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MINE ENGINEERING
MINE RECLAMATION

CIVIL ENGINEERING
CONST. MANAGEMENT

January 13, 2023

Rob Zuber
Division of Reclamation, Mining and Safety
1313 Sherman Street, Room 215
Denver, CO 80203

Re: 2020 Annual Hydrology Report
Adequacy Review #1
Bowie Resources, LLC, Bowie No. 2 Mine
Permit No. C-1996-083

Dear Mr. Zuber:

On behalf of Bowie Resources, LLC, below are the responses to DRMS' adequacy review letter dated December 14, 2021;

1. **DRMS:** Please explain why the FMC sites are not monitored three times per year. At the very least, the data tables should show a third column and include an explanation such as, "Site was not accessible."

The AHR includes two tables with data for Pond 7-7 (Figures 134 and 135), but there is no data for Pond 7-2. Please provide the data for Pond 7-2 or explain why it is not included in the AHR.

BRL: In regard to the FMC sites, as submitted, on both figures there is text near the top of the page that says "No water in Canal in September". In upcoming AHRs, the text will be more concise if/when the water has been turned off in the third quarter.

Figures 134 and 135 inadvertently contained data for Pond 7-7. Please see revised **Figure 134** which contains data for Pond 7-2.

2. **DRMS:** Names of some sites are unclear. On the page for S-2 (Figure 15), the name is Freeman Gulch rather than J&M Spring as in the PAP (page 2.05-128). Similar issues are apparent with other springs as well (e.g., S-4, S-5b, and S-16). Please explain these discrepancies and, as necessary, revise any pages in the AHR or submit a TR with revised

pages in the PAP.

BRL: Description of Springs S-2, 4, 4a, 5, 5a, 5b and 16 will be revised in the upcoming AHRs to reflect the description listed in the permit.

It is not clear why some parameters in the surface water list in the Hydrologic Monitoring Plan of the PAP (page 2.05-135) are not included in the 2020 AHR data.

Please explain why this data is missing from the AHR. Examples include:

- The parameter Oil and Grease was not analyzed for many sites (Deer-up, Deer-low, FMC-up, FMC-low, NFG-up, NFG-low, D34-14, and HUB-LOW).
- Chromium III was not sampled for NFG-low (Figure 79).
- Bicarbonate, cadmium, and other parameters are missing from the dataset for SW-01 (Figure 86).
- Sulfate, mercury and zinc are missing from the dataset for AW-1 (Figure 107).

In regards to Oil & Grease sampling, it was inadvertently left off the 2020 parameters list. Going forward it will be included in the parameters list.

Chromium III was inadvertently left off on the lab parameters for NFG-Low. Please see revised **Figure 79**.

The laboratory parameters for SW-01 have been updated. Many parameters were inadvertently left off of the table. Please see revised **Figure 86**.

The laboratory parameters for AW-01 have been updated to include Sulfate, Mercury and Zinc. In addition, the data input for Calcium was put in the space for Cadmium. Cadmium is undetectable, and Calcium has been put on the correct line. Please see revised **Figure 107**.

As submitted, the dissolved Mercury showed a value of 0.03 mg/L for AW-11. That input value should have been input for Manganese (Total), and dissolved Mercury is less than the detection limit. Please see revised **Figure 121**.

Please let me know if you need additional information.

Sincerely,

Tamme Bishop

Tamme Bishop, P.E.
Project Engineer

AW-1
Alluvial Well
Top of Pipe Elevation - 5977.76'
Depth - 120'
Pipe 1.06' Above Ground

Initiated	11/23/1996	11/23/1996	11/23/1996	11/23/1996
Activated	3/27/1997	3/27/1997	3/27/1997	3/27/1997
Date	11/30/2020	9/29/2020	6/9/2020	3/4/2020

