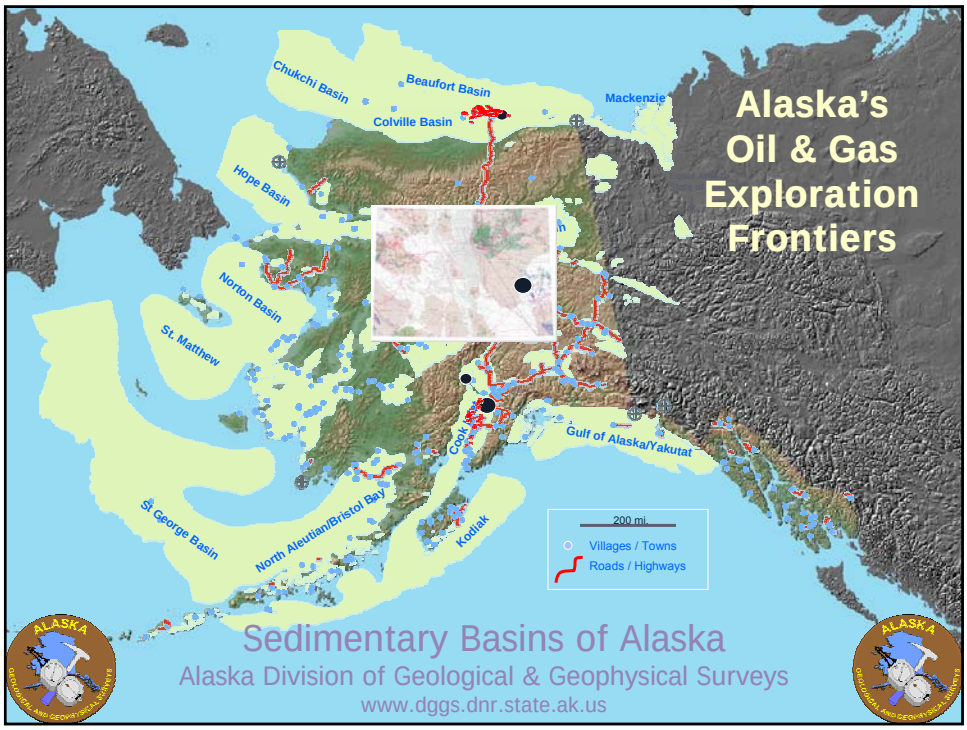
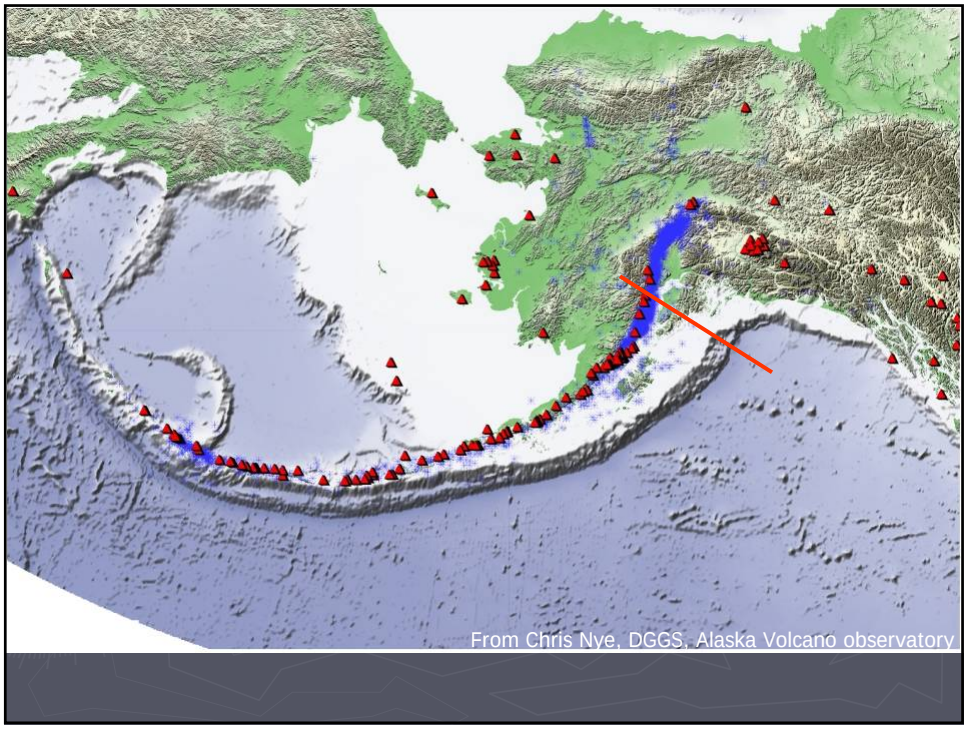
