UNRUH, MARK E., and ROBERT W. RUFF, Converse Consultants, Anaheim, CA

Lacustrine Diatomaceous Deposits of Piute Valley, California and Nevada

A small, potentially economic deposit of diatomite occurs in Piute valley, near the California-Nevada border. Outcrops are found primarily in Secs. 21 and 28, T13N, R19E, San Bernardino Base and Meridian.

The deposit crops out over an area of approximately 1 mi^2 (2.6 km^2). The materials consist of diatomite interbedded with minor amounts of sand, silt, and volcanic ash. The sediments are capped by a layer of caliche. The deposit has been gently uplifted and has been dissected by erosion to expose at least 15 ft (4.6 m) of diatomite and associated sediments.

The deposit is lacustrine in origin. The entire deposit it thinly laminated with sand and silt lenses occurring mostly near the top. Predominantly diatomite occurs below this sequence. A cursory examination under the microscope showed approximately 80% diatomite. The beds dip either subhorizontal or 2 to 5° to the east in all occurrences.

Microscopically, the majority of the diatoms are rodlike or cylindrical in shape, which is typical of lacustrine diatoms found in the southwest. The individual diatoms are intact and show little or no alteration.

The material from the deposit has been used in the past as filler for wallboard and as insulation material.

VAN ATTA, ROBERT O., Portland State Univ., Portland, OR, and KEVIN B. KELTY, Diamond Shamrock Corp., Denver, CO

Nonmarine Lithofacies Included In Scappoose Formation, Northwest Oregon

Discovery of commercial quantities of gas near Mist, in northwest Oregon, has stimulated exploration activity and renewed interest in Tertiary stratigraphy of the region. The youngest rocks include the Scappoose Formation and the overlying Grande Ronde Basalt (middle Miocene, Columbia River Basalt Group). As originally described, the Scappoose Formation was said to be of late Oligocene to early Miocene age, based on fossils of "Blakeley age." However, recent work shows that basaltic conglomerate lenses in fluvial arkosic sandstone with interbedded marine siltstone and sandstone in the Scappoose Formation are coeval with the Grande Ronde Basalt. Chemical analyses of basalt clasts in the conglomerates and of flows of overlying Grande Ronde Basalt have the same diagnostic ratios of $(Na_2O + K_2O)/P_2O_5$, $(CaO + MgO)/P_2O_5$, and TiO_2/P_2O_5 and very similar trace-element compositions. Older basalts in the region, middle Eocene Tillamook Volcanics and late Eocene Goble Volcanics, which are other possible sources of the conglomerate clasts, have very different major oxide and trace-element compositions.

Identical conglomerates containing Grande Ronde basalt clasts are found overlying older, pre-Scappoose formations as well as between flows in Grande Ronde Basalt sections. The conglomerates and associated cross-bedded arkosic sandstones with mudstone rip-ups were deposited in channels and valleys eroded into and through the Scappoose Formation.

The Scappoose Formation was apparently deposited as a wave- and tide-dominated delta. Marine regression or progradation of shoreline was followed by development of a fluvial valley system which was filled and partially buried by Grande Ronde Basalt.

VON HUENE, R., J. AUBOUIN, M. BALTUCK, R. ARNOTT, J. BOURGOIS, M. FILEWICZ, R. HELM, Y. OGAWA, K. KVENVOLDEN, B. LIENERT, T. MCDONALD, K. MCDOUGALL, E. TAYLOR, and B. WINSBOROUGH

Preliminary Results, DSDP Leg 84, Middle America Trench Off Guatemala

The Middle America Trench off Guatemala, which was drilled on DSDP Legs 67 and 84, is part of a nonaccreting convergent margin. The igneous continental framework of Central America extends to the base of the landward trench slope. Ophiolitic rocks, which correspond to the acoustic basement seen in seismic records beneath a cover of Neogene slope deposits, were recovered at five sites (seven holes). This basement represents an ocean crust first tectonized in the pre-Campanian and emplaced in pre-early Eocene time; the basement is not a tectonic product of the present convergent margin. Subduction of sediment on the Cocos plate may result in the development of overpressures which was observed directly at four sites.

On Leg 84, gas hydrate was recovered at three sites and detected at five of the six sites drilled. It occurs dispersed in muddy sediment or in porous lithologies and in fractures. A distinctive gas composition and low salinity pore water were found associated with the gas hydrate. The source of the gas was mainly biogenic, but thermogenic gas apparently was present in fractures of the basement rock.

WAGNER, DANA B., Chevron U.S.A. Inc., Concord, CA

Foraminiferal Distributions and Environmental History of Quaternary San Francisco Bay

The Holocene San Francisco Bay and adjacent ocean-shelf foraminiferal fauna have been divided into five principal biofacies: brackish-water nearshore mudflat, marsh, normal bay, open bay, and open ocean. The open-ocean biofacies probably is restricted to the area outside the Golden Gate; at some localities individual specimens were found to occur within the open bay, but they were thought to have been current transported. By analogy, these biofacies provided the basis necessary for recognizing Pleistocene paleoenvironments in two bay cores.

