

South Dakota

*Department of Environment
& Natural Resources*

Minerals and Mining Program

Oil & Gas Section - Rapid City, SD

SOUTH DAKOTA OIL & GAS DEVELOPMENT

PRESENT AND FUTURE

BY

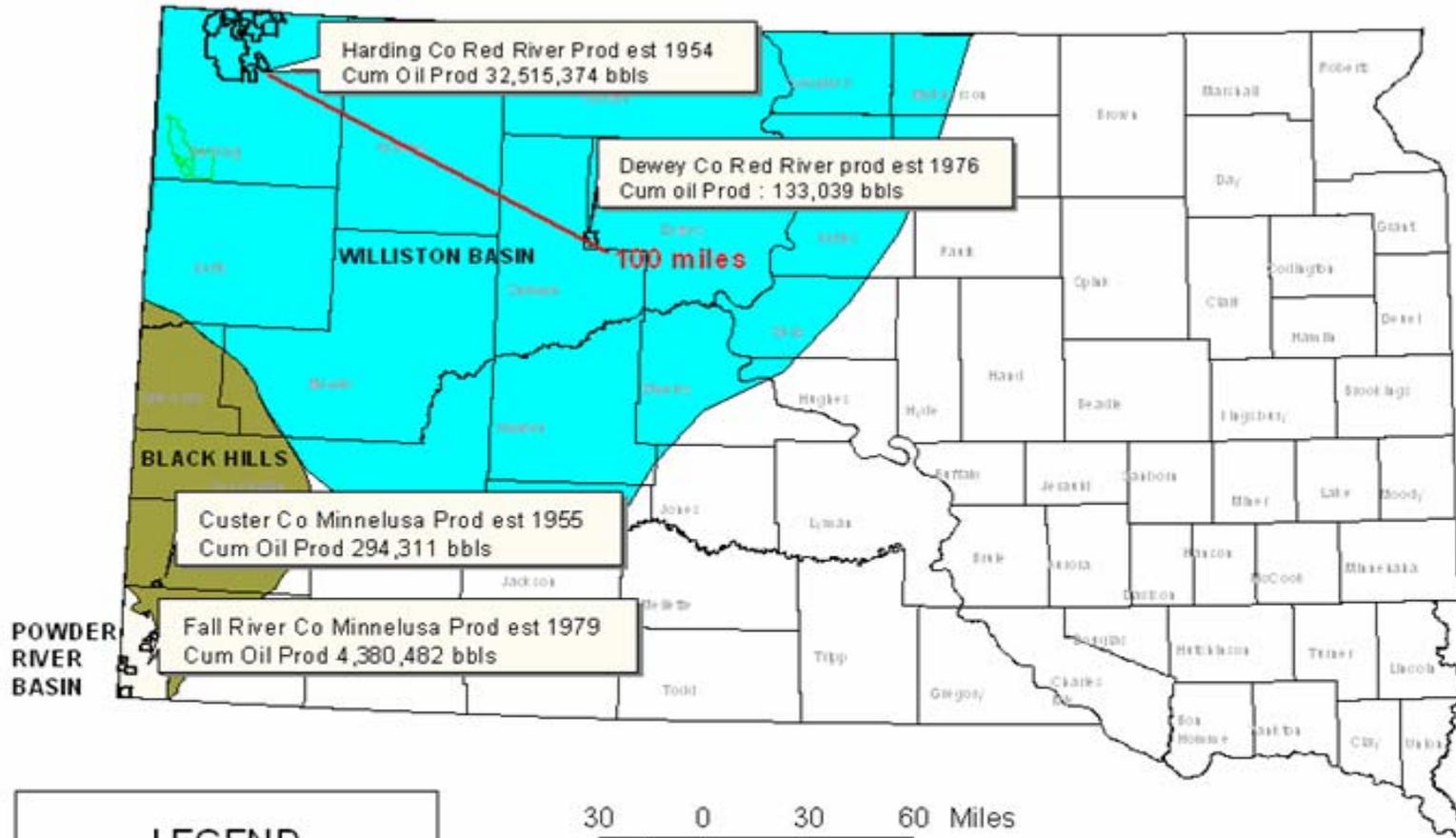
GERALD (MACK) McGILLIVRAY

SENIOR GEOLOGIST, SD DENR OIL & GAS SECTION

2010 WILLISTON BASIN PETROLEUM CONFERENCE

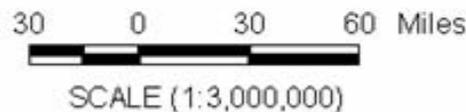
