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SAGEPOINT/DUGOUT CANYON
BASIC HYDROGEOLOGIC DATA REPORT

Prepared for:

SUNEDCO COAL COMPANY
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December 15, 1982

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Wahler Associates

Geotechnical and Water Resources Engineering

December 15, 1982
SED102

Mr. Charles W. Durrett
Environmental Coordinator
Sunedco Coal Company
7401 W. Mansfield Ave.
Lakewood, Colorado 80235

Dear Mr. Durrett:

Wahler Associates (WA) is pleased to submit with this letter a summary of work performed at Sunoco Energy Development Co.'s (Sunedco) Sage Point/Dugout Canyon property in Carbon County, Utah. The work performed is to be used in support of Sunedco's application (ACT/007/009) entitled Sage Point/Dugout Canyon Project, SMCRA Permit Application Chapter IV-B, Hydrology. The scope of work included the performance of static water levels, falling head tests, preparation and presentation of test results, and the preparation of a ground water potentiometric map for each of the aquifers on the property. Soldier Canyon Mine, which is adjacent to Sunedco's property, ground water data were also evaluated.

PROJECT OVERVIEW

The field work was directed by Mr. Joel Siegel, WA staff water resources engineer. The field work was initiated November 1, 1982. Water data were collected from five monitoring well locations (Figure 1) described below:

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<u>Well Number</u>	<u>Latitude</u>	<u>Longitude</u>	<u>Top of Casing Elevation In Feet Above Sea Level</u>
5-1	394315	1103548	7186
10-2	384254	1103333	6626
11-2	394221	1103205	8204
19-1	394112	1103022	8254
24-1	394046	1103055	8416

The wells were established by Eureka Energy Co. (Eureka), the prior property owner, between 1976 and 1979. These wells are further described in Sunedco's application noted above.

Water level data were collected from all five wells. Only well 19-1 was found dry (Table 1). These data were used in conjunction with data previously collected by Eureka (Table 1) in developing the potentiometric level map (Figure 1) for the property.

Falling head tests were performed at three of the five wells. Wells 19-1 and 24-1 were not accessible owing to poor weather and road conditions.

TEST PROCEDURES

A 2000 gallon clean water truck, provided by Western Exploration, was used to carry water to each of the monitoring wells. Static water levels were taken at the wells, after which an additional head was applied to the aquifer. This was done via the injection of water into the wells from the water truck. Water level measurements were taken prior to and during all tests using an Olympic well probe. The levels were measured frequently during the early stages of the test, and several hours apart after a few hours had passed.

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Because the representative value of elapsed time from which transmissivity values were calculated from the data is on the order of 1000 minutes, the significance of early time data is less than what was anticipated at the time of testing.

Wells 10-2 and 11-2 were filled to within 100 feet of the ground surface. Well 5-1 was filled to approximately 20 feet below ground surface. Time was allowed for each well to settle, which generally occurred 5 to 10 minutes after filling. Response of the Price River formation aquifer was slow at both test locations (wells 10-2 and 11-2).

Well 5-1 displayed a very slow decline in head. Therefore, the time between measurements was increased from minutes to hours after test initiation. This test was in the coal members of the Blackhawk formation.

DATA ANALYSIS

The basic equation for the residual head in a well, to which an initial excess is applied, was modified in order to determine the transmissivity of the Price River formation. Assumptions implicit in the analysis are that water levels in the formation are affected by the recharge only in the immediate vicinity of the well, and that the storativity is small. These assumptions are applicable for the Price River formation. This type of analysis does not allow for the determination of aquifer storativity.

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Attachment I includes all data in tabular form for each of the 3 tests, and time-residual head plots for the Price River formation (wells 10-2 and 11-2). A simplified analysis for determining Blackhawk formation coal (well 5-1) transmissivity is included in Attachment I, as well as a description of the graphical procedures applied to the data from the Price River formation. All field test data is given in Attachment II.

