

18.2 **Surface Retorting: Research and Development Efforts to Move Beyond the Small-Unit Size Barrier**

Larry Southwick¹

¹*L. M Southwick & Associates, Cincinnati, Ohio, United States*

Surface retorting of oil shale has attracted considerable interest over the last several decades. However, the designs always turn out to require oil prices in excess of the current price for oil, no matter how much oil price has risen in the interim since the last flurry of interest. The reason for this is that the unit size of the various retorting schemes has varied little, generally 8-10,000 BPSD. Therefore the amount of steel and concrete required to construct these plants per barrel of production has remained basically unchanged. A 50-60,000 BPSD plant still requires 5-6 parallel trains. To achieve a reduction in total plant construction cost per barrel of production requires that a design be developed that will have units of greater size, say even as large as 60,000 BPSD. While there are certain design concepts that will allow units of such size, they introduce other problems. The most promising concept for larger units is a fluid bed process basically like the fluid catalytic cracker or fluid coking processes seen in oil refineries. However, this configuration had a problem during earlier testing with excessive carry over of fine retorted shale into the heavy oil product, from which removal was difficult. In revisiting previous oil shale fluid bed pilot plant work, it appears there is a method to greatly reduce fines carryover. That method has actually been used successfully in other processes. This paper will review available data from the earlier work and indicate what a larger unit would entail.