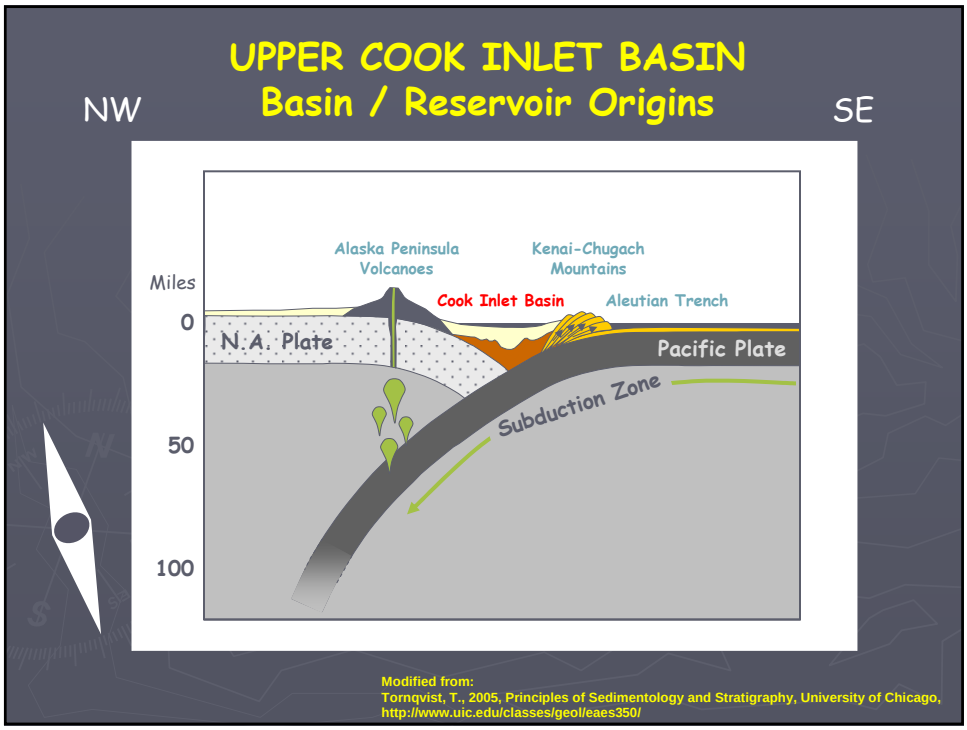
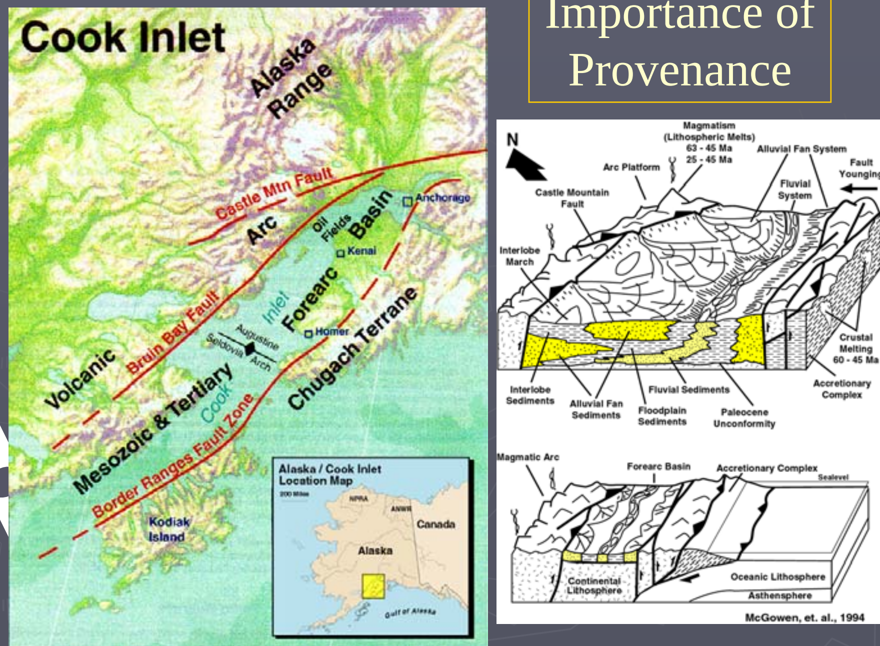

