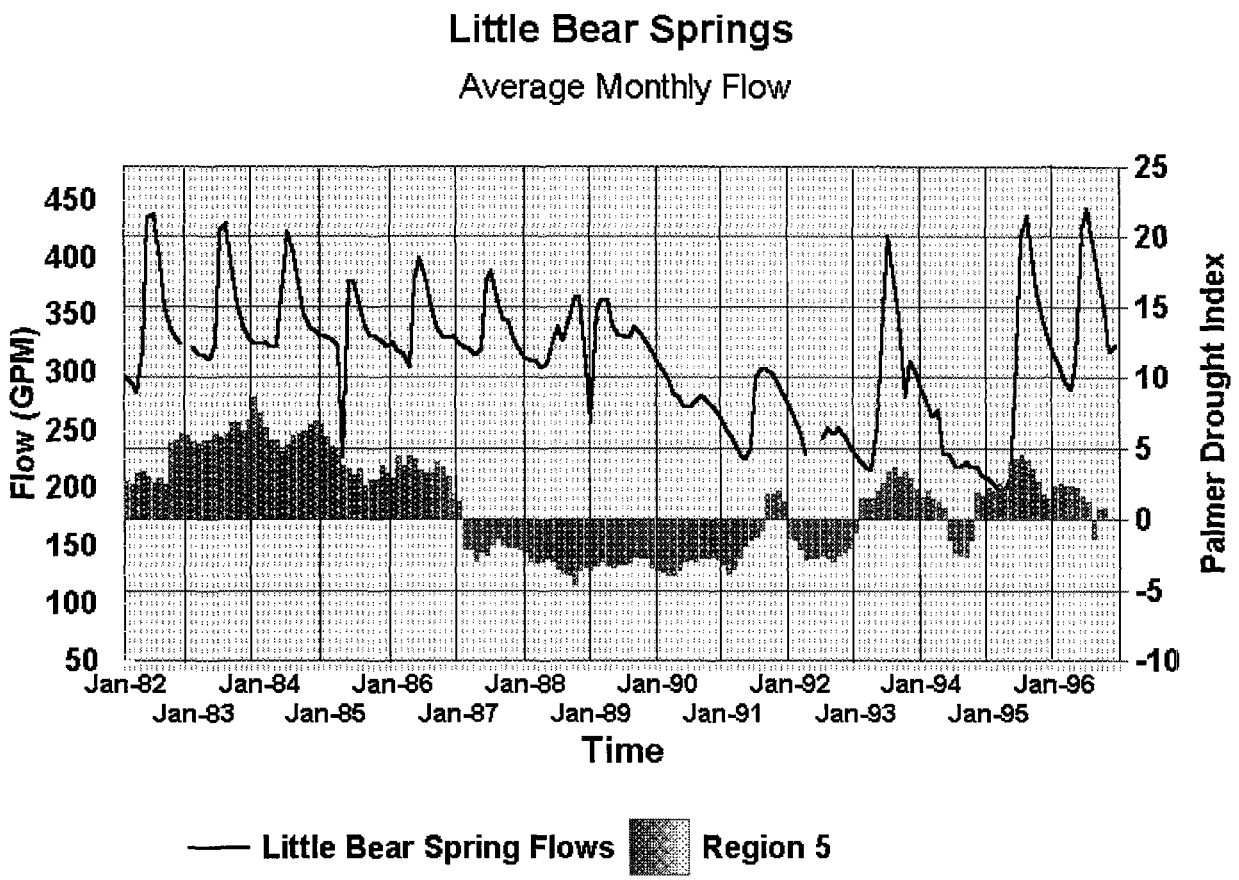


Figure 5 shows the operational and post-mining water quantity for Little Bear Spring and includes the Palmer Drought index for region 5. Because Little Bear Spring is shown to be in drought index region 4, region 4 was also used to compare Little Bear Spring flows. It appeared that Region 5 more closely fit the recharge characteristics of this spring. The reason for the better fit is believed to be caused from the extent that region 4 is influenced by the drought pattern of the south central region of the state and because the Little Bear spring is influenced by the mountain terrain of the Wasatch Plateau which is encompassed in Region 5.

