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EVALUATION AND TARGETING OF GEOTHERMAL ENERGY RESOURCES IN THE SOUTHEASTERN UNITED STATES

Progress Report, October 1, 1978-March 30, 1979

John K. Costain Lynn Glover III A. Krishna Sinha

Work Performed Under Contract No. ET-78-C-05-5648

Virginia Polytechnic Institute and State University Blacksburg, Virginia



U. S. DEPARTMENT OF ENERGY Geothermal Energy

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EVALUATION AND TARGETING OF GEOTHERMAL ENERGY RESOURCES

IN THE SOUTHEASTERN UNITED STATES

Progress Report

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Lithologic Analysis of Sediment Samples from the Intermediate Drilling Program

Michael Svetlichny

During the period October 1, 1978 - March 15, 1979, 32 holes were completed as part of the Atlantic Coastal Plain drilling program. In each of the 300 m deep holes, drill cuttings were collected at 3.0 m intervals and sealed in airtight plastic bags to prevent sediments from drying out.

At least two attempts were made to recover core in each hole. A minimum of 15 m was cored. Recovery of unconsolidated, clean sand frequently was poor because material tends to be washed away by the coring process, and sediments were not always retained in the core barrel by the core catcher. In an effort to maximize core recovery and minimize drilling costs, one coring interval was selected to be within a thick (†15 m) sequence of clayey, silty, or consolidated sediments, and the other coring attempt was made near the maximum depth of 300 m. Detailed analyses of the cores has begun, but there are no results to report as yet.

Lithologic descriptions of the drill cuttings have been completed for each hole; the results are presented as a table following this text. The descriptions are based on Folk's (1974) classification. Each category reflects the proportion of gravel, sand, and silt plus clay in that sample. In cases where well-sorted gravel was present, a distinction was made between granules, pebbles, and cobbles. Similarly, the sand fraction was subdivided into very fine, fine, medium, coarse, and very coarse sand. If silt and clay occurred in equal proportion, they were collectively referred to as mud. Whole and fragmented macrofossils were reported as shells.

Selected samples from each hole are being wet sieved with a number 230 U.S. standard sieve to determine the proportion of sediment that is finer than 4.0 phi. This work began recently so that the data set is incomplete. The results to date are included in the table that follows this text.

ACKNOWLE DGEMENT

The following Gruy Federal Personnel assisted in sample descriptions and sieving: Kenneth Hurst, Ronald Herzick, Paul Caprio, Michael Hoffman, and Donald Hostvedt.

