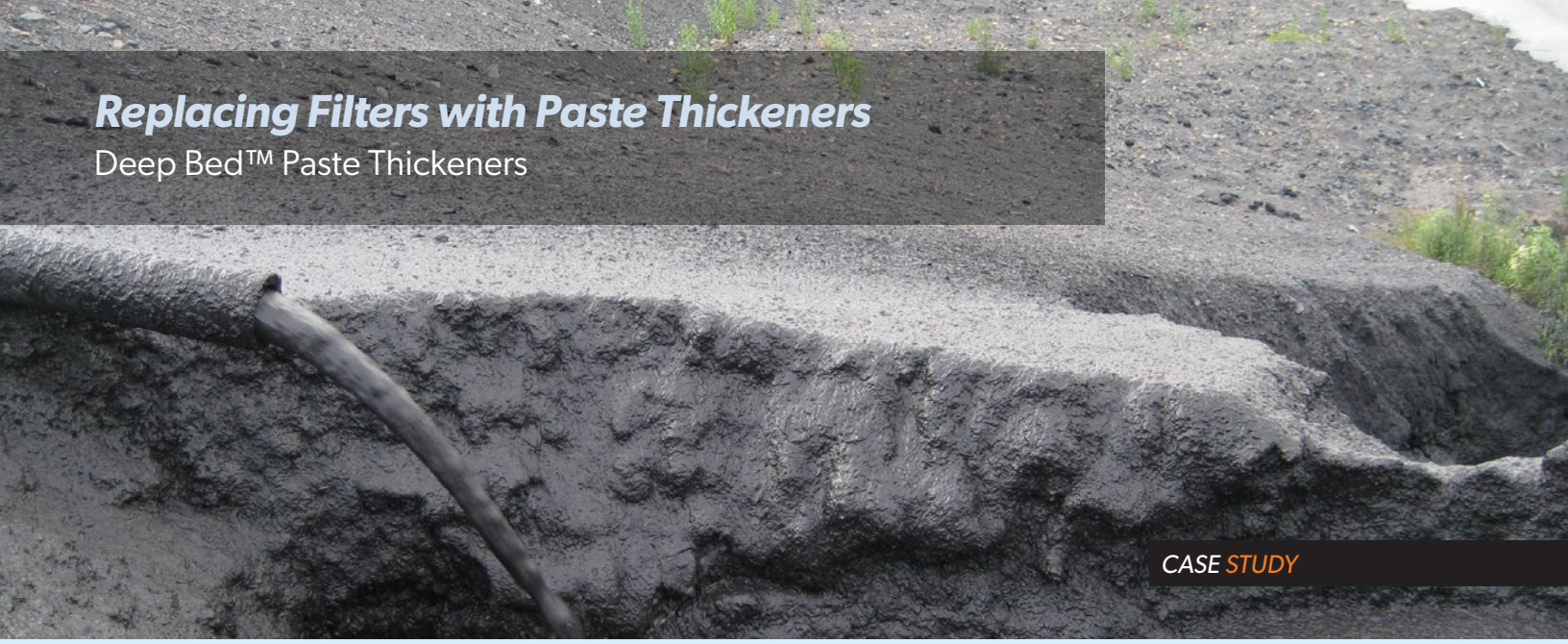

Replacing Filters with Paste Thickeners

Deep Bed™ Paste Thickeners

CASE STUDY

Location: **Lone Mountain, Virginia**
Owner: **Arch Coal**

Improving the Process

In 1998, the plant began using belt press filters to dewater the refuse (tailings) to approximately 50 wt% solids and trucking the cake to the disposal site. This allowed the plant to convert the slurry pond to a surface stack for reduced risk as well as increase water recovery. Later, in 2004, the plant installed a column flotation circuit to process the fines. This process improvement increased coal recovery, but also increased the load on the belt press filters, causing the filters to become a bottleneck to the process.

Bench-scale and pilot-scale tests were conducted and indicated that a paste thickener could produce an underflow of 45–55 wt% solids, similar to the belt press filters. The polymer dosage for the paste thickener was significantly lower than the high usage of belt press filters.

PasteThick™/WesTech recommended and provided a system layout to place the paste thickener near the impoundment site to reduce the cost of transporting the paste thickener underflow. A 15m-diameter WesTech Deep Bed™ paste thickener was installed above the disposal site (about one half mile from the plant) at an elevation to be above the highest potential raisings of the dam. The existing two high-rate thickeners received the process refuse stream and thickened to about 30 wt% solids, which was then pumped to the paste thickener. The paste thickener underflow was transported to the disposal site by gravity.

The reported economics of the paste system is very interesting. The total installation cost of the paste thickener was US $2.8 million, 60% of which was spent on the foundation, earthwork (preparation for new thickener site), thickener and the erection, with the remaining 40% going for the pumps, pipelines, instrumentation, valves, electrical equipment, and support activities.

The project payback was about two years as the cost savings of the paste thickener system include a reduction of polymer cost from US $0.18–0.38 per raw ton of plant feed for the belt filter to US $0.05–.012. This resulted in an annual cost savings of US $1.1 million. There were an additional US $0.5 million-per-year savings brought about by eliminating the belt press filter maintenance, paste trucking, and road maintenance.

WesTech 15m diameter Deep Bed™ paste thickener located above the deposition site.

	Feed	Underflow	Overflow
Stream flow, gpm	1300	494	806
Stream Specific Gravity	1.13	1.34	1.0
Wt% solids	23%	51%	
Dry solids, stph	84.5	84.5	

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