MAY 3, 2010 - BISMARCK, ND

CURRENT OIL & GAS PRODUCING BASINS/AREAS IN SOUTH DAKOTA



LEGEND

-  OIL FIELDS
-  GAS FIELDS
-  WILLISTON BASIN
-  BLACK HILLS
-  POWDER RIVER BASIN

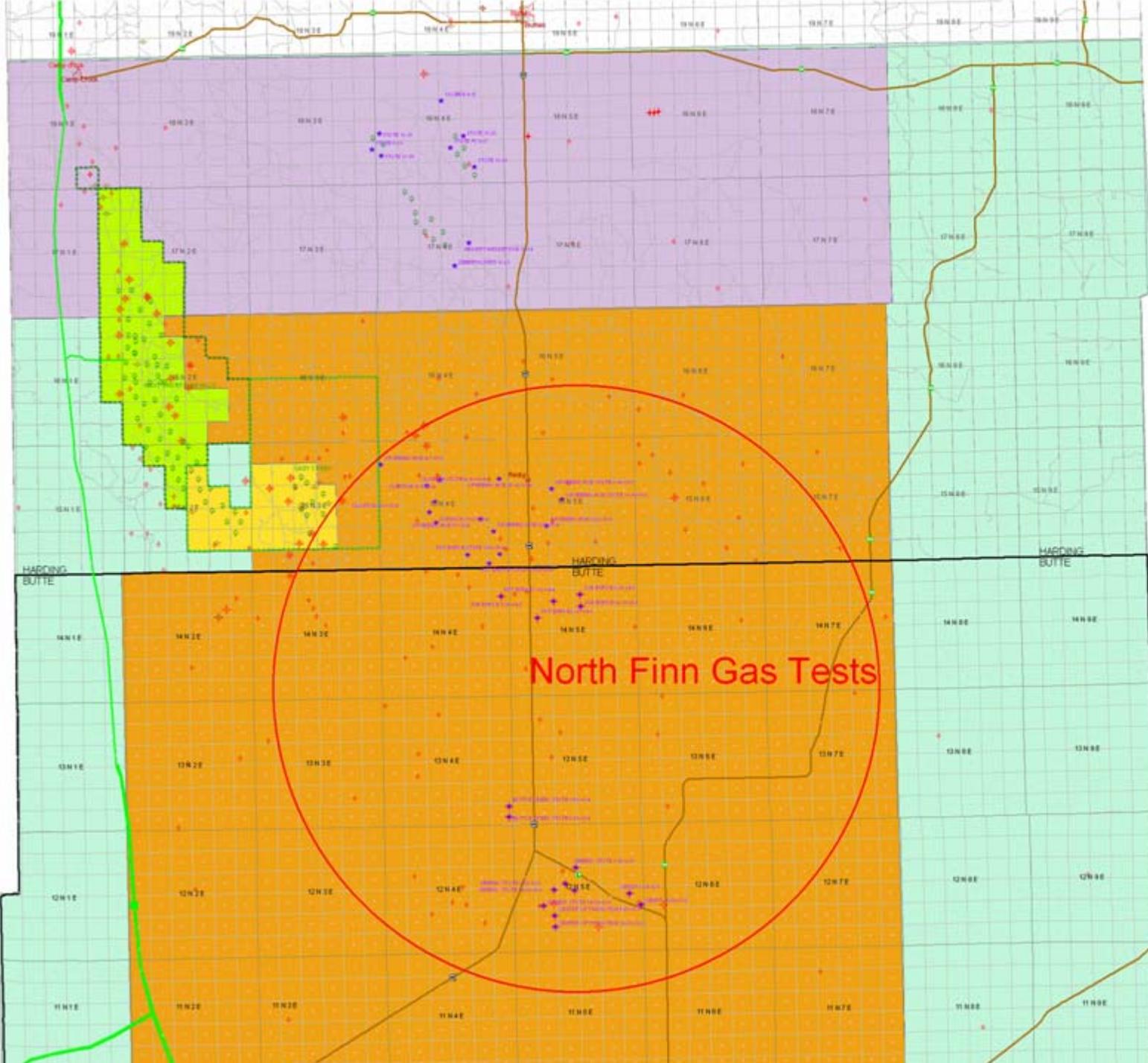


COMPILED BY MACK McGILLIVRAY

THE FUTURE OF OIL AND GAS EXPLORATION AND PRODUCTION IN SOUTH DAKOTA

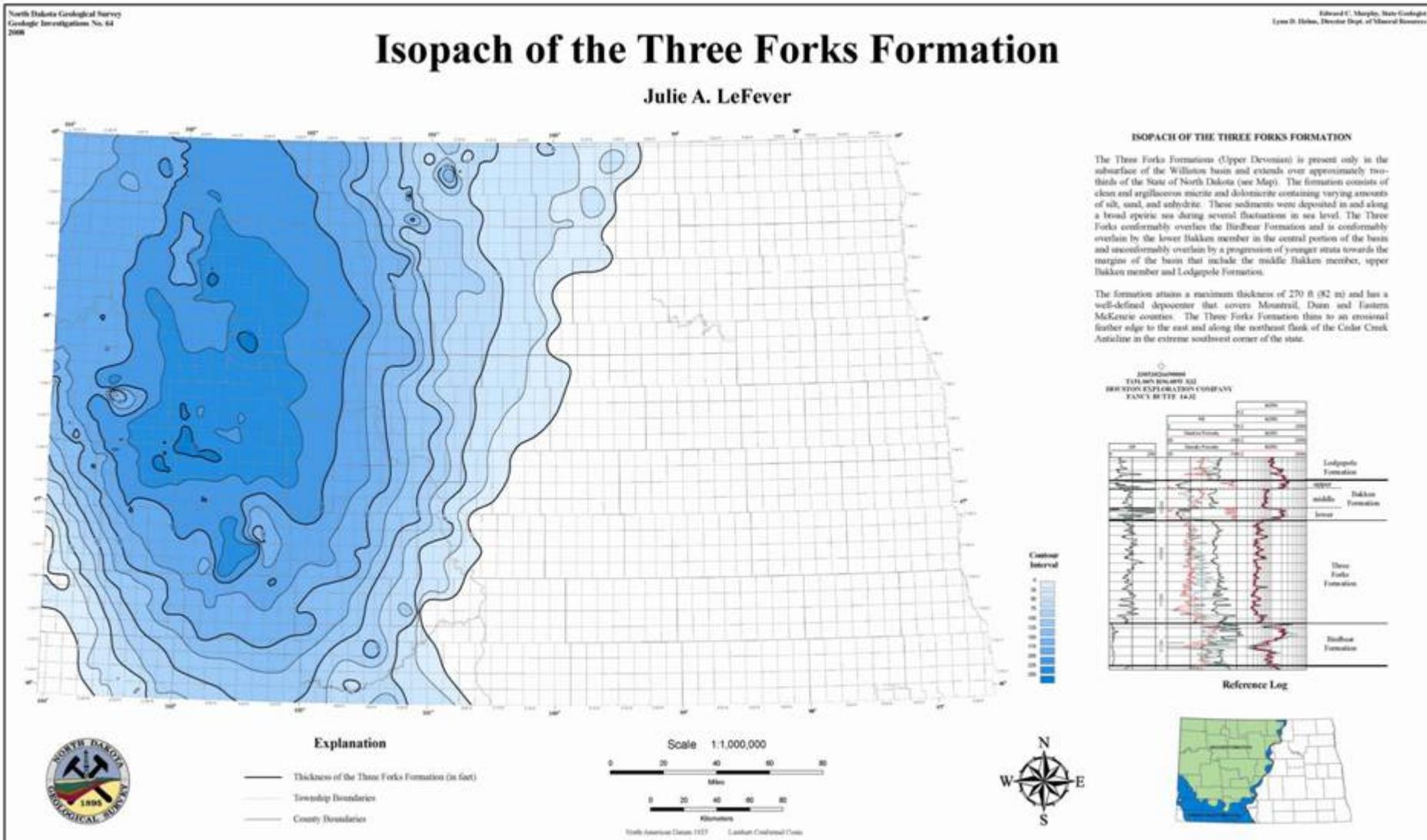
HARDING/BUTTE SHANNON GAS SPACING UNITS

- GAS WELLS**
- NEW PERMITS**
 - NEW PERMIT
 - NEW WELL
 - ◊ PRODUCING
 - ◊ S/VTA
 - ✱ P&A
 - PLUGGED & ABANDONED**
 - + OIL
 - + GAS
 - + UIC
 - + DRY HOLE
 - WBI PIPELINE** ———
 - SHANNON SPACING UNITS**
 - NORTH FINN (25-08)
 - SPYGLASS (15-06, 22-06, 29-08)
 - WEST SHORT PINE HILLS (8-85)
 - CADY CREEK (7-85)
 - McCUTCHIN (5-81)



