הערכת פליטה ממכלי אחסון לפי EPA AP-42 :

$$L_w = 0.0010 M_v P_v Q K_n K_p$$

L_w= working loss. [lb/yr]

M_v=vapor molecular weight. [lb/mole]

P_v= vapor pressure at daily average liquid surface temp. [psia]

Q= annual net through. [bbl/yr]

K_n=working turnovers :

K_p=1.0 (Appendix A)

$$Q = 400\left[\frac{m^3}{hr}\right] \times 6.28[\frac{bbl}{1\ m^3}] \times 24[\frac{hr}{1\ day}] \times 365[\frac{day}{1\ yr}] = 2.2 \times 10^7\ [\frac{bbl}{year}]$$

For turnovers > 36 K_n=(180+N)/6*N ,

$$\text{N} = 4 \times 30 \times 12 = 1440,\ K_n = \frac{180+1440}{6*1440} = 0.187$$

P_v =0.002 [psia] , (Appendix B)

$M_v = 130\ \left[\frac{\text{lb}}{\text{mole}}\right]$, (Appendix B)

$$L_w = 0.0010 \times 130\left[\frac{lb}{mole}\right] \times 0.002[psia] \times 2.2 \times 10^7\left[\frac{bbl}{yr}\right] \times 0.187 \times 1 \approx 1070[\frac{lb}{yr}]$$

$$L_w = 802.23\left[\frac{lb}{yr}\right] = 0.054[\frac{kg}{hr}]$$

$$average\ Working\ time = \frac{3000[m^3]\ average\ volume}{400\left[\frac{m^3}{hr}\right]} = 7.5\ [hr]$$

$$Mass\ flow \times working\ time = 7.5\ [hr] \times 0.054\left[\frac{kg}{hr}\right] = 0.41\ [kg]$$

$$\text{max adsorption}\ efficiency\ = 10\%$$

$$10 \times 0.41\ [kg] = 4.1[kg]\ per\ day$$

$$4.1[kg]\ \times 180\ [day] \approx 740[kg]\ for\ 6\ months$$

APPENDIX A

K_P = working loss product factor, dimensionless
for crude oils, $K_P = 0.75$; adjustment of K_P may be appropriate in the case of splash loading into a tank
for all other organic liquids, $K_P = 1$

APPENDIX B

Table 7.1-2. PROPERTIES (M_V, M_L, P_{VA}, W_L) OF SELECTED PETROLEUM LIQUIDS[a, c]

Petroleum Liquid Mixture	Vapor Molecular Weight[a]	Liquid Molecular Weight[b]	Liquid Density [a]	ASTM D86 Distillation Slope[c]	Vapor Pressure Equation Constant[d]	Vapor Pressure Equation Constant[d]	True Vapor Pressure (at 60 °F)
	M_V	M_L	W_L	S	A	B	P_{VA}
	lb/lb-mole	lb/lb-mole	lb/gal	°F/vol %	dimensionless	°R	psia
Midcontinent Crude Oil	50	207	7.1	–	Figure 7.1-16	Figure 7.1-16	–
Refined Petroleum Stocks	–	–	–	–	Figure 7.1-15	Figure 7.1-15	–
Motor Gasoline RVP 13	62	92	5.6	3.0	11.644	5043.6	7.0
Motor Gasoline RVP 10	66 [e]	92	5.6	3.0	11.724	5237.3	5.2
Motor Gasoline RVP 7	68	92	5.6	3.0	11.833	5500.6	3.5
Light Naphtha RVP 9-14	–	–	–	3.5	–	–	–
Naphtha RVP 2-8	–	–	–	2.5	–	–	–
Aviation Gasoline	–	–	–	2.0	–	–	–
Jet Naphtha (JP-4)	80	120	6.4	–	11.368	5784.3	1.3
Jet Kerosene (Jet A)	130	162	7.0	–	12.390	8933.0	0.008
No. 2 Fuel Oil (Diesel)	130	188	7.1	–	12.101	8907.0	0.006
No. 6 Fuel Oil [f]	130	387	7.9	–	10.781	8933.0	0.002
Vacuum Residual Oil[g]	190	387	7.9	–	10.104	10,475.5	0.00004

[a] References 10 and 11

[b] Liquid molecular weights from "Memorandum from Patrick B. Murphy, Radian/RTP to James F. Durham, EPA/CPB Concerning Petroleum Refinery Liquid HAP and Properties Data, August 10, 1993," as adopted in versions 3.1 and 4.0 of EPA's TANKS software.