Field Parameters		Summary Information										
		UNITS	Baseline			Operation						
			Min	Ave	Max	Min	Ave	Max				
Static Water Level	Feet		61.92	71.25	82.01	43.44	71.22	88.10	88.1	86	70.9	78.7
Water Elevation	Feet		5895.7	5906.5	5915.8	5889.7	5906.5	5934.3	5889.66	5891.76	5906.86	5899.06
FieldComment												
ph	su		7.1	7.2	7.3	7.0	7.4	12.9	7.69	7.43	7.53	7.47
Conductivity	umhos/cm		8900	9100	9300	1460	5230	9000	5130	4750	4270	3070
Temperature	Celsius		10.2	11.3	12.4	8.7	12.9	15.5	11.5	15	12.1	14
Lab Parameters	UNITS											
Bicarbonate	mg/L		641	649	657	214.0	608.6	1165.2			746	
Carbonate	mg/L		<MDL	<MDL	<MDL	<MDL	0.83	10.76			<MDL	
Chloride	mg/L		77	78	79	8.5	154.9	318.5			172	
Conductivity	umhos/cm		6480	7230	7980	894	5136	8610			4190	
Hardness	mg/L		2750	2895	3040	<MDL	1449	4511			1180	
Nitrate-Nitrite	mg/L		5.7	6.5	7.3	<MDL	3.74	11.20				
Ammonia	mg/L		0.07	0.11	0.14	<MDL	0.51	8.10			8.1	
pH	su		7.4	7.6	7.8	0.0	7.4	8.5			0.03	
Phosphate	mg/L		<MDL	<MDL	<MDL	<MDL	0.03	0.22				
ResidueFilterable-TDS	mg/L		7990	8200	8410	787	4494	8710				
Sulfate	mg/L		5140	5220	5300	135	2407	8330			1600	
Arsenic (Dissolved)	mg/L		<MDL	0.001	0.001	<MDL	0.090	0.553			<MDL	
Cadmium (Dissolved)	mg/L		<MDL	<MDL	<MDL	<MDL	0.016	0.050				
Calcium (Dissolved)	mg/L		316	327	338	23.4	173.1	360.0			141	
Iron (Dissolved)	mg/L		<MDL	<MDL	<MDL	<MDL	0.12	1.75			0.9	
Iron (TREC)	mg/L		0.13	0.41	0.70	0.01	0.58	2.37				
Magnesium (Dissolved)	mg/L		476	505	533	53.8	285.5	961.5			<MDL	
Manganese (Dissolved)	mg/L		<MDL	0.03	0.05	<MDL	0.034	0.490			0.07	
Manganese (TREC)	mg/L		0.01	0.03	0.06	<MDL	1.524	7.440			<MDL	
Mercury (Dissolved)	mg/L		<MDL	<MDL	<MDL	<MDL	0.00005	0.00024			<MDL	
Selenium (Dissolved)	mg/L		0.026	0.031	0.035	0.001	0.230	7.400			0.0067	
Sodium (Dissolved)	mg/L		1550	1625	1700	253.0	902.8	1867.5			618	
Zinc (Dissolved)	mg/L		<MDL	<MDL	<MDL	<MDL	0.02	0.11			<MDL	

Alluvial Wells AW-1 through AW-6 are located north of Old State Highway 133, near the entrance to the mine.

AW-11
Alluvial Well
Elevation - 5884
Depth - 60.86'

Initiated	12/20/2000	12/20/2000	12/20/2000	12/20/2000
Activated	2/28/2002	2/28/2002	2/28/2002	2/28/2002
Date	11/30/2020	9/29/2020	6/10/2020	3/4/2020