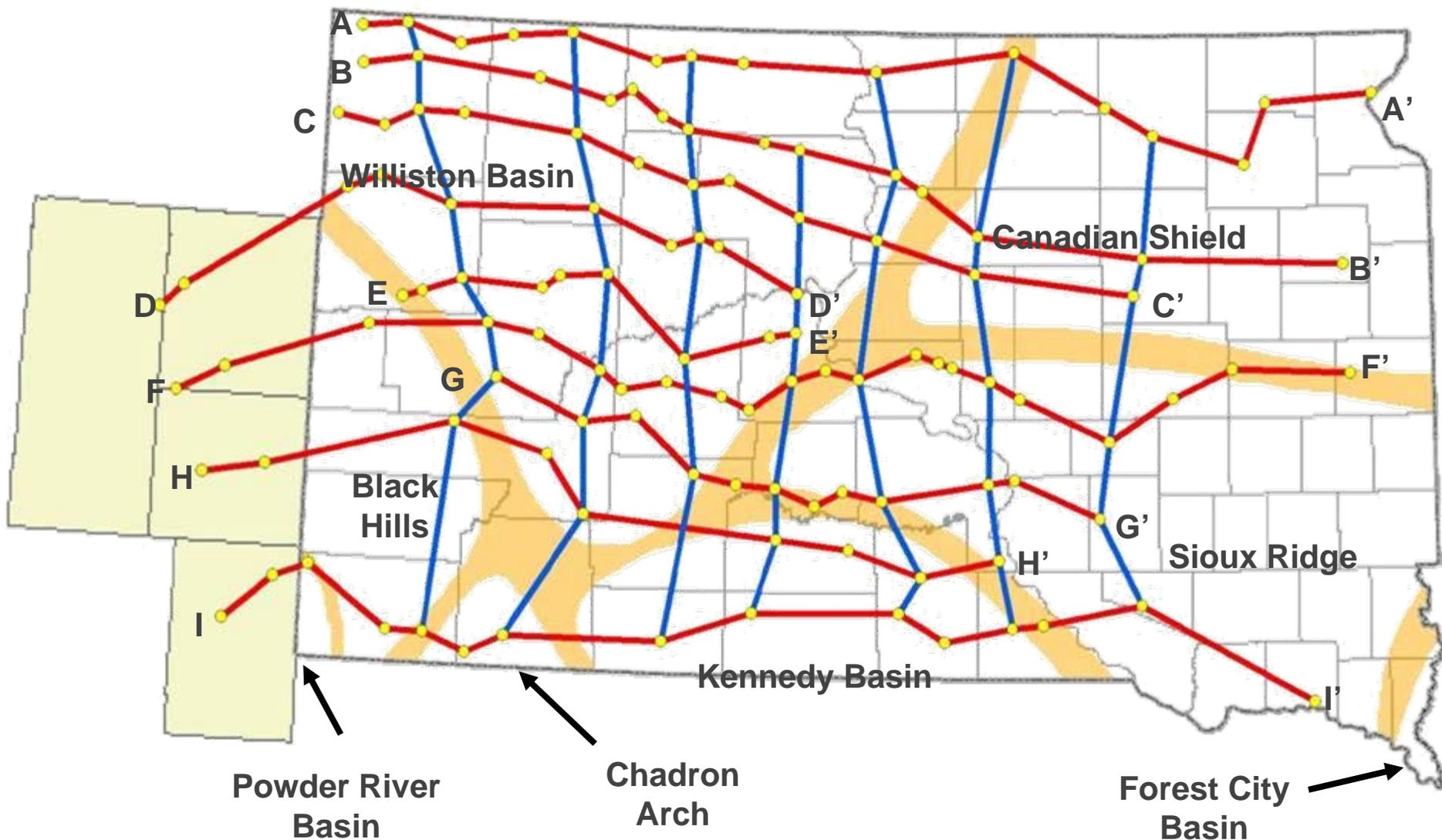
USE OF THIS INFORMATION IS AT THE USER'S SOLE RISK. THE USER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND REGULATORY APPROVALS. THE USER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND REGULATORY APPROVALS. THE USER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND REGULATORY APPROVALS.

This Isopach map of the Three Forks shows that in all probability, the formation does not end at the ND/SD Border. Unless the infamous “Stateline Fault” we have all heard about DOES exist!

