Re-examination of Utah's oil shale resources: Historical database and new research

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ABSTRACT

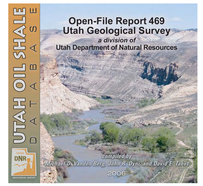
With the recent increase in crude oil prices and concerns over diminishing conventional reserves, the Utah Geological Survey has begun to re-examine the state's oil shale resource. A major component of this process was to collect and preserve historical oil shale data from studies conducted in Utah and present it in a useable electronic format for the business and scientific communities. Files in this database include Fischer assays made from drill cores or cuttings for 581 unique boreholes; scanned geophysical logs for 173 different boreholes, along with an inventory of paper logs for an additional 290 wells available in the Utah Geological Survey's library; spotty to complete formation-top information for key beds in the Green River Formation for over 1000 different wells; detailed lithologic descriptions for 168 wells; an overview resource map; and an extensive oil shale bibliography for research done within the state.

Most of the historical oil shale resource assessments conducted in Utah concentrated on the Green River Formation within the southeastern part of the Uinta Basin. This area holds the thickest and richest oil shale deposits in Utah, but other significant areas within the basin warrant further study. We have broadened our attention to include the entire Uinta Basin. Using old Fischer assay analyses as our guide, we looked at several geophysical logs from oil and gas wells and picked tops for several key oil shale beds. Using this new information, we are developing a better idea of the overall oil shale resource for the state of Utah.

UTAH OIL SHALE DATABASE

UGS Open-File Report 469

Collaboration between the Utah Geological Survey, U.S. Geological Survey, and the U.S. Bureau of Land Management

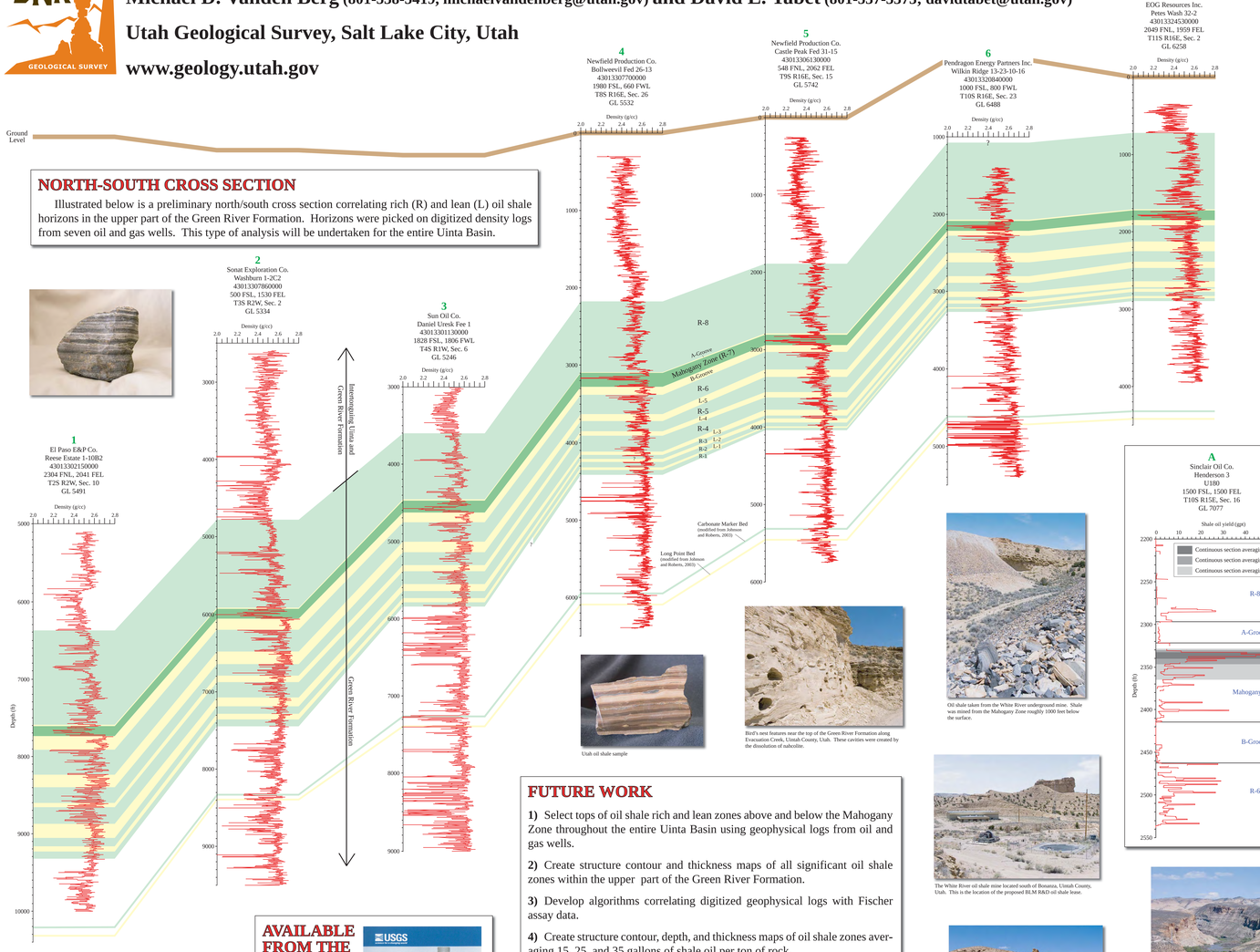


Contents:

1) Fischer assays for 581 wells
   - Excel and Text files
   - Limited pdf files of original reports
2) Lithologic logs for 168 wells
   - Pdf or Tiff files
3) Geophysical logs for 173 wells
   - Tiff files
   - An inventory of paper logs for an additional 290 wells available in the UGS library
4) Formation tops data for over 1000 wells
   - Excel or Text files
5) Extensive Utah oil shale bibliography
   - 981 references
6) Preliminary Utah oil shale resource map
   - New Mahogany bed outcrop coverage
   - Location of wells in database
   - Preliminary 25 gpt zone isopachs

NORTH-SOUTH CROSS SECTION

Illustrated below is a preliminary north/south cross section correlating rich (R) and lean (L) oil shale horizons in the upper part of the Green River Formation. Horizons were picked on digitized density logs from seven oil and gas wells. This type of analysis will be undertaken for the entire Uinta Basin.