Alaska Geologic CO_2 Storage Potential
The Cook Inlet Basin
Alaska Division of Geological & Geophysical Surveys
Alaska Division of Oil & Gas
Bob Swenson
State Geologist
&
Laura Silliphant
Petroleum Geologist

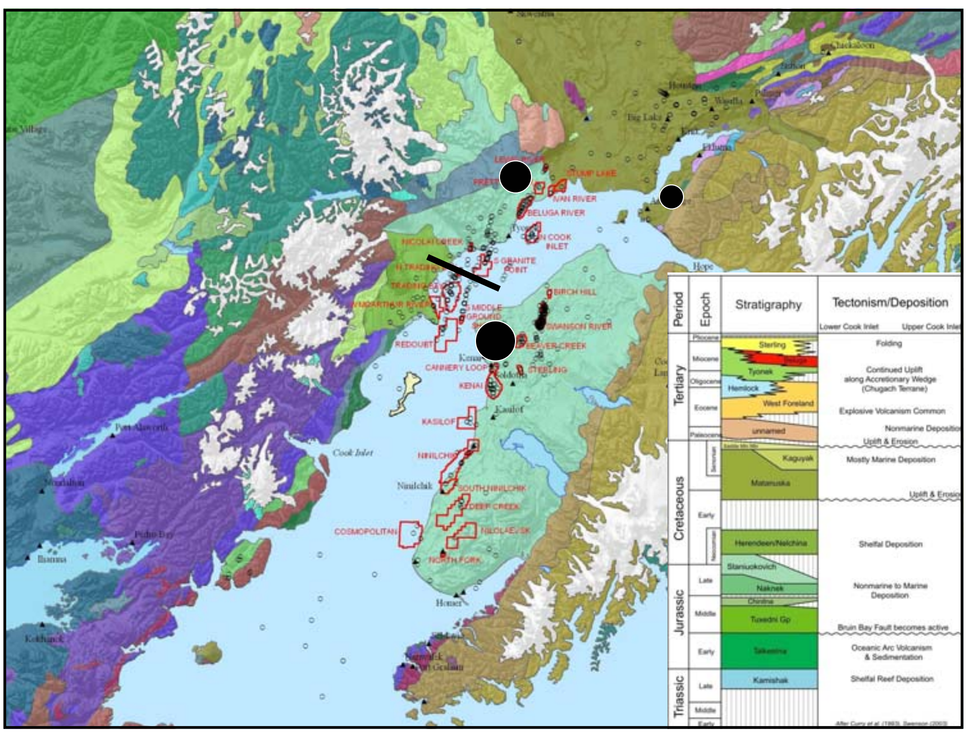

Alaska's
Oil & Gas
Exploration
Frontiers
Chukchi Basin
Beaufort Basin
Colville Basin
Mackenzie
Hope Basin
Norton Basin
St. Matthew
Cook
Gulf of Alaska/Yakutat
St George Basin
North Aleutian/Bristol Bay
Kodiak
200 mi
Villages / Towns
Roads / Highways
Sedimentary Basins of Alaska
Alaska Division of Geological & Geophysical Surveys
www.dggs.dnr.state.ak.us


