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Some Basic Observations Resulting from over 40 years of Subsidence Monitoring

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Abstract

Observations gleaned from almost 40 years of subsidence monitoring confirms a number of certainties related to evaporite mining and subsidence. All underground openings in rock salt, potash, trona and gypsum are in the process of closing. Every such opening will eventually close completely given sufficient time. The rate of closure appears to be a function of mining depth, mining height, and local percent extraction. The closure of underground openings in evaporites, either single or multiple openings, is accompanied by a subsidence trough both over and to some distance outside the mined area. The detectable limit of subsidence outside the mining area defines the angle of draw. Observations have also allowed the determination of the sub-critical span that results in the onset or initiation of subsidence and the critical spans or areas resulting in the complete subsidence of one point on surface. The ratio of theoretical maximum subsidence to observed subsidence and the possibilities for controlling the maximum allowable subsidence using extraction rates is also discussed. It has been the author's experience that subsidence predicting models significantly underestimate the amount of subsidence. Perhaps these observations will be of interest to those utilizing predictive models.

Key words: potash, subsidence, Saskatchewan, underground mining, rock mechanics