Utah oil shale sample

Bird's nest features near the top of the Green River Formation along Evacuation Creek, Uintah County, Utah. These cavities were created by the dissolution of nahcolite.

Oil shale taken from the White River underground mine. Shale was mined from the Mahogany Zone roughly 1000 feet below the surface.

The White River oil shale mine located south of Bonanza, Uintah County, Utah. This is the location of the proposed BLM R&D oil shale lease.

The boundary between the Uinta and Green River Formations, located near Evacuation Creek, Uintah County, Utah.

Outcrop of the Green River Formation along the White River, Uintah County, Utah.

FUTURE WORK

1) Select tops of oil shale rich and lean zones above and below the Mahogany Zone throughout the entire Uinta Basin using geophysical logs from oil and gas wells.

2) Create structure contour and thickness maps of all significant oil shale zones within the upper part of the Green River Formation.

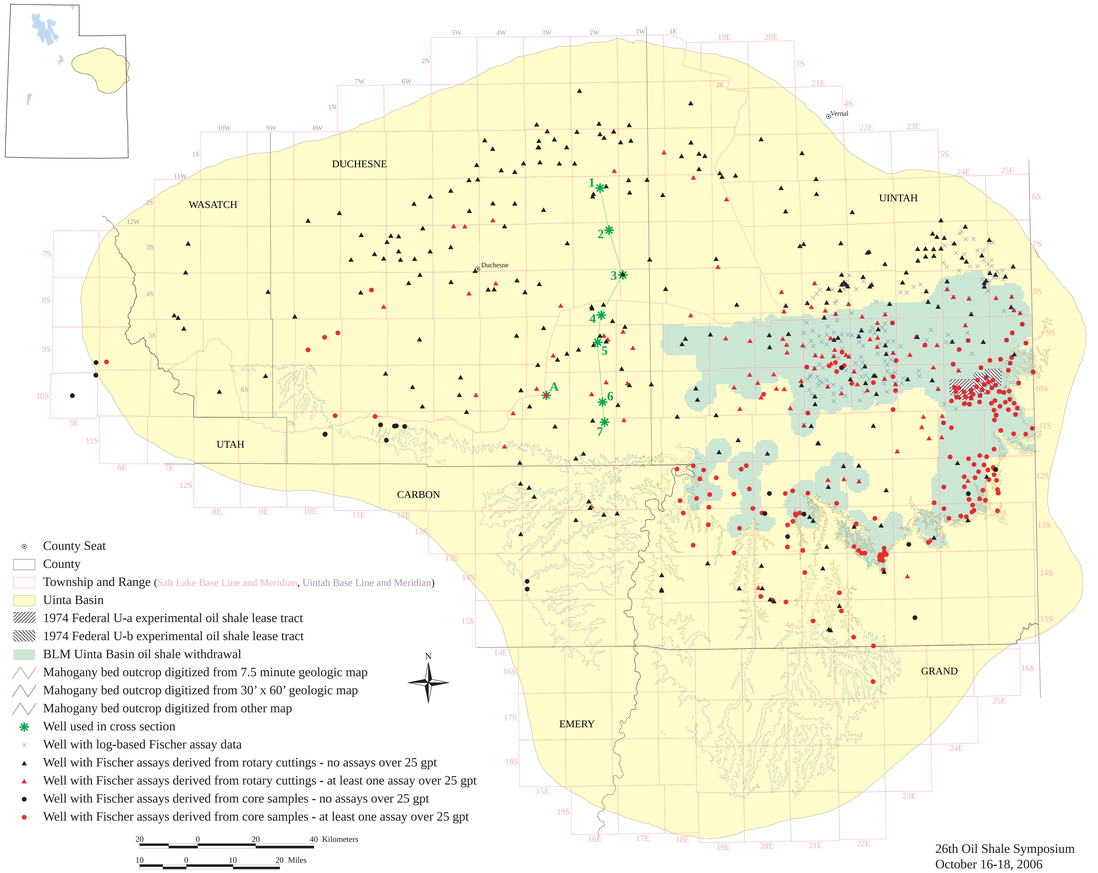
3) Develop algorithms correlating digitized geophysical logs with Fischer assay data.

4) Create structure contour, depth, and thickness maps of oil shale zones averaging 15, 25, and 35 gallons of shale oil per ton of rock.

5) Create regional cross sections illustrating structure and correlation of oil shale zones.

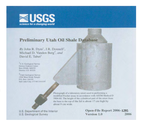
6) Determine areas favorable for surface mining, underground mining, and in-situ extraction.

7) Develop new shale oil resource estimates for the Uinta Basin of Utah.



AVAILABLE FROM THE USGS

Preliminary Utah Oil Shale Database, Open-File Report 2006-1295



ACKNOWLEDGEMENTS

Funding and historical data provided by the U.S. Bureau of Land Management. Historical data and expertise provided by the U.S. Geological Survey, especially John R. Dyni and John R. Donnell.

26th Oil Shale Symposium
October 16-18, 2006