Valley-Fill Sandstones in the Kootenai Formation on the Crow Indian Reservation, South-Central Montana

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Abstract

Subsurface data is being collected, organized, and a digital database is being prepared for the project. An ACCESS database and PC-Arcview is being used to manage and interpret the data. Well data and base map data have been successfully imported into Arcview and customized to meet the needs of this project.

All of the four 30' X 60' geologic quadrangles have been scanned to produce a digital surface geologic data base for the Crow Reservation and all are nearing completion. Formal technical review, prior to publication, will begin in January, 1998.

Field investigations were completed during this quarter. With the help of a student field assistant from the Crow Tribe, the entire project area was inventoried for the presence of valley-fill deposits in the Kootenai Formation. Field inventory has resulted in the identification of nine exposures of thick valley-fill deposits. These appear to represent at least four major westward-trending valley systems. All the channel localities have been measured and described in detail and paleocurrent data has been collected from all but one locality. In addition, two stratigraphic sections were measured in areas where channels are absent. One channel has been traced over a distance of about 60 miles and exhibits definite paleostructural control.

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Executive Summary

Subsurface data is being collected, organized, and a digital database is being prepared for the project. An ACCESS database and PC-Arcview are being used to manage and interpret data. Land grid data (Township, Range, and Section) and well data have been imported into Arcview.

All of the four 30' X 60' geologic quadrangles have been scanned to produce a digital surface geologic data base for the Crow Reservation and all are nearing completion. Formal technical review will begin the publication process in January and February, 1998.

Field investigations were completed during this quarter. With the help of a student field assistant from the Crow Tribe, the entire project area was inventoried for the presence of valley-fill deposits in the Kootenai Formation. Field inventory has resulted in the identification of nine exposures of thick valley-fill deposits. These appear to represent at least four major westward-trending valley systems. All the channel localities have been measured and described in detail and paleocurrent data has been collected from all but one locality. In addition, two stratigraphic sections were measured in areas where channels are absent. All of these data have been compiled and processed digitally.

Introduction

The stratigraphic study of the valley-fill sandstones in the Kootenai Formation was begun in August, 1996 with reconnaissance field work to locate the exposures of channel sandstone deposits. Subsurface aspects of the project were begun in the second quarter and are continuing.

The production and publication of surface geologic maps of the Crow Reservation area is nearing completion. An oil and gas training seminar for Crow Tribal members was completed in the third quarter.

Results and Discussion

Subsurface data collection was begun in the second quarter of this project, and continues this quarter. A collection of most of the oil and gas well logs for the Crow Reservation area was donated to the project by a company that had initiated an exploration program on the reservation several years ago. These have been filed and inventoried to determine missing well coverage. Preliminary regional subsurface cross sections have been constructed for correlation purposes and to identify channel facies.

A digital data base of commercially available "scout card" data has been generated using Microsoft Access. PC-Arcview is being used for map generation and interpretation. The well data and land grid data (Township, Range, and Section) have been imported into Arcview. Data tables for stratigraphic well log data specific to this project have been designed and data is currently being compiled.

Geologic maps of all four 30' X 60' quadrangles that encompass the Crow Reservation have been digitally scanned for the geologic data base that will be provided to the Crow Tribe. These are all nearing completion. The maps and explanations for the Billings and Bridger Quadrangles are completed and technical review prior to publication will begin in January, 1998. The Hardin and Lodge Grass Quadrangles will follow shortly thereafter.

Field investigations for this field season were begun during the last quarter. To help with these investigations a field assistant was employed as described in the original project proposal. Marzha Fritzler, a member of the Crow Tribe and a student at Haskell Indian Nations University in Liberal, Kansas was selected for this position.

Field investigations were completed during this quarter. The entire project area was inventoried for the presence of valley-fill deposits in the Kootenai Formation. Field inventory has resulted in the identification of nine exposures of major valley-fill deposits. These appear to represent at least four major westward-trending valley systems. All the channel localities have been measured and described in detail and paleocurrent data has been collected from all localities. In addition, two stratigraphic sections were measured in areas where channels are absent. All the measured sections have been digitally

plotted using LogPlot97 by Rockware. Paleo-current data from all exposures have been compiled, tabulated, and rose diagrams have been constructed using SpheriStat for Windows by Pangaea Scientific.

One channel has been mapped over a distance of about 60 miles. Paleocurrent data, and the trace of the channel, document definite paleostructural control on the trend of this channel (Figure 1). This fact will be extremely useful in predicting the subsurface extensions of Greybull channels.

Reconnaissance investigations of valley-fill deposits in the Bighorn Basin to the west have also been conducted. Preliminary results indicate that some of these channels appear to be continuations of the channels identified on the Crow Reservation.

Conclusion

Subsurface data is being collected, organized, and a digital database is being prepared for the project. The database will be managed with Microsoft Access; PC-Arcview is being used for map generation and interpretation.

All four 30' X 60' geologic quadrangles have been scanned to produce a digital surface geologic data base for the Crow Reservation. All quadrangles are nearing completion and the map explanations are being compiled.

Field investigations were completed this quarter. Four major westward-trending valley systems have been identified. Measured sections of all localities have been completed, and compiled and plotted digitally. Paleocurrent data has also been compiled and statistically analyzed using digital methods.