Introduction

Fugitive coal within the Main Series waste dumps is possible, because of over digging while exposing the Q seam coal. The roof waste material destinations were not logged during operations, therefore the exact location and volume of possible fugitive coal is unknown. This document explains the theoretical location and percentage of fugitive coal within the waste dumps of the Main Series.

Source and destination

In the terrace mining method used at the Leigh Creek Coalfield, waste material from the upper benches are hauled to the surface and lower benches back filled into the void created by mining. This method reduces haul cycles distances and the overall foot print of the mining operation. Figure 1 is a cross sectional view of the Main Series bench source and destination concept.

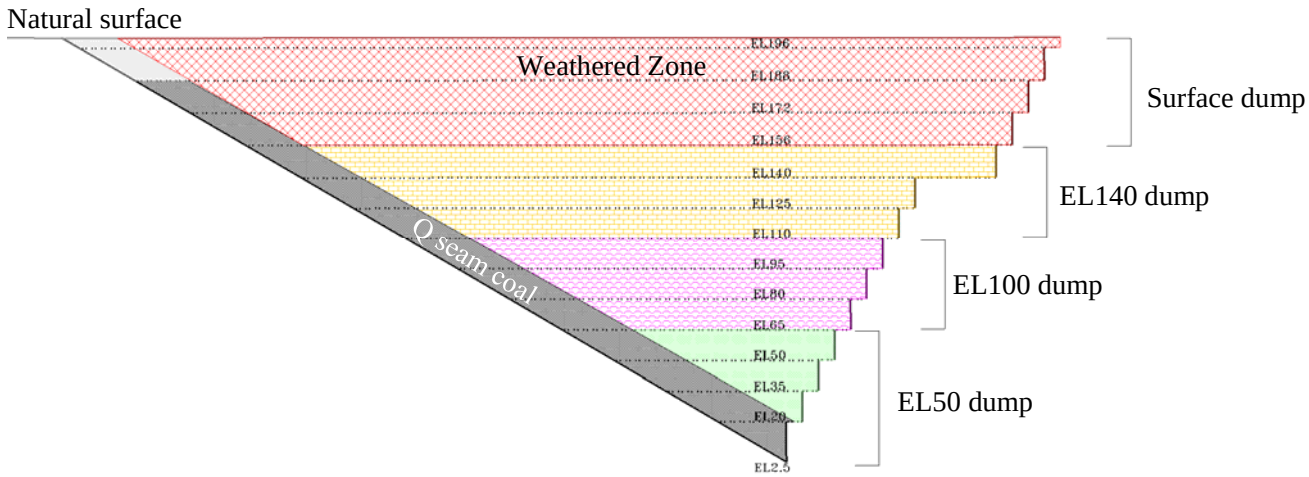


Figure 1 Representative Main Series cross section showing material destination

The dump heights are <40m to optimize haulage profiles and for dump stability. Material is either hauled up hill or on the same elevation as the source excavation. Figure 2 shows a representative in pit long section view of the different dumping elevations.