Salisbury, off Zion Road, MD NO. 46

INTERVAL (METERS)	FORMATION-AGE	DESCRIPTION	COMMENTS	SAMPLES SIEVED	RATIO COARSE/FINE	PERCENT FINES
0-39.6		Very fine-fine clean sand with quartz gravel				
39.6-45.7		Silty fine sand with gravel, slightly glauconitic			·	
45.7-57.9		Fine sand				
57.9-67.1		Very fine-medium sand with gravel	Some coarse sand and silt near end of interval			
67.1-76.2		Fine sand				
76.2-100.6		Fine-medium sand, slightly glauconitic			•	
100.6-103.6		Silty medium-coarse sand	х			
103.6-112.8		Very fine-medium sand, slightly glauconitic	Some clay near bottom of interval		-	
112.8-115.8		Very fine-coarse sand with gravel	Shells			
115.8-125.0		Silty fine sand with some gravel and coarse sand. Glauconitic				
125.0-131.1		Silty clay with some sand and gravel, Glauconitic			·	ан ¹
131.1-152.4		Silty fine sand with coarse sand and gravel	Shells			
152.4-155.4		Silty clay with sand and gravel				
155.4-171.0		Fine-coarse sand with gravel	Minor shells			
171.0-176.8	•	Silty fine grey	Shells			
	(METERS) 0-39.6 39.6-45.7 45.7-57.9 57.9-67.1 67.1-76.2 76.2-100.6 100.6-103.6 103.6-112.8 112.8-115.8 115.8-125.0 125.0-131.1 131.1-152.4 152.4-155.4 155.4-171.0	(METERS) FORMATION-AGE 0-39.6 39.6-45.7 45.7-57.9 57.9-67.1 67.1-76.2 76.2-100.6 100.6-103.6 103.6-112.8 112.8-115.8 115.8-125.0 125.0-131.1 131.1-152.4 152.4-155.4 155.4-171.0	(METERS)FORMATION-AGEDESCRIPTION0-39.6Very fine-fine clean sand with quartz gravel39.6-45.7Silty fine sand with gravel, slightly glauconitic39.6-45.7Silty fine sand with gravel, slightly glauconitic45.7-57.9Fine sand45.7-57.9Fine sandVery fine-medium sand with gravel67.1-76.2Fine sand76.2-100.6Pine-medium sand, slightly glauconitic100.6-103.6Silty medium-coarse sand103.6-112.8Very fine-medium sand, slightly glauconitic112.8-115.8Very fine-coarse sand115.8-125.0Silty fine sand with some gravel and coarse sand. Glauconitic131.1-152.4Silty fine sand with coarse sand and gravel152.4-155.4Silty clay with sand and gravel155.4-171.0Pine-coarse sand with gravel	(METERS)FORMATION-AGEDESCRIPTIONCOMMENTS0-39.6Very fine-fine clean sand with quartz gravel39.6-45.7Silty fine sand with gravel, slightly glauconitic39.6-45.7Silty fine sand with gravel, slightly glauconiticSome coarse sand and silt near end of interval57.9-67.1Very fine-medium sand with gravelSome coarse sand and silt near end of interval67.1-76.2Fine sand76.2-100.6Pine-medium sand, slightly glauconitic100.6-103.6Silty medium-coarse sand103.6-112.8Very fine-medium glauconitic103.6-112.8Very fine-coarse sand112.8-115.8Very fine-coarse sand, slightly glauconitic115.8-125.0Silty fine sand with gravel115.8-125.0Silty fine sand ard gravel, Glauconitic131.1-152.4Silty fine sand with gravel152.4-155.4Silty clay with sand and gravel155.4-171.0Fine-coarse sand with gravel	(METERS)FORMATION-AGEDESCRIPTIONCOMMENTSSAMPLES SIEVED0-39.6Very fine-fine clean sand with quartz gravel, slightly glauconiticSilty fine send with gravel, slightly glauconiticSome coarse sand and silt near end of interval39.6-45.7Silty fine-medium sand with gravel and silt near end of intervalSome coarse sand and silt near end of interval67.1-76.2Fine sendFine-medium send, slightly glauconiticSome clay near bottom of interval67.1-76.2Fine-medium send, slightly glauconiticSome clay near bottom of interval103.6-112.8Very fine-medium send, slightly glauconiticSome clay near bottom of interval112.8-115.8Very fine-coarse send with gravelShells115.8-125.0Silty fine send with some gravel, gravel, clauconiticShells131.1-152.4Silty fine send with gravelShells152.4-155.4Silty clay with send and gravelShells155.4-171.0Fine-coarse send with gravelMinor shells	(METERS)FORMATION-AGEDESCRIPTIONCOMMENTSSAMPLES SIEVEDCOARSE/FINE0-39.6Servelsitty fine cleen sgravel, sitghtly glauconiticSome coarse sand and silt near end of intervalSome coarse sand and silt near end of interval39.6-45.7Sitty fine-medium send with gravelSome coarse sand and silt near end of interval57.9-67.1Very fine-medium send with gravelSome coarse sand and silt near end of interval67.1-76.2Fine-medium sand, sitghtly glauconitic100.6-103.6Sitty medium-coarse sand103.6-112.8Very fine-medium glauconitic112.8-115.8Very fine-medium glauconitic115.8-125.0Sitty fine sand d carse sand and coarse sand d gravel, slauconitic125.0-131.1Sitty fine sand gravel, slauconitic131.1-152.4Sitty fine sand and gravel152.4-155.4Sitty clay with sand and gravel155.4-171.0Fine-coarse sand with gravel

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176.8-132.9	Granular muddy sand	
182 .9-189. 0	Very fine-fine sand with some coarse sand	
189.0-222.5		Becoming more gravelly and shelly toward end of interval
222.5-231.6	Cored	Recovery from 224.9- 230.1
231.6-240.8	Very fine-fine limy sand. Glauconitic	Minor shells
240.8-243.8	Sandy clay, slightly glauconitic	Shells
243.8-246.9	Slightly granular fine-very fine limy sand. Glau- conitic	Shells
246.9-259.1	Silty fine sand with gravel	Shells
259.1-271.3	Fine sandy clay grading into silty fine sand	
271.3-289.6	Silty fine sand with gravel	
289.6-294.4	Silty fine sand	
294.4-305.0	Cored	Recovery from 294.4- 298.6

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