APPENDIX 7-64

BASELINE INFORMATION FOR THE U-68082 LEASE MOD AREA

Petersen Hydrologic

04 October 2004

Mr. Dave Shaver
GENWAL Resources, Inc.
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Price, Utah 84501

Dave,

At your request, we have performed a hydrologic investigation of the No-Name canyon and surrounding area adjacent to the Crandall Canyon Mine permit area. The results of this investigation are summarized in the following letter report.

Introduction

GENWAL Resources, Inc. has operated the Crandall Canyon #1 Mine since 1984. The mine surface facilities are located in Crandall Canyon, approximately 15 miles northwest of Huntington, Utah. GENWAL is currently considering the potential for mining coal reserves located east of and contiguous with their existing permit area. The coal reserves in consideration are located beneath the No-Name and Blind Canyon drainages in the western part of Section 32, Township 15 South, Range 7 East (Figure 1). Coal mining of these reserves would likely involve the undermining of the stream channel in No-Name Canyon. The Blind Canyon stream channel would not be undermined. The purpose of this investigation is to characterize the groundwater and surface-water resources in the proposed mining and surrounding area.

Including this introduction, this report contains the following sections:

Introduction
Methods of Study
Climatic conditions
Geologic conditions
Characterization of Groundwater Systems
Characterization of Surface-water Systems
Annotated Photographs

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Methods of Study

Existing groundwater and surface-water discharge and water-quality data were obtained from GENWAL Resources and compiled into electronic format. During May and June of 2004, the No-Name and Blind Canyon drainages and the intervening highland areas were traversed and surveyed. During July 2004, the No Name Canyon drainage was again surveyed from the upper forks to the confluence with Huntington Creek. All of the springs and seeps identified in the study area during previous spring and seep surveys were visited and monitored. At each spring or seep where groundwater discharge was observed, discharge and water-quality measurements were performed, GPS locations were obtained, and the site was digitally photographed. Stream discharge and water-quality measurements in No-Name Canyon were also performed. Spring and stream discharge measurements were performed using an appropriate calibrated container and stopwatch. Water-quality measurements were performed in the field using regularly calibrated pH, specific conductivity, and dissolved oxygen meters. Temperature measurements were performed with a calibrated digital thermometer. GPS locations were obtained using a hand-held Garmin GPS. Monitoring site details are presented in Table 1. Discharge and water-quality data for springs and streams in the study area are presented in Table 2. Annotated photographs of selected springs, seeps, and surface-water monitoring sites are included at the end of this report.

Climatic conditions

Climatic conditions in the study area are depicted graphically in a plot of the Palmer Hydrologic Drought Index (PHDI) for Utah Region 4 (Figure 2). Region 4 encompasses the south-central mountains of Utah, which includes the Crandall Canyon Mine area. The PHDI is a monthly value generated by the National Climatic Data Center using a variety of hydrologic parameters that indicates wet and dry spells. The PHDI is calculated from several hydrologic parameters including precipitation, temperature, evapotranspiration, soil water recharge, soil water loss, and runoff. Consequently, it is a useful tool for evaluating the relationship between climate and groundwater and surface- water discharge data. The PHDI is useful for determining whether variations in spring and stream discharge rates are the result of climatic variability or whether they are the result of other factors.

As indicated by the PHDI (Figure 2), the region has experienced periods of extreme drought and periods of extreme wetness in addition to periods of near normal climatic conditions. The climatic conditions the area was experiencing during hydrologic data collection are important to consider when evaluating the data discussed in this report. It is apparent in Figure 2 that, beginning in mid-2000, the region entered a period of moderate to severe drought that continues to the present.

Geologic Conditions

The Blackhawk Formation is exposed at the land surface over essentially all of the area that will potentially be undermined. The Castlegate Sandstone overlies the Blackhawk Formation in a small area along the ridgeline between Blind and No-Name Canyons. The Blackhawk Formation consists primarily of interbedded sandstones, siltstones, shales, and coal beds. Much of the sandstone in the Blackhawk Formation occurs as sandstone paleochannels that are usually not continuous over large distances and are encased both vertically and horizontally in low-permeability shale units. The Blackhawk Formation is underlain by the Star Point Sandstone, which consists of three prominent, cliff-forming sandstone members that are interbedded with low-permeability marine shales of the underlying Mancos Shale. The approximate location of the top of the Star Point Sandstone is depicted in Figure 1.

