

Appendix B

Kensington Project Tailings Storage Facility Consolidation Testing & Modeling

with time were recorded during each loading stage. Once settlement ceased or became negligible during loading, the confining pressure was increased to the next loading stage. Confining pressures ranging from approximately 1 kPa to 400 kPa were applied in both tests.

The coefficient of consolidation and void ratio was determined for each stress level. Calculated coefficients of consolidation (c_v) and void ratios determined for the Total Tailings and Fine Fraction Tailings were very similar. The relationships between void ratio and effective confining stress for the Total Tailings and Fine Fraction Tailings are shown on Figure 1. It is evident that there is little difference between these two tailings materials. Calculated coefficients of consolidation range from 0.5 to 1.0 $m^2/year$ at low stresses to approximately 40 $m^2/year$ at high stresses. The low coefficients of consolidation at low stresses indicate that the tailings will initially consolidate slowly until higher effective stress conditions are achieved by ongoing dissipation of excess pore water pressures.

Consolidation and Seepage Modeling

The consolidation model was run for the expected 10-year life of the mine using a finite difference consolidation model developed by KP. The model incorporates the consolidation characteristics of the tailings, large strain consolidation theory and the tailings rate of rise during operations (based on tailings production from the mine operating plan).

The attached figures present the results of the consolidation modeling for the Slate Creek Lake TTF.

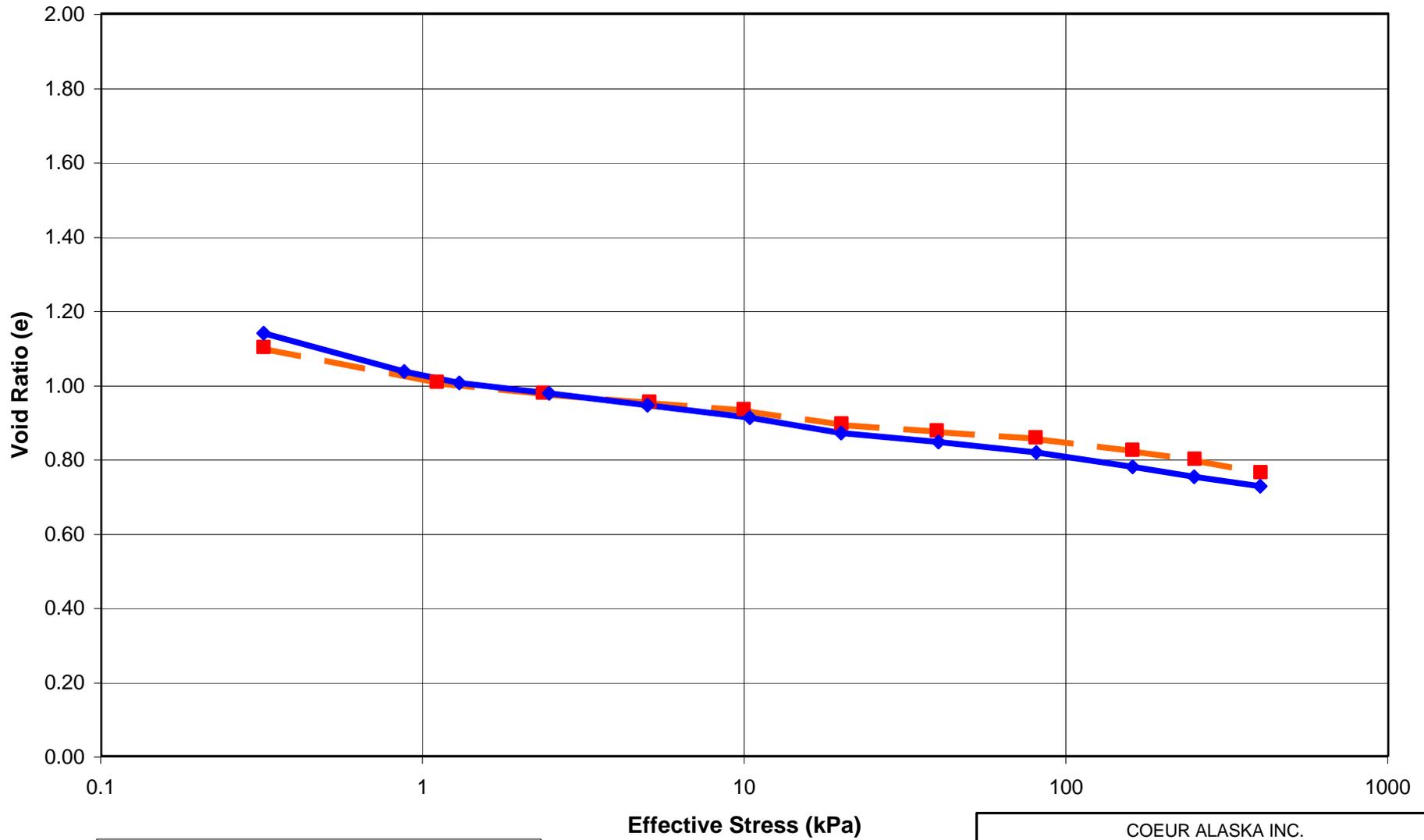
Figure 2 shows the predicted average dry density of the tailings deposit during operations and after closure. The dry densities are higher than predicted by the previous analysis in 2004 due to the higher initial settled density (lower initial void ratio) determined from the laboratory testing.

