SUNNYSIDE TAR SAND DEPOSIT: DATA AND REFERENCES FROM INDUSTRIAL EXPLORATION PROJECTS

compiled by J. Wallace Gwynn

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UTAH GEOLOGICAL SURVEY
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INTRODUCTION

Sources and Conversion of Data

In 1999, Amoco Minerals Company donated a large volume of data relating to Amoco's tar-sand operation to the Utah Geological Survey (UGS). Most of the data were generated by Amoco and other companies that conducted tar-sand exploration activities in the vicinity of Sunnyside, Carbon County, Utah. The documents filled eleven storage boxes, currently housed at the UGS' Utah Core Research Center, and include reports, maps, cross sections, geophysical logs, geochemical data, and core photographs.

To make these data more accessible to potential users, I scanned most of the geological material that seemed relevant for assessing the resource potential of the Sunnyside tar sand deposit. Geophysical logs were scanned and stored in digital formats (.jpg or .tif). Amoco's mining plans and information not directly applicable to the area's resource potential were not scanned. Most of the tabular data from the paper copies of core-hole and outcrop sections were converted to Microsoft Excel™ spreadsheet format. In a few cases, very lengthy, handwritten data tables were not converted to Excel, but were captured in .pdf format. All of the applicable references and other sources of data are presented in .pdf format.

Core Hole and Outcrop Section Locations

Most core hole and outcrop section locations were initially identified on logs or in data sources by township, range, section, and the first 1/4 section at best. From Calkin's (1990) Regional Map – Sunnyside Tar Sands, the location of each core hole and section was determined to the nearest ¼ ¼ ¼ section. Using the same map, Taylor Boden of the UGS determined both UTM Zone 12 and latitude/longitude locations as accurately as possible. I used one or both of these location identifiers to site each of the core holes and outcrop sections.

Location and Access

The Sunnyside tar sand deposit is located in Carbon County, Utah, about 25 to 30 miles east of Price, in the vicinity of Bruin Point on the Roan Cliffs. Access to the area is by way of Whitmore Canyon heading north out of the town of Sunnyside.

The area covered by the Amoco information, shown in figure 1, includes all or parts of T. 12–14 S., R. 13–15 E., Salt Lake Base Line and Meridian. The tar sands are exposed on the southwest-facing Roan Cliffs at elevations from 9000 to 10,000 feet.

GEOLOGY

The following description of the geology in the Sunnyside area is taken from Calkin (1983). The Sunnyside tar sand deposit is located stratigraphically in the Green River Formation, which has been divided into three members; from top to bottom these are the Parachute Creek, Garden Gulch, and Doug-