From Chris Nye, DGGS, Alaska Volcano observatory


UPPER COOK INLET BASIN
Basin / Reservoir Origins
NW
SE
Miles
0
50
100
Alaska Peninsula Volcanoes
Kenai-Chugach Mountains
Cook Inlet Basin
Aleutian Trench
N.A. Plate
Pacific Plate
Subduction Zone
Modified from:
Tornqvist, T., 2005, Principles of Sedimentology and Stratigraphy, University of Chicago, http://www.uic.edu/classes/geol/eaes350/

Importance of Provenance

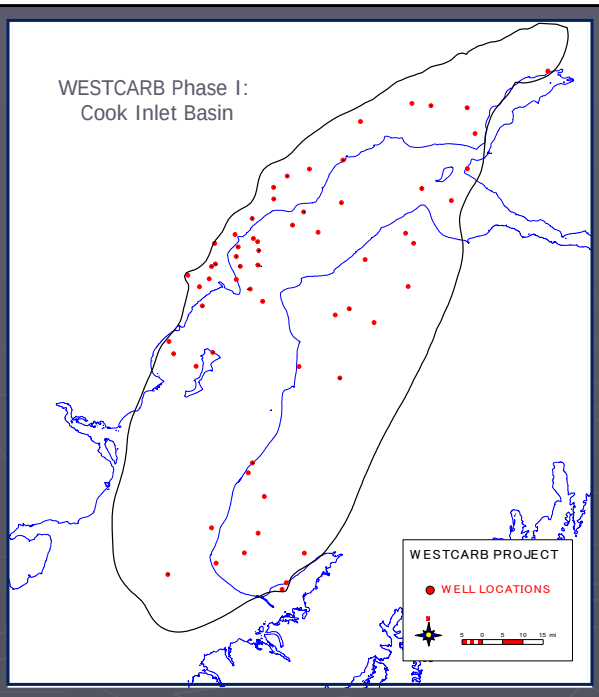


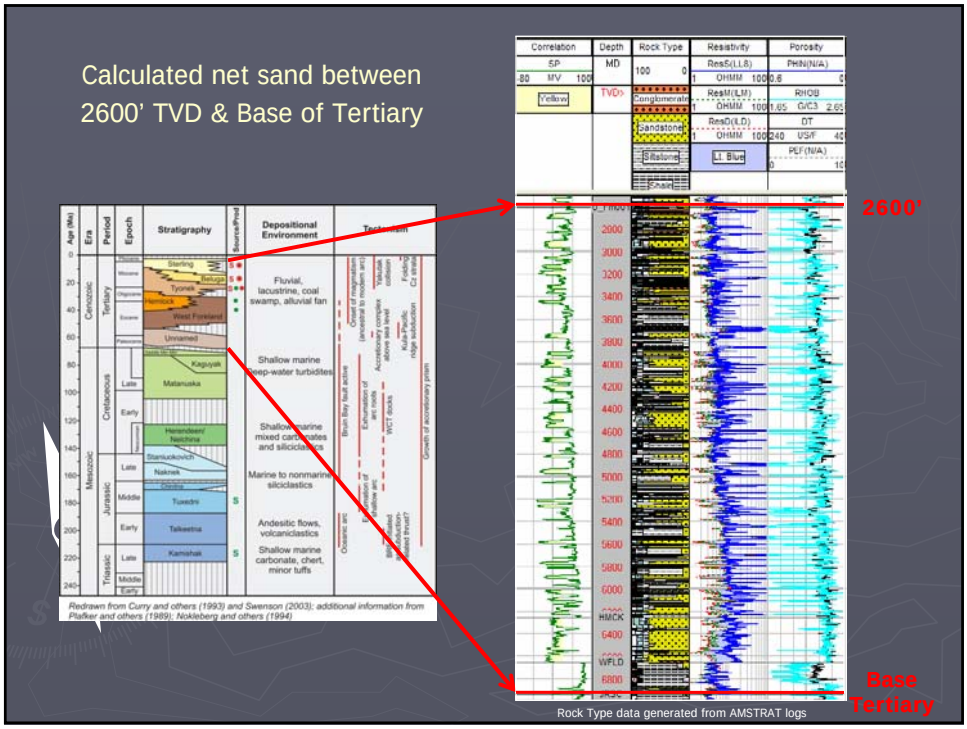