Consolidation modelling was carried out for varying final depths of tailings to examine the influence of tailings depth on the rate of consolidation and seepage after closure. The tailings deposit at closure is generally shallowest around the periphery of the TTF and deepest toward the centre in the area currently occupied by Slate Creek Lake, as shown by Figure 3.

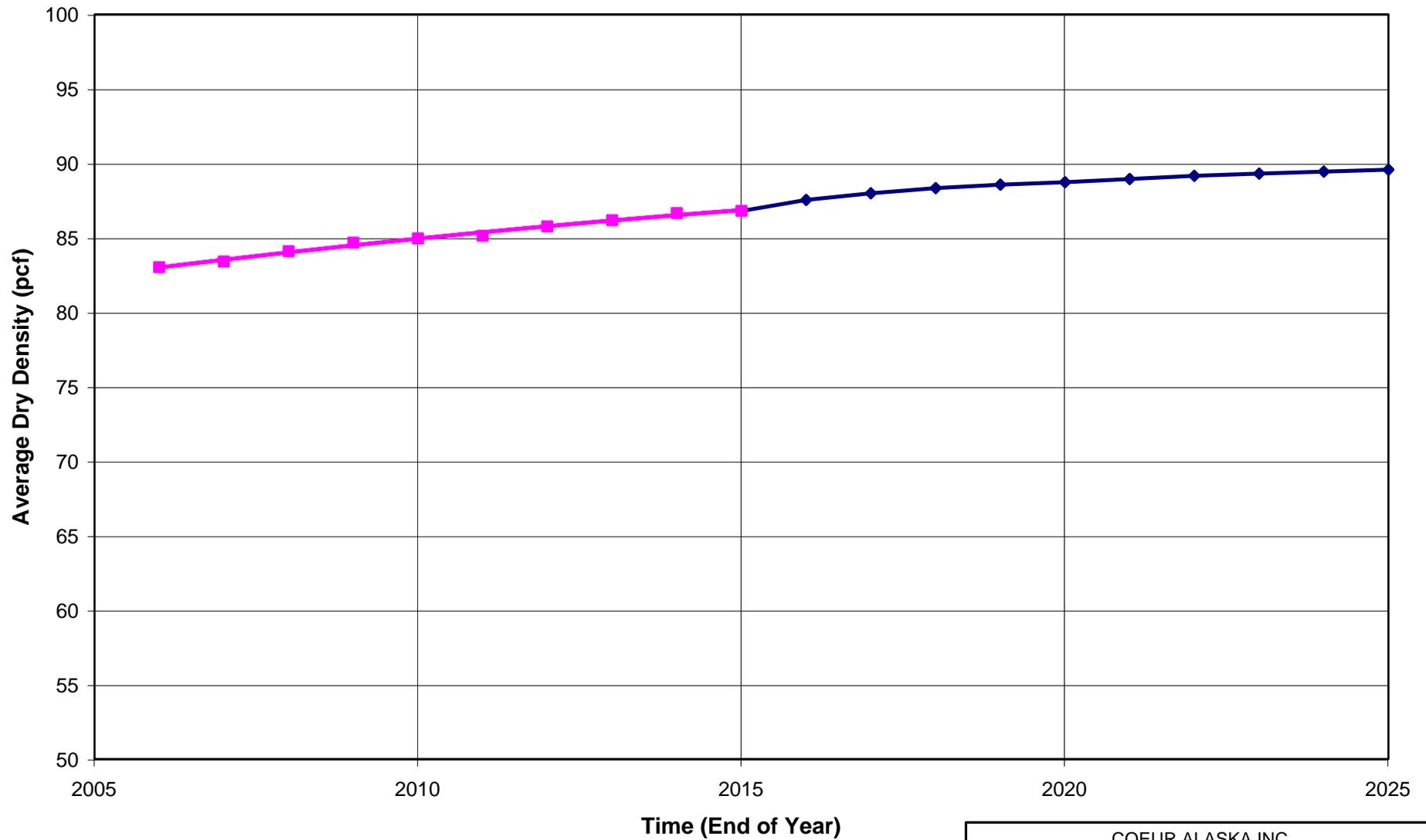
The shallow depth tailings (less than 30 feet) around the periphery of the facility are predicted to be over 90% consolidated in less than 2 years after the end of operations. The intermediate depth tailings are predicted to be 90% consolidated within 10 years, while the deepest tailings in the center of the facility (approximately 75-100 feet thick) are predicted to take much longer to reach this level of consolidation, likely several decades. However, predicted seepage rates from even the deepest tailings are very low.

