

SPOTLIGHT

on Athel pines growing on slimes dumps

by W.K. BRINSDEN *

In August 1965, the late Mr Alan Smith, then Mill Superintendent at Gold Mines of Kalgoorlie (GMK), Australia, asked me to investigate the planting of vegetation on the GMK slimes dams in order to ease the dust problem in urban and industrial areas—a problem that is caused largely by dust from these barren slimes dams.

My early sources of information were the comprehensive papers in various issues of the *Journal of The South African Institute of Mining and Metallurgy*. However, the climate of Johannesburg differs from that of Kalgoorlie. The average Johannesburg rainfall, which falls mostly in summer, is 730 mm, and the average maximum summer temperature is 26°C (top 34°C). The winters are cool, the average maximum being 18°C (low -7°C). Kalgoorlie, on the other hand, receives, on average, 257 mm of sporadic rainfall, has hot dry summers with an average maximum of 35°C (top 45°C), and cool winters with an average maximum of 18°C (low -2°C).

My obvious choice was to look at established trees growing on the GMK lease. A number of Athel pines were growing vigorously adjacent to the Oroya mining and geology offices and also on a nearby sand dump. The Athel pine (*Tamarix aphylla*), which is native to North Africa, Asia, and India, was originally introduced into Australia in 1936 by Mr Essington Lewis, then manager of BHP. His cuttings were planted in Whyalla, where some difficulty had been experienced in finding trees and shrubs that would flourish despite the district's low rainfall.

In August 1965, cuttings of approximately 20 cm length and 1 cm diameter were taken from the GMK trees, stripped of leaves, and placed in jars of water in the sun. When the cuttings had sprouted both leaves and roots, they were planted in local soil in tins (about 20 cm high and 10 cm in diameter), and watered daily.

In October 1965, when the new shoots were about 8 cm long, the trees were transplanted onto a lower flat section—approximately 30 m wide, 30 m long, and 2 m high—of the Trafalgar slimes dam. No additional soil or fertilizer was

used, and the trees were planted in their tins, the bases of which had been removed (the tin would eventually rust away). A few common varieties of non-prickly cactus and two native salt bush (spp *Atriplex*) were also planted, but did not survive, probably because of the acidity of the slime.

During the summer of 1965/1966, Kalgoorlie's rainfall was 88 per cent above the average, and this probably helped the trees to survive. The moisture content was usually about 2,5 per cent from about 10 cm below the surface, and the pH value of the slime (d_{80} approximately 75 μm) was about 6. The trees were watered twice a week for the first four months and then left untended. By 1974 they had grown to only about 0,7 m, which indicated that their growth in slime was very slow.

Other Athel pines were planted on the wall of the dam, but did not survive beyond 1974, probably because of the steep (about 500) slope and the hardness of the walls, which were initially formed by hand-shovelling of the slime as the height of the dam was raised.

Five of the six Athel pines planted in 1965, which probably reached maturity (approximately 5 m in height) in 1981—16 years after being planted—have survived. In the early 1980s, waste rock had to be dumped on the dam, but the management of KMA (now KCGM) took care to ensure that the trees were not buried.

Trials are being conducted on other tailings dams so that the performance of cuttings taken from the trees on Trafalgar dam can be compared with that of cuttings taken at various sites in Western Australia. It might also be worth while for an attempt to be made to strike cuttings from Trafalgar dam in pots containing different mixtures of soil and slime.

References

1. ANON. The evergreen Athel tree. *The BHP Review*. Sep. 1946. pp. 14—15.
2. CHENIK, D. Addendum. *J. S. Afr. Inst. Min. Metall.*, vol. 63. pp. 212—253.

* Trent Securities Ltd, Perth, Australia. Tel: (09) 221-2752. Fax: (09) 221-4326.