FROM THE PRESIDENT
CHRIS McLINDON

At 2:00 on the morning of April 12, 1943, a fault ruptured the surface of the earth at a sugarcane plantation along the west bank of the Mississippi River near Vacherie, Louisiana. Given that it was spring, the river was at medium flood stage, and the north end of the fault was only about three-tenths of a mile from the levee, the New Orleans District of the Corps of Engineers dispatched Harold Fisk to investigate. He found that the surface rupture was comprised of a series of parallel open cracks arranged in an en echelon pattern. Together they were over a mile long on an orientation of about 30 degrees west of north, and the western side of the fault was down-dropped relative to the eastern side. There was a maximum displacement of about eight inches near the center of the fault trace.

This episode brought together three seemingly disparate timeframes of geological history. The movement of the fault was an instantaneous geological event. In many ways this put it in the same category with episodes of fault movement that are associated with earthquakes, but no seismic activity was detected at the Loyola University seismography station, only 50 miles away. This would tend to suggest that movement experienced at the surface was not directly associated with deep tectonic movement. It was something different, and understanding the processes that caused a rupture in the earth's surface so close to the river may prove to be one of the more important areas of geological investigation that we are presented with today.

Fisk found that the surface rupture was also directly associated with a set of historical crevasses of the river that have occurred over a period of several centuries. The surface trace is nearly coincident with a historical distributary channel of the river whose natural levees form a topographic ridge that extends perpendicularly from the river into Lac Des Allemands. The relatively complex channel network of this crevasse feature suggests that it has been active a few times in the past. The Corps sent a drilling rig to the site to collect a set borings across the fault displacement. Fisk's interpretation of a subsurface profile constructed from these borings showed that there was displacement of the strata throughout the Holocene epoch. The pattern of offset of these strata, and the fact that the offset of Pleistocene surface was about three feet at a depth of about 40 feet below the surface, suggests that the April 12 rupture was the latest in a series of episodic of fault movements. The coincidence of the fault with the main channel of the crevasse system indicates that previous episodes of fault movement may have caused crevasses of the river.

The longest of the three timeframes associated with the fault rupture is evidenced on Exhibit 3 of Docket No. 93-445 at the Geological Oil and Gas Division of the Louisiana Office of Conservation. A fault plane map submitted as evidence in a unitization proposal filed at Vacherie Field shows the contours of a fault that has over 500 feet of displacement at a depth of about 6,000 feet. The orientation of the fault plane contours suggest that they can be extrapolated to a surface coincidence with the 8 inches of offset that occurred instantaneously on April 12. This coincidence would mean that the fault has been moving episodically on the flanks of the Vacherie Salt Dome for about 20 million years.

Most people tend to think of geological processes in terms of things that happened over long periods of time in the distant past. It is not until the occurrence of an instantaneous event that we consider the implications of geology in the here and now. The importance of the Vacherie fault rupture is that it shows that studying geological processes in the distant past is the best way to predict the occurrence of instantaneous (and potentially catastrophic) events in the future. The Vacherie fault has been mapped as a part of the oil and gas industry knowledge base. That same knowledge base has the potential to map the locations of other faults along the river that extend to the surface and are coincident with the sites of historical crevasses. It appears likely that crevasses at Donaldsonville, Edgard, Killona, Sauve, Caenarvon, Fort St. Phillip, and the Jump near Venice may be associated with such faults. These are all areas that should be categorized as having higher probabilities for future events. The shortest and most effective route to fully investigate these areas will be through the cooperative engagement of the oil and gas industry with state and federal agencies that are responsible for the integrity of the river levee system.

Chris McLindon