Characterization of Groundwater Systems

Groundwater discharge has been identified in the study area from both the Blackhawk Formation and the Star Point Sandstone. As summarized in Table 1, of the 17 springs and seeps identified in the study area, eight discharge from the Blackhawk Formation and nine discharge from the Star Point Sandstone. Maximum discharge rates for springs in the Blackhawk Formation range from 6 gpm to a seep (Table 1). Minimum discharge in Blackhawk Formation springs and seeps ranges from no discharge to a seep. Maximum discharge for springs and seeps in the Star Point Sandstone range from 10 gpm to a seep. Minimum discharge from springs in the Star Point Sandstone range from no discharge to a seep (Table 1). Specific conductance values for springs in the Blackhawk Formation and Star Point Sandstone are generally similar, averaging 566 µS. The average of all specific conductance measurements for Star Point Sandstone springs (632 µS) is slightly higher than that of the Blackhawk Formation Springs (526µS), likely a result of groundwater interacting with the Mancos Shale tongues in the Star Point Sandstone. Temperature and pH measurements for the Blackhawk Formation and Star Point Sandstone springs are generally similar (Table 2).

It is particularly noteworthy that of the 17 springs and seeps in the study area, all but 4 have at times been completely dry. The other four springs have at times only discharged as a seep. Most of the highest flows measured at the springs occurred during the historic extreme wet spell of the early 1980's (Figure 2; Table 2). None of the springs have discharge characteristics indicative of discharge from a significant groundwater system. The lack of significant baseflow component to the discharge from springs and seeps in the Blackhawk Formation indicates that there is not a deep, drought-resistant groundwater system that supports discharge at the springs in the study area. Rather, springs in the study area are likely supported in the spring and early summer months by annual snowmelt recharge. As the snowpack melts and the seasonal recharge is flushed through the groundwater system, the springs dry-up. Consequently, during dry years when the annual snowmelt recharge is meager, there is commonly no discharge from many of the

springs in the study area.

Characterization of Surface-Water Systems

Surface waters in the southern portion of the study area drain into No-Name Canyon. No-Name Canyon, a tributary to Huntington Creek, drains an area of approximately 0.54 square miles. Discharge and water-quality measurements at No-Name Canyon were performed during the high-flow period (May and June) of 2004. Measurements were performed on the upper left and upper right forks, and at a location approximately 150 feet above the confluence with Huntington Creek. A water sample was collected for laboratory baseline water-quality analyses at the lower creek monitoring site on 21 May 2004. The results of the laboratory analyses are attached to this letter report. The creek water is of the calcium-magnesium-bicarbonate chemical type with a TDS concentration of 696 mg/l.

When the No-Name Canyon drainage was visited on 21 May 2004, discharge at the upper right fork was meager (1.69 gpm). The upper right fork drainage above the confluence of the two forks was dry in all but a few locations. In a few locations (near SP-22) there was minimal seepage (dripping) of surface water in the channel (<0.1 gpm). Discharge in the upper left fork was considerably greater (24.4 gpm). Most of the water in the upper left fork originated from seepage into the stream channel in several locations in a debris/snow-covered section of the creek near SP-15. There was snow melting in the drainage above and below SP-15. Above this location, the creek was dry. Visual observations in the lower trunk of the drainage suggested that the discharge in this reach was fairly constant from the confluence of the upper forks to near the confluence with Huntington Creek. In the lowermost approximately 200 feet of the drainage above the confluence with Huntington Creek it was apparent that some of the flow was infiltrating into the alluvial sediments underlying the stream channel. The discharge measured at this location was 17.8 gpm, which represents a loss of approximately 8 gpm relative to that measured at the upper forks.