Field Parameters		Summary Information			Baseline			Operation				
		UNITS	Min	Ave	Max	Min	Ave	Max	Min	Ave	Max	
Static Water Level	Feet		11.92	38.20	50.31	19.13	43.77	57.60	52.7	46.2	35.1	52.2
Water Elevation	Feet		5833.7	5845.8	5872.1	5826.4	5840.2	5864.9	5831.3	5837.8	5848.9	5831.8
FieldComment											No field	
ph	su		6.7	7.3	7.5	6.9	7.6	8.0	7.58	7.59	parameters	7.48
Conductivity	umhos/cm		390	760	1060	480	1058	1719	1562	1246	provided	1713
Temperature	Celsius		11.2	13.4	15.7	7.5	12.8	15.3	13.1	13.6		7.48
Lab Parameters	UNITS											
Bicarbonate	mg/L		350	367	384	177.3	312.6	536.0			288	
Carbonate	mg/L		<MDL	<MDL	<MDL	<MDL	4.59	6.88			<MDL	
Chloride	mg/L		2	3	3	<MDL	39.0	255.2			25.3	
Conductivity	umhos/cm		671	850	1030	661	1100	2870			942	
Hardness	mg/L		587	587	587	265.0	538.9	911.7			389	
Nitrate-Nitrite	mg/L		0.10	0.28	0.56	<MDL	0.65	2.70			0.59	
Ammonia	mg/L		<MDL	0.05	0.08	<MDL	0.13	0.43			<MDL	
pH	su		7.2	7.5	7.8	7.1	7.8	8.5			8.2	
Phosphate	mg/L		<MDL	0.14	0.39	<MDL	1.22	20.60			20.6	
ResidueFilterable-TDS	mg/L		360	553	690	350	757	2150			636	
Sulfate	mg/L		20	150	250	4.94	213.13	510.00			207	
Arsenic (Dissolved)	mg/L		<MDL	<MDL	<MDL	<MDL	0.022	0.280			<MDL	
Cadmium (Dissolved)	mg/L		<MDL	<MDL	<MDL	<MDL	0.010	0.030			<MDL	
Calcium (Dissolved)	mg/L		70.6	92.9	110.0	30.8	130.3	765.0			69.5	
Iron (Dissolved)	mg/L		0.02	0.04	0.05	<MDL	0.19	2.46			<MDL	
Iron (TREC)	mg/L		0.07	4.93	9.97	<MDL	2.52	24.30			<MDL	
Magnesium (Dissolved)	mg/L		46.2	64.6	75.8	37.5	112.3	748.0			52.4	
Manganese (Dissolved)	mg/L		<MDL	0.02	0.03	<MDL	0.403	5.400			<MDL	
Manganese (TREC)	mg/L		<MDL	0.34	0.57	<MDL	0.385	2.540			0.03	
Mercury (Dissolved)	mg/L		<MDL	<MDL	<MDL	<MDL	0.00008	0.00027			<MDL	
Selenium (Dissolved)	mg/L		<MDL	0.001	0.002	<MDL	0.011	0.116			0.0025	
Sodium (Dissolved)	mg/L		12.70	19.37	22.9	11.0	44.1	125.0			58.6	
Zinc (Dissolved)	mg/L		<MDL	0.01	0.02	<MDL	0.02	0.07			<MDL	

* Could not access site

Alluvial Wells AW-11 through AW-13 are located north of the Union Pacific Railroad. They were installed in 2000 to develop baseline data for a new train loadout.

Baseline Information for AW-11 is derived from events beginning on 12/20/00 through 2/28/02.
Point influenced by mining on 2/28/02.

NFG-low
North Fork - Drainage System
Elevation - 5680

Initiated	9/30/1996	9/30/1996	9/30/1996	9/30/1996
Activated	3/31/1997	3/31/1997	3/31/1997	3/31/1997
Date	11/30/2020	8/4/2020	5/13/2020	3/25/2020

