

**Los Angeles Regional Water Quality Control Board**

**TO:** Samuel Unger, Executive Officer

**FROM:** C.P. Lai  
Ph.D., P.E., Water Resources Control Engineer  
**LOS ANGELES REGIONAL WATER QUALITY CONTROL BOARD**

**DATE:** March 20, 2014

**SUBJECT:** TPH MASS CALCULATION FOR SUBSOIL AT KAST PROPERTY

As requested by Executive Officer Samuel Unger, I have calculated an estimate of the mass of total petroleum hydrocarbons (TPH) in the subsoil at the Former Shell Tank Farm at the Kast Property (Site).

The total TPH mass was obtained at three depths below ground surface by using the areas of the triangles formed by adjacent sampled stations and the concentrations collected at the sampled stations and depths. The areas of triangles are obtained by using the finite element method. The analysis is based on the following assumptions:

1. Density of sub-soil is assumed to be a constant value of 110 lb/ft<sup>3</sup> (1762 kg/m<sup>3</sup>)
2. Concentration varies linearly within sampling stations
3. Mass varies linearly with depth

The results of total mass and impacted area of TPH at different depths below ground surface are presented in Table 1 through Table 3 for TPH as Diesel, TPH as Motor Oil, and TPH as Gasoline, respectively. Concentration contour lines at different depths are shown in Figure 1 through Figure 3.

**Table 1 Total Mass and Impact Area of TPH as Diesel**

Depth (ft) BGS	Impact Area (ft <sup>2</sup> )	Mass (lbs)/ft	Total Mass (lbs)
2	1770032	105410	105410
3	1682807	170021	243126
5	1595582	299244	712391
10	1476774	562619	2867049

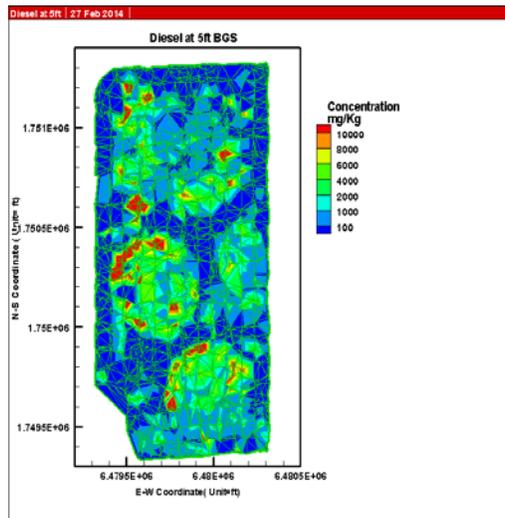
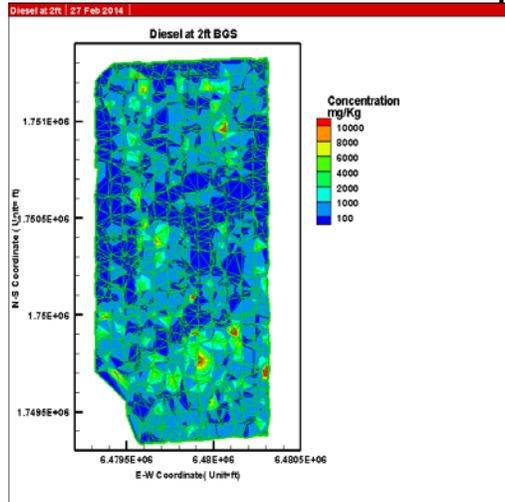
**Table 2 Total Mass and Impact Area of TPH as Motor Oil**

Depth (ft) BGS	Impact Area (ft2)	Mass (lbs)/ft	Total Mass (lbs)
2	1792074	187857	187857
3	1710030	240675	402123
5	1627986	346310	989108
10	1528505	605052	3367513

**Table 3 Total Mass and Impact Area of TPH as Gasoline**

Depth (ft) BGS	Impact Area (ft2)	Mass (lbs)/ft	Total Mass (lbs)
2	991603	1797	1797
3	1192861	8596	6994
5	1394119	22164	37739
10	1398650	55342	231504

