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Association Round Table

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Abstracts

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Wrench Faulting in Selected Areas of Permian Basin

Landsat and NASA High Altitude Special Mission Aircraft imagery have made it possible to define at least six separate lineament trends between the Amarillo-Wichita uplift (N62°W) and the Texas lineament (N54°W) that are 200 to 330 mi (320 to 530 km) long and oriented N54°W to N62°W. These long lineaments are thought to be P shears and are left-lateral wrench faults by definition. Wrench faults, transcurrent faults, and strike-slip faults are basically synonymous; all are shear faults. Wrench faults in the earth's crust are characterized by the following: (1) very long, straight traces; (2) high angle of dip (fault with over 70° dip should be examined closely); (3) en echelon nature of faulting; (4) angles between faults that suggest shear patterns; (5) earthquake history in the region; and (6) offsets.

This left-lateral wrench fault system has been demonstrated at the Carta Valley fault zone. The Permian surface between Brown-Bassett and JM field of Terrell, Crockett, and Val Verde Counties along the Pecos River has a fracture system that is compatible with wrench faulting. In Garza and Borden Counties, the elements of left-lateral wrench faulting can be demonstrated from high altitude aircraft imagery and demonstrated on the surface and in the subsurface with seismic support.

Surface lineaments are observed on Landsat imagery throughout the Permian basin and lead to the belief that the very long N54° to 62°W lineaments are P shears. The set oriented N86° ± E are the Riedel shears and the N36°E are conjugate Riedel shears. These form high angle en echelon faults of a left-lateral wrench fault system that can be documented with faulting at the surface in Borden and Garza Counties, and with the surface alignments being documented on CDP seismic lines in the subsurface.

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Nuclear Waste—Our Radioactive Hot Potato

Nuclear industry inevitably produces nuclear waste, whose prudent, prompt and economic disposal is important to the national welfare. Technological problems of containment and isolation have apparently been solved. Underground or "geologic" disposal sites have the potential for permanent isolation, with salt, basalt, granite, shale, and tuff currently receiving principal attention as repository host rocks. Bedded salt deposits may offer the principal mechanical advantages, but in the northwestern United States the abundance of basalt at existing test sites has made it the subject of experimentation. However, psychological, political, and allegedly environmental obstructionism have stalled the process and virtually immobilized current construction.

A program is suggested with the purpose of satisfying technical requirements for public protection while allaying the exaggerated fears of anti-nuclear factions. These include seven points.

1. Minimum population density in site area-fewer than two persons per square mile.
2. Avoidance of areas of crop cultivation, or specialized industrial use.
3. Avoidance of areas of known seismicity or earthquake activity.
4. Avoidance of topographic heights or drainage lows.
5. Subsurface cover of at least 1,500 ft (457 m) for high-level wastes, and at least 150 ft (46 m) for statutorially defined low-level wastes, these depths to be exceeded wherever practical to obtain optimum repository conditions.
6. Avoidance of zones of active flow of subsurface waters, or waters having surface outlets.
7. Design and construction to serve as possible sources of artificial geothermal energy.

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Depositional and Diagenetic Controls on Reservoir Development in a Pennsylvanian Phylloid Algal Buildup: Reinecke Field, Horseshoe Atoll, West Texas

Reinecke field is one of a series of fields in the Horseshoe atoll (Midland basin, west Texas) that produce from Pennsylvanian phylloid algal buildups. Examination of cores from the Reinecke field indicates that porosity in the field is controlled largely by two factors: (1) leaching of biotic constituents and matrix; and (2) dolomitization. These two factors have led to development of a complex reservoir.

Six major rock types have been identified from the field. These are in order of abundance: (1) medium-crystalline, ferroan dolomite, (2) echinoderm-foram wackestone, (3) echinoderm-fusulinid packstone-grainstone, (4) phylloid algal-bryozoan-foram packstone, (5) coarsely crystalline, high-porosity, ferroan dolomite, and (6) shale.

Reservoir porosity and permeability are controlled by the distribution of rock types. In the southern end of the field, two areas of differing character occur: one in which the rocks are more than 80% dolomite and a second in which the rocks consist of interbedded dolomite and fossiliferous lime wackestone to grainstone. Most of the oil from the field is produced from these two areas. A third reservoir type that rims the northern half of