

Figure C-13 shows the region where a qualitative chemical analysis of the eroded region was performed. The comparison of the EDX spectra from the specific regions identified in Figure C-13 shows concentration of copper and sulfur in the grain boundaries in addition to iron sulfide formation adjacent to iron oxide in the oxidized surface layer. Sulfide formation within the steel microstructure increases in concentration as the oxidized region is approached from the steel side. This is clearly shown in Figure C-14.

The larger sulfides further into the steel are the more stable manganese sulfides that were formed when the steel was made. The smaller sulfides that have formed as a result of the fire do not contain significant amounts of manganese, but rather are primarily sulfides containing iron and copper. These sulfides have a lower melting temperature range than manganese sulfide. It is much more difficult to tell if melting has occurred in the grain boundary regions in this steel as was observed in the A36 steel from WTC 7. It is possible and likely, however, that even if grain boundary melting did not occur, substantial penetration by a solid state diffusion mechanism would have occurred as evidenced by the high concentration of sulfides in the grain interiors near the oxide layer. Temperatures in this region of the steel were likely to be in the range of 700–800 °C (1,290–1,470 °F).

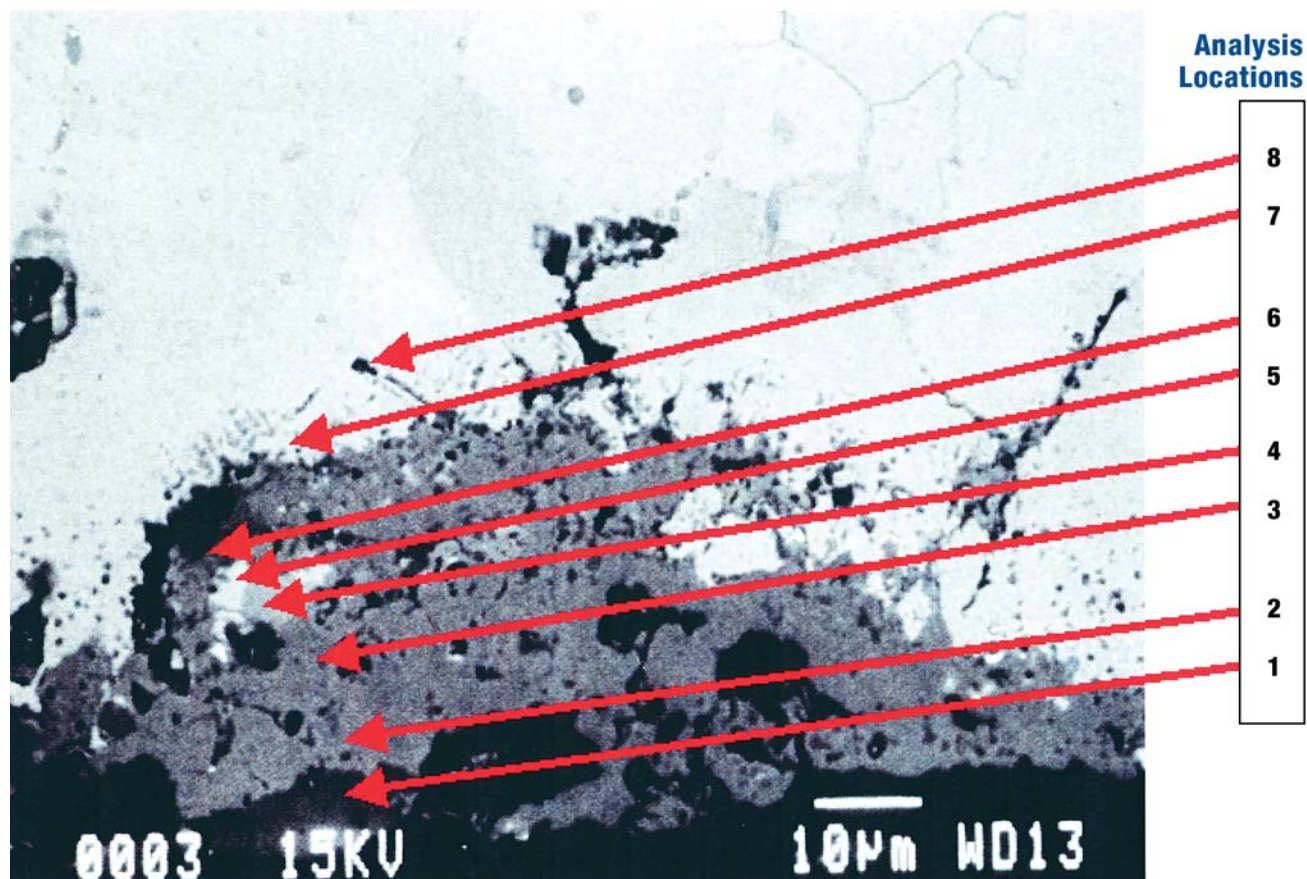


Figure C-13 Regions where chemical analysis was performed.