**Figure 1 Concentration contour line at different depths for TPH as Diesel**



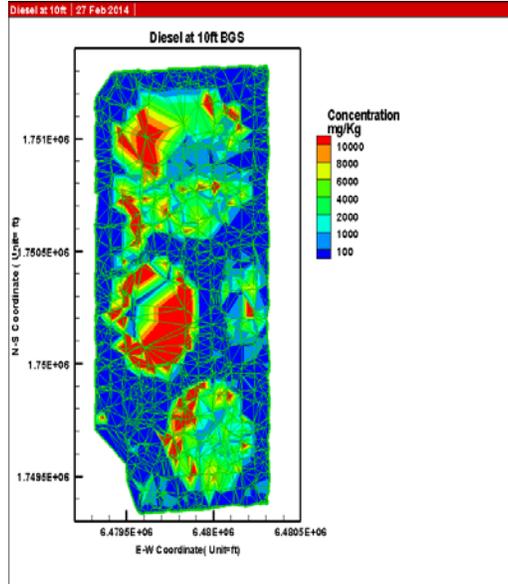
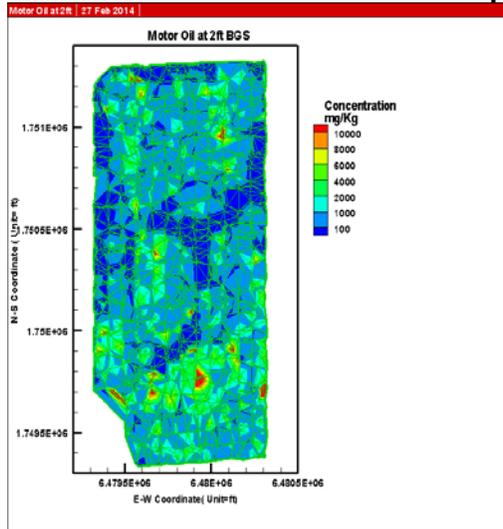


Figure 2 Concentration contour line at different depths for TPH as Motor Oil



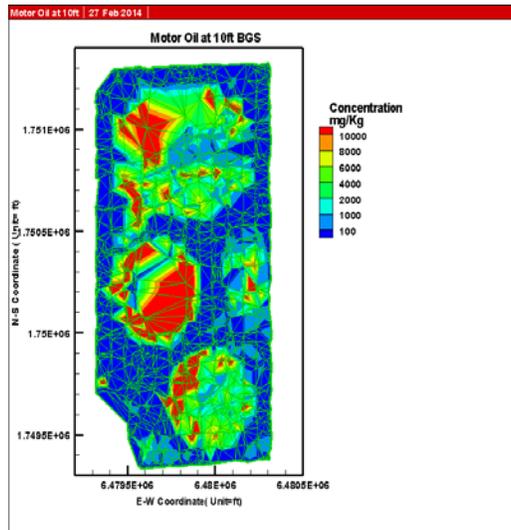
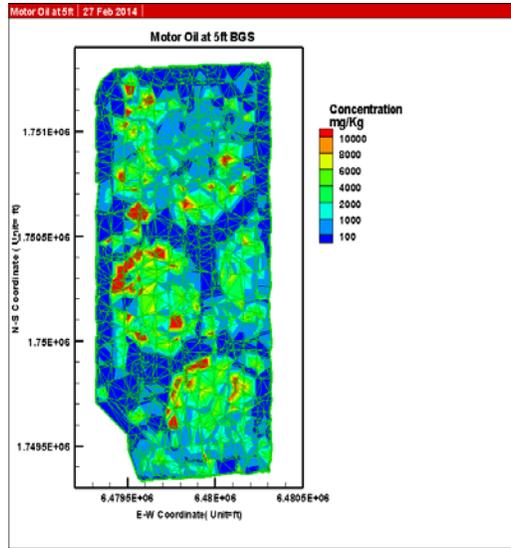


Figure 3 Concentration contour line at different depths for TPH as Gasoline