It should be noted that the data obtained in the months of April 1985 and January 1989 are questionable as to their validity. These data appear as though they may be approximately 100 g.p.m. less

than the flow expected by observing the trend. Data collection, reporting or calculation errors may have influenced these data. In observing the trend of low flows there appears to be a slow decline in flow rate in conjunction with the drought. There is a gradual decline in the low flows over the drought period from 1987 through 1993. The low flows continue to decline at a slower rate from April 1991 through May 1995, when the flow rate quickly rises. When a comparison of the average annual flow and the average annual drought index is made the trends for spring flow and for recharge are more similar for the years 1994 through 1996. Local precipitation data may also follow a similar relationship to the high peak flows but, these data were not provided so, the relationship was not assessed.

In 1989 and 1990 the variation in flow rate for the year were the lowest for the period of record. The lack of variation appears to be tied to having water available for recharge. These decreased flows and reduced peak flows occurred during the 3rd and 4th years of a drought cycle. See figure 5. Peak flows were observed in April and January for 1989 and 1990, respectively. The 1996 flow rates appear to have regained flow levels and monthly flow characteristics of those observed during mining in 1982, as is suggested in figure 4.

Although the Tie Fork well was determined to be impacted by mining and has been considered in a separate geohydrologic response area from Little Bear Spring, a similar quick response trend was observed in the Tie Forks well over this period. This may indicate the quick recharge response is a regional characteristic and is related to climatic conditions and similar recharge properties.

No obvious changes to seasonal variation have occurred due to mining. Peak flows were observed in April and January for 1989 and 1990, respectively. The 1996 flow rates appear to have regained flow levels and monthly flow characteristics of those observed during mining in 1982. The variation in flow rate appears to be tied to climatic factors.

Mill Fork Drainage

Mill Fork Drainage is a tributary of Huntington Creek. According to the R317-2 Utah Administrative Code the Classification for Huntington Creek and it's tributaries are 1C, 2B, 3A and 4, upstream of the highway U-10 crossing. In the plan, a list of current water rights could not be located. The worse case scenario for each parameter analyzed for the classification system is assumed to apply to the flows in Mill Fork Drainage.

Two sites were monitored, 4-3W and 4-8W upstream and downstream of the site on Lower Mill Fork. No comparisons of data prior to, during, or following mining could be completed because data collection started in 1985 after mining ceased. Data analyses completed included averages, variances from average and minimum and maximum values observed for each parameter in the data set. Where the monitored parameters had values that could be compared against a water quality standards they were presented in table 1, the remaining data summary can be found in Appendix A.

No exceedence in water quality standards for the Mill Fork Drainage were observed for the data analyzed. Although Nitrate as N and Fluoride are standards for the Mill Fork Drainage no data are available down stream of the site. However, there is no suspected reason that either of these parameters might change due reclamation practices and contribution of runoff from this site.

Table 1.

Parameter	Site	Mean	Deviation from Mean	Minimum	Maximum
pH units	4-3W	8.05	0.1	7.46	8.5
	4-8W	8.02	0.17	8.9	7.31
Standard	6.5 - 9.0		Class 1C, 2A, 2B, 3B and 4		
	6.0 - 9.0		40 CFR Subpart E- post-mining areas		
TDS (mg/l)	4-3-W	378.28	99.22	176	710
	4-8-W	341.89	112.05	204	616
Standard	1,200		Class 4		
Total Iron	4-3-W	0.72	0.63	0.06	3.03
	4-8-W	0.37	0.28	ND	1.15
Standard	1000(acid soluble)		Class 1C, 2A, 2B, 3B and 4		
Fluoride (mg/l)	4-3W	0.14	0.04	0.11	0.16
	4-8W	#	#	#	#
Standard	1.4-2.4		Class 1C		
Nitrates as N (mg/l)	4-3W	0.32	0.06	0.31	0.33
	4-8W	#	#	#	#
Standard	10; 4		Class 1C; Class 2B		

‘ ND = not detected at the detection limit.
No data available.