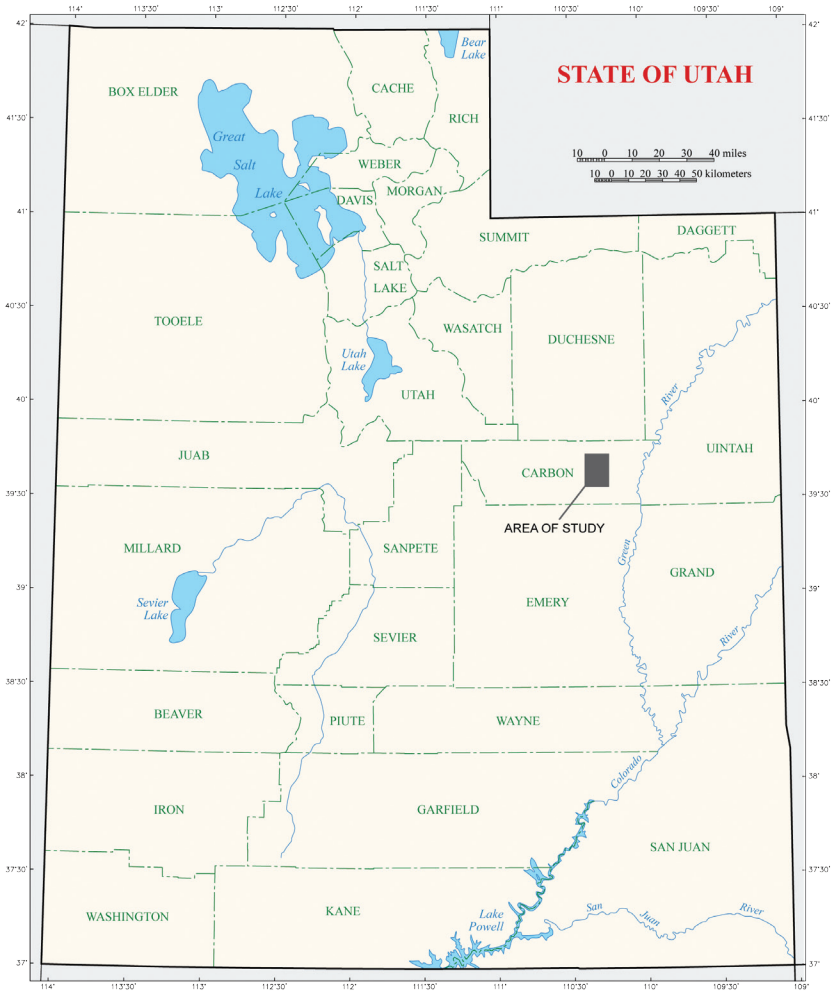

Figure 1. *Location of Sunnyside tar sand area covered by the Amoco data.*

las Creek Members. The Parachute Creek Member represents the lake facies of Eocene Lake Uinta, deposited in prodelta and delta-front environments. This member is characterized by laminated tan to buff shales and thin, discontinuous bituminous sheet sands. The Garden Gulch Member represents the shore facies, which includes nearshore, bay, beach, and bar depositional environments. This member consists of fossiliferous limestones and poorly bedded greenish gray shales. The Douglas Creek Member consists of red shales and massive, bituminous sandstones, and represents deltaic facies deposited in channels, levees, and marshes.

The general strike of the sedimentary beds is N 25º W with an average dip of 5º NE; dips range from 3º to 8º NE (see figure 2). The beds have been tilted only slightly from their original horizontal position, and structural deformation and faulting is minimal.

The tar sands in the Sunnyside area are localized within porous and permeable sandstones, siltstones, and limestones in the middle portion of the Green River Formation. The majority of bituminous zones are located within sandstone bodies in the upper portion of the Douglas Creek Member and in the Garden Gulch Member.

Detailed descriptions of the geology, structure, stratigraphy, mineralogy, and other information, are found in the reports by Boyle (1981), Calkin (1981-83, 1985, 1987-91), Combs (1967), Edwards (1982), Dolcater (1988), Morrison and Knudsen (1984), Noon (1989), Remy (1984, 1991), Robinson (1981), and Tampa (1989a, b, and c), all of which are on file at the Utah Core Research Center. Other references included in the "Selected Bibliography" list can be found in Gwynn and Hanson, 2007 (updated 2009).

DATA FOLDERS IN APPENDIX

The core analyses, Soxhlet extraction data, geophysical logs, core photographs, and other information for assessing the resource potential of the Sunnyside tar sand deposit are contained in the following 24 folders. The file type (Excel, pdf, tif, or jpg) is indicated at the end of each folder name.

1. Amoco & Great Natl wells bitumen grade: one Excel spreadsheet.
2. Amoco core holes CH-1 to CH-72 zone data: one Excel spreadsheet.
3. Amoco core holes CH-13 to CH-33c data: one Excel spreadsheet and pdf file of originals.
4. Amoco core holes CH-49 to CH-63 oil content: one Excel spreadsheet.
5. Amoco core holes CD-1 to CD-3 Soxhlet data: one Excel spreadsheet.
6. Amoco core holes MP-1 to MP-6 Soxhlet data: one Excel spreadsheet.
7. Amoco holes AK-1 to AK-7 data: one Excel spreadsheet.
8. Amoco measured sections 1 to 61: seven pdf files of outcrop descriptions.
9. Amoco RC, RCT, SS-NW, WCT and surface Soxhlet data: one Excel spreadsheet.
10. Amoco sections & misc wells - zone data: one Excel spreadsheet.
11. Amoco SS-NW-1, 2, 4, 5, 6, and 7 Assays: one Excel spreadsheet.
12. Amoco-Kaiser core holes 1 to 7 Soxhlet data: seven pdf files of analytical reports.
13. ARCO wells 1, 2, 3, 5 poro-perm and fluid data: one Excel spreadsheet.
14. Bruin Point core hole 1 bitumen & water content: one Excel spreadsheet.
15. Campbell and Dixon measured section: one Excel spreadsheet and one pdf file.
16. Great Natl core holes 13 and 14, 14A: one Excel spreadsheet and two pdf files of lithology logs.
17. Loc & tar sand for core holes & measured sections: one Excel spreadsheet.
18. Maps of Sunnyside TS area or deposit: two jpg files of scanned map.
19. Phillips Sunnyside 1, 2, and 3 core descriptions: three pdf files.
20. Photographs Amoco holes CH-1to CH-72 and others: numerous jpg files of core photographs.
21. Shell core holes 1-6, poro-perm & core descriptions: ten pdf files.
22. Signal Horizontal CHs 101 and 102: one pdf file of porosity, permeability, and lithology data.
23. Signal-Sunnyside 1 core analyses: one Excel spreadsheet and one pdf file of porosity, permeability, and oil saturation data.
24. Sunnyside Well-Log and Measured Section Scans: numerous tif files of scanned core and outcrop logs.