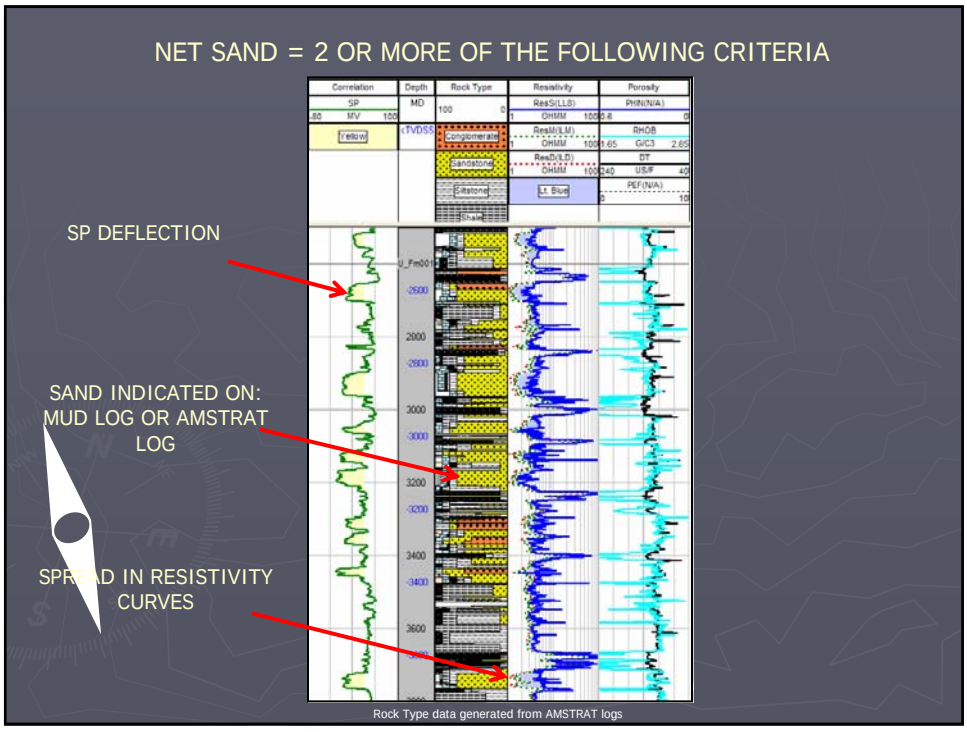
WESTCARB Phase I: Cook Inlet Basin

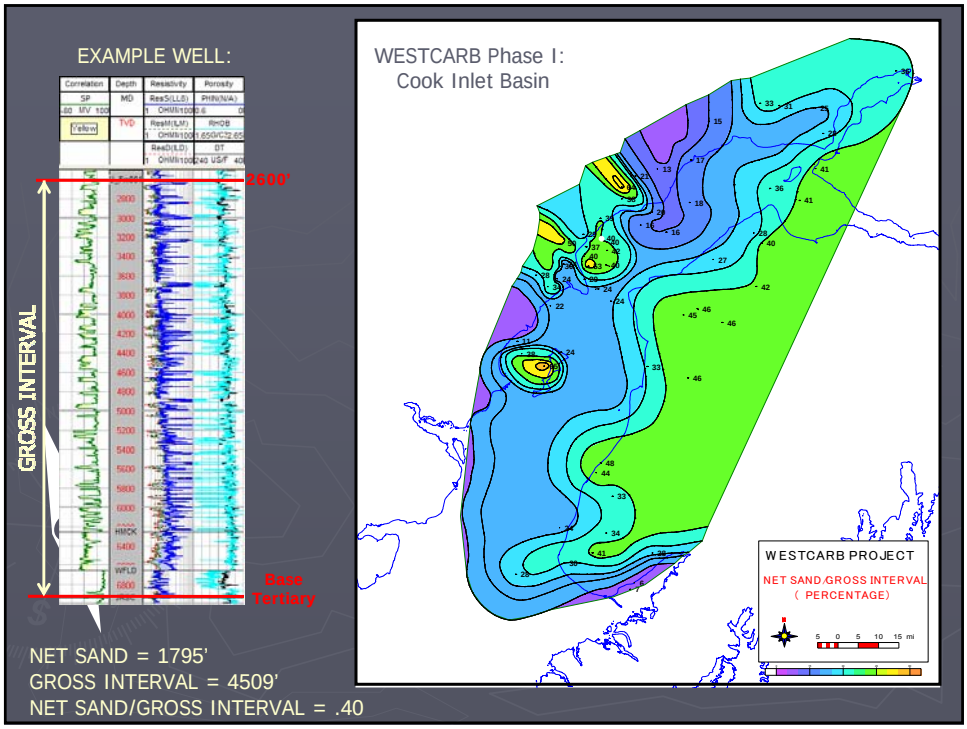
- Incorporated 61 wells distributed around the basin
- Calculated net sand between 2600' TVD and base of Tertiary section
- Net sand includes oil, gas, and saline sands
- Created a net sand to gross interval grid
- Created total thickness grid of Tertiary Section
- Multiplied net to gross grid by total thickness grid
- Calculated average porosity value for reservoir sands
- Calculated total pore volume