Discharge From Mine Portals

No water is being discharged from the Huntington #4 mine. Regulatory requirements of 40 CFR 434.50 for underground mine drainage does not apply. One other area within the permit and reclaimed area is issuing water. However, this site is associated with Title IV and was reclaimed under the abandoned mine reclamation program Spring Canyon Project, Mill Fork Site AMR/007/905. This discharge location has not been considered part of the Huntington #4 permitting actions.

Summary

The bond should be released as no pollution of surface and subsurface water has been determined to be occurring and, future occurrence of pollution from this site is expected to have a low probability as determined through the information and data analyzed.

Appendix A

Huntington No.4 Mine: Upper Mill Fork

Location Upper Mill Fork
STORET # 173150 Site # 4-3-W

DATE	F-Temp Deg. C	F-pH pH units	F-Sp.Cond umhos/cm	Flow GPM	L-pH pH units	T.Sus.Sol mg/l	D-Calciu mg/l	D-Magne mg/l	D-Potass mg/l	D-Sodium mg/l	Bicarbnat mg/l	Carbonat mg/l	Chloride mg/l	Fluoride mg/l	Nitrate N mg/l
01/15/86	1	8	540	0.5	8.3	16	59	19	1	1	192	0	4	0.11	0.33
03/19/86	1	8.1	560	18.5	8.1	16	65	73	3	16	272	0	22	0.16	0.31
04/23/86	3	8	640	29.6	8.1	<1.					325	0	24		
05/13/86	2	8	600	562	8	66					290	0	10		
06/15/86	3	8.1	450	296	8.3	92					273	0	4		
07/24/86	10	8	510	249	8.1	8					287	0	8.2		
08/11/86	12	8.1	580	76.4	8	<1.					303	0	13		
09/24/86	9	8.1	875	58	7						208	0	14	0.15	
10/01/86	5	8	480	36.4	8.2	2					342	0	16		
11/22/86	2	8.1	460	62.7	8.2	342					398	0	10		
12/07/86	2	8	300	56	7.6	106					153	0	24		
01/05/87	1	8.2	455	38	8.2	68					379	0	10		
02/06/87	1	8	660	72.2	8.1	26					400	0	12		
03/12/87	1	8.1	290	42								0	14		
05/01/87	6	8.1		42		1						0	24		
05/17/87	6	8	790	51		171	56	67	3	18	328	0	3		
06/07/88	4	8	180	56		13					272	0	3.2		
06/01/93	4.5	8.5	300	550	8.2	64					286	<1.	1.87		
05/14/96	10	7.46	276	63.6		71	59.7	22.7	0.78	4.83	279				

	Deg. C	pH units	umhos/cm	GPM	pH units	T.Sus.Sol mg/l	D-Calciu mg/l	D-Magne mg/l	D-Potass mg/l	D-Sodium mg/l	Bicarbnat mg/l	Carbonat mg/l	Chloride mg/l	Fluoride mg/l	Nitrate N mg/l
Mean	4.39	8.05	497.00	124.21	8.03	62.47	59.93	45.43	1.95	9.96	293.35	0.00	12.07	0.14	0.32
Mean Deviatio	2.88	0.10	160.69	122.12	3.11	56.09	19.92	15.10	0.65	3.43	79.93	ND	6.32	0.04	0.06
Min	1	7.46	180	0.5	7	ND	56	19	0.78	1	153	ND	1.87	0.11	0.31
Max	12	8.5	875	562	8.3	342	65	73	3	18	400	0	24	0.16	0.33