When the No-Name drainage was again visited approximately 4 weeks later on 17 June 2004, discharge in the drainage was appreciably less. On the afternoon of 16 June 2004 the region experienced thundershowers. On 17 June 2004 there was a near-constant moderate rain shower occurring in the drainage. On 17 June 2004 discharge in the upper right fork at the surface was absent near the confluence of the two forks. Discharge in the upper left fork was measured at 5.76 gpm, which is less than ¼ that measured during May 2004. Similarly, the discharge measured near the confluence with Huntington Creek was only 2.48 gpm, which is less than 15% of that measured in May. The meager discharge measured at the lower site infiltrated entirely into the subsurface within approximately 50 feet downstream. No surface water flowed into Huntington Creek from No-Name Canyon.

When the No-Name Canyon drainage was again visited on 14 July 2004 the creek was

dry. Based on the discharge characteristics observed during 2004, the creek would not be considered a perennial stream.

Please feel free to contact me should you have any questions in this regard.

Sincerely,

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Table 1 Monitoring site information for springs and creeks in the No-Name Canyon area.

Spring	Formation	UTM coordinates		Q_{max}	Q_{min}	Comments
Springs						
SP-1	Star Point Sandstone			seep	dry	Discharges from the Star Point Sandstone over Mancos Shale
SP-2	Star Point Sandstone			seep	dry	Discharges from the Star Point Sandstone over Mancos Shale
SP-3	Star Point Sandstone	486315	4369554	4	dry	
SP-4	Blackhawk Formation			6	seep	Discharges from colluvium at head of landslide in Blackhawk Formation
SP-5	Blackhawk Formation			seep	dry	Discharges from colluvium at head of landslide in Blackhawk Formation
SP-6	Blackhawk Formation			5	dry	
SP-15	Blackhawk Formation	485608	4368847	seep	dry	
SP-16	Blackhawk Formation	485672	4368903	1.7	dry	
SP-17	Blackhawk Formation	485677	4368904	3	dry	
SP-18	Star Point Sandstone	485737	4368968	10	seep	
SP-19	Star Point Sandstone			5	seep	
SP-20	Star Point Sandstone			seep	dry	
SP-21	Star Point Sandstone	486271	4369204	2	dry	
SP-22	Blackhawk Formation	485484	4369148	4	dry	
SP-23	Blackhawk Formation			5	seep	
SP-24	Star Point Sandstone			10	dry	
SP-25	Star Point Sandstone			<1	dry	
Streams						
No-Name Canyon						
Upper R. Fork		485775	4369074			
Upper L. Fork		485786	4369050			
Lower		486545	4369280			

Table 2 Discharge and water-quality data for springs and creeks in the No-Name Canyon area.

	Date	discharge (gpm)	T (°C)	pH	Cond. (µS)	Comments
Springs						
SP-1	Jun-85	seep				
	Oct-85	dry				
	Sep/Oct 93	dry				
	22-May-04	dry				
SP-2	Jun-85	seep				
	Oct-85	dry				
	Sep/Oct 93	dry				
	22-May-04	dry				
SP-3	Jun-85	4	17	8.12	730	
	Oct-85	dry				
	Sep/Oct 93	dry				
	22-May-04	seep				Melting snow in drainage above seep area
SP-4	Jun-85	6	10	7.86	660	
	Oct-85	seep				
	Sep/Oct 93	seep				
	22-May-04	dry				
SP-5	Jun-85	seep				
	Oct-85	dry				
	Sep/Oct 93	seep				
	22-May-04	dry				
SP-6	Jun-85	5				
	Oct-85	dry				
	Jun-93	seep				
	Sep/Oct 93	dry				
	22-May-04	dry				
SP-15	Jun-85	seep				
	Oct-85	dry				
	Jun-93	seep				
	Sep/Oct 93	seep				
	21-May-04	seep	7.4	8.09	622	Melting snow in drainage above spring area
SP-16	Jun-85	dry	14.5	8.34	560	
	Oct-85	dry				
	Jun-93	0.2	0.2	8.35	462	
	Sep/Oct 93	seep				
	21-May-04	1.72	5.4	7.73	708	Landslide movement occurred since 1993