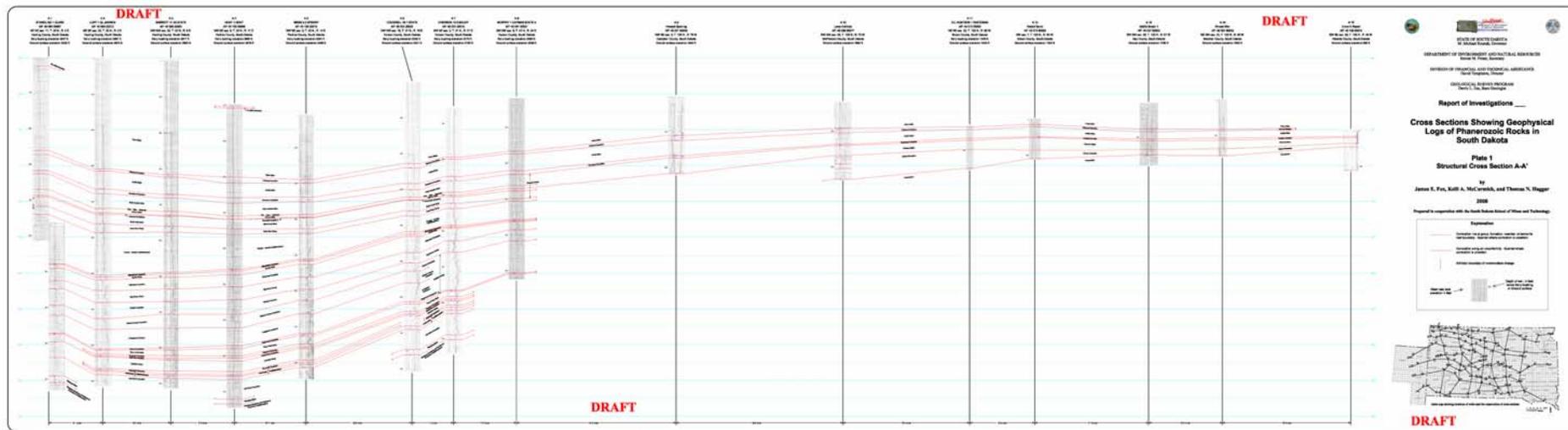


***SDGS/DENR MAPS AND
PUBLICATIONS
THAT MAY HELP ID
THE THREE FORKS AND
OTHER POTENTIAL
PRODUCING FORMATIONS***

Cross Sections of Geophysical Logs of Phanerozoic Rocks in South Dakota



Cross Section Showing Geophysical Logs of Phanerozoic Rocks In the Northern Portion of the Williston Basin in South Dakota By J.E. Fox (SDSMT) and K.A. McCormick and T.N. Hagggar (SDGS)



Became available as a SDGS publication July, 2008

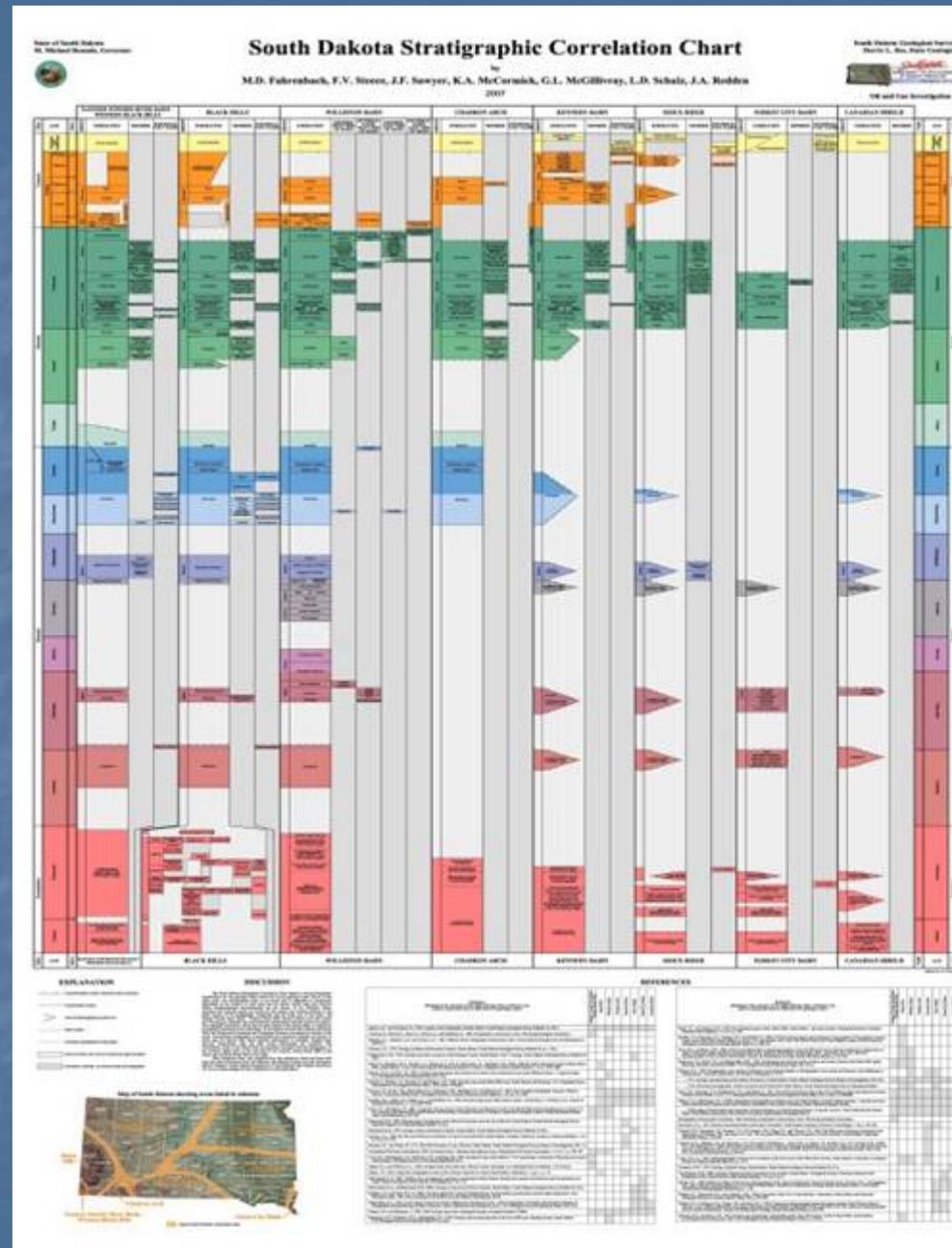
Stratigraphic Correlation Chart of South Dakota