ADDITIONAL SOURCES OF INFORMATION AND DATA

There is a wealth of information and data on the Sunnyside tar sand deposit besides that which has been extracted from the eleven boxes of Amoco data. References for these sources of information are found in Gwynn and Hanson, 2007 (updated 2009). These information sources can be broadly grouped as follows: geological and mineralogical investigations; economic, socioeconomic and environmental studies; tar sand separation and bitumen upgrading processes; raw and extracted bitumen chemistry and physical property characterizations; water use and availability studies; potential use investigations; process patents; and mining potential evaluations. No attempt has been made to include these materials in this summary report.

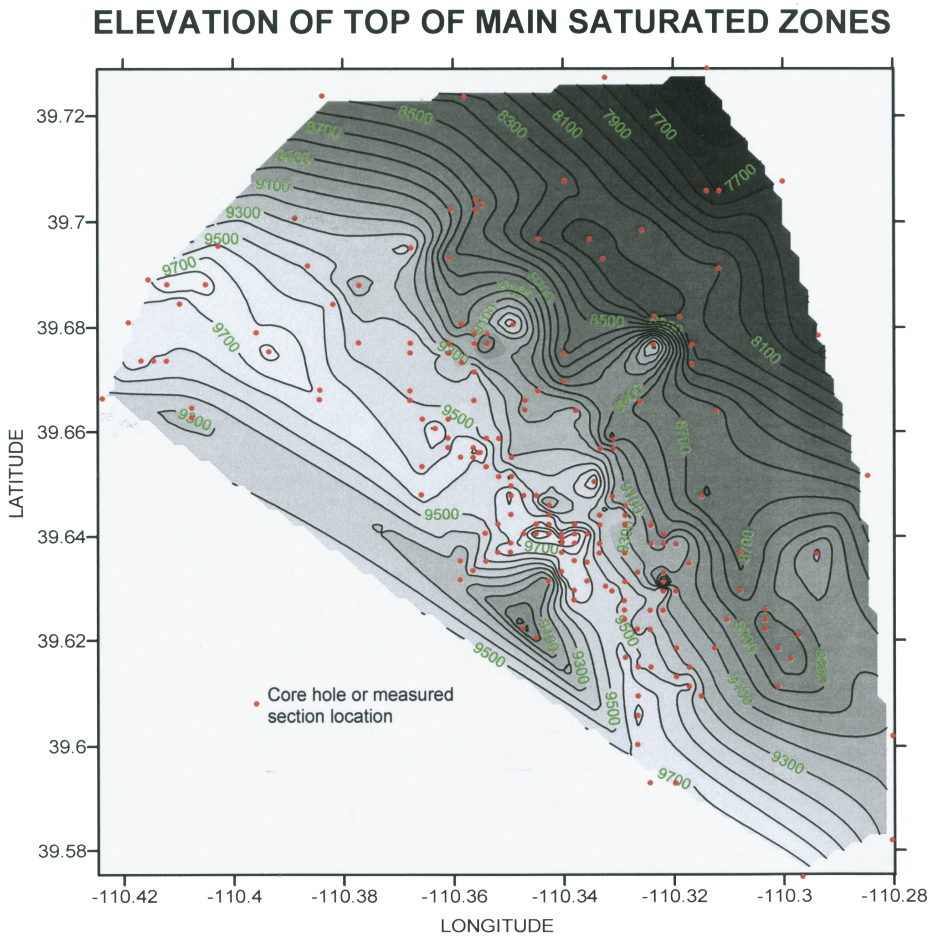

Figure 2. *Northeast-dipping structure contours on top of main saturated tar sand zones.*

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