		discharge (gpm)	T (°C)	pH	Cond (µS)
SP-17	Jun-85	2	10	7.71	460
	Oct-85	dry			
	Jun-93	3	10	8.48	407
	Sep/Oct 93	dry			
	21-May-04	dry			
SP-18	Jun-85	10	7	7.42	500
	Oct-85	2	3	8.15	450
	Jun-93	<0.125	8	8.5	447
	Sep/Oct 93	seep			
	21-May-04	0.27	4.6	8.24	583
SP-19	Jun-85	5	6.5	7.6	620
	Oct-85	1	3.5	8.27	530
	Jun-93	seep			
	Sep/Oct 93	seep			
	21-May-04	dry			
SP-20	Jun-85	seep			
	Oct-85	dry			
	Sep/Oct 93	dry			
	21-May-04	dry			
	14-Jul-04	dry			
SP-21	Jun-85	2	13.5	8.53	820
	Oct-85	dry			
	Sep/Oct 93	dry			
	21-May-04	seep			
	14-Jul-04	dry			
SP-22	Jun-85	4	3.5	8.05	230
	Oct-85	1	3.5	7.32	350
	Jun-93	seep			
	Sep/Oct 93	dry			
	21-May-04	0.1	7.2	8.13	567
SP-23	Jun-85	5	6	8.02	550
	Oct-85	2	3.5	8.08	670
	Jun-93	0.5	10	8.19	498
	Sep/Oct 93	seep			
	21-May-04	dry			
SP-24	Jun-85	2	6	7.35	790
	Oct-85	dry			
	Jun-93	10	8	8.54	555
	Sep/Oct 93	seep			
	21-May-04	dry			
SP-25	Jun-85	<1	10	6.8	820
	Oct-85	dry			
	Sep/Oct 93	dry			
	21-May-04	dry			

Streams

No-Name Canyon

Upper R. Fork					
21-May-04	1.69	7.6	8.18	641	Dissolved oxygen = 6.53 mg/l
17-Jun-04	dry				
14-Jul-04	dry				
Upper L. Fork					
21-May-04	24.4	5.2	8.54	537	Dissolved oxygen = 7.67 mg/l
17-Jun-04	5.76	7.6	8.43	554	Dissolved oxygen = 8.46 mg/l
14-Jul-04	Damp				Monitored during rain storm, slow drip over rocks
Headwaters of L. Fork near SP-15					
21-May-04	4.48	6.3	8.30	542	Dissolved oxygen = 7.48 mg/l
Lower					
21-May-04	17.8	6.9	8.45	561	Dissolved oxygen = 7.41 mg/l
17-Jun-04	2.48	8.0	8.53	655	Surface flow ceased approx. 50 feet below site
14-Jul-04	dry				