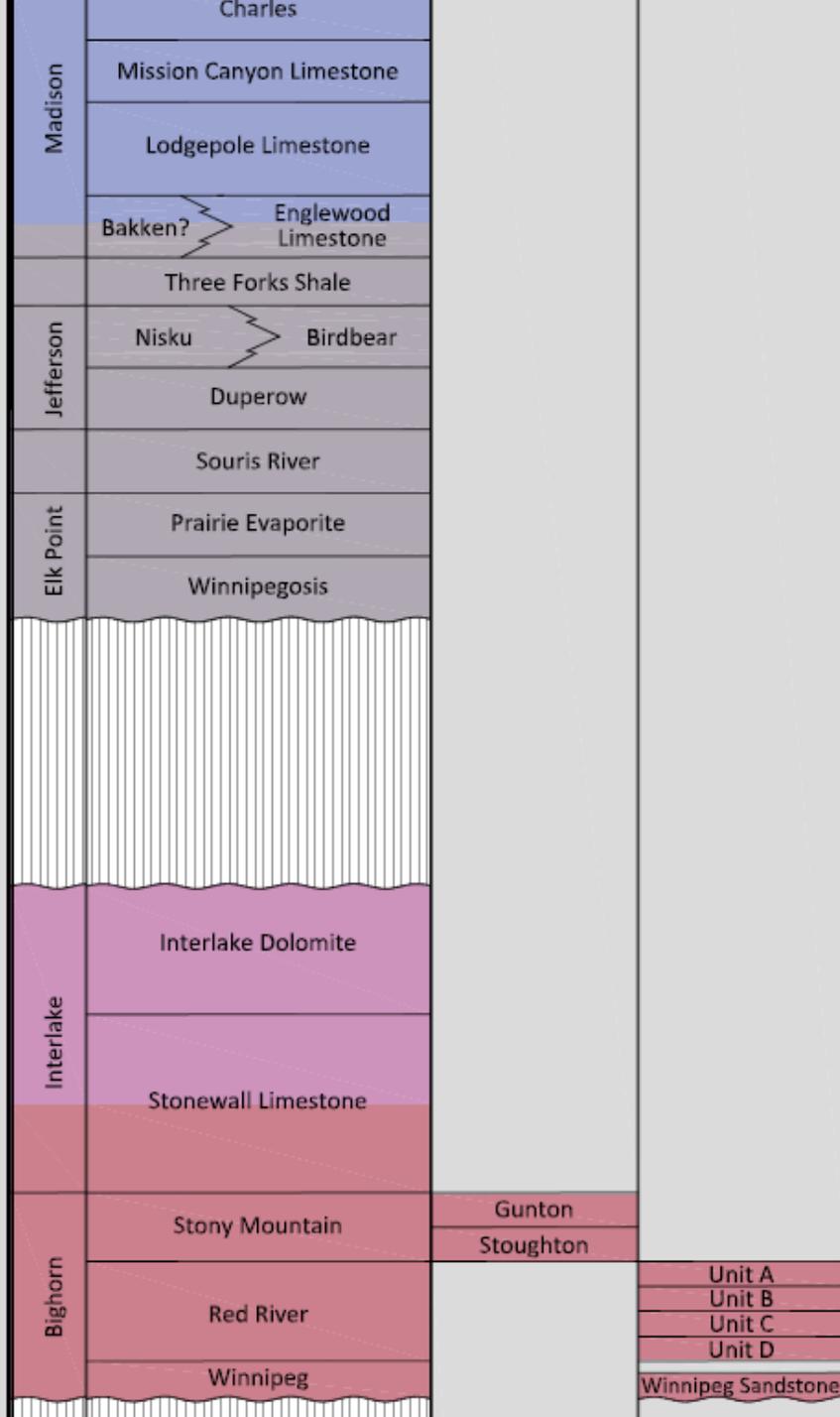
By

MD Fahrenbach,
FS Steece,
FS Sawyer,
KA McCormick,
GL (Mack) McGillivray,
JA Redden,
LD Schulze