Consolidation seepage flows to the tailings surface are predicted to be minimal over much of the facility within 2 years after the end of operations. Figure 4 shows the estimated seepage flux ($US\ gpm/ft^2$) to surface from the consolidating tailings for the shallow, intermediate and deep tailings areas. The corresponding predicted seepage rates with time after the end of operations for each of these areas are shown on Figure 5. The total predicted seepage to the tailings surface after closure is approximately 6 gpm after 2 years and about 4 gpm after 5 years. Almost all on-going consolidation seepage to surface after this time is from the deepest tailings in the center of the facility (approximately 3 gpm). These seepage rates are much lower than previously estimated by the 2004 study.

The consolidation analysis indicates that seepage rates from the tailings deposit will be negligible shortly after the end of operations, particularly around the periphery of the facility where tailings are shallower. Although it may take several more years for the deeper tailings in the center of the TTF to fully consolidate, the seepage rate from these tailings is predicted to be minor (3 gpm or less).



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KENSINGTON PROJECT			
VOID RATIO VERSUS EFFECTIVE STRESS RELATIONSHIPS FOR KENSINGTON TAILINGS			
<i>Knight Piésold</i> CONSULTING	PROJECT / ASSIGNMENT NO. VA101-20/6	REF NO. VS-0188	REV. 0
	FIGURE 1		