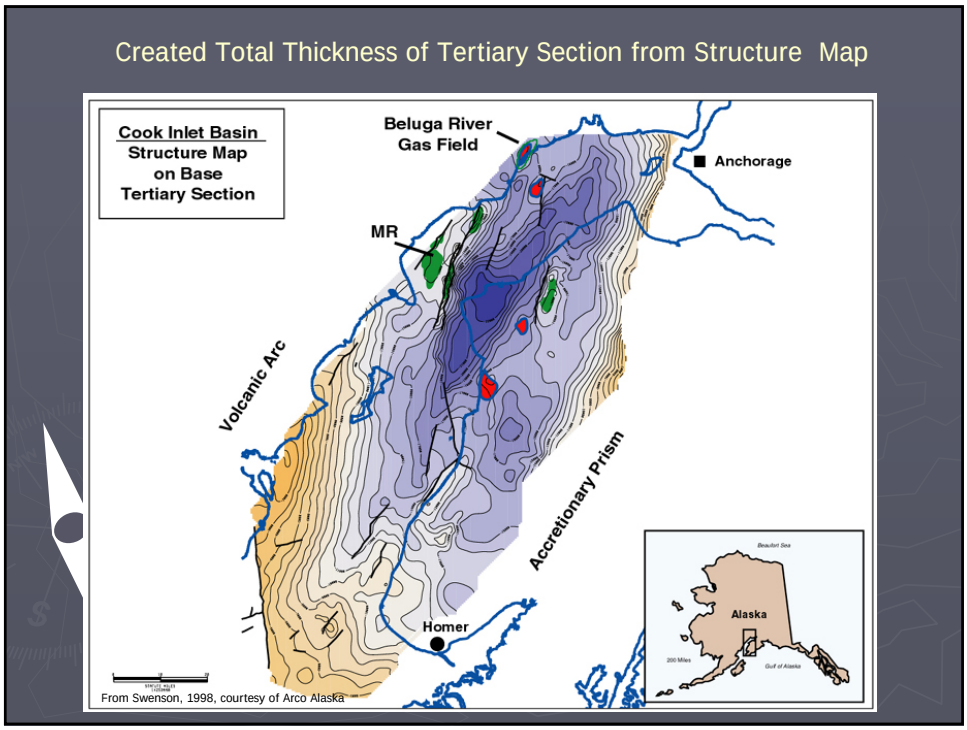
Incorporated 61 wells



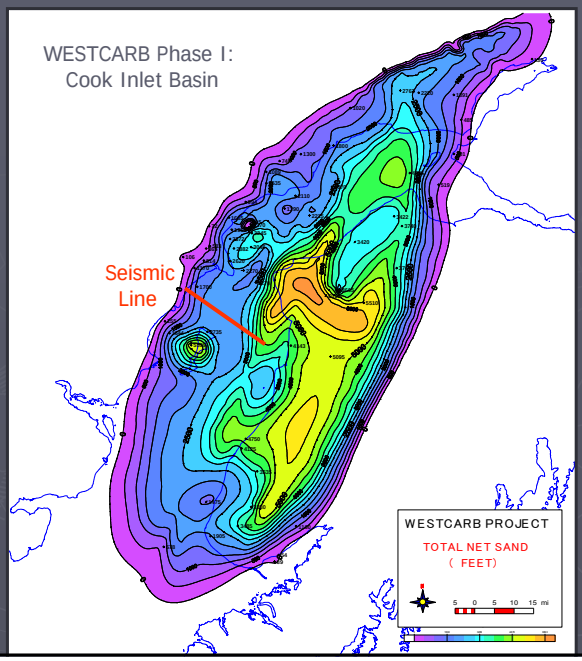

Calculated net sand between
2600' TVD & Base of Tertiary
Correlation
Depth
Rock Type
Resistivity
Porosity
SP
MD
ResS(LLS)
PHIN(N/A)
ResM(ILM)
RHOB
ResD(LLD)
DT
PEF(N/A)
Yellow
TVD>
Conglomerate
Sandstone
Siltstone
Lt. Blue
Shale
2600'
Base Tertiary
Stratigraphy
Depositional Environment
Tectonism
Redrawn from Curry and others (1993) and Swenson (2003); additional information from Plafker and others (1989); Nokleberg and others (1994)
Rock Type data generated from AMSTRAT logs


NET SAND = 2 OR MORE OF THE FOLLOWING CRITERIA
SP DEFLECTION
SAND INDICATED ON:
MUD LOG OR AMSTRAT
LOG
SPREAD IN RESISTIVITY
CURVES
Rock Type data generated from AMSTRAT logs


EXAMPLE WELL:
2600'
GROSS INTERVAL
Base Tertiary
NET SAND = 1795'
GROSS INTERVAL = 4509'
NET SAND/GROSS INTERVAL = .40
WESTCARB Phase I:
Cook Inlet Basin
WESTCARB PROJECT
NET SAND/GROSS INTERVAL
(PERCENTAGE)


Created Total Thickness of Tertiary Section from Structure Map
Cook Inlet Basin
Structure Map
on Base
Tertiary Section
Beluga River
Gas Field
Anchorage
MR
Volcanic Arc
Accretionary Prism
Homer
Alaska
From Swenson, 1998, courtesy of Arco Alaska

Total Net Sand Map



WESTCARB Phase I: Pore Volume Calculation

Pore Volume Net Sand = (total net sand volume) * (Average porosity)

= (12,796,356,346 acre-ft) * (0.19)

= 2,431,307,706 acre-ft

= 2,431,307,706 acre-ft * 7758 barrels/acre-ft

= 18,862,085,181,130 barrels

***note: porosity value is still a work in progress


End