Huntington No.4 Mine: Upper Mill Fork

DATE	Sulfate mg/l	T-Hardns mg/l	L-Sp. Cond umhos/cm	TDS @ 18 mg/l	T-Iron mg/l	T-Mn ug/l	Na Ads R	T-Calciu mg/l	T-Magnes mg/l	T-Potass mg/l	T-Sodium mg/l
01/15/86	12	225	370	224	0.23	20	<0.1				
03/19/86	159	462	770	488	0.24	10	0.33				
04/23/86	125	382	753	440	0.06	<20.	0.38	49	63	2.9	17
05/13/86	107	314	606	396	0.75	20	0.59	53	44	1.5	24
06/15/86	23	245	450	348	1.48	50	0.16	77	13	1	6
07/24/86	53	283	484	312	0.13	<20.	0.26	52	37	1.5	10
08/11/86	84	329	604	368	0.21	<20.	0.31	46	52	2	13
09/24/86	223	406	813	710			0.37	82	49	3	17
10/01/86	93	387	701	400	0.11	<20.	0.34	46	66	2	16
11/22/86	64	380	668	400	3.03	120	0.24	71	50	2	11
12/07/86	68	212	335	176	0.15	<20.	0.32	32	32	2	11
01/05/87	70	372	666	372	2.19	60	0.3	62	53	2	13
02/06/87	69	382	701	414	0.92	60	0.31	59	57	2	14
03/12/87											
05/01/87	77	376		405	0.07	<20.		50	61	2	13
05/17/87	152	414		480	1.03						
06/07/88	21	238		250				59	22	1	5
06/01/93	17	228	436	256	0.22	<20.		58	20	3.9	6.4
05/14/96	20	243		370							

	Sulfate mg/l	T-Hardns mg/l	L-Sp. Cond umhos/cm	TDS @ 18 mg/l	T-Iron mg/l	T-Mn ug/l	Na Ads R	T-Calciu mg/l	T-Magnes mg/l	T-Potass mg/l	T-Sodium mg/l
Mean	79.83	326.56	596.93	378.28	0.72	24.29	0.30	56.86	44.21	2.06	12.60
Mean Deviatio	43.68	84.31	250.29	99.22	0.63	23.43	0.16	23.09	21.71	0.91	5.99
Min	12	212	335	176	0.06	ND	ND	32	13	1	5
Max	223	462	813	710	3.03	120	0.59	82	66	3.9	24

Huntington No.4 Mine: Lower Mill Fork

Location Upper Mill Fork
STORET # 173150 Site # 4-3-W

DATE	F-Temp Deg. C	F-pH pH units	F-Sp.Cond umhos/cm	Flow GPM	L-pH pH units	T.Sus.Sol mg/l	D-Calciu mg/l	D-Magne mg/l	D-Potass mg/l	D-Sodium mg/l	Bicarbnat mg/l	Carbonat mg/l	Chloride mg/l	Fluoride mg/l	Nitrate N mg/l
01/15/86	1	8	540	0.5	8.3	16	59	19	1	1	192	0	4	0.11	0.33
03/19/86	1	8.1	560	18.5	8.1	16	65	73	3	16	272	0	22	0.16	0.31
04/23/86	3	8	640	29.6	8.1	<1.					325	0	24		
05/13/86	2	8	600	562	8	66					290	0	10		
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12/07/86	2	8	300	56	7.6	106					153	0	24		
01/05/87	1	8.2	455	38	8.2	68					379	0	10		
02/06/87	1	8	660	72.2	8.1	26					400	0	12		
03/12/87	1	8.1	290	42											
05/01/87	6	8.1		42		1						0	14		
05/17/87	6	8	790	51		171	56	67	3	18	328	0	24		
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Min	1	7.46	180	0.5	7	ND	56	19	0.78	1	153	ND	1.87	0.11	0.31
Max	12	8.5	875	562	8.3	342	65	73	3	18	400	0	24	0.16	0.33

Huntington No.4 Mine: Lower Mill Fork

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Mean Deviatio	43.68	84.31	250.29	99.22	0.63	23.43	0.16	23.09	21.71	0.91	5.99
Min	12	212	335	176	0.06	ND	ND	32	13	1	5
Max	223	462	813	710	3.03	120	0.59	82	66	3.9	24