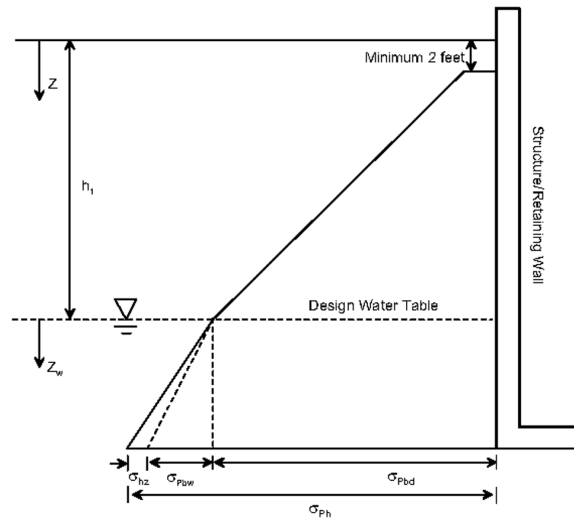


**Comanche Peak Nuclear Power Plant, Units 3 & 4**  
**COL Application**  
**Part 2, FSAR**



$$k_p = \tan^2(45 + \frac{\phi'}{2}) = 3.25 \quad [1.7]$$

Passive earth pressure coefficient

$$\sigma_{Pbd} = k_p \gamma_t Z \cong 406Z \quad [213Z]$$

Passive pressure above water table ( $2 < Z \leq h_1$ )

$$\sigma_{Pbd} = 0$$

No passive pressure for ( $Z \leq 2$ )

$$\sigma_{Pbw} = k_p (\gamma_t - \gamma_w) Z_w \cong 203Z_w \quad [103 Z_w]$$

Passive pressure increment below  $h_1$  (water table depth)

$$\sigma_{hz} = \gamma_w Z_w \cong 62.4Z_w$$

Hydrostatic pressure

$$\sigma_{Ph} = \sigma_{Ps} + \sigma_{Pbd} + \sigma_{Pbw}$$

Total passive (horizontal) pressure

**Notes:**

- Units: psf for pressure and ft for dimensions.
- Assumed compacted backfill properties:
  - Total unit weight:  $\gamma_t = 125$  pcf
  - Internal effective friction angle:  $\phi' = 32^\circ$
  - Effective cohesion intercept:  $C' = 0$
- Seismic earth pressure not included.
- A horizontal displacement of about  $0.02H$  at the top of the walls is required in order to mobilize the full passive resisting forces ( $H$  is total wall height). For the case of rigid and unyielding walls, the numbers are shown in brackets ( $\phi'$  is limited to  $15^\circ$ ).

**Figure 2.5.4-244 Passive Earth Pressure**