Introductory Comments:

This material was presented at a Department of Natural Resources Technical Review Meeting held in Anchorage on March 26th, 2008. This public gathering was aimed at creating a venue to formalize the rapid communication data and results from ongoing work by the Division of Geological & Geophysical Surveys (DGGS) and Division of Oil & Gas (DOG). Additionally, this meeting sought to stimulate discussion on the petroleum geology of northern Alaska.

The following presentation was created and delivered by Marwan Wartes (DGGS). The version included here is only slightly modified from the original; in the absence of a speaker, some slides have been annotated to improve clarity and any animations have been removed.

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The Colville Basin of Alaska’s North Slope represents one of the most promising onshore exploration frontiers in North America.
Primary Investigators / Collaborators

DGGS
- M. Wartes
- D. LePain
- R. Gillis
- R. Reifenstuhl
- P. Delaney
- A. Loveland
- R. Swenson

DOG
- P. Decker
- K. Helmold
- D. Shellenbaum

UAF
- W. Wallace
- M. Whalen
- P. McCarthy

Students
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- P. Flaig
- J. Mongrain
- A. Duncan

USGS
- J. Dumoulin
- D. Houseknecht
- C. Schenk
- T. Moore
- C. Potter

Consultant
- G. Mull
DGGS / DOG North Slope Program

- Stratigraphic and structural studies of economically significant units
- Characterization of the regional petroleum system (source rock geochemistry and reservoir quality)
- Detailed 1:63,360-scale geologic mapping of economically significant areas

Funding sources
- DGGS / DOG general funds
- State capital improvement grants
- Federal STATEMAP
- Industry consortium pays for operational expenses and intern support
SUMMARY PROPOSAL FOR THE ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS NORTH SLOPE PROGRAM:

PETROLEUM-RELATED GEOLOGICAL STUDIES IN THE BROOKS RANGE FOOTHILLS AND NORTH SLOPE, ALASKA

2008 Field Program

Research to be conducted by:

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March, 2008
2007 Industry Support

Anadarko  FEX
BG Alaska  Chevron
Petro-Canada  Pioneer Natural Resources
ENI  Shell
ConocoPhillips
Student training (internships)

Scientific / logistical support for theses

UAF Graduate Students

- Dolores van der Kolk
- Peter Flaig
- Jake Mongrain
- Rebecca Bailey (BP)
- Alec Duncan (BP)
- Jesse White (Kinderhook-Morgan)
Annual Field Tour

- Overview of stratigraphy and structure relevant to the North Slope petroleum system
- Visit key localities
- Consider new results
Location Map—2007 Field Tour
2007 DGGS Tour Localities

Day 1

Stop 1.1 Fortress Mtn Fm fan delta, Atigun syncline
Stop 1.2 Nanushuk Fm shoreface, Slope Mountain
Stop 1.3 Nanushuk Fm fluvial, NE of Icecut
Stop 1.4 Torok Fm turbidites, Sagavanirktok R/Lupine R

Day 2

Stop 2.1 Gilead Ss (Torok Fm) turbidites, Ivishak River
Stop 2.2 Seabee Fm turbidites, Hue Sh-equivalent source, & basal Canning Fm structure, Sagashak Creek
Stop 2.3 Canning Fm turbidites, Sagashak Creek
Stop 2.4 Schrader Bluff nonmarine to shallow marine, Toolik River

2007 camp – Galbraith Lake
2007 Field Tour Stops

See Wartes and Decker, 2008

Mull et al., 2003
PROGRAM OBJECTIVE

Provide high quality, publicly available data to stimulate exploration in northern Alaska

PUBLICATION LIST FROM THE ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS (DGGS) BROOKS RANGE FOOTHILLS AND NORTH SLOPE PROGRAM (1994-PRESENT)


Ongoing work (in prep)

- Geologic Maps (Cobblestone, Kanayut, & Kavik)
- Brookian sedimentology & stratigraphy
- Kemik Ss facies and paleogeography
- Organic geochemistry
- Brookian petrology & reservoir quality
- Subsurface studies
- Thermochronology/structure/burial history
- Gravity Survey
- Biostratigraphy (megafossil and microfossil)
2007 Program Focus
2007 Program Focus

- **NORTHERN (East-central North Slope)**
  - *Sedimentology and Sequence Stratigraphy of Upper Cretaceous and Tertiary Exposures in the Sagavanirktok River Area*
  - *Stratigraphy, Structural Geology, and Depositional Setting of Albian-Turonian Rocks in the Gilead Area*

- **SOUTHERN (Proximal Foreland Basin)**
  - *Reconstruction of the Lower Cretaceous Depositional System, Southern Colville Basin*
  - *Structural Evolution of the Brooks Range Foothills—Constraining Burial History and Timing in the Foothills Province*

- **GENERAL**
  - *Controls on Brookian Sandstone Reservoir Quality*
  - *Source Rock Quality and Hydrocarbon Occurrence*
  - *Geologic Mapping*
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<th>Topic</th>
<th>Presenter(s)</th>
<th>Start Time</th>
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<tbody>
<tr>
<td>Safety comment</td>
<td>BP rep</td>
<td>8:30</td>
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<tr>
<td>Introduction</td>
<td>R. Swenson</td>
<td>8:35</td>
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<tr>
<td>North Slope program overview</td>
<td>M. Wartes</td>
<td>8:45</td>
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<td>Summary of recent North Slope studies with an emphasis on work in</td>
<td>P. Decker &amp; M. Wartes</td>
<td>9:00</td>
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<td>Structural and stratigraphic investigations of Albian-Turonian</td>
<td>P. Decker</td>
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<td>Surface to subsurface correlations, Sagavanirktok River area,</td>
<td>P. Decker</td>
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<td>east-central North Slope</td>
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<td>POSTERS &amp; ADDITIONAL DISCUSSION OF MORNING TOPICS</td>
<td>Staff</td>
<td>10:00-11:30</td>
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<tr>
<td>LUNCH</td>
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<td>11:30 - 1:00</td>
</tr>
</tbody>
</table>
POSTERS & ADDITIONAL DISCUSSION

- Preliminary interpreted regional seismic lines
- Preliminary annotated well log cross sections
- Geochemistry and stratigraphy of the Pebble Shale (eastern North Slope)
- Turonian-Campanian facies analysis ("Sagashak" Creek)
- Schrader Bluff and Prince Creek formations measured sections (Toolik River)
- Schrader Bluff Formation sedimentology and stratigraphy (Ivishak River)
- Cenomanian(?)-Turonian(?) measured section and facies (Sagavanirktok rivers)
- Measured sections and facies in the Nanushuk Formation (Colville River)
- Summaries of past work on the Nanushuk Formation (Tuktu escarpment)
- Preliminary petrography and reservoir quality of the Fortress Mountain Formation
- Summaries of past work on the Fortress Mountain Formation
- Geologic Mapping in the Kavik area
- Geologic Mapping in the East-central Brooks Range Foothills