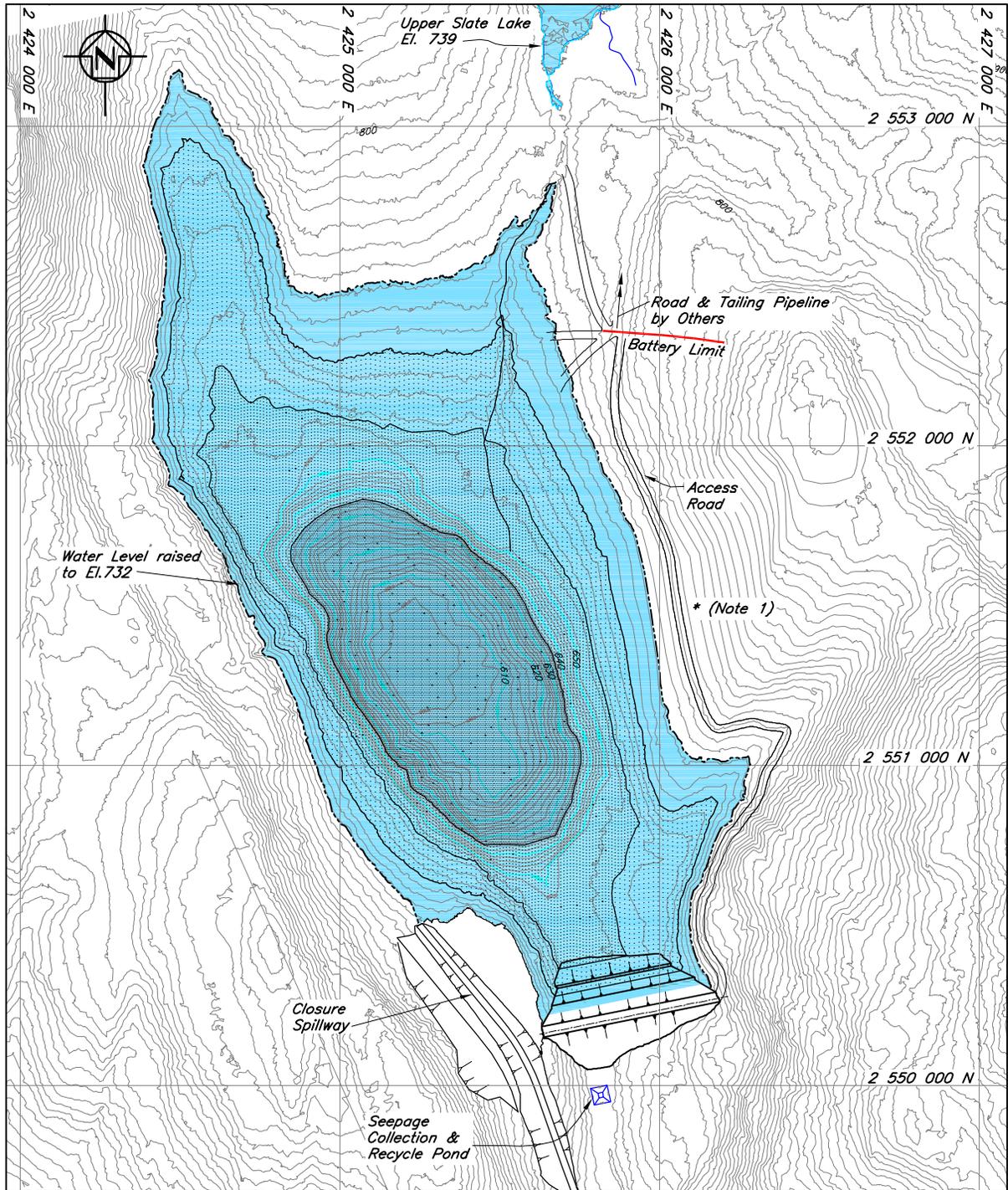
■ Operations ◆ Post-Closure

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AVERAGE TAILINGS DENSITY VS. TIME

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	FIGURE 2		

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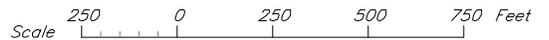


NOTE

1. LIDAR information is void at the asterisked and topography is interpolated based on available information.

LEGEND

-  Deep tailings
60-100 ft thick, (15 acres)
-  Intermediate tailings
30-60 ft thick, (15 acres)
-  Shallow tailings
0-30 ft thick, (20 acres)