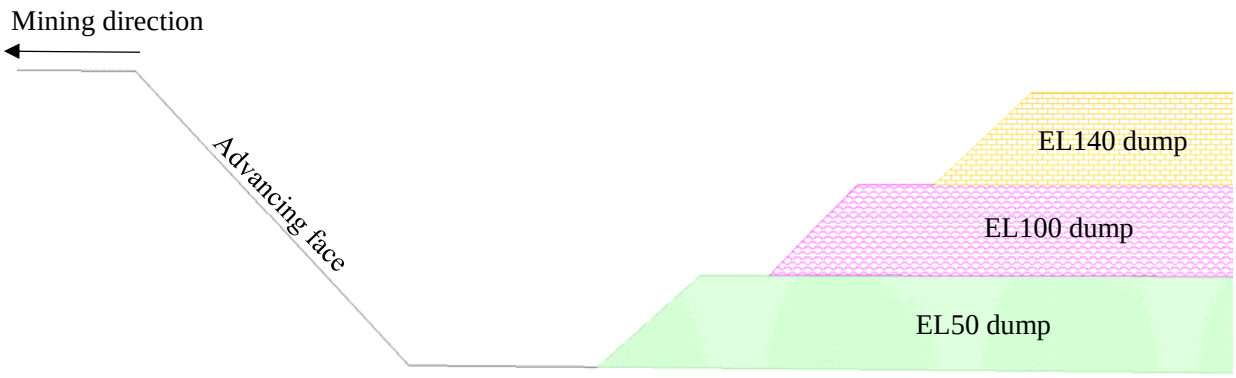


Figure 2 Representative long section view of Main Series in pit dumps

Leigh Creek Coalfield - Possible fugitive coal in waste dumps

Loss and dilution theory

Some coal loss is inevitable during the cleaning of the roof of coal seams by either excavator or a dozer. At Leigh Creek Coal Field a true thickness of 20cm loss and dilution was assumed during the mining operations to calculate coal recoverable. A 20cm true thickness coal loss will be used in this document to calculate the possible percentage of fugitive coal in the waste dumps. See figure 3 for a representative illustration of loss and dilution.

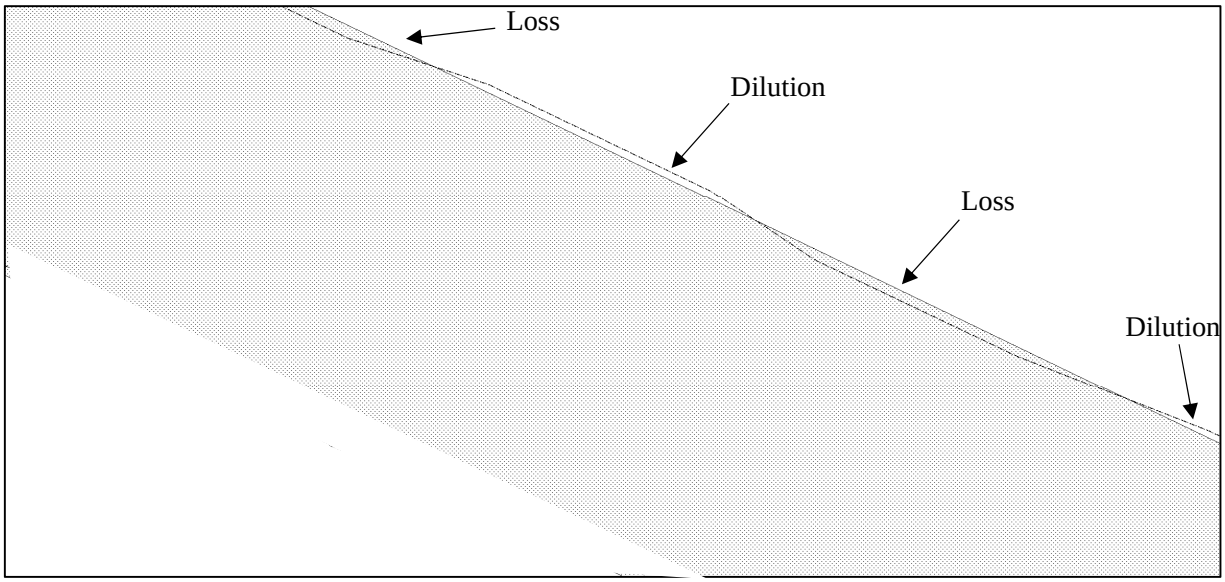
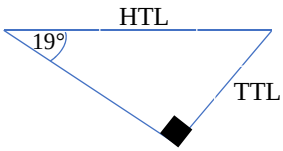


Figure 3 Representative illustration of loss and dilution

To determine the possible fugitive coal a horizontal thickness percentage has been calculated per bench. Each bench width from low wall to high wall was measured at each bench interval using a surveyed mined surface layer in the MT21 area. The nonlinear width variance between each bench is due to faulting along the low wall in the area measured. The following formulae was used to convert true thickness into a horizontal thickness.

HTL = Assumed horizontal distance of coal loss
TTL = Assumed true thickness of coal loss
LWA = Low wall angle



HTL = TTL/ sine (LWA)
HTL = 12 / sine (19)
HTL = 0.61m

A horizontal thickness of 0.6m has been used in table 4 to calculate the theoretical fugitive coal percentage in each dump destination.

