

CAVERN SAMPLING WITH COILED TUBING

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ABSTRACT

The Strategic Petroleum Reserve of the United States Department of Energy currently contains approximately 590 million barrels of crude oil stored in caverns in Gulf Coast salt domes. Continuing heat gain from the salt causes an increase in stored oil temperature. The resulting increase in oil vapor pressure, and gas intrusion from the salt, cause an increase in vapor and gas emissions from the oil when it is transferred to atmospheric pressure storage tanks. Sampling and analysis of the crude oil include samples obtained and maintained under pressure to prevent escape of gas and vapor until analysis. An onsite portable separator and laboratory have also been used to obtain gas content data which is more accurate than that previously achieved with samples sent to a lab for analysis.

In order to obtain feed to the portable separator directly from various depths in a cavern, a coiled tubing unit has been used with the separator and lab to sample eight SPR caverns including two at the West Hackberry site, one at the Big Hill site, and five at the Bryan Mound site. Profiles of cavern temperature versus depth were used to determine cavern convection patterns which indicate possible variations in gas content.

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