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**LOWER SLATE LAKE – TTF
TAILINGS SEEPAGE AREAS BY DEPTH**

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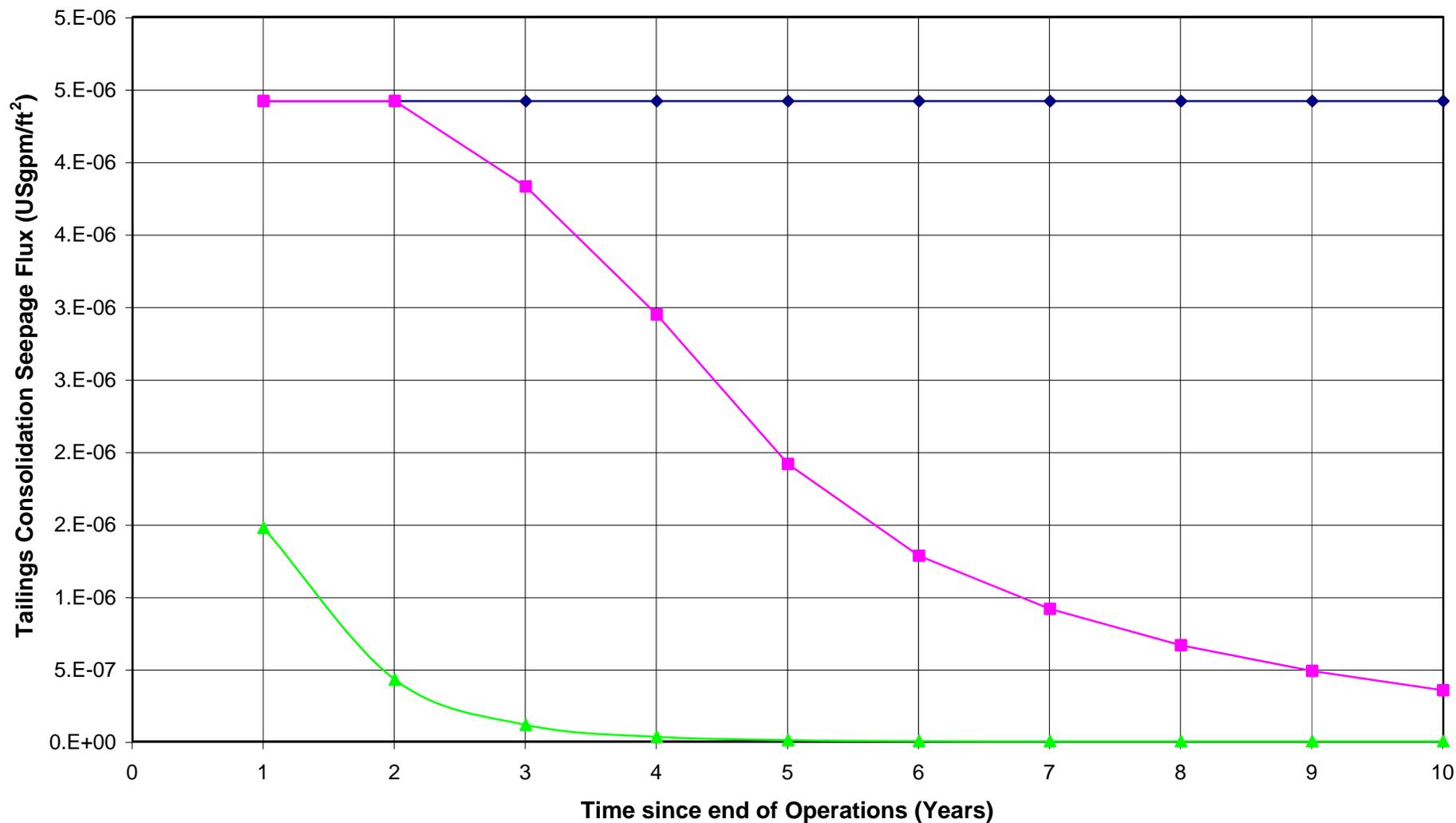
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FIGURE 3