Joint effort by DENR
Oil & Gas Section
And
South Dakota Geological Survey

Became available
as a SDGS publication
(Oil & Gas Investigation 1)
July, 2007





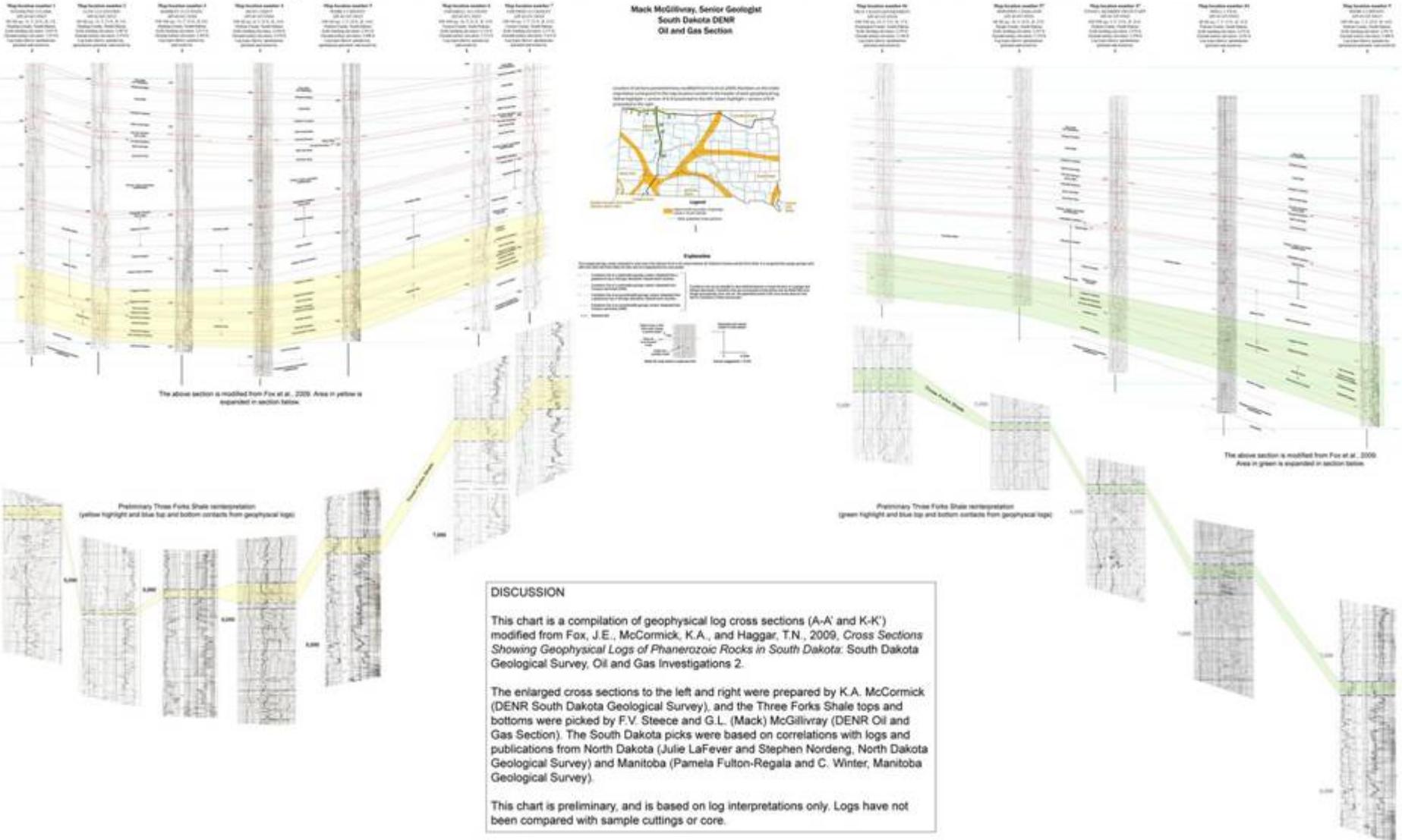
Enlarged Section from the Stratigraphic Column showing the Williston Basin section from the Madison to the Winnipeg.

Notice we have a question mark after the Bakken, but there is no question the Three Forks is present

The DENR O&G Section and Geological Survey plan to continue research on the Three Forks, and plan to construct structural contour maps, study drill cores and cuttings, conduct research, and consult with Industry to bring Exploration and Production to the state.

Preliminary Correlation of the Three Forks Shale in the Subsurface of Western South Dakota

Mack McGillivray, Senior Geologist
South Dakota DENR
Oil and Gas Section



The above section is modified from Fox et al., 2009. Area in yellow is expanded in section below.

The above section is modified from Fox et al., 2009. Area in green is expanded in section below.