Field Parameters	UNITS	Summary Information									
		Baseline			Operation						
		Min	Ave	Max	Min	Ave	Max				
Flow	CFS	99	292	610	30	478	3080	83	1400	240	30
FieldComment											
ph	su	8.1	8.4	8.7	7.6	8.3	9.1	8.5	8.4	7.6	8.6
Conductivity	umhos/cm	160	180	200	50	192	356	356	267	128	245.0
Temperature	Celsius	4.0	8.5	14.6	0.3	10.9	22.6	2.1	16.4	7.4	5.9
DO	mg/L				0.0	9.6	91.7	8.99	9.04	91.7	*
Lab Parameters	UNITS										
Bicarbonate	mg/L	95	100	105	28.1	84.7	148.0				53.3
Chloride	mg/L	2.00	2.50	3.00	<MDL	25.08	288.30		3.1		53.3
Chromium III CrIII	mg/L				<MDL	<MDL	<MDL		<MDL		
Chromium VI CrIV	mg/L				<MDL	<MDL	<MDL		<MDL		
Cyanide, Total	mg/L				<MDL	<MDL	<MDL		<MDL		
Conductivity	umhos/cm	201	222	242	78	213	754				115
Hardness	mg/L	84	85	85	<MDL	84.80	270.40		106		53
Nitrate	mg/L	<MDL	0.08	0.16	<MDL	0.33	3.90		<MDL		<MDL
Nitrate-Nitrite	mg/L	0.00	0.08	0.16	<MDL	<MDL	<MDL		<MDL		<MDL
Nitrite	mg/L	<MDL	<MDL	<MDL	<MDL	0.002	0.010		<MDL		
Ammonia	mg/L	<MDL	<MDL	<MDL	<MDL	0.06	0.31		<MDL		
Oil & Grease	mg/L	<MDL	<MDL	<MDL	<MDL	4	5				
pH	su	8.0	8.0	8.0	7.0	7.9	8.8		8.5		8.2
Phosphate	mg/L	<MDL	<MDL	<MDL	<MDL	0.10	1.50				0.03
ResidueFilterable-TDS	mg/L	130	140	150	50	157	692		150		76
ResidueNonFilterable-TSS	mg/L	<MDL	3	6	<MDL	23	141				33
SAR		0.55	0.61	0.66	<MDL	0.62	2.42				0.3
Sulfate	mg/L	10.0	15.0	20.0	<MDL	16.3	82.5		17.8		7
Sulfide S	mg/L				<MDL	0.04	0.04		<MDL		
Aluminum (TREC)	mg/L	0.10	0.15	0.21	<MDL	0.40	1.77				1.77
Arsenic (TREC)	mg/L	<MDL	0.001	0.001	<MDL	0.0058	0.0500		0.0005		0.0006
Boron	mg/L				0.02	0.56	1.35		<MDL		
Cadmium (TREC)	mg/L	<MDL	<MDL	<MDL	<MDL	0.0029	0.0180		<MDL		<MDL
Calcium (TREC)	mg/L	24.6	24.8	25.0	6.9	27.1	132.0		30.6		16.2
Copper (TREC)	mg/L	<MDL	<MDL	<MDL	<MDL	0.012	0.198		<MDL		<MDL
Iron, Dissolved	mg/L	<MDL	<MDL	<MDL	<MDL	0.35	12.90		<MDL		<MDL
Iron (TREC)	mg/L	0.14	0.21	0.27	<MDL	0.41	4.17		0.36		1.51
Lead (TREC)	mg/L	<MDL	0.010	0.020	<MDL	0.0114	0.1500		0.0003		0.0009
Magnesium (TREC)	mg/L	5.30	5.50	5.70	2.00	6.10	18.80		7.3		3.1
Manganese (Dissolved)	mg/L	<MDL	<MDL	<MDL	<MDL	0.146	2.900		0.01		
Manganese (TREC)	mg/L	0.021	0.090	0.160	0.007	0.044	0.802		0.02		0.03
Mercury (TREC)	mg/L	<MDL	<MDL	<MDL	<MDL	0.00007	0.00030		<MDL		<MDL
Molybdenum (TREC)	mg/L	<MDL	<MDL	<MDL	<MDL	0.004	0.030				<MDL
Nickel	mg/L				<MDL	0.010	0.010		<MDL		
Selenium (TREC)	mg/L	<MDL	<MDL	<MDL	<MDL	0.004	0.034		0.0002		0.0002
Silver	mg/L				<MDL	<MDL	<MDL		<MDL		
Sodium (TREC)	mg/L	11.5	12.2	12.9	3.0	15.0	91.5				5.0
Zinc (TREC)	mg/L	0.02	0.02	0.03	<MDL	0.02	0.16		<MDL		<MDL

Field parameters, except flow, for the Lower North Fork of the Gunnison River are taken on the river approximately 1500' below the confluence of Terror Creek and the North Fork of the Gunnison. Flow data for the North Fork of the Gunnison river is obtained from USGS station #09132500.

* Data not provided

P7-2
Steven's Gulch - Pond 7-2
Elevation - 8190

Initiated	7/29/1985	7/29/1985	7/29/1985
Activated	6/10/2014	6/10/2014	6/10/2014
Date	12/3/2020	8/31/2020	5/28/2020

