

UNIVERSITY OF UTAH RESEARCH INSTITUTE

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Dr. Anthony W. Gorody  
Senior Scientist  
Basic Research  
Gas Research Institute  
8600 West Bryn Mawr Avenue  
Chicago, IL 60631Subject: Contract No. 5089-260-1855  
Monthly Technical Report

Dear Tony:

Enclosed are four copies of the Monthly Technical Report for the month of April 1989. Also attached is a memo from M. L. Allison reporting the amount of time he has spent on the project.

Sincerely,

Dennis L. Nielson  
Associate Director

Enclosure

cc: M. L. Allison  
J. B. Hulen  
W. L. Forsberg  
D. A. Petty  
P. M. Wright

encls:

DEFINITION OF STRATIGRAPHIC HETEROGENEITY USING DIPMETER LOGS

Monthly Report  
April 1, 1990 through April 30, 1990

Prepared By:

THE UNIVERSITY OF UTAH RESEARCH INSTITUTE

Dennis L. Nielson  
M. Lee Allison  
Susan Juch Lutz  
Wilford Forsberg

For

GAS RESEARCH INSTITUTE

Contract No. 5089-260-1855

GRI Project Manager  
A. W. Gorody

## 1.0 GRI DISCLAIMER

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## GRI May Monthly Report

### 2.0 Work Planned for the Month

Work planned for the month included additional collection of field data, review of the field work, data analysis, preparation for a workshop at the Texas Bureau of Economic Geology, and a meeting between D. L. Nielson and C. A. Bengston.

### 3.0 Work Completed During April

A field review of the data collected took place in the first week of April. Present were D. L. Nielson, S. J. Lutz, M. L. Allison, P. B. Anderson, and Thomas Morris (new professor at Brigham Young University, formerly with Exxon). The principal conclusion of this review was that sufficient data had been collected for the bulk of the analyses. Although we will probably return to the field to fill in data, most of the field work has been completed.

The location of the core hole was also discussed, and it was concluded that the best area is located to the west of the Muddy Creek outcrops that we have measured and that have served as the starting point for the BEG permeameter measurements.

Data analysis using Statistical Curvature Analysis Techniques is different from its use for structural interpretation. Structure affects the entire sedimentary package and the analysis therefore starts with using all the data to define the structure within which the well is drilled. In the stratigraphic application, one is interested in defining the facies and geometry of discrete sedimentary packages. Therefore, interpretation begins by identifying separate depositional units and then looking at the geometric relationships to define both the facies and depositional character of the package.

Initial definition of units uses the dip and azimuth vs. depth plots. In these diagrams, not only the values of the dips and azimuths but also the standard deviation of the values is used to identify specific units.

Analysis was initiated using the sedimentary structures observed in the field. Orientation data of cross beds from several different environments were compiled. These data indicate differences in the distribution of dip azimuths between fluvial, distributary channel, distributary mouth bar, and tidal environments. Similar analysis of hummocky cross stratified beds also indicates clearly identifiable patterns.

Once units have been defined for analysis, the dip vs. azimuth plot is very useful in defining the sedimentary structures of the unit.

Plots of dip vs. azimuth for a channel unit clearly indicate the bulk curvature is similar to that for a plunging fold.

D. L. Nielson and C. A. Bengston met in Walnut Creek, Ca. during the month. Bengston is currently looking at data that was generated during the field work. To his knowledge, this is the first attempt at approaching dipmeter interpretation from outcrop data. All previous calibration efforts have approached the problem from log and core data. Bengston will be present at UURI's industry workshop on June 18.

Additional time was spent in April preparing for a presentation at the Texas Bureau of Economic Geology scheduled to be held the first of May.

#### 4.0 Allied Investigations

UURI is in final contract negotiations with Atlas Wireline Services to receive a research software license for the WDS system. This is Atlas's well log interpretation software package and will allow UURI to digitally process and interpret well log data. Atlas indicates that they will be providing us with a software package valued at about \$125,000. UURI will be investing an additional \$25,000 in hardware and training. Dr. Alan Tripp of UURI attended a ten day course in April on the use of the system. One week was spent on dipmeter instruction. This software and expertise will be available for use on GRI projects.

#### 5.0 Problems Encountered

None

#### 6.0 Work Planned for Next Month

During May, the research team will be principally occupied in data analysis, definition of Strat-SCAT rules, and in preparation for our industry workshop which is scheduled for June 18.