by W. H. Pierce
W. H. Pierce Exploration

Southern Arabian Basin Oil Habitat: Seals and Gathering Areas

This regional investigation contributes to the understanding of the influence and relationship of gathering areas and seals to oil habitat in the Arabian basin. Cross plots and cumulative frequency distribution plots characterize the hydrocarbon habitat and lead to the following inferences: gathering- or fetch-area size and contemporaneous peak-oil-generation rank as important factors in the accumulation of giant Middle East oil reserves. The importance of excellent seals to Middle East oil abundance should be moderated by recognition of the impact of widespread peak-oil-generation to seal effectiveness.

The highest frequency of fields with several stacked reservoirs occurs in areas of modern peak-source-generation. Thin seals can be effective. Gross seal lithology is not as important as previously thought. Vertical migration through seals is an important process. Seals leak but are effective. Cross plots of original oil in place versus field gathering area can help to identify areas of rich and/or thick source rock or sweet spots. Inefficiencies resulting from long distance migration are not apparent.

Sweetness map analysis—using gathering area with assigned oil-in-place values—results in an inferred source rock distribution that contrasts with published source rock distributions.

Biographical Sketch

Walter (Wally) H. Pierce grew up in Muncie, Indiana. He received an A.B. degree in geology and French from DePauw University. Leaving Indiana, he continued his education at the Colorado School of Mines for M.S. and Ph.D. degrees in geology. To support his studies at Mines, he worked in both the heavy metals branch and the petroleum geology branch of the USGS. He worked for Eddie D. Mckee of the USGS on the Supai Group of the Grand Canyon and carried this work farther west into western Arizona and southern Nevada for his Ph.D. work at CSM. He taught a variety of courses for over eight years as a geology faculty member at Ball State University, University of Georgia, and the Colorado School of Mines. Seventeen years ago he came to Houston to work for Amoco International.

While at Amoco he worked for Africa and Middle East new ventures, Madagascar, and Qatar exploration. Most recently, his Amoco specialization was in Middle East regional studies with projects involving resource assessment, strategic regional studies, and joint regional studies with other companies. The recent merger to form BP Amoco has resulted in Wally adjusting to life as a retiree/consultant.

Recently his technical interests have included the application of database programs to regional studies and hydrocarbon habitat, undiscovered reserve estimation and the statistical quantification of exploration difficulty, focusing methodologies for exploration work, oil versus gas distribution, habitat of stacked reservoir distribution, and the importance of gathering areas and seals in regional exploration. The paper presented here represents one of these interests for which Wally received an Amoco "Best Paper" award. □

HGS International Explorationists Meeting • Monday, May 17 • Westchase Hilton, 9999 Westheimer • Social 5:30 p.m., Dinner 6:30 p.m.