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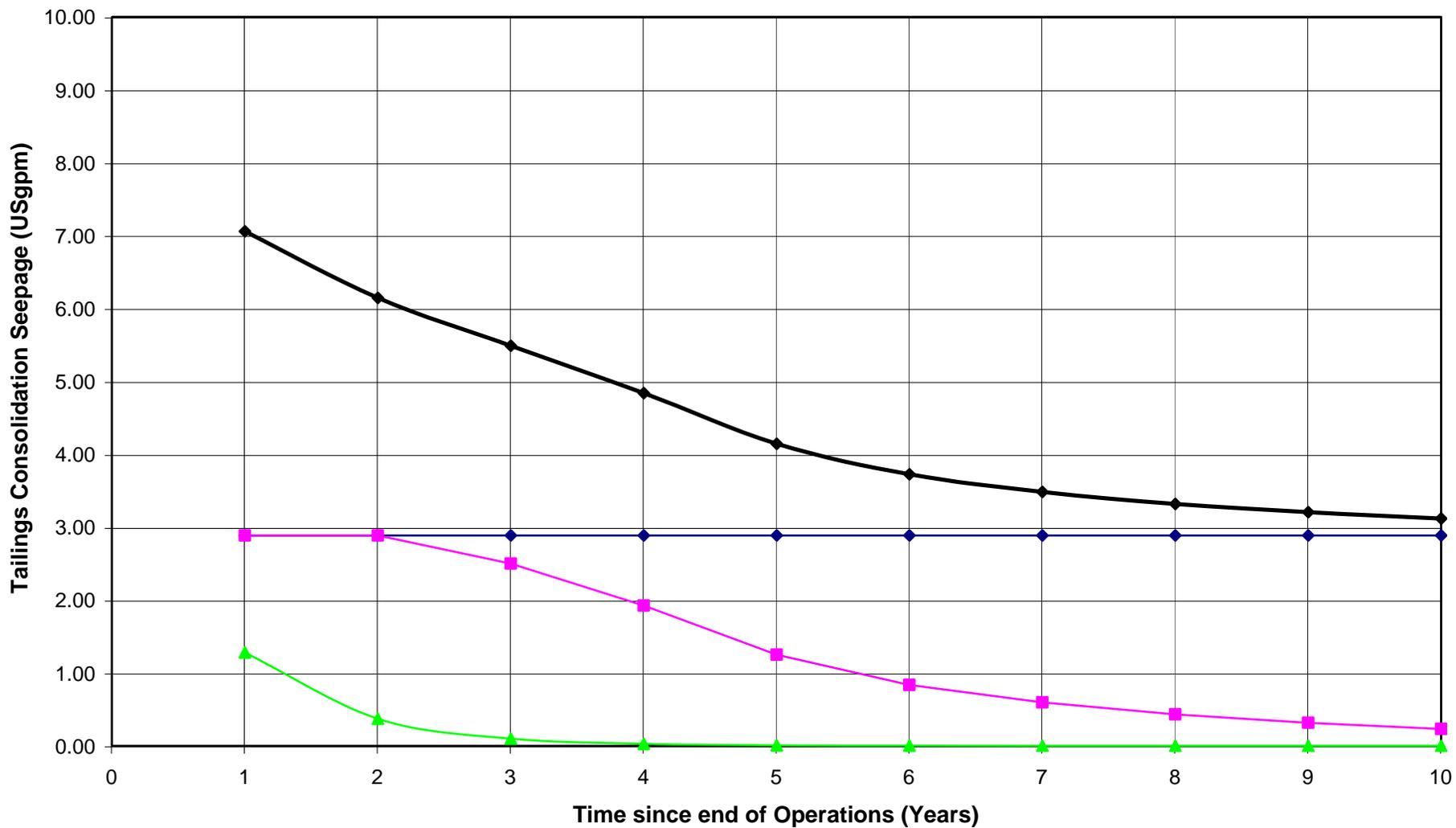
CAD FILE: M:\101\00020\GBVA\Acad\Figs\VA101.dwg 1"=500' PLOT 1=(PS) Feb 21 2005 By:ndhalwa Time @ 10:25



◆ Deep tailings (60-100ft. thick, 15 acres)
■ Intermediate Depth Tailings (30-60 ft. thick, 15 acres)
▲ Shallow Tailings (0-30 ft. thick, 20 acres)

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DISTRIBUTION OF CONSOLIDATION SEEPAGE FLUX TO SURFACE WITH TAILINGS DEPTH		
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	FIGURE 4	
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◆ Deep tailings (60-100ft. thick, 15 acres)
■ Intermediate Depth Tailings (30-60 ft. thick, 15 acres)
▲ Shallow Tailings (0-30 ft. thick, 20 acres)
◆ Total Tailings Deposit

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DISTRIBUTION OF CONSOLIDATION SEEPAGE TO SURFACE WITH TAILINGS DEPTH			
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CONSULTING		FIGURE 5	
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