Cold-water, open-ocean influence existed at the onset of Pleistocene deposition within the bay, reaching inland as far as the east side of Yerba Buena Island (core 88), and at times as far southeast as the Oakland Estuary (core 484). The degree of periodic open-ocean influence, both in its geographic extent and its duration, was far greater than anticipated. Fluctuations ranging from open-ocean to marsh conditions persisted throughout the Pleistocene and correlate with Pleistocene and Holocene periods of glacial and interglacial eustatic sea-level changes. No faunal evidence was found to indicate the existence of Pleistocene nearshore mudflat biofacies. This may have been indicative of either lack of preservation or rapidly changing environments. The core samples contained five species not found within the Holocene bay: *Bulimina marginata, Elphidium albiumbilicatum, Lagena filicosta, Oolina melo,* and *Globigerina quinqueloba.*

WEBB, GREGORY W., Univ. Massachusetts, Amherst, MA

Turbidite Reservoir Facies and Trap Types

Recognition of the turbidite nature of many petroleum-producing sands worldwide makes it imperative to understand both the facies types encountered and the trap types to be anticipated in future exploration and development work. Several facies models have been proposed, most of which are not readily usable with the data generally available in subsurface work. The facies analysis presented examines large-scale controls, such as climate, provenance, basin geometry, and tectonics, and then considers the various large to small-scale facies and sand-body geometries that result. Use of wire-line log pattern, dipmeter, and core descriptive data as criteria is emphasized. The newly recognized meander channel facies is shown to be important in prograded muddy slope areas. The concept of a "facies" as referring to a mappable assemblage of beds of varying natures and origins is favored, in contrast to the practice of assigning a separate facies designation to each single successive bed, with resulting uncertainty as to overall significance.

The author's trap-type classification, which includes canyon-dependent, fan-dependent, anticline-dependent, fault-dependent, and uplift topography-dependent traps, is used in conjunction with the facies analysis to predict the trap types most likely to be encountered in the various facies and basin settings. The trap classification itself is developed as a predictive tool rather than as a pigeonholing exercise.

WHITTAKER, ALUN, and RAFAEL GURVIS, Exploration Logging Inc.

Wellsite Geochemical Analysis in Frontier Exploration—Logistics, Benefits, and Examples

In the past 10 years, organic geochemistry has become an increasingly significant factor in petroleum exploration. In frontier exploration areas, the need for geochemical data during drilling operations, rather than months after a well is finished, is now well appreciated. Real-time geochemical data have proven to be an important additional parameter in exploration and well completion decisions.

Wellsite geochemistry mandates unique operational, technical, and data interpretation requirements. However, the timely nature of data availability during drilling operations as well as the ability for field geochemists to work closely with other wellsite personnel greatly enhances exploration efficiency. Sample procurement, preparation, and selection can be much more accurately realized by personnel familiar with local geology and a specific drilling operation. Furthermore, sample contamination by drilling fluid additives is more easily prevented, detected, and isolated from fresh samples at the wellsite.

YOUNGBERG, A. D., Laramie Energy Technology Center, Laramie, WY, and E. BERKMAN and A. ORANGE, Emerald Exploration Consultants, Inc., Austin, TX

Location of Burns and Faults at Hanna Underground Coal Gasification Area by Use of High-Resolution Seismic Survey

In November 1980, a high-resolution seismic survey was conducted at the Hanna underground coal gasification area. The objectives of the survey were to locate and characterize the burn cavity at the Hanna II, phases 2 and 3 gasification site, and to locate shallow geologic faults. Seismic data acquisition and processing parameters were specifically designed to emphasize reflections at the shallow, 200 to 500 ft (60 to 160 m) depths. A three-dimensional grid of data was obtained over the burn zone. Processing included time-varying filters, deconvolution, trace compositing, and two-dimensional, areal stacking of the data in order to identify anomalies. An anomaly was clearly discernible resulting from the rubble-collapse void in the burn zone. The anomaly was studied in detail and compared to synthetic models. The fault system was found to be a graben complex with antithetic faults. The fault system contains folded beds. A series of anomalies was discovered on the northeast end of one of the seismic lines. These reflections have been identified as underground mine adits from the old Hanna No. 1 coal mine.

AAPG RESEARCH CONFERENCE
Interactive Computer Applications in Petroleum Exploration
Keystone, Colorado
May 9-12, 1982

Abstracts

BANKS, RICHARD B., and JOSEPH K. SUKKAR, Scientific Computer Applications, Inc., Tulsa, OK

Complex Subsurface Analysis Using Interactive Modeling and Simulation Techniques

Many offshore producing regions (and some onshore regions, such as Prudhoe Bay) are complicated by dual nemeses: intersecting non-vertical faults and directional well bores. Fault occurrences are observed in well bores or on seismic lines. When many fault occurrences are present, it often is difficult to determine which fault cuts are associated with which faults. An interactive contouring system allows the user to try various ways of connecting fault occurrences to form (intersecting) fault surfaces in (subsurface) space.

Once the faults have been modeled, the next task is to model (reconstruct, contour) subsurface formations as they interact with the various faults. This task is difficult enough when there are many formations and many faults. The task is even more difficult when directional wells are involved, since isopachs needed for reconstruction (i.e., stacking) are hard to determine.

A multi-surface multi-fault contouring system is being used to perform these complex subsurface analyses. A case study from offshore Gulf Coast illustrates its use.

CARLBOM, INGRID, Schlumberger-Doll Research, Ridgefield, CT

Dipmeter Advisor Expert System

The dipmeter services offered by Schlumberger consist of measurements made in a well bore to determine the inclinations, or dip, of the bedding layers penetrated by the well. The measurements are represented on a log in the form of arrow plots, which indicate the magnitude and direction of the dip as a function of depth. Information about the underground structure and stratigraphy can be derived from arrow plot patterns on the dipmeter log in conjunction with other types of data from the borehole as well as some general knowledge of the geological area. Traditionally, interpretation of dipmeter data has been made by a human expert who identifies and decodes the arrow plot patterns.

The Dipmeter Advisor system is an application of artificial intelligence and expert system techniques to dipmeter log inter-