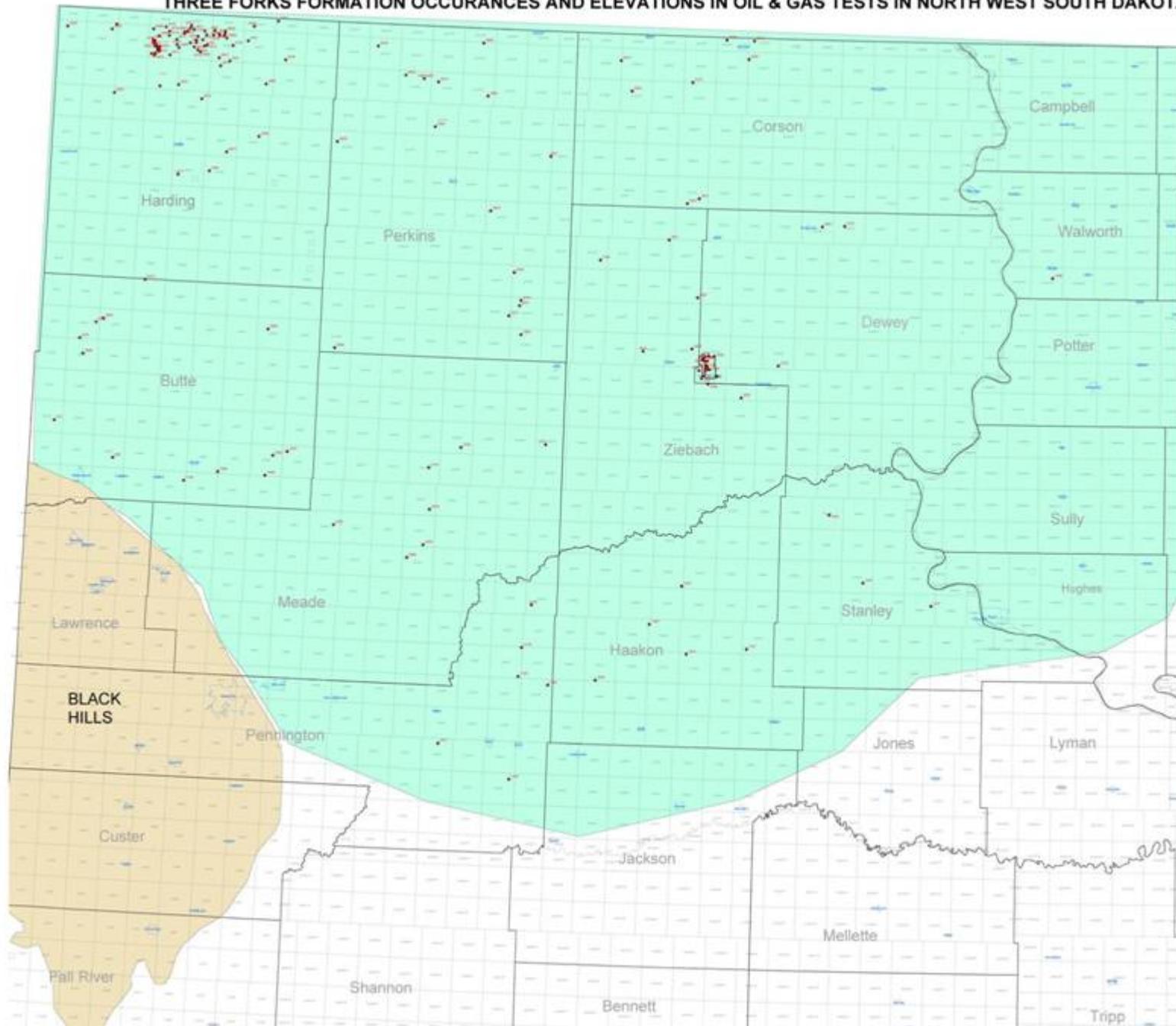
DISCUSSION

This chart is a compilation of geophysical log cross sections (A-A' and K-K') modified from Fox, J.E., McCormick, K.A., and Haggar, T.N., 2009, Cross Sections Showing Geophysical Logs of Phanerozoic Rocks in South Dakota: South Dakota Geological Survey, Oil and Gas Investigations 2.

The enlarged cross sections to the left and right were prepared by K.A. McCormick (DENR South Dakota Geological Survey), and the Three Forks Shale tops and bottoms were picked by F.V. Steece and G.L. (Mack) McGillivray (DENR Oil and Gas Section). The South Dakota picks were based on correlations with logs and publications from North Dakota (Julie LaFever and Stephen Nordeng, North Dakota Geological Survey) and Manitoba (Pamela Fulton-Regala and C. Winter, Manitoba Geological Survey).

This chart is preliminary, and is based on log interpretations only. Logs have not been compared with sample cuttings or core.

THREE FORKS FORMATION OCCURANCES AND ELEVATIONS IN OIL & GAS TESTS IN NORTH WEST SOUTH DAKOTA



Scale 1:350,000



WILLISTON BASIN



While every effort has been made to ensure the integrity of this map and related data upon which it is based, the South Dakota Department of Environment and Natural Resources makes no representation or warranty, expressed or implied, with respect to its accuracy, completeness, or usefulness for any particular purpose or use.



Compiled by Mack McGillivray, April 2010

FOR MORE INFORMATION,

SEE OUR WEBSITE <http://denr.sd.gov/des/og/oghome.aspx>

OR CONTACT:

FRED STEECE (SUPERVISOR) email: fred.steece@state.sd.us

MACK MCGILLIVRAY (SENIOR GEOLOGIST) email: mack.mcgillivray@state.sd.us

**SOUTH DAKOTA DEPARTMENT OF ENVIRONMENT & NATURAL RESOURCES
MINERALS & MINING PROGRAM - OIL & GAS SECTION**

**2050 WEST MAIN, SUITE #1
RAPID CITY, SD 57702-2493**

PHONE: (605)394-2229 FAX: (605)394-5317