



STATE OF  
COLORADO

Musick - DNR, Jason <jason.musick@state.co.us>

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## 2015 AHR Adequacy Response

1 message

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**Tamme Bishop** <tamme.jestover@bresnan.net>  
To: "Musick - DNR, Jason" <jason.musick@state.co.us>  
Cc: Basil Bear <BasilBear@bowieresources.com>

Wed, Aug 17, 2016 at 9:53 AM

Hi Jason, please see the attached response <<...>> and let me know if you have any questions. Thanks.

Tamme Bishop, P.E.

JE Stover & Associates, Inc.

2352 N. 7th Street, Unit B

Grand Junction, CO 81501

970-245-4101



**AHR Adequacy 2015\_BOW1-.pdf**

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# J. E. STOVER & ASSOCIATES, INC.

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MINE ENGINEERING  
MINE RECLAMATION

CIVIL ENGINEERING  
CONST. MANAGEMENT

August 17, 2016

Jason Musick  
Division of Reclamation, Mining & Safety  
1313 Sherman St., Room 215  
Denver, CO 80203

Re: Bowie Resources, LLC, Bowie No. 1 Mine  
2015 Annual Hydrology Report Review  
Permit C-1981-038

Dear Mr. Musick:

DRMS' letter dated August 4, 2016 transmitted its 2015 annual hydrology report review. On behalf of Bowie Resources, LLC, (BRL), following are its responses to the DRMS' comments and concerns.

1. DRMS - Item No.9 in the table, numerous sampling sites did not include the TDS Ratio. Please provide information as to the justification for the omission of parameters not listed above.

BRL - For the TDS Ratio calculation, an email correspondence occurred with Accutest Laboratories. They do not know what the TDS Ratio is and have never heard of it. Upon inspection of Table 2 parameter requirements, TDS is not required, but the TDS ratio is. In our estimation, there should not be a TDS ratio required, only TDS. Therefore, in future AHR's, the TDS ratio will be removed only TDS will be provided.

Sampling site P1001 listed a deficiency for Temperature, Conductivity and pH. "No Inflow" has been added to the Field notes. **Please see revised Figure No. 39 for Pond 1001.**

Sampling site P1007 listed a deficiency for Total Iron and Total Manganese. These two parameters were erroneously left off of the table but have been added. **Please see revised Figure no. 47 for Pond 1007.**

2. DRMS - Item No.12 in the table, numerous sampling sites did not include the TDS Ratio. Please provide information as to the justification for the omission of parameters not listed above.

BRL - Please see discussion above in item no. 1 in regard to TDS Ratio.

Sampling site SM06 listed a deficiency for flow rate. As shown in Table 2 for wells, a flow rate is not required.

Sampling site SM07 listed a deficiency for conductivity. Conductivity was erroneously left off of the table but has been added. **Please see revised Figure No.18 for SM-07.**

Sincerely,

*Tamme Bishop*

Tamme Bishop P.E.  
Project Engineer

Cc: Basil Bear, Bowie Resources, LLC (electronically)

P1001  
East Roatcap Creek - Pond 10-1  
Depth - 5'  
Elevation -8520

Initiated	6/1/1992	6/1/1992	6/1/1992	6/1/1992
Activated	2/1/1994	2/1/1994	2/1/1994	2/1/1994
Date	11/10/2015	9/11/2015	6/21/2015	4/10/2015

Field Parameters	UNITS	Summary Information									
		Baseline			Operation						
		Min	Ave	Max	Min	Ave	Max				
Flow	GPM	0.2	0.5	0.8977	0.0	4.8	67.01	0	0	3.75	0
Freeboard	Feet	0.0	0.0	0	0.0	1.5	5	3.27	2.83	0.3125	
Temperature	Celsius				0.8	14.3	28.4			16.2	
Conductivity	umhos/cm	102	133	163	70	282	760			180	
pH	su				7.0	8.0	8.9			7.8	
Field Comments								No Inflow	No Inflow	No Inflow	No Inflow
Lab Parameters	UNITS										
Bicarbonate	mg/L				36	86	163			82	
Carbonate	mg/L				<MDL	<MDL	<MDL			<MDL	
Chloride	mg/L				<MDL	12	73			<MDL	
Conductivity	umhos/cm				43	192	324			153	
Hardness	mg/L				31	97	265.33			81.3	
Acidity	mg/L				-79	-11	18.4			-78.8	
pH	su				6.6	7.5	8.2			7.59	
ResidueFilterable-TDS	mg/L				70	130	218			132	
ResidueNonFilterable-TSS	mg/L				7	40	96			52	
SAR					0.129	0.233	0.489			0.165	
Sulfate	mg/L				<MDL	16	76.97			0.52	
Calcium (Dissolved)	mg/L				5.9	21.1	42.6			21.2	
Iron (Dissolved)	mg/L				0.01	0.22	0.57			0.245	
Iron (Total)	mg/L				0.03	1.39	2.13			2.13	
Magnesium (Dissolved)	mg/L				3.5	9.8	38.6			6.89	
Manganese (Total)	mg/L				<MDL	0.061	0.0807			0.0807	
Sodium (Dissolved)	mg/L				2.0	5.0	9.87			3.48	
TDS Ratio (grav./calc.)					0.77	1.00	1.13				

Pond 10-1 is a man made pond (approximately 20' x 20') with an earthen berm located on the south side. The pond is located in the SW1/4SE1/4 of Section 10, T13S, R92W. Source of surface water is from the Overland Ditch via a man made drainage. (Simon Hydro Search, 92)

