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POSTER

DETERMINATION OF MERCURY IN CRUDE OIL USING A NOVEL METHOD

Stephen E. Long,¹ W. Robert Kelly,¹ Jacqueline L. Mann¹, and Harry N. Giles²

¹Analytical Chemistry Division, Chemical Science and Technology Laboratory, National Institute of Standards and Technology, Gaithersburg, MD 20899

²PetroStorTech LLC, 2324 N. Dickerson Street, Arlington, VA 22207

A high-accuracy analytical method employing isotope dilution combined with cold-vapor generation inductively coupled plasma – mass spectrometry (ICP-MS) has been used to determine mercury in more than 100 crude oil and 29 sludge samples from the DOE Strategic Petroleum Reserve (SPR) and other sources. The mercury in the sample is converted to free Hg²⁺ ions using nitric acid in a closed system combustion process employing Carius tubes. This process ensures complete equilibration of the isotopic spike (²⁰¹Hg) and the mercury in the sample and, at the same time, eliminates the possibility of external contamination and volatilization loss. Determination by isotope dilution ICP-MS is absolutely specific for mercury and provides superior sensitivity and accuracy. The method detection limit for mercury in crude oil is 0.02 ng/g and is limited by the analytical blank. All samples analyzed were above the detection limit, but most crude oils were very low: 77 samples (75 %) were below 1 ng/g Hg and 90 samples (87 %) were below 2 ng/g Hg. The grand mean for 103 crude oils was 1.4 ng/g Hg (1s = 2.8 ng/g). In addition to the SPR samples, the method has been used to determine mercury in several Canadian samples and in Cymric, a crude oil previously reported to contain extremely high levels of mercury. The Hg concentration in sludge samples ranged from 2 to 500 ng/g
