APPENDIX F

Calculation of Clean Up Criteria for Volatilisation for Hot Spots

Calculation of Extraction Time

26-2-1998

Monitoring Well	MW241	MW242	MW250	MW253	MW259	MW261
TPH Conc. at 2-3m	338	5360	2675	20	52	4440
TPH conc. below 3m	2522	29	133	4061	21728	No_data
Average conc of TPH = 3760 mg/kg						

Contaminated area = 59,500 m^2 ; Density of soil (ρ_{soil}) = 1765 $kg\,m^{-3}$

Mass of vadose zone soil = 59,500 $m^2 \times \rho_{soil} \times 0.5$ (assume 25% of contaminated soil at vadose zone) (2m deep)
(based on boring records reported in Technical Report RA24 issued by NCAL)

$= 5.25e^7$ kg

Mass of saturated zone soil = 59,500 $m^2 \times \rho_{soil} \times 1.5$

$= 1.58e^8$ kg

Mass of TPH in vadose zone = $5.25e^7$ kg $\times$ 3760 $\frac{mg}{kg} \times \frac{1\,kg}{10^6 mg}$ = $1.97e^5$ kg

Mass of TPH in saturated zone = $1.58e^8$ kg $\times$ 3760 $\frac{mg}{kg} \times \frac{1\,kg}{10^6 mg}$ = $5.94e^5$ kg

Total = $7.91e^5$ kg

Time for Extraction

Assume 56% biodegradation → 4.43 e^5 kg
44% volatilisation → 3.48 e^5 kg

VT1 ⇒ time = $\frac{3.48\,e^5\,kg}{83.3\,kg/hr^*}$ = 4178 hrs = 174 days

VT2 ⇒ time = $\frac{3.48\,e^5\,kg}{66.5\,kg/hr^*}$ = 5233 hrs = 218 days

VT3 ⇒ time = $\frac{3.48\,e^5\,kg}{93.8\,kg/hr^*}$ = 3710 hrs = 155 days

VT4 ⇒ time = $\frac{3.48\,e^5\,kg}{243.7\,kg/hr^*}$ = 1428 hrs = 60 days

Remark:
* Values based on XDD review report.

Multiply by 2 for steady state ⇒ time for VT1 = 348 days ; time for VT2 = 436 days

time for VT3 = 310 days ; time for VT4 = 120 days