Foul Stench on Leg 182 in the Great Australian Bight

BY ALBERT C. HINE AND DAVID FEARY

Early one morning soon after commencing Leg 182 drilling, the Drilling Superintendent informed the Co-Chief Scientists, David Feary and Al Hine, that there was an H_2S emergency, and he had to shut down all drilling operations. What a kidder! What a jokester! We needed some levity, and perhaps this was his idea of a prank? "No, really! We have exceeded the safe level of H_2S and all drilling has been stopped," he said in all seriousness. We were invited to see for ourselves, or more appropriately, smell for ourselves. So, we left the safe confines of the Co-Chiefs' office and headed aft. Sure enough, the drilling rig floor, the catwalk, and main lab reeked of rotten eggs or worse. Even the H_2S sensors had gone off scale. As well as smelling nasty, H_2S is a poisonous gas that can kill if it's at a high-enough concentration. The gassy sediment-filled core liners blew their caps off at both ends, and the 156,000 ppm measured was the highest H_2S concentration ever recorded on an ODP leg. H_2S and the drilling business is serious stuff—there was to be no more drilling until we could sort this out. The success of the leg hung in the balance.

So, we quickly had to understand what was causing such high levels of gas in the cores and devise a strategy to handle them safely. Key was the geochemists' conclusion that sulfate-rich brines and abundant organic matter were interacting to produce the gas. Because organic matter occurred throughout the sediment, the brine distribution became the most important element. By carefully plotting a number of geochemical parameters and drawing on his experience on past carbonate Legs 133 and 166 where he had encountered lower levels of H_2S, inorganic geochemist Peter Swart correctly predicted that the H_2S levels would increase to a certain point and then rapidly decrease. We surmised that the sulfate-rich brines had infiltrated into the sediment from above during sea-level lowstands, when evaporative lagoons were probably very common along this highly arid continental margin.

But, even relieved by this benign explanation, the Captain and Drilling Superintendent required that anyone handling the cores had to wear a breathing apparatus for protection, including a full rubber-face mask, tank, and regulator. Additionally, everyone had to undergo special H_2S training in the science lounge. With all of our gear in place and our training behind us, we were back in business. The sectioned cores had to remain in the open air on the catwalk until the sensors declared them safe to bring inside for analysis. Because it took hours for the cores to degas, and we were bringing "core on deck" every 45 minutes due to the shallow water and soft sediment, cores were literally stacked up like cord-wood on the catwalk. Despite the degassing, the lab still stank and we had every porthole and doorway wide open. Had we been working in a tropical environment, it would have been unbearable inside.

Scientists and techs on the *JOIDES Resolution* catwalk wearing breathing apparatus while sectioning cores.

In the end, we occupied nine sites and brought back ~ 3.5 km of smelly cores—a drilling success to be sure under extreme circumstances. We only hope that the core repository at College Station, Texas does not smell like the *JOIDES Resolution* did during those two months in the Great Australian Bight!

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