P1007  
East Roatcap Creek - Pond 10-7  
Depth - 4'  
Elevation -8350

Initiated	10/1/1991	10/1/1991	10/1/1991	10/1/1991
Activated	2/1/1996	2/1/1996	2/1/1996	2/1/1996
Date	11/10/2015	9/11/2015	6/21/2015	4/10/2015

Field Parameters	UNITS	Summary Information			Baseline			Operation					
		Min	Ave	Max	Min	Ave	Max	Min	Ave	Max			
Flow	GPM	0.0	12.8	200	0.0	4.9	52.2	0.65	3	15	5		
Freeboard	Feet				0.0	0.7	13.1			13.1	0		
Temperature	Celsius	0.6	8.6	20.5	0.5	10.1	21.2	7.8	8	18.3	9.8		
Conductivity	umhos/cm	130	375	540	160	357	570	390	360	330	350		
pH	su	6.4	7.6	8.4	6.9	8.0	8.5	8.2	8.2	8.4	8.1		
Field Comments													
Lab Parameters	UNITS												
Bicarbonate	mg/L	66.0	74.0	82	74.3	192.4	288			157			
Carbonate	mg/L	<MDL	<MDL	<MDL	<MDL	3.7	20			<MDL			
Chloride	mg/L	1.0	1.0	1	<MDL	28.5	173.71			1			
Conductivity	umhos/cm	128.0	141.0	154	99	368	508			298			
Hardness	mg/L	63.0	67.5	72	91	180	260			158			
Acidity	mg/L				-163	-22	37			-163			
pH	su	7.6	7.8	7.9	7.3	7.9	8.5			8.22			
ResidueFilterable-TDS	mg/L	88.0	89.0	90	110	257	356			210			
ResidueNonFilterable-TSS	mg/L	6.0	6.0	6	<MDL	19.1	65			24			
SAR		0.2	0.2	0.26	0.15	0.46	0.767			0.291			
Sulfate	mg/L	12.0	12.0	12	<MDL	7.4	20			2.3			
Calcium (Dissolved)	mg/L	15.8	17.4	19	20.3	41.7	65.2			40			
Iron (Dissolved)	mg/L				0.05	7.82	38.5			38.5			
Iron (Total)	mg/L				0.22	1.00	2.25			0.88			
Magnesium (Dissolved)	mg/L	5.7	5.8	6	8.6	18.2	33.16			14.2			
Manganese (Total)	mg/L				0.01	0.13	0.44			0.137			
Sodium (Dissolved)	mg/L	4.0	4.4	4.8	3.8	14.2	25			8.75			
TDS Ratio (grav./calc.)	%	<MDL	<MDL	<MDL	<MDL	0.94	1.15						

Pond 10-7 is a man made pond (approximately 25' x 25') with an earthen dam on the south side. The pond is located in the NE1/4SE1/4 of Section 10, T13S, R92W. Source of surface water is from natural runoff and the Overland Ditch. (Simon Hydro Search, 92)

**SM07**  
**Monitoring Well SM-7**  
**Depth - 55'**  
**Top of Pipe Elevation - 7800'**  
**Pipe 2.5' Above Ground**

Initiated	8/22/1985	8/22/1985
Activated	10/1/1997	10/1/1997
Date	6/17/2015	10/24/2014

Summary Information

Field Parameters	UNITS	Baseline			Operation				
		Min	Ave	Max	Min	Ave	Max		
Static Water Level	Feet	18.2	26.2	32.3	0.0	27.3	45.0	24.62	28.83
Water Elevation	Feet	7767.7	7773.8	7781.8	7755.0	7772.7	7800.0	7775.38	7771.17
Temperature	Celsius	6.0	9.2	15.8	6.4	8.1	10.3	9.2	8.7
Conductivity	umhos/cm	180	267	510	180	249	580	270	240
pH	su	6.8	7.6	8.5	6.8	7.4	7.8	7.1	7.2
Field Comments									
Lab Parameters	UNITS								
Bicarbonate	mg/L	102	165	680	64	117	198	115	98.5
Carbonate	mg/L	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL
Chloride	mg/L	2	5	13	<MDL	33.8	199	2.5	32.51
Conductivity	umhos/cm	229	280	362	218	296	506	234	247
Hardness	mg/L	103	139	193	<MDL	143	478	113	125.81
Acidity	mg/L				-118	-3	18	-118	2
pH	su	6.5	7.2	8.0	6.5	7.2	8.3	7.02	7.15
ResidueFilterable-TDS	mg/L	117	164	220	110	207	377	147	215
ResidueNonFilterable-TSS	mg/L	8	257	846	<MDL	38	154	5.5	35
SAR		0.19	0.24	0.29	0.12	0.51	2.68	0.263	0.969
Sulfate	mg/L	<MDL	19	78	<MDL	11.3	30.0	5.7	12.76
Calcium (Dissolved)	mg/L	1.9	40.4	59.0	19.8	38.5	120.3	34	36.2
Iron (Dissolved)	mg/L				<MDL	0.08	0.35	<MDL	0.02
Iron (Total)	mg/L				0.02	0.23	0.77	0.0635	0.13
Magnesium (Dissolved)	mg/L	6.0	7.9	11.0	5.5	11.2	78.8	6.75	8.6
Manganese (Total)	mg/L				<MDL	0.019	0.060	0.0208	0.01
Sodium (Dissolved)	mg/L	6.0	6.8	8.3	6.2	15.1	105.8	6.56	25
TDS Ratio (grav./calc.)	%	0.95	1.07	1.19	0.85	1.06	1.58		1.01

Shallow monitoring wells SM-1 through SM-11 were constructed in 1985 in order to gather additional information on alluvial/colluvial deposits within the permit boundary. They are depicted on Map 4-1.