Summary Information

Field Parameters	UNITS	Baseline			Operation					
		Min	Ave	Max						
Outflow	GPM	0	0.67	15.39	11.25		11.25			
Inflow	GPM	0	0.27	3.75	0.00		0.00			
Freeboard	Feet	0	1.32	3.42	6.50		6.50	6.5	3.5	2.5
Temperature	Celsius	10	16.71	27.80	15.10		15.10			
Conductivity	umhos/cm	160	248.77	321.00	170.00		170.00			
pH	su	7.2	8.46	9.70	7.7		7.7			
Field Comments								No flow	No flow	No flow
Lab Parameters	UNITS									
Bicarbonate	mg/L	119.6	158.9	223.0						
Carbonate	mg/L									
Chloride	mg/L	<MDL	2.7	5.0						
Conductivity	umhos/cm	204.0	251.3	320.0						
Hardness	mg/L	92.0	117.0	142.0						
pH	su	6.8	7.5	8.3						
ResidueFilterable-TDS	mg/L	118.0	169.7	234.0						
ResidueNonFilterable-TSS	mg/L	10.0	100.0	538.0						
SAR		0.20	0.41	1.00						
Sulfate	mg/L	<MDL	11.3	49.0						
Calcium (Dissolved)	mg/L	22.0	27.9	35.0						
Magnesium (Total)	mg/L	9.0	11.5	15.0						
Sodium (Dissolved)	mg/L	5.0	10.0	22.0						
Potassium	mg/L									
TDS Ratio (grav./calc.)										

Activated 6/10/14

Bowie Resources, LLC
Bowie No. 2 Mine
2020 Annual Hydrology Report

Surface Water

SW-01
West Terror Creek - Downstream
Elevation - 7140

Initiated	10/24/2013	10/25/2013	10/26/2013
Activated			
Date	12/1/2020	9/14/2020	5/20/2020

Summary Information

Field Parameters	UNITS	Baseline			Operation					
		Min	Ave	Max	Min	Ave	Max			
Flow	CFS	0.20	3.85	52.00				0.4	0.2	0.8
Water Level in Flume	Feet	0.100	0.632	2.000						
Temperature	Celsius	0	6.6	20.2				7.9	8.4	7.3
Conductivity	umhos/cm	80.2	137	192				192	137	80
pH	su	0.7	8.1	10.6				0.7	10.6	7.4
Field Comments										
Lab Parameters	UNITS									
Bicarbonate	mg/L	37.1	70.9	90.6						37.1
Chloride	mg/L	0.56	0.85	1.30						0.8
Conductivity	umhos/cm	65.4	106	139						72
Hardness	mg/L	34	54.54	69.90						34
Acidity	mg/L	-76	-54.44	-25.00						<MDL
Nitrate-Nitrite	mg/L	<MDL	<MDL	<MDL						<MDL
Oil and Grease	mg/L	<MDL	<MDL	<MDL						
Phosphate	mg/L	0.017	0.06	0.23						0.12
ResidueFilterable-TDS	mg/L	86.7	104	144						98
ResidueNonFilterable-TSS	mg/L	<MDL	13	34						0.06
SAR		0.226	0.329	0.505						0.32
Sulfate	mg/L	1.8	8.1	82.0						82
Aluminum (TREC)	mg/L	<MDL	8.956	101.000						8
Arsenic (TREC)	mg/L	<MDL	<MDL	<MDL						0.26
Cadmium (TREC)	mg/L	<MDL	<MDL	<MDL						<MDL
Calcium (TREC)	mg/L	8.6	14.1	18.0						<MDL
Calcium (Dissolved)	mg/L	1.2	14.1	18.2						1.16
Copper (TREC)	mg/L	<MDL	<MDL	<MDL						0.0003
Iron (Dissolved)	mg/L	0.0310	3.8880	41.6000						<MDL
Iron (TREC)	mg/L	0.074	0.991	9.000						9.0
Lead (TREC)	mg/L	<MDL	<MDL	<MDL						<MDL
Magnesium (TREC)	mg/L	0.10	4.39	6.07						0.1
Magnesium (Dissolved)	mg/L	0.89	4.72	6.09						0.89
Manganese (TREC)	mg/L	0.0003	0.0137	0.0334						0.0003
Mercury (TREC)	mg/L	<MDL	<MDL	<MDL						2.9
Molybdenum (TREC)	mg/L	<MDL	<MDL	<MDL						<MDL
Selenium (TREC)	mg/L	<MDL	<MDL	<MDL						0.010
Sodium (TREC)	mg/L	3.37	5.69	8.50						<MDL
Sodium (Dissolved)	mg/L	3.48	5.78	8.66						<MDL
Zinc (TREC)	mg/L	<MDL	<MDL	<MDL						0.0001

The area of concern for monitoring point SW-01 has not been affected by the mining operation. Therefore, all recorded monitoring events are considered Baseline.

Negative acidity value indicates equivalent value of alkalinity