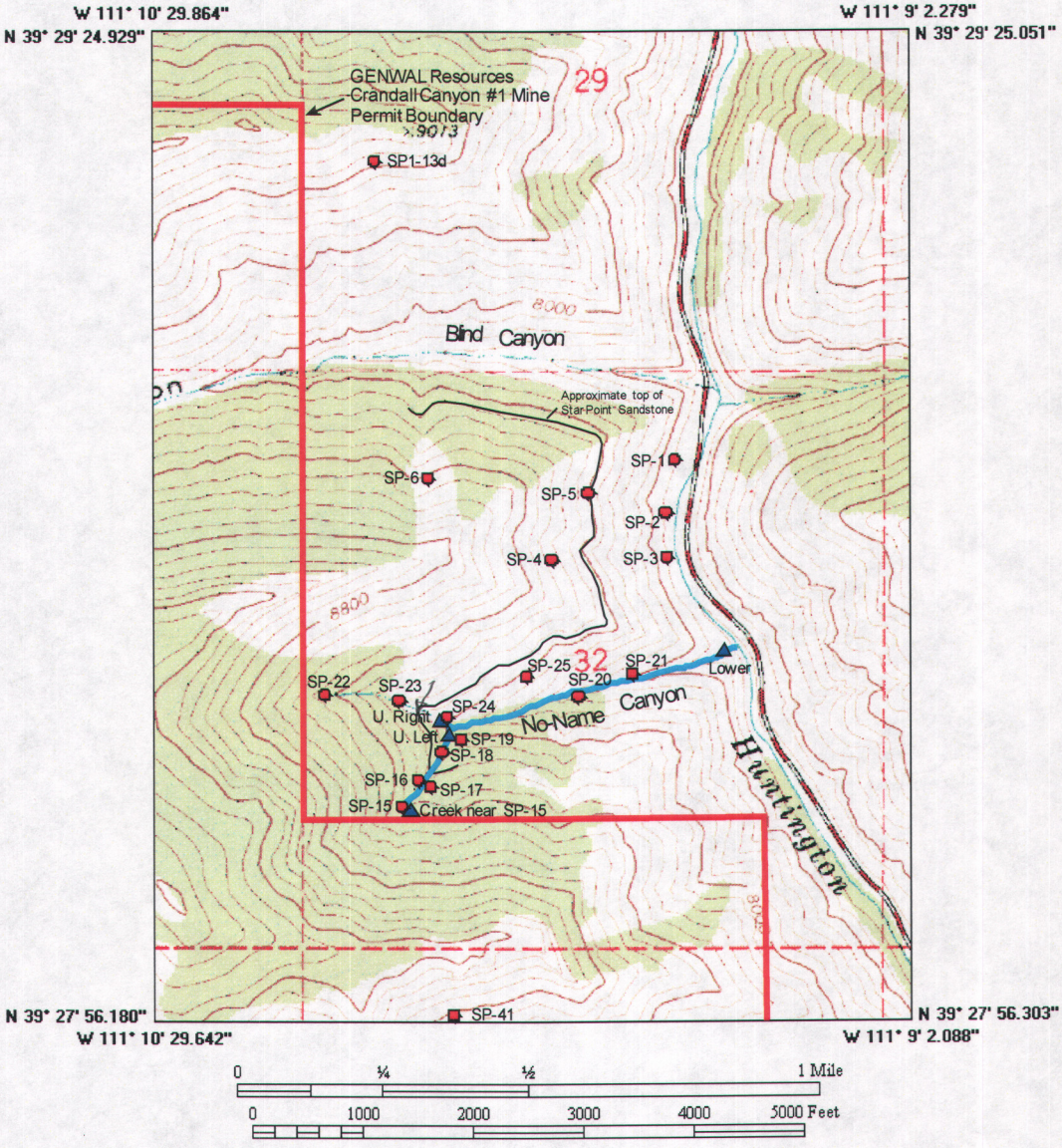

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Figure 1 Locations of springs and stream monitoring sites in the No-Name Canyon area.

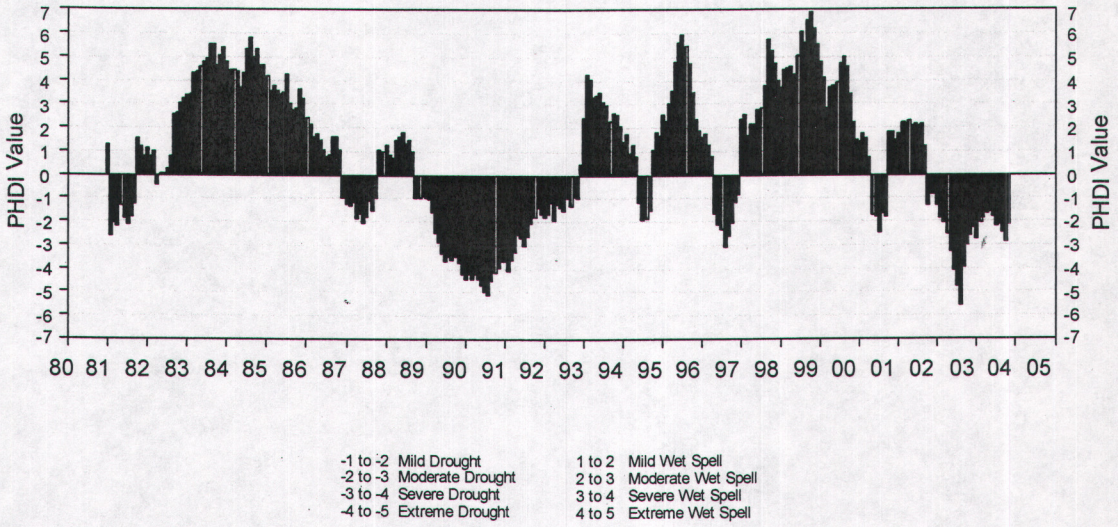

Figure 2 Plot of Palmer Hydrologi c Drought Index for Utah Region 4.