Leigh Creek Coalfield - Possible fugitive coal in waste dumps

Coal Seam	Source bench (EL)	Source bench width (m)	Destination dump (EL)	Fugitive coal %
Q	172	653	Surface dump	0.09%
Q	156	597	Surface dump	0.10%
Q	140	522	EL140	0.11%
Q	125	437	EL140	0.14%
Q	110	393	EL140	0.15%
Q	95	345	EL100	0.17%
Q	80	274	EL100	0.22%
Q	65	240	EL100	0.25%
Q	50	168	EL50	0.36%
Q	35	119	EL50	0.50%
Q	20	74	EL50	0.81%
Q	5	24	EL50	2.50%

Table 4 Theoretical fugitive coal percentage in Main Series waste dumps

Excluding the final bench, no waste material theoretically contains higher than 0.81 % fugitive coal. Based on table 4, the locations and fugitive coal percentages can be seen on figure 5.

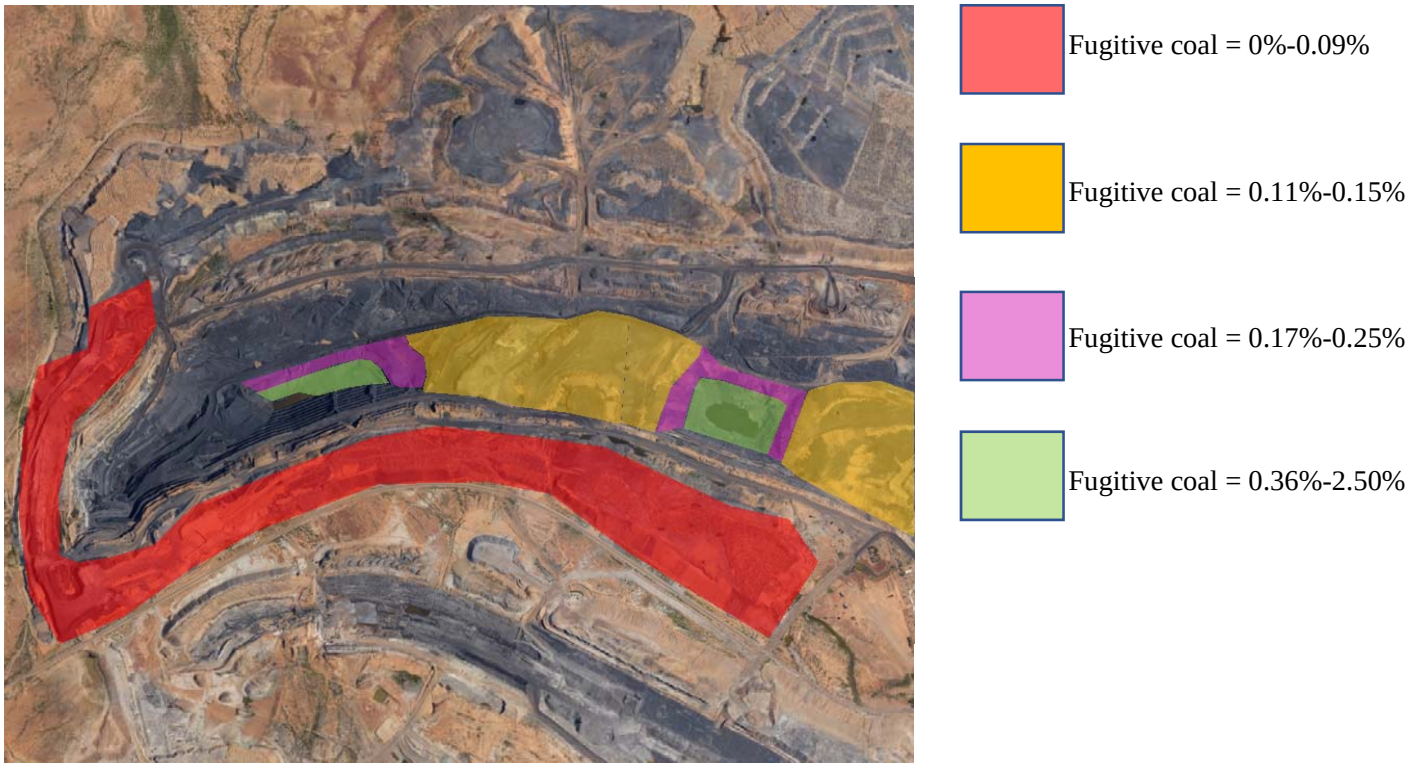


Figure 5 Main Series dump destinations and fugitive coal percentage

Leigh Creek Coalfield - Possible fugitive coal in waste dumps