RESULTS

The transmissivity of the Price River formation aquifer at the locations tested on the Sage Point/Dugout Canyon property is 1 gallon per day per foot (gpd/ft). This value is a reliable order of magnitude estimate. The transmissivity of the formation apparently decreased with time during falling head tests at wells 10-2 and 11-2. The stated confidence in the results is well within the normally expected range for falling head tests.

A simple analytical procedure for determining the coupled transmissivity of the Sunnyside and Rock Canyon coal members of the Blackhawk formation is described in Attachment I-C. The conclusion that can be drawn from well 5-1 data is that the coals of the Blackhawk formation are near-impermeable. The transmissivity is 0.009 gpd/ft.

The results of the aquifer tests indicate that the strata of the Price River formation and the coal seams of the Blackhawk formation have limited aquifer potential. The calculated transmissivities of the strata are so low that water development would be uneconomical,

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even for domestic or stock-watering uses. Therefore, the strata of the Price River and Blackhawk formations should not be considered aquifers.

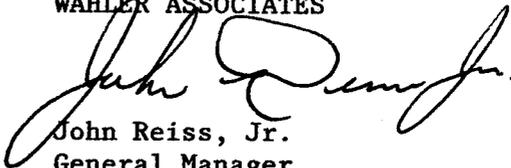
POTENTIAL HEAD DATA AND MAP

Table 2 summarizes potential head data with reference to both ground elevation and mean sea level for all wells monitored by WA during the time period November 1-5, 1982. Figure 1 is a potentiometric map for the Price River formation, and was based upon data from Table 2.

WA is confident that the content of this report, inclusive of data and backup calculations, is sufficient for presentation to the Office of Surface Mining and Utah Division of Oil, Gas and Mining as a base-line hydrologic report for the Sage Point/Dugout Canyon property. Please call if we can be of any further assistance.

Sincerely,

WAHLER ASSOCIATES


John Reiss, Jr.
General Manager
Rocky Mountain Region

JR:br

TABLE 1
WATER LEVEL DATA COLLECTED BY EUREKA ENERGY CO.*

DATA	MONITORING WELLS				
	5-1 Sunnyside & Rock Canyon Coal	10-2 Middle Castlegate Sandstone	11-2 Price River	19-1 North Horn	24-1 Lower Castle gate Sandstone (PR)
Formation Perforated					
Collar Altitude (FT MSL)	7186.38	7727.39	8203.79	8254	8416
Dates Sampled (ft below land surface)					
November, 1979					
16				--	--
23		--			
24			--		
26	139.90				
27		348.44		304.78	759.75
December, 1979					
12	159.91	640.62	1119.65	312.26	895.72
January, 1980					
10		709.03	1123.51		
19	180.77				
24				311.40	
February, 1980					
14			1123.32		
15	197.72	711.86			
March, 1980					
17	208.29	710.60			
18			1121.25	296.95	1019.92
April, 1980					
9	215.15	710.46	1121.15	228.29	1024.41
April, 1981					
1	275.92	711.23	1119.17		

* Data provided by Sunoco Energy Development Co.

TABLE 2
 WATER LEVEL SUMMARY
 SAGE POINT/DUGOUT CANYON PROPERTY
 NOVEMBER, 1982

WELL NUMBER	GEOLOGIC FORMATION	TOP OF CASING ELEVATION IN FEET ABOVE MEAN SEA LEVEL	STATIC WATER LEVEL BELOW TOP OF CASING IN FEET	STATIC WATER LEVEL IN FEET ABOVE MEAN SEA LEVEL	DATE OF MEASUREMENT
5-1	Sunnyside and Rock Canyon Coals	7186	304.9	6881.1	11-4-82
10-2	Price River Formation	7727	715.8	7011.2	11-3-82
11-2	Price River Formation	8204	1127.6	7076.4	11-4-82
19-1	North Horn Formation	8254	Dry ¹	—	11-2-82
24-1	Price River Formation	8416	1020	7396	11-2-82

¹Used two probes to depths